HUMBLE I.S.D.
OAK FOREST ES - HVAC UPGRADES
CSP #2026-02

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PROJECT TEAM

DBR Inc.
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South Bldg. Suite 300
Houston, Texas 77042
713-914-0888

MEP Engineer
Brent B. Moe, P.E.
bmoe@dbrinc.com

Humble I.S.D.
1703 Wilson Rd, Building B
Humble, TX 77396

CODE REQUIREMENTS

2018 International Existing Building Code
2023 National Electrical Code
2018 International Fire Code
2018 International Mechanical Code
2018 International Plumbing Code
2018 International Energy Conservation Code

LOCATION



ADDRESS

OAK FOREST ES: 6400 KINGWOOD GLEN DR.
HUMBLE, TX 77346

GENERAL NOTES

Existing Building Construction: TYPE II A

Existing Buidling Total Floor Area: 79,656 sq.ft.

Project Scope: Replacement of boilers, water heaters, chillers, pumps, air handlers, control system, thermal storage tank, VAV boxes and hot water coils.

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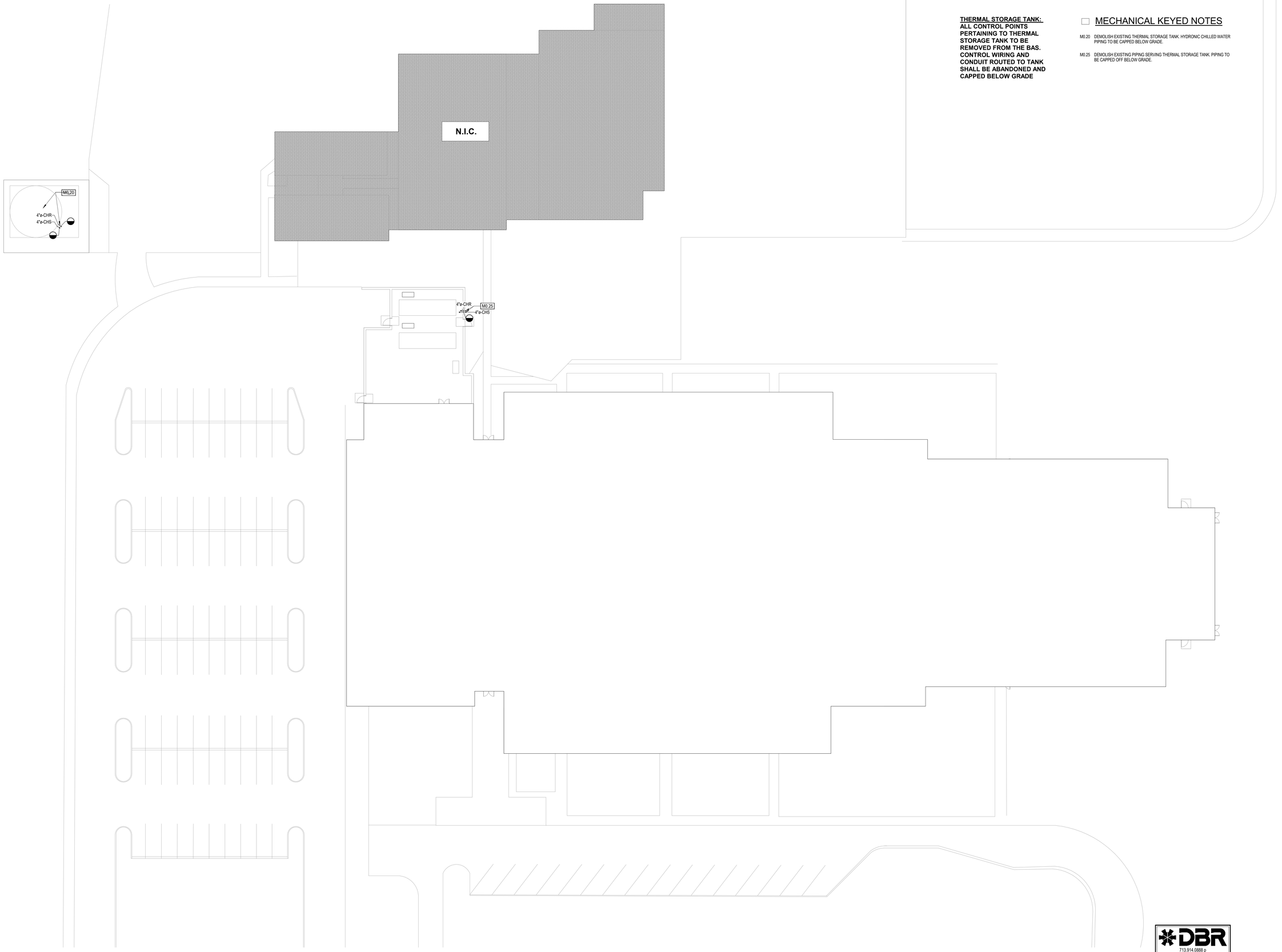
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SHEET TITLE: COVER SHEET
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THERMAL STORAGE TANK:
ALL CONTROL POINTS PERTAINING TO THERMAL STORAGE TANK TO BE REMOVED FROM THE BAS. CONTROL WIRING AND CONDUIT ROUTED TO TANK SHALL BE ABANDONED AND CAPPED BELOW GRADE

MECHANICAL KEYED NOTES

M0.20 DEMOLISH EXISTING THERMAL STORAGE TANK. HYDRONIC CHILLED WATER PIPING TO BE CAPPED BELOW GRADE.

M0.25 DEMOLISH EXISTING PIPING SERVING THERMAL STORAGE TANK. PIPING TO BE CAPPED OFF BELOW GRADE.

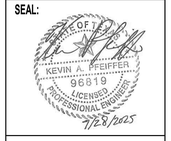
1 **MEP SITE PLAN**
1" = 20'-0"

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SHEET TITLE: MEP SITE PLAN

SHEET NUMBER: MEP0.20

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GENERAL ELECTRICAL NOTES:

A. REFER TO SHEET E0.02 FOR ALL GENERAL ELECTRICAL NOTES.

ELECTRICAL KEYED NOTES

E12.7 EXISTING MECHANICAL UNIT SHALL BE REMOVED AND REPLACED WITH NEW. REFERENCE NEW PLANS. DISCONNECT UNIT BEING REMOVED AND RECONNECT NEW UNIT AS REQUIRED WITH NEW ELECTRICAL EQUIPMENT. REUSE EXISTING CIRCUIT SERVING REMOVED UNIT, EXTEND CONDUCTORS AND CONDUIT AS REQUIRED TO MAKE CONNECTION TO NEW UNIT AS NECESSARY. CONTRACTOR SHALL FIELD VERIFY EXISTING ELECTRICAL EQUIPMENT AND COORDINATE WITH MECHANICAL CONTRACTOR AND OWNER PRIOR TO STARTING ANY WORK.

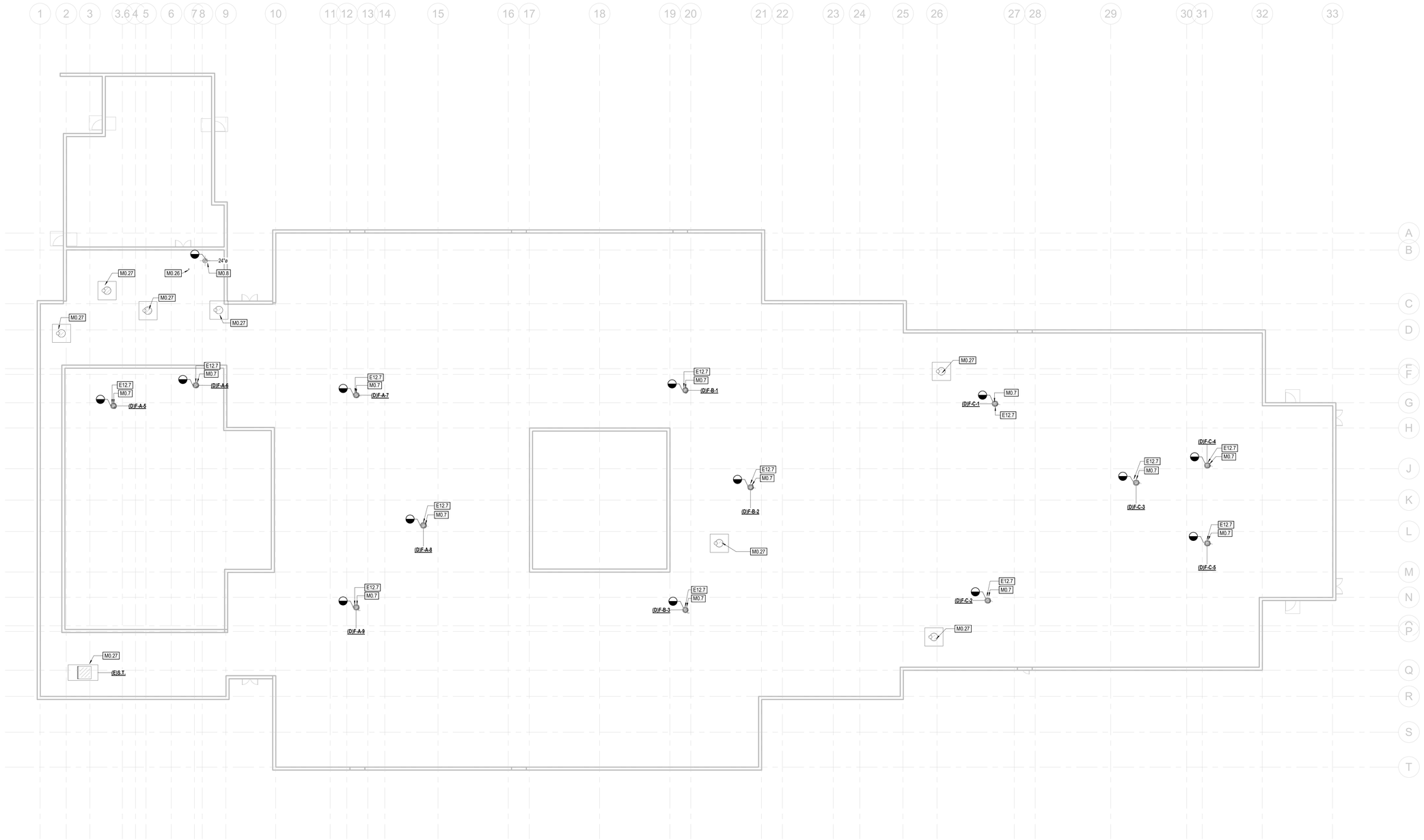
MECHANICAL KEYED NOTES

M0.7 DEMOLISH EXISTING ROOFTOP EXHAUST FAN AT APPROXIMATE LOCATION SHOWN. ROOF CURB TO REMAIN. ALL ASSOCIATED CONTROLS, ELECTRICAL AND ACCESSORIES TO REMAIN.

M0.8 DEMOLISH EXISTING 24" BOILER FLUE AT APPROXIMATE LOCATION SHOWN.

M0.26 DEMOLISH EXISTING VENTING FOR GAS WATER HEATERS. PROVIDE WITH NEW.

M0.27 EXISTING INTAKE / EXHAUST AIR HOOD TO REMAIN.



1 DEMOLITION MECHANICAL ROOF PLAN

1/16" = 1'-0"

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117260
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PROFESSIONAL ENGINEER
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SHEET TITLE: DEMOLITION MEP ROOF PLAN

SHEET NUMBER: MEP0.21

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GENERAL ELECTRICAL NOTES:

A. REFER TO SHEET E0.02 FOR ALL GENERAL ELECTRICAL NOTES.

ELECTRICAL KEYED NOTES

E3.7 NEW MECHANICAL UNIT REPLACING EXISTING UNIT ONE FOR ONE. REFERENCE ELECTRICAL DEMO PLANS FOR EXISTING MECHANICAL UNITS BEING REPLACED. DISCONNECT UNIT BEING REMOVED AND RECONNECT NEW UNIT AS REQUIRED WITH NEW ELECTRICAL EQUIPMENT. REUSE EXISTING CIRCUIT SERVING REMOVED UNIT, EXTEND CONDUCTORS AND CONDUIT AS REQUIRED TO MAKE CONNECTION TO NEW UNIT AS NECESSARY. REFER TO PANEL SCHEDULE FOR ADDITIONAL INFORMATION/NOTES. CONTRACTOR SHALL FIELD VERIFY EXISTING ELECTRICAL EQUIPMENT AND COORDINATE WITH MECHANICAL CONTRACTOR AND OWNER PRIOR TO STARTING ANY WORK.

MECHANICAL KEYED NOTES

M1.9 PROVIDE 4" CONCENTRIC VENTING FOR GAS WATER HEATER AT APPROXIMATE LOCATION SHOWN. ROUTE TO ROOF AND PROVIDE MANUFACTURER ROOF CAP. COORDINATE WITH OTHER TRADES FOR ROUTING OFF FLUES TO TERMINATE ON EXISTING ROOF.

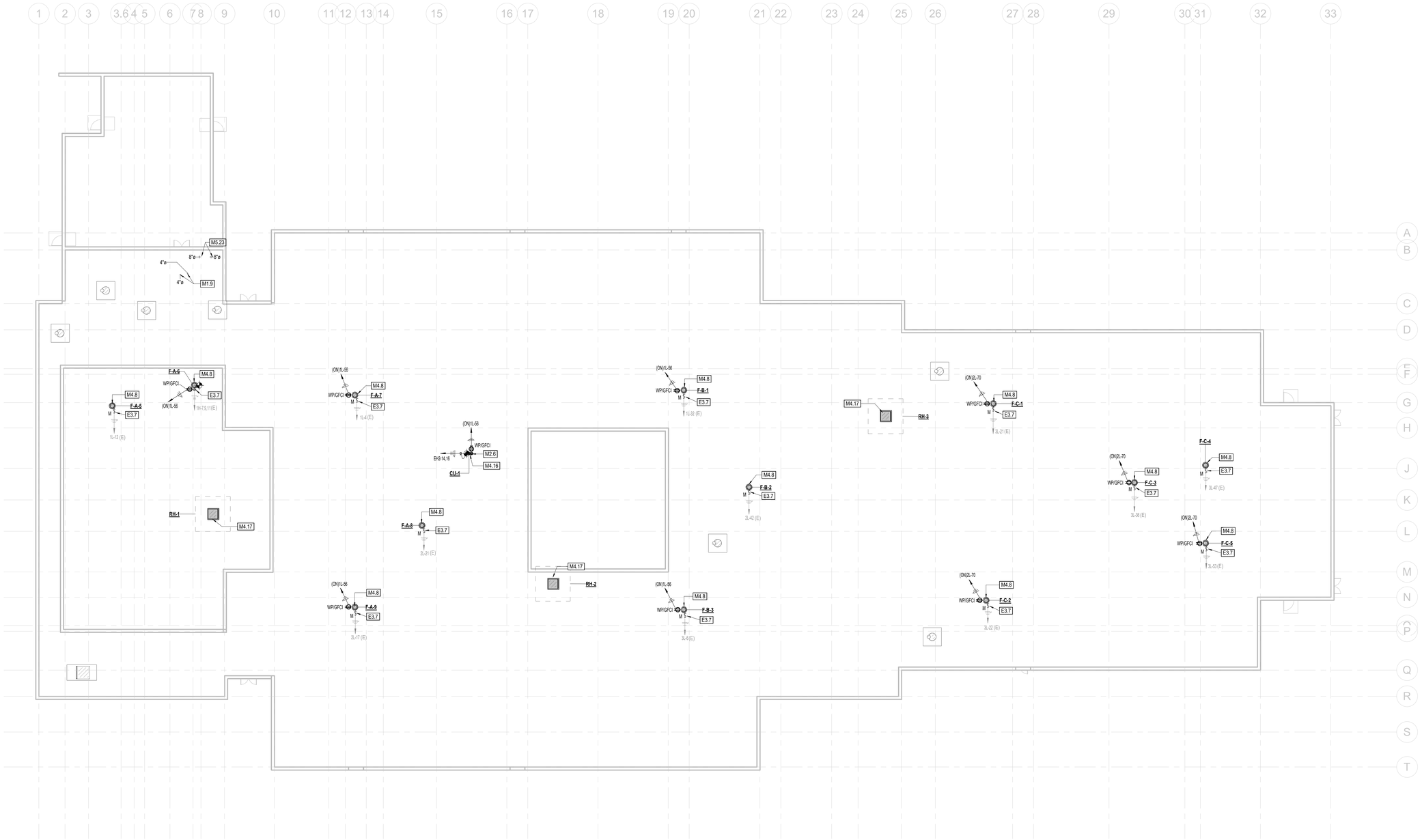
M2.6 ROUTE REFRIGERANT PIPING FROM AIR COOLED CONDENSING UNIT DOWN TO INDOOR FAN COIL UNIT. REFRIGERANT PIPING SHALL BE SIZED PER MANUFACTURER'S RECOMMENDATIONS. FIELD VERIFY EXACT PIPING ROUTING. RE: DETAIL 2/M6.01.

M4.8 PROVIDE ROOF MOUNTED EXHAUST FAN AT APPROXIMATE LOCATION SHOWN. FAN TO BE ATTACHED TO EXISTING ROOF CURB, PATCH AND SEAL AS REQUIRED FOR NEW FAN. PROVIDE ROOF CURB ADAPTER IF REQUIRED.

M4.16 PROVIDE ROOF MOUNTED AIR COOLED CONDENSING UNIT AT APPROXIMATE LOCATION SHOWN. INSTALL UNIT ON EXISTING ROOF. PROVIDE ALL CLEARANCES AROUND CONDENSER AS REQUIRED BY EQUIPMENT MANUFACTURER. RE: 05/M6.02

M4.17 PROVIDE BAROMETRIC RELIEF AIR HOOD AT APPROXIMATE LOCATION SHOWN. INSTALL PER MANUFACTURERS INSTALLATION INSTRUCTIONS. RE: 01/M6.02

M5.23 PROVIDE 8" STAINLESS STEEL CAT IV EXHAUST FLUE. FLUE TO PENETRATE THROUGH ROOF FOR NEW OPENING. PROVIDE EXHAUST FLUE WITH CONDENSATE NEUTRALIZER AT DRIP LEG AND PROVIDE PIPING ROUTING TO NEAREST FLOOR DRAIN IN BOILER ROOM. PROVIDE NEW ROOF OPENINGS AS REQUIRED FOR NEW FLUES. THE EXISTING OPENINGS WILL BE REQUIRED TO BE PATCHED, SEALED, AND INSULATED TO MATCH EXISTING ROOF.



1 MECHANICAL ROOF PLAN

1/16" = 1'-0"

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SHEET TITLE: MEP ROOF PLAN

SHEET NUMBER: MEP0.22

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ABBREVIATIONS

A

A	AIR (COMPRESSED)
ABV	ABOVE
A/C	AIR CONDITIONING
AC	ALTERNATING CURRENT, AIR COMPRESSOR
ACCH	AIR COOLED CHILLER
ACCU	AIR COOLED CONDENSING UNIT
AD	ACCESS DOOR, AREA DRAIN
ADJ	ADJUSTABLE
AF	AIR FILTER
AFC	ABOVE FINISHED CEILING
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHRI	AIR-CONDITIONING, HEATING, AND REFRIGERATION INSTITUTE
AHU	AIR HANDLING UNIT
AL	ALUMINUM
AMB	AMBIENT
AP	ACCESS PANEL
APD	AIR PRESSURE DROP
ARCH	ARCHITECT, ARCHITECTURAL
AS	AIR SEPARATOR
ASHP	AIR SOURCE HEAT PUMP
ASHRAE	AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS
ASTM	AMERICAN SOCIETY OF TESTING AND MATERIALS
AVG	AVERAGE
AWS	AMERICAN WELDING SOCIETY
AUX	AUXILIARY

B

B	BOILER
BC	BELOW COUNTER
B/C	BACK OF CURB
BFF	BELOW FINISHED FLOOR
BFV	BUTTERFLY VALVE
BLDG	BUILDING
BM	BENCHMARK
BOF	BOTTOM OF FOOTING
BOS	BOTTOM OF STRUCTURE
BP	BACKFLOW PREVENTER
BTU	BRITISH THERMAL UNIT
BV	BALL VALVE

C

C	CELSIUS
CAB	CABINET
CD	CONDENSATE DRAIN LINE
CFM	CUBIC FEET PER MINUTE
CFS	CUBIC FEET PER SECOND
CH	CHILLER
CHR	CHILLED WATER RETURN
CHS	CHILLED WATER SUPPLY
CHW	CHILLED WATER
CHWP	CHILLED WATER PUMP
CI	CAST IRON
CIRC	CIRCULATING
CL	CENTERLINE
CLG	CEILING
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
COMB	COMBINATION
COMP	COMPRESSOR
CONC	CONCRETE, CONCENTRIC
COND	CONDENSER, CONDENSATE
CONN	CONNECTION
CONT	CONTINUOUS,CONTINUATION
CTR	CENTER
CU	COPPER
CV	CONSTANT VOLUME

D

D	DEPTH, DRAIN, DRYER
DB	DRY BULB
DC	DIRECT CURRENT
DDC	DIRECT DIGITAL CONTROL
DOMB	DUAL DUCT MIXING BOX
DESIG	DESIGNATION
DTL	DETAIL
DIA	DIAMETER
DIFF	DIFFUSER
DIM	DIMENSION
DISC	DISCONNECT
DN	DOWN
DPR	DAMPER
DW	DISHWASHER
DWG	DRAWING
DX	DIRECT EXPANSION

E

EA	EACH
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
ECC	ECCENTRIC
EDB	ENTERING DRY BULB
EDH	ELECTRIC DUCT HEATER
EF	EXHAUST FAN
EFF	EFFICIENCY
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRICAL
EMERG	EMERGENCY
ENCL	ENCLOSURE
ENGR	ENGINEER
EQ	EQUAL
EQUIP	EQUIPMENT
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
ETD	EXISTING TO BE DEMOLISHED
ETR	EXISTING TO REMAIN
EUH	ELECTRIC UNIT HEATER
EVAP	EVAPORATOR
EWB	ENTERING WET BULB
EWT	ENTERING WATER TEMPERATURE
EX	EXPLOSION PROOF
EXT	EXTERNAL
EXTG	EXISTING

F

F	FAHRENHEIT, FIRE
FBO	FURNISHED BY OTHERS
FCU	FAN COIL UNIT
FD	FLOOR DRAIN, FIRE DAMPER
FLA	FULL LOAD AMPS
FLEX	FLEXIBLE
FLR	FLOOR
FPTU	FAN POWERED TERMINAL UNIT
FT	FOOT, FEET
FUT	FUTURE

G

G	GAS
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GLV	GLOBE VALVE
GND	GROUND
GPM	GALLONS PER MINUTE
GUH	GAS UNIT HEATER
GV	GATE VALVE

H

HDT	HORIZONTAL DRAW THROUGH
HORIZ	HORIZONTAL
HP	HORSEPOWER, HEAT PUMP
HSTAT	HUMIDISTAT
HT	HEIGHT
HTG	HEATING
HTR	HEATER
HW	HOT WATER
HWP	HEATING WATER PUMP
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
HX	HEAT EXCHANGER
HZ	HERTZ

I

ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IH	INFRARED HEATER
IN	INCH
INSUL	INSULATION
INT	INTERNAL, INTERIOR

K

KEC	KITCHEN EQUIPMENT CONTRACTOR
KO	KNOCKOUT
KVA	KILOVOLT- AMPS
KW	KILOWATT

L

L	LENGTH
LAT	LEAVING AIR TEMPERATURE
LF	LINEAR FEET
LP	LOW PRESSURE
LRA	LOCKED ROTOR AMPS
LVL	LEVEL
LWB	LEAVING WET BULB
LWCO	LOW WATER CUT OFF
LWT	LEAVING WATER TEMPERATURE

M

MAT	MIXED AIR TEMPERATURE
MAX	MAXIMUM
MBTUH	THOUSAND OF BTU'S
MC	MECHANICAL CONTRACTOR
MECH	MECHANICAL
MFR	MANUFACTURER
MH	MANHOLE
MI	MALLEABLE IRON
MIN	MINIMUM
MP	MEDIUM PRESSURE
MTD	MOUNTED
MU	MAKE-UP
MVD	MANUAL VOLUME DAMPER
MSAH	MINI-SPLIT AIR HANDLER
MSCU	MINI-SPLIT CONDENSING UNIT
MZ	MULTI-ZONE

N

N.C.	NORMALLY CLOSED
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
N.O.	NORMALLY OPEN
NO.	NUMBER
NTS	NOT TO SCALE

O

OA	OUTSIDE AIR
OAF	OUTSIDE AIR FAN
OAHU	OUTSIDE AIR HANDLING UNIT
OBD	OPPOSED BLADE DAMPER
OC	ON CENTER
OD	OUTSIDE DIAMETER, OVERFLOW DRAIN
OFCU	OUTSIDE AIR FAN COIL UNIT
OPG	OPENING
OS&Y	OUTSIDE SCREW AND YOKE

P

PG	PRESSURE GAUGE
PP	POLYPROPYLENE
PPM	PART PER MILLION
PRI	PRIMARY
PRS	PRESSURE REDUCING STATION
PRV	PRESSURE REDUCING VALVE
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH GAUGE
PV	PLUG VALVE
PVC	POLYVINYL CHLORIDE

Q

QTY	QUANTITY

R

RA	RETURN AIR
RAD	REFRIGERATED AIR DRYER
RAF	RETURN AIR FAN
RAG	RETURN AIR GRILLE
RAT	RETURN AIR TEMPERATURE
RCP	REFLECTED CEILING PLAN
RD	ROOF DRAIN
RE	REFERENCE, REFER
RED	REDUCER
REFR	REFRIGERATOR
REG	REGISTER
REINF	REINFORCING
REQD	REQUIRED
REV	REVISION, REVISE
RH	RELATIVE HUMIDITY
RHG	REFRIGERANT HOT GAS
RL	REFRIGERANT LIQUID
RLA	RUNNING LOAD AMPS
RM	ROOM
RPM	REVOLUTIONS PER MINUTE
RS	REFRIGERANT SUCTION
RTU	ROOFTOP UNIT
RV	RELIEF VALVE

S

SA	SUPPLY AIR
SAF	SUPPLY AIR FAN
SAG	SUPPLY AIR GRILLE
SAR	SUPPLY AIR REGISTER
SC	STEAM CONDENSATE
SCHED	SCHEDULED
SEC	SECONDARY
SECT	SECTION
SENS	SENSIBLE
SF	SQUARE FEET
SFCS	SPRINKLER FLOOR CONTROL STATION
SH	SHOWER
SHT	SHEET
SIM	SIMILAR
SM	SHEETMETAL
SP	STATIC PRESSURE, SUMP PUMP
SPEC	SPECIFICATION
SPR	SPRINKLER
SQ	SQUARE
SS	STAINLESS STEEL
SSSC	SOLID STATE SPEED CONTROL
STD	STANDARD
STL	STEEL
STM	STEAM
STR	STRAINER
SURF	SURFACE
SUSP	SUSPEND
SV	SANITARY VENT
SW	SOFT WATER
SZ	SINGLE ZONE

T

TC	TEMPERATURE CONTROL
TDH	TOTAL DYNAMIC HEAD
TF	TRANSFER FAN
TH BLK	THRUST BLOCK
THERM	THERMOMETER
TMV	THERMOSTATIC MIXING VALVE
TSP	TOTAL STATIC PRESSURE
TSTAT	THERMOSTAT
TW	TEMPERED HOT WATER
TYP	TYPICAL

U

UCD	UNDER CUT DOOR
UG	UNDERGROUND
UH	UNIT HEATER
UL	UNDERWRITERS LABORATORIES, INC
UNO	UNLESS NOTED OTHERWISE
U/F	UNDERFLOOR
U/S	UNDERSLAB

V

V	VOLT
VA	VOLT- AMPERE
VAC	VACUUM
VAV	VARIABLE AIR VOLUME
VB	VALVE BOX, VACUUM BREAKER
VD	VOLUME DAMPER
VDT	VERTICAL DRAW THROUGH
VEL	VELOCITY
VERT	VERTICAL
VFD	VARIABLE FREQUENCY DRIVE
VIB	VALVE IN BOX
VOV	VALVE ON VERTICAL
VP	VACUUM PUMP
VRF	VARIABLE REFRIGERANT FLOW
VVR	VARIABLE AIR VOLUME REHEAT

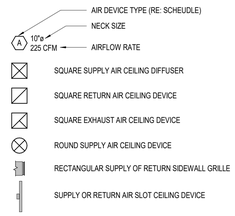
W

W	WATT, WIDTH
W/	WITH
W/O	WITHOUT
WB	WET BULB
WM	WATER METER
WP	WEATHERPROOF
WPD	WATER PRESSURE DROP
WSHP	WATER SOURCE HEAT PUMP
WWF	WELDED WIRE FABRIC

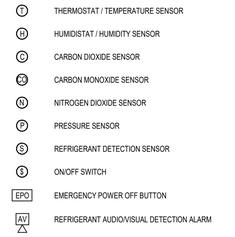
Z

Z	ZONE

AIR DEVICE TYPES



WALL MOUNTED SENSOR AND DEVICE TYPES



CONTROLS SCHEMATIC SYMBOLS LEGEND

AI	ANALOG INPUT	FS	FLOW SWITCH
AO	ANALOG OUTPUT	DAT	DISCHARGE AIR TEMPERATURE SENSOR
DI/BI	DIGITAL/BINARY INPUT	S	WALL SENSOR
DO/BO	DIGITAL/BINARY OUTPUT	T	THERMOSTAT
MD	ON-OFF MOTORIZED DAMPER	CO2	CARBON DIOXIDE SENSOR
MMD	MODULATING TYPE MOTORIZED DAMPER	SP	SET POINT
AFMS	AIR FLOW MEASURING STATION	S/A	SUPPLY AIR
MCV	CONTROL VALVE MODULATING TYPE	R/A	RETURN AIR
VFD	VARIABLE FREQUENCY DRIVE	O/A	OUTSIDE AIR
CSR	CURRENT SENSING RELAY	HC	HEATING COIL
FRZ	FREEZESTAT	CC	COOLING COIL
HSL	HIGH STATIC LIMIT	DX	DIRECT EXPANSION COOLING COIL
SPT	STATIC PRESSURE TRANSMITTER	PICCV	PRESSURE INDEPENDENT CHARACTERIZED CONTROL VALVE
DPT	DIFFERENTIAL PRESSURE TRANSDUCER	AFC	AIRFLOW CROSS
FM	FLOW METER	DPS	DIFFERENTIAL PRESSURE SWITCH

PIPING TYPES

CD	CONDENSATE DRAIN LINE	REF	REFRIGERANT PIPING SIZED BY MFR.
CHS	CHILLED WATER SUPPLY	HPS	HIGH PRESSURE STEAM SUPPLY
CHR	CHILLED WATER RETURN	HPR	HIGH PRESSURE CONDENSATE RETURN
HWS	HOT WATER SUPPLY	LPS	LOW PRESSURE STEAM SUPPLY
HWR	HOT WATER RETURN	LPR	LOW PRESSURE CONDENSATE RETURN
CWS	CONDENSER WATER SUPPLY	PCR	PUMPED CONDENSATE RETURN
CWR	CONDENSER WATER RETURN		

DESIGN CRITERIA

LOCATION:
HUMBLE, TEXAS

ELEVATION: 43 FEET

DESIGN CONDITIONS:

HEATING DB:	31.6 °F (ASHRAE 99.6%)
COOLING DB / WB:	97 °F / 77 °F (ASHRAE 0.4%)
DEHUMIDIFICATION DP / DB:	98.2 °F / 76.6 °F (ASHRAE 0.4%)

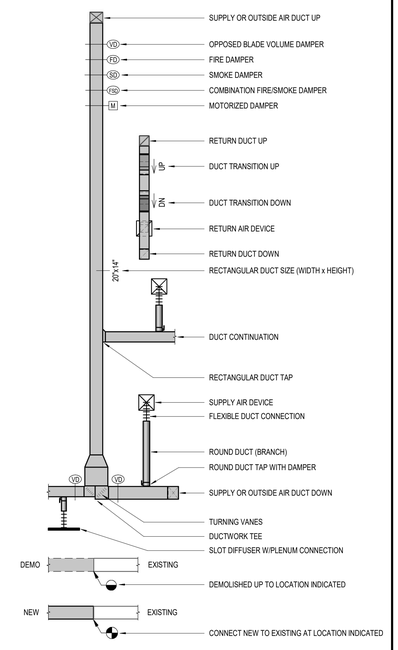
SPACE INDOOR DESIGN TEMPERATURE:

HEATING DB:	70 °F
COOLING DB:	75 °F
RELATIVE HUMIDITY	50%

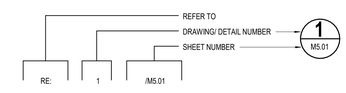
BUILDING CODES & STANDARDS

APPLICABLE CODES:
2018 INTERNATIONAL BUILDING CODE
2018 INTERNATIONAL FIRE CODE
2018 INTERNATIONAL MECHANICAL CODE
2018 INTERNATIONAL PLUMBING CODE
2018 INTERNATIONAL ENERGY CONSERVATION CODE

DUCTWORK



DRAWING/DETAIL REFERENCE KEY



DBR
SERVICE | QUALITY | INTEGRITY | SUSTAINABILITY
9990 Richmond Avenue
South Building, Suite 310
Houston, Texas 77042
713.914.4333 p 713.914.9260 f

ISSUANCE:

No.	DATE	DESCRIPTION
	07/28/25	ISSUE FOR BID

SEAL:



HUMBLE ISD - OAK FOREST ES - HVAC
UPGRADES - 6400 KINGWOOD GLEN DR, 77346

TBPE Firm Registration No. 2234

DATE: 07/28/25

DRAWN BY: DBR

CHECKED BY: DBR

PROJECT NUMBER 250054.000

SHEET TITLE: MECHANICAL SYMBOL LEGEND

SHEET NUMBER: M0.01

DBR
713.914.0888 p
https://www.dbrinc.com
TBPE Firm Registration No. 2234
DBR Project # 250054.000
RA | RM | LB | TN | -

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DEMO/RENO MECHANICAL GENERAL NOTES

A. REFER TO ARCHITECTURAL DEMOLITION DRAWINGS FOR SCOPE OF DEMOLITION WORK, EXACT LOCATIONS, CONDITIONS, PHASING, CONSTRUCTION SCHEDULING, AND ANY ADDITIONAL DEMOLITION NOTES, REQUIREMENTS, ETC.

B. MECHANICAL DEMOLITION DRAWINGS ARE GENERALLY DIAGRAMMATIC AND IT IS THE INTENT AND MEANING OF THE CONTRACT DOCUMENTS THAT ALL MECHANICAL SYSTEMS SHALL REMAIN UNLESS NOTED TO BE REMOVED OR DEMOLISHED. VERIFY EXACT LOCATIONS AND CONDITIONS AND COORDINATE WITH GENERAL CONTRACTOR AND OWNER'S REPRESENTATIVE FOR APPROVAL PRIOR TO REMOVING ANY EXISTING ITEMS. DO NOT ABANDON ANY ITEMS IN PLACE.

C. EQUIPMENT, DUCTWORK, PIPING, ETC. INDICATED AS EXISTING (E) SHALL REMAIN AND BE RE-USED IN EXISTING LOCATIONS. IF EXISTING ITEMS CONFLICT WITH NEW CONSTRUCTION, CONTRACTOR SHALL RELOCATE, REWORK, REROUTE, RECONNECT, AND REINSTALL COMPLETELY AS REQUIRED AS IF NEW AT NO ADDITIONAL COST. COORDINATE WITH GENERAL CONTRACTOR, OWNER'S REPRESENTATIVE, ARCHITECT, ETC. PRIOR TO RELOCATION. REFER TO APPLICABLE NOTES FOR NEW ITEMS.

D. EQUIPMENT, DUCTWORK, PIPING ETC. INDICATED AS EXISTING TO BE DEMOLISHED (D) SHALL BE REMOVED IN THEIR ENTIRETY. ALL APPURTENANCES, RELATED COMPONENTS, INCLUDING ALL DUCTWORK, PIPING, SUPPORTS, HANGERS, CONTROLS, ETC. ASSOCIATED WITH EACH ITEM SHALL BE REMOVED UNLESS NOTED OTHERWISE. CAP ALL DUCTWORK AND PIPING AS REQUIRED SERVING EACH ITEM AT BUILDING MAINS. VERIFY EXACT LOCATIONS AND CONDITIONS AND COORDINATE WITH GENERAL CONTRACTOR AND OWNER'S REPRESENTATIVE FOR APPROVAL PRIOR TO REMOVING ANY EXISTING ITEMS. DO NOT ABANDON ANY ITEMS IN PLACE.

E. WHERE CONSTRUCTION, EXISTING DUCTWORK, MECHANICAL / PLUMBING / FIRE SPRINKLER PIPING, ELECTRICAL CONDUIT, CABLING, ETC. WHICH MUST REMAIN AS PART OF AN ACTIVE SYSTEM CONFLICTS WITH NEW CONSTRUCTION, CONTRACTOR SHALL RELOCATE, REWORK, REROUTE, RECONNECT, AND REINSTALL COMPLETELY AS REQUIRED AS IF NEW AT NO ADDITIONAL COST. COORDINATE WITH GENERAL CONTRACTOR, OWNER'S REPRESENTATIVE, ARCHITECT, ETC. PRIOR TO RELOCATION. REFER TO APPLICABLE NOTES FOR NEW ITEMS.

F. CONTRACTOR SHALL COORDINATE WITH EACH TRADE CONTRACTOR FOR REMOVAL OF EXISTING ELECTRICAL AND PLUMBING SERVICES INCLUDING ALL CONDUIT, WIRING, PIPING, INSULATION, APPURTENANCES, RELATED COMPONENTS, ETC. ASSOCIATED WITH REMOVAL OF EXISTING MECHANICAL EQUIPMENT. VERIFY EXACT LOCATIONS AND CONDITIONS AND COORDINATE WITH GENERAL CONTRACTOR AND OWNER'S REPRESENTATIVE FOR APPROVAL PRIOR TO REMOVING ANY EXISTING ITEMS. DO NOT ABANDON ANY ITEMS IN PLACE.

G. THESE DRAWINGS WERE PREPARED FROM THE BEST INFORMATION AVAILABLE. ORIGINAL DRAWINGS, FIELD OBSERVATIONS, ETC., BUT MAY NOT INDICATE THE EXACT LOCATION OF ALL EXISTING MECHANICAL COMPONENTS. THE CONTRACTOR SHALL CAREFULLY INVESTIGATE THE EXISTING CONDITIONS SURROUNDING THE INSTALLATION OF THEIR WORK PRIOR TO PROCEEDING WITH THE INSTALLATION. MODIFICATIONS REQUIRED DUE TO EXISTING CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT / ENGINEER OWNER FOR REVIEW BY WAY OF SHOP DRAWINGS OR SKETCHES DETAILING THE EXISTING CONDITIONS AND THE PROPOSED REVISION.

H. CONTRACTOR SHALL BE RESPONSIBLE TO VISIT THE JOBSITE, COMPLETELY REVIEW CONTRACT DOCUMENTS, AND FIELD VERIFY EXTENT OF WORK AND EXACT LOCATIONS AND CONDITIONS OF ALL NEW AND EXISTING CONSTRUCTION, ELEVATIONS, SERVICE POINTS, ETC. AS REQUIRED FOR A COMPLETE AND CONGRUENT OPERATING SYSTEM. CONTACTOR SHALL COORDINATE WITH GENERAL CONTRACTOR, OWNER'S REPRESENTATIVE, AND REPORT IN WRITING ANY CONFLICTS, PROBLEMS, OR ANY CONDITION THAT MAY ADVERSELY AFFECT THE PROPER EXECUTION OF THE WORK THAT IS NOT INDICATED ON THE DRAWINGS. THIS SHALL NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR MAKING ANY CORRECTIONS OR ALTERATIONS DEEMED NECESSARY TO COMPLETE THE WORK AND SHALL INCLUDE ALL ASSOCIATED COSTS IN THEIR BID WITH NO ADDITIONAL EXPENSE.

I. CONTRACTOR SHALL COORDINATE ALL CUTTING AND PATCHING OF EXISTING WALLS, CEILINGS, ROOF AND FLOOR REQUIRED FOR THEIR WORK WITH GENERAL CONTRACTOR, STRUCTURAL ENGINEER, AND OWNER'S REPRESENTATIVE. ALL PENETRATIONS SHALL BE SEALED AND RESTORED TO THE ORIGINAL CONDITIONS, STRUCTURAL PROPERTIES, AND FINISHED IN SAME MATERIALS AND MANNER AS ADJACENT AREAS. ALL ROOF PENETRATIONS, ROOF PIPE SUPPORTS, FLASHINGS, ETC. SHALL BE MADE WATERTIGHT AND AS RECOMMENDED BY THE ROOF MANUFACTURER. ALL EXISTING PENETRATIONS WHICH ARE NOT TO BE REUSED SHALL BE PROPERLY SEALED OFF TO MAINTAIN THE STRUCTURAL, WATERPROOF, AND FIREPROOF INTEGRITY OF THE WALL, FLOOR, OR ROOF SYSTEM PENETRATED.

J. COORDINATE ALL RENOVATIONS / REMODEL / DEMOLITION WORK WITH THE OWNER'S REPRESENTATIVE, BUILDING ENGINEER / MAINTENANCE PERSONNEL AND OTHER TRADES PERFORMING WORK IN THE BUILDING PRIOR TO THE REMOVAL OF ANY ITEMS OF MECHANICAL, ELECTRICAL, AND PLUMBING EQUIPMENT, FIXTURES, OR SYSTEMS THAT WILL AFFECT OTHER SYSTEM WITHIN THE AREA OF CONSTRUCTION, OR OTHER AREAS OF THE BUILDING. CONTRACTOR SHALL NOTE THAT THE BUILDING IS OCCUPIED, AND WILL REMAIN SO DURING CONSTRUCTION, AND, THEREFORE, UTILITIES / BUILDING SYSTEMS MUST REMAIN IN OPERATION. ANY REQUIRED OUTAGES MUST BE COORDINATED WITH GENERAL CONTRACTOR, OWNER'S REPRESENTATIVE AND BUILDING ENGINEER / MAINTENANCE PERSONNEL. PROVIDE TEMPORARY CONNECTIONS OF UTILITIES AND AIR CONDITIONING AS NECESSARY TO FACILITATE THE PHASING OF CONSTRUCTION.

K. ALL WORK SHALL BE SCHEDULED AND PERFORMED IN STRICT COORDINATION WITH CONSTRUCTION PHASING AND WITH OWNERS' SCHEDULES, OCCUPANCIES, ETC. PROVIDE ADDITIONAL VALVES, TAPS, TEMPORARY DUCTWORK, PIPING, ETC. AS NECESSARY TO PROVIDE UNINTERRUPTED SERVICE TO AREAS OUTSIDE OF THE PHASE IN WHICH WORK IS BEING PERFORMED. ALL NECESSARY SHUTDOWNS OR OUT OF PHASE WORK SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR AND OWNER'S REPRESENTATIVE.

L. PRIOR TO THE REMOVAL OF ANY MECHANICAL, ELECTRICAL, AND PLUMBING EQUIPMENT, FIXTURES, OR SYSTEMS, THE CONTRACTOR MUST VERIFY THE ORIGIN AND TERMINATION OF THOSE SYSTEM AND CONFIRM THAT THE ITEMS BEING REMOVED DO NOT SERVE ANY ITEMS THAT ARE TO REMAIN (INCLUDING THOSE IN AREAS OUTSIDE THE CONTRACT LIMITS). WHEN RENOVATION / REMODEL / DEMOLITION WORK IS PERFORMED, THE CONTRACTOR SHALL EXERCISE CARE IN PROTECTING EXISTING ITEMS TO REMAIN AND EXISTING ITEMS TO BE REMOVED AND RELOCATED. PROTECT ALL EXISTING BUILDING COMPONENTS, WALLS, FLOORS, FINISHES, FURNISHINGS, ADJACENT EQUIPMENT, LIGHTING, ETC. ANY ITEMS DAMAGED OR WHERE FINISHES HAVE BEEN MARRED, SHALL BE REPAIRED AND REFINISHED TO ORIGINAL CONDITION AT NO COST TO THE OWNER. ALL ITEMS SOILED IN THE PROGRESS OF THE WORK SHALL BE CLEANED TO THEIR PRE- EXISTING CONDITIONS.

M. ALL EXISTING EQUIPMENT REMOVED SHALL BE PROTECTED FROM DAMAGE IN SO FAR AS PRACTICAL. THESE ITEMS SHALL BE STORED ON SITE FOR A MINIMUM OF TWO (2) WEEKS UNLESS INDICTED OTHERWISE BY THE OWNER'S REPRESENTATIVE TO ALLOW INSPECTION BY THE OWNER. ALL ITEMS RETAINED BY THE OWNER SHALL BE TAGGED AND STORED ON SITE UNTIL DIRECTED OTHERWISE BY OWNER. ALL ITEMS NOT RETAINED BY THE OWNER SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE AND DISPOSED OF PROPERLY.

N. REWORK AND REPAIR ALL DUCTWORK AND PIPING INSULATION DAMAGED OR REMOVED DURING RENOVATION / REMODEL / DEMOLITION AS REQUIRED TO MATCH EXISTING.

O. EQUIPMENT INGRESS AND EGRESS ROUTES FOR THE RENOVATION WORK SHALL BE COORDINATED WITH THE OWNER. COORDINATE TIMES, DATES, AND DURATIONS WITH OWNER A MINIMUM OF 2 WEEKS IN ADVANCE TO ENSURE THERE ARE NO CONFLICTS IN USAGE OF EQUIPMENT/SPACES.

P. ALL EXISTING EQUIPMENT THAT INCLUDES A REFRIGERATION CIRCUIT THAT IS TO BE DEMOLISHED OR RELOCATED SHALL HAVE THE REFRIGERANT CHARGE RECOVERED PRIOR TO DEMOLITION OR RELOCATION. REFRIGERANT RECOVERY SHALL COMPLY WITH EPA, STATE, AND LOCAL JURISDICTION REQUIREMENTS. RECOVERED REFRIGERANTS SHALL NOT BE USED IN ANY SYSTEM, NEW OR EXISTING, UNLESS THE REFRIGERANT HAS BEEN RECLAIMED AND FOUND TO MEET THE PURITY REQUIREMENTS OF AHRI 700.

Q. EXISTING EQUIPMENT BEING RELOCATED SHALL BE VERIFIED TO BE IN PROPER OPERATING CONDITION PRIOR TO EQUIPMENT RELOCATION. VERIFICATION SHALL BE PERFORMED BY EQUIPMENT MANUFACTURER'S AUTHORIZED SERVICE REPRESENTATIVE. IF EXISTING EQUIPMENT IS FOUND TO BE DEFICIENT, THE SERVICE REPRESENTATIVE SHALL NOTIFY THE ENGINEER AND OWNER AND PROVIDE RECOMMENDATIONS TO RESTORE EQUIPMENT TO PROPER OPERATING CONDITION.

MECHANICAL GENERAL NOTES

A. MECHANICAL DRAWINGS AND SPECIFICATIONS ARE DIAGRAMMATIC IN NATURE AND INTENDED TO DESCRIBE AND ILLUSTRATE SYSTEMS THAT WILL NOT INTERFERE WITH THE ARCHITECTURAL / STRUCTURAL CONDITIONS OF THE BUILDING AND WILL FIT INTO AVAILABLE SPACES. CONTRACTOR SHALL COORDINATE ALL WORK TO CONFORM TO THE ARCHITECTURAL, STRUCTURAL, FINISH CONDITIONS, EQUIPMENT MANUFACTURER / FIXTURE CUTSHEETS AND WITH OTHER TRADES, TO AVOID OBSTRUCTIONS, AND TO ALLOW THE PROPER INSTALLATION OF EACH ITEM. EQUIPMENT SIZES, DIMENSIONS, AND REQUIRED CONNECTIONS SHALL BE VERIFIED WITH THE MANUFACTURER'S DRAWINGS AND CUTSHEETS PRIOR TO FABRICATING OF DUCTWORK, PIPING, OR POURING OF CONCRETE HOUSEKEEPING PADS. CONTRACTOR SHALL OBTAIN ALL ARCHITECTURAL DRAWINGS AND STRUCTURAL DATA, LOCATIONS OF PIERS, BEAMS, COLUMNS, JOISTS, ETC., FROM STRUCTURAL DRAWINGS AND PROVIDE OFFSETS, RELOCATIONS, ETC., AS REQUIRED TO MEET THIS INTENT AT NO ADDITIONAL COST. PROVIDE ALL NECESSARY PIPING, DUCTWORK, FITTING, INSULATION, AND OTHER ACCESSORIES IN ORDER TO COMPLETE THE INSTALLATION.

B. CONTRACTOR SHALL BE RESPONSIBLE TO EXAMINE ALL THE CONTRACT DOCUMENTS CAREFULLY BEFORE SUBMITTING THEIR BID, WITH PARTICULAR ATTENTION TO ERRORS, OMISSIONS, CONFLICTS WITH PROVISIONS OF LAWS AND CODES HAVING JURISDICTION, CONFLICTS BETWEEN DRAWINGS OR DRAWINGS AND SPECIFICATIONS, AND AMBIGUOUS DEFINITION OF THE EXTENT OF COVERAGE BETWEEN CONTRACTS. ANY SUCH DISCREPANCY SHALL BE BROUGHT IMMEDIATELY TO ATTENTION FOR CORRECTION. SHOULD ANY OF THESE ERRORS, OMISSIONS, CONFLICTS, OR AMBIGUITIES EXIST, THE CONTRACTOR SHALL HAVE THEM EXPLAINED AND AT THEIR EXPENSE, SUPPLY THE PROPER MATERIALS AND LABOR TO MAKE GOOD ANY DAMAGE OR DEFECTS IN THEIR WORK OR THE RESULTS OBTAINED THEREFORE, CAUSED BY SUCH DISCREPANCY. THE CONTRACTOR SHALL MAKE A CAREFUL EXAMINATION OF THE PREMISES AND THOROUGHLY FAMILIARIZE THEMSELF WITH THE REQUIREMENTS OF THE CONTRACT. UPON COMMENCEMENT OF THE CONSTRUCTION FOR THE WORK INCLUDED IN THIS CONTRACT, THE CONTRACTOR SHALL BE DEEMED TO HAVE MADE SUCH A STUDY OR EXAMINATION AND ACCEPTS ALL CONDITIONS.

C. WHEREVER CONFLICTS OCCUR BETWEEN DIFFERENT PARTS OF THE CONTRACT DOCUMENTS (SUCH AS DRAWINGS AND SPECIFICATIONS), THE GREATER QUANTITY, THE BETTER QUALITY, THE LARGER SIZE, OR THE VALUE WITH THE GREATEST COST IMPACT SHALL PREVAIL UNLESS THE ARCHITECT INFORMS THE CONTRACTOR OTHERWISE IN WRITING. THIS INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING DATA: DIMENSIONS, GAUGE THICKNESS, TEMPERATURES, PRESSURE, BTUH, SCHEDULE / TIME DURATION, ELECTRICAL RATING, MATERIAL, SAFETY RATING, ENERGY EFFICIENCY, ETC.

D. CONTRACTOR SHALL PROVIDE A MECHANICAL INSTALLATION THAT IS COMPLETE AND ALL ITEMS AND APPURTENANCES NECESSARY, REASONABLY INCIDENTAL, OR CUSTOMARILY INCLUDED, EVEN THOUGH EACH AND EVERY ITEM IS NOT SPECIFICALLY CALLED OUT OR SHOWN. THE CONTRACTOR SHALL PROVIDE ALL EQUIPMENT, MATERIALS, LABOR, SUPERVISION AND SERVICE NECESSARY SO AS TO PROVIDE A COMPLETE, FUNCTIONING MECHANICAL SYSTEM.

E. ALL EQUIPMENT, PIPING, DUCTWORK, ETC. SHALL BE LOCATED APPROXIMATELY IN GENERAL LOCATIONS SHOWN AND SHALL CONFORM TO ALL ARCHITECTURAL AND STRUCTURAL CONDITIONS. PROVIDE ANY ADDITIONAL SUPPORTS, HANGERS, OPENINGS, ETC. AS REQUIRED FOR A COMPLETE INSTALLATION. EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED INSTALLATION INSTRUCTIONS ENSURING THAT ACCESS PANELS ARE NOT BLOCKED. EXPERIENCED CRAFTSMEN SHALL MAKE THE INSTALLATION OF ALL EQUIPMENT IN A NEAT WORKMANSHIP-LIKE MANNER. EQUIPMENT SHALL BE AS SCHEDULED OR APPROVED EQUAL. EQUIPMENT SHALL BE INSTALLED IN FULL ACCORDANCE WITH ALL APPLICABLE CODES HAVING JURISDICTION. COORDINATE BETWEEN ALL TRADES PRIOR TO STARTING ANY WORK. PROVIDE ADEQUATE CLEARANCE FOR PROPER OPERATION, SERVICE/ MAINTENANCE. AIR FLOW, ETC. PIPING AND DUCTWORK ARE NOT PERMITTED IN ELECTRICAL, ELEVATOR MACHINE, TELECOM, IT, AND COMMUNICATION ROOMS. ALL ELEVATIONS INDICATED IN THIS WAY (8' – 4") ARE THE ELEVATIONS FROM THE FINISHED FLOOR DIRECTLY BELOW TO THE BOTTOM OF THE BARE PIPE OR DUCT.

F. EXECUTE ALL WORK FOLLOWING LOCAL, STATE AND/OR NATIONAL CODES, ORDINANCES AND REGULATIONS GOVERNING THE PARTICULAR CLASS OF WORK INVOLVED. THE GOVERNING CODES ARE MINIMUM REQUIREMENTS. THE DRAWINGS AND/OR SPECIFICATIONS SHALL PREVAIL WHERE THE DRAWINGS ARE/OR ACCOMPANYING SPECIFICATIONS EXCEED THE CODE REQUIREMENTS.

G. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FILING AND PAYING ALL FEES AND OBTAINING NECESSARY PERMITS AND CERTIFICATES OF INSPECTION. THE CONTRACTOR SHALL DELIVER ALL CERTIFICATES OF INSPECTION TO OWNER/CONSTRUCTION MANAGER INCLUDING COPIES WITH MAINTENANCE MANUALS.

H. CONTRACTOR SHALL PROVIDE DETAILED AND DIMENSIONED HVAC DUCTWORK AND PIPING FABRICATION SHOP DRAWINGS FOR APPROVAL BY THE ARCHITECT / ENGINEER, DURING THE INSTALLATIONS OF THE WORK, THE CONTRACTOR SHALL KEEP DETAILED RECORDS OF ANY AND ALL CHANGES MADE FROM THE WORK AS ACTUALLY INSTALLED. THESE RECORD DRAWINGS SHALL BE NOTED "AS-BUILT", AND SUBMITTED TO THE ARCHITECT / ENGINEER FOR REVIEW WITH ALL O&M MANUALS.

I. PROPERLY SUPPORT ALL EQUIPMENT, DUCTWORK AND PIPING WITHIN THE BUILDING AND PROVIDE ADEQUATE PROVISIONS FOR SLOPE AND ANCHORAGE. CONTRACTOR SHALL USE HANGERS, RODS AND INSERTS LISTED BY UNDERWRITERS' LABORATORIES FOR THE SERVICE INTENDED, SECURELY SUPPORTED BY STRUCTURAL MEMBERS WHICH IN TURN ARE SUPPORTED DIRECTLY FROM THE BUILDING STRUCTURE.

J. CLEARANCE REQUIREMENTS BETWEEN MECHANICAL COMPONENTS AND SWITCHBOARDS, PANELBOARDS, POWER PANELS, MOTOR CONTROL CENTERS AND TRANSFORMERS SHALL CONFORM TO THE LATEST VERSION OF THE NATIONAL ELECTRICAL CODE.

K. DUCTWORK AND PIPING SHALL BE INSTALLED CONCEALED ABOVE CEILINGS, INSIDES CHASES / WALLS, ETC. IN GENERAL LOCATIONS SHOWN, UNLESS NOTED OTHERWISE. CONFORM TO ALL ARCHITECTURAL, STRUCTURAL, AND FINISH CONDITIONS OF THE BUILDING. WHEREVER CONDITIONS ARISE WHICH WILL CAUSE NORMALLY CONCEALED MATERIALS TO BE EXPOSED, IMMEDIATELY CALL THE SITUATION TO THE ATTENTION OF THE ARCHITECT AND STOP WORK IN THOSE AREAS UNTIL THE ARCHITECT DIRECTS THE RESUMPTION OF THE WORK AND THE PROCEDURES TO BE FOLLOWED. ALL DUCTWORK, PIPING AND ASSOCIATED ACCESSORIES IN OCCUPIED AREAS THAT ARE EXPOSED TO VIEW SHALL BE PAINTED. REFER TO ARCHITECT FOR COLOR. DUCT SIZES SHOWN ON PLANS ARE CLEAR INSIDE DIMENSIONS. IN ANY CASE WHERE A PIPE OR DUCT SHOWN ON THE PLAN SHEET DIFFERS FROM THAT SHOWN IN A SCHEMATIC OR DETAIL, PROVIDE THE LARGER OF THE TWO SIZES SHOWN.

L. SLOPE AND ARRANGE HVAC PIPING TO ESTABLISH HIGH POINTS FOR AIR ELIMINATION AND LOW POINTS TO PERMIT PROPER DRAINAGE. PROVIDE AIR VENTS AT HIGH POINTS AND DRAIN VALVES AT LOW POINTS. ALL PIPING SHOWN ON FLOOR PLANS SHALL BE ROUTED ABOVE THE CEILING ON THE FLOOR WHERE IT IS SHOWN, UNLESS OTHERWISE NOTED. ARRANGE PIPING CONNECTIONS TO ALL EQUIPMENT TO ALLOW EASY REMOVAL OF EQUIPMENT, COILS, FANS, MOTORS, FILTERS, ACCESS PANELS, ETC. PROVIDE UNIONS, FLANGES, AND VALVES AT CONNECTIONS. ALL EXTERIOR PIPING SHALL BE INSULATED AND JACKETED. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS. PIPING RUN-OUTS TO TERMINAL UNITS SHALL BE 3/4" UNLESS OTHERWISE NOTED. MINIMUM PIPE SIZE FOR THE PROJECT SHALL BE 3/4".

M. WALL MOUNTED THERMOSTATS / HUMIDISTATS / SENSORS SHALL BE MOUNTED AT 42" A.F.F. APPROX. WHERE INDICATED ON PLANS, UNLESS OTHERWISE NOTED. SENSOR LOCATION SHALL BE MAX 12" FROM END OF WALL AND/OR DOOR JAMB. COORDINATE EXACT LOCATIONS WITH ARCHITECT, ELECTRICAL CONTRACTOR, AND BETWEEN OTHER TRADES PRIOR TO MOUNTING. DO NOT MOUNT ABOVE DIMMERS. THERMOSTATS ON EXTERIOR WALLS OR WALLS SEPARATING CONDITIONED SPACE FROM UNCONDITIONED SPACE SHALL BE INSULATED. THERMOSTATS / HUMIDISTATS / SENSORS SHALL NOT BE INSTALLED ON DECORATIVE WALLS.

N. FIRE, SMOKE, AND FIRE/SMOKE DAMPERS SHALL BE INSTALLED AS INDICATED AND WHERE OTHERWISE REQUIRED BY LOCAL CODES AND ORDINANCES. REFER TO ARCHITECTURAL DRAWINGS / BUILDING CODE SUMMARY / LIFE SAFETY PLANS FOR LOCATIONS OF ALL FIRE RESISTANT / RATED WALLS, CEILINGS, CHASES, SHAFTS, SMOKE COMPARTMENTS, AND LOCATIONS OF EGRESS CORRIDORS. DAMPER SIZES INDICATED ARE CLEAR INSIDE AIRSTREAM DIMENSIONS. PROVIDE MEANS TO ADEQUATELY SERVICE THE DAMPERS FUSIBLE LINKS. PROVIDE 12" X 12" MINIMUM METAL ACCESS DOORS IN ALL GYPBOARD AND PLASTER CEILINGS. INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND UL LISTING FOR SERVICE INTENDED. PROVIDE METAL SLEEVES AS REQUIRED. PROVIDE ACCESS DOORS IN DUCTWORK AT ALL FIRE, SMOKE, AND FIRE/SMOKE DAMPERS. ALL SMOKE AND FIRE/SMOKE DAMPERS REQUIRE INTEGRAL SMOKE DETECTORS AND SHALL BE INSTALLED BY THE MECHANICAL CONTRACTOR. IDENTIFY ACCESS DOORS IN ACCORDANCE WITH SPECIFICATIONS AND CODE.

O. ALL DUCTWORK AND ASSOCIATED ACCESSORIES SHALL BE CONSTRUCTED TO MEET THE LATEST SMACNA STANDARDS FOR HVAC DUCT CONSTRUCTION. IN NO CASE SHALL THE DUCTWORK BE LESS THAN 26 GAUGE FOR LOW PRESSURE DUCTWORK AND 24 GAUGE FOR MEDIUM PRESSURE DUCTWORK. ALL DUCTWORK SHALL BE CONSTRUCTED TO SEAL CLASS 'A' AS REFERENCED IN SMACNA STANDARDS. ALL NON-WELDED JOINTS AND SEAMS SHALL BE SEALED. THIS INCLUDES BUT IS NOT LIMITED TO TRANSVERSE JOINTS, LONGITUDINAL SEAMS, DUCT WALL PENETRATIONS, SPIN-INS, TAPS, AND OTHER BRANCH CONNECTIONS, ACCESS DOORS, ACCESS PANELS, AND DUCT CONNECTIONS TO EQUIPMENT. OPENINGS FOR ROTATING SHAFTS SHALL ALSO BE SEALED WITH BUSHINGS. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

P. ALL OUTSIDE AIR, SUPPLY AIR, AND RETURN AIR DUCTWORK AND PLENUMS SHALL BE INSULATED WITH A MINIMUM OF R-6 INSULATION WHERE LOCATED IN UNCONDITIONED SPACES AND SHALL BE INSULATED WITH A MINIMUM OF R-8 INSULATION WHERE LOCATED OUTSIDE THE BUILDING. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

Q. CEILING-MOUNTED AIR DEVICES SHALL BE LOCATED APPROXIMATELY AS SHOWN. COORDINATE FRAME MOUNTING TYPES FOR AIR DEVICES WITH CEILING TYPES INDICATED ON ARCHITECTURAL REFLECTED CEILING PLAN. ALL CEILING DIFFUSERS TO BE 4-WAY TYPE, UNLESS NOTED OTHERWISE BY AIRFLOW ARROWS ON FLOOR PLAN. INSULATE THE BACKSIDE OF ALL CEILING AIR DEVICES. REFER TO PLANS AND AIR DEVICE SCHEDULE FOR SIZE OF DUCT RUNOUT AND AIR DEVICE CONNECTION SIZE. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR LOCATIONS, OF ALL CEILING FEATURES, LIGHTS, AIR DEVICES, FINISHES, CEILING HEIGHTS AND ELECTRICAL DRAWINGS FOR SPEAKERS, DETECTORS, POWER OUTLETS, ETC. AND FIRE PROTECTION SHOP DRAWINGS FOR FIRE SPRINKLER HEADS. COORDINATE FINAL LOCATIONS WITH ARCHITECT AND BETWEEN TRADES PRIOR TO MOUNTING. ALL CEILING MOUNTED AND WALL MOUNTED AIR DEVICE FINISHES SHALL MATCH ADJACENT ARCHITECTURAL SURFACE UNLESS OTHERWISE INDICATED. CONTRACTOR SHALL COORDINATE COLOR WITH ARCHITECT.

R. BRANCH DUCT RUN-OUTS TO AIR DEVICES SHALL BE SAME SIZE AS NECK, UNLESS NOTED OTHERWISE. PROVIDE A SPIN-IN TAP WITH MANUAL VOLUME DAMPER AT MAIN DUCT TAP AND EXTEND AS SHOWN. EXTEND FLEX DUCTWORK A MAXIMUM OF 5'-0" FROM AIR DEVICES. INSTALL AS STRAIGHT AS POSSIBLE WITH LONG RADIUS BENDS WITH CLAMPS TO BE USED AT BOTH ENDS. ALL DAMPERS LOCATED ABOVE INACCESSIBLE CEILINGS SHALL BE PROVIDED WITH REMOTE DAMPER OPERATORS.

S. TURNING VANES SHALL BE INSTALLED IN ALL MITERED ELBOWS AND AIR EXTRACTORS. PROVIDE ADEQUATE ACCESS AND MEANS TO ADJUST / BALANCE ALL AIR EXTRACTORS. TURNING VANES SHALL BE CONSTRUCTED TO MEET THE LATEST SMACNA STANDARDS FOR HVAC DUCT CONSTRUCTION.

T. MEDIUM PRESSURE BRANCH DUCT RUN-OUTS TO AIR TERMINAL UNITS SHALL BE SAME SIZE AS AIR TERMINAL UNIT INLET, UNLESS NOTED OTHERWISE. INCREASE DUCT SIZE BY 2" IF THE DISTANCE BETWEEN THE MAIN DUCT AND THE TERMINAL UNIT INLET IS GREATER THAN 6'-0" AND / OR UTILIZES MORE THAN 2-90 DEGREE ELBOWS. PROVIDE A SPIN-IN FLARED CONICAL TAP AT MEDIUM PRESSURE DUCT MAIN AND EXTEND AS SHOWN. FLEXIBLE DUCTWORK SHALL NOT BE USED TO MAKE CHANGES IN DIRECTION IN MEDIUM PRESSURE DUCT.

U. ACCESS PANELS SHALL BE PROVIDED FOR EACH LOCATION WHERE EQUIPMENT, MANUAL VALVES, AUTOMATIC CONTROL VALVES, AUTOMATIC DAMPER MECHANISMS, FIRE/SMOKE DAMPERS, ETC., ARE INSTALLED BEHIND FURRINGS, CHASES, OR ABOVE INACCESSIBLE CEILINGS. SIZE AND POSITION EACH ACCESS PANEL SO THAT THE CONCEALED EQUIPMENT CAN BE PROPERLY SERVICED. MINIMUM SIZE SHALL BE 18" X 18" UNLESS FIELD CONDITIONS DICTATE OTHERWISE. REFER TO ARCHITECTURAL DRAWINGS / SPECIFICATIONS AND COORDINATE WITH GENERAL CONTRACTOR FOR EXACT LOCATION, CONDITIONS, SIZES, FINISHES, ETC.

V. PROVIDE REMOTE DAMPER OPERATORS FOR EACH LOCATION WHERE VOLUME DAMPERS ARE INSTALLED BEHIND FURRINGS, CHASES, OR ABOVE INACCESSIBLE CEILINGS. SIZE AND POSITION REMOTE DAMPER OPERATOR SO THAT THE CONCEALED VOLUME DAMPERS CAN BE ADJUSTED. REMOTE OPERATOR SHALL BE A STRAIGHT SOLID SHAFT EXTENSION IN-LINE FOR DIRECT CONNECTION TO VOLUME DAMPER SHAFT WITHOUT GEAR MECHANISM, UNLESS OTHERWISE INDICATED ON THE DRAWINGS. COORDINATE WITH ARCHITECT AND GENERAL CONTRACTOR FOR APPROVAL, EXACT LOCATION, CONDITIONS, SIZES, FINISHES, ETC.

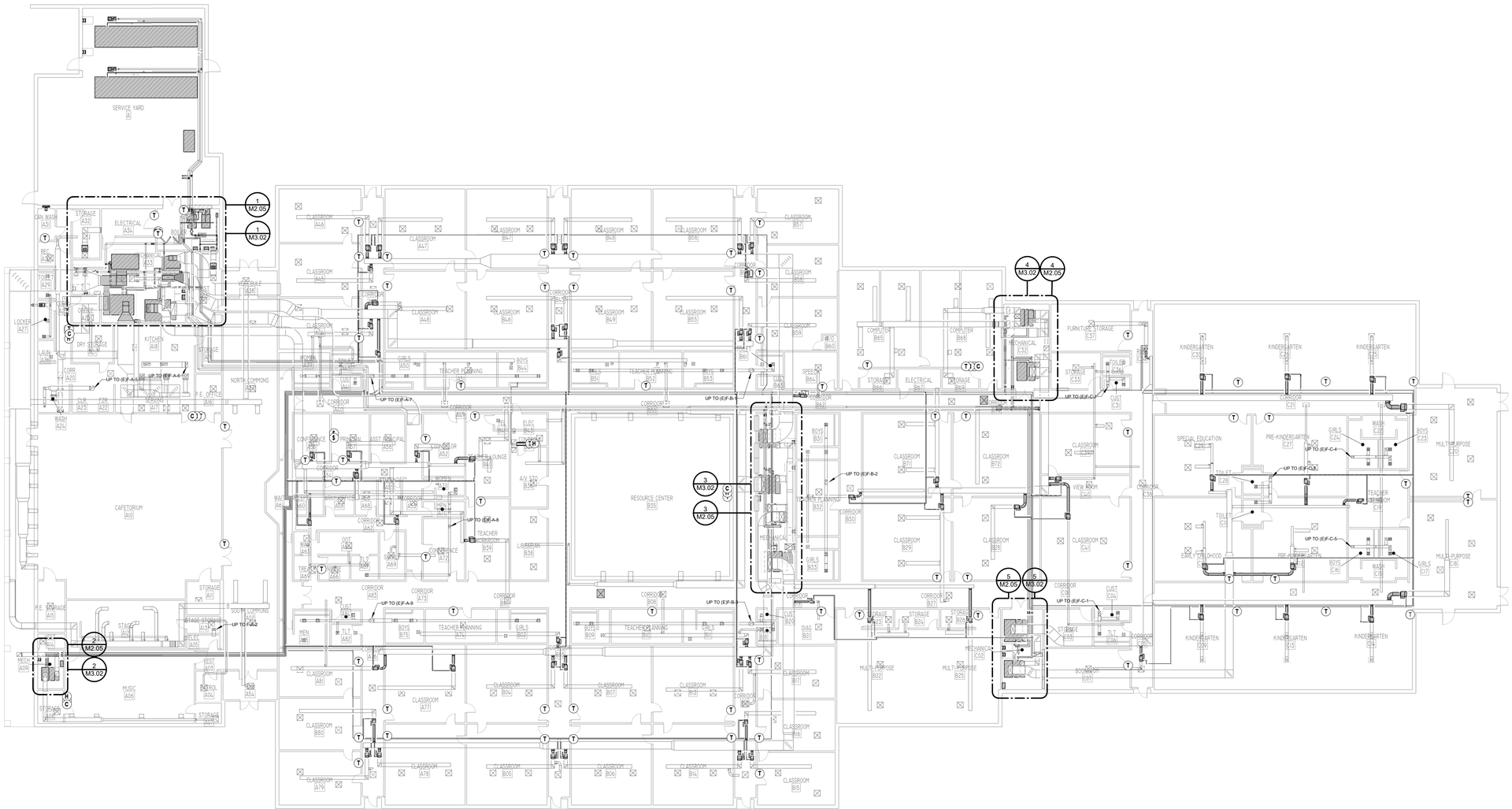
W. HVAC SYSTEMS SHALL BE INSTALLED COMPLETE WITH ALL BALANCING AND REGULATING DEVICES NECESSARY FOR THE TAB CONTRACTOR TO PERFORM THEIR WORK. COORDINATE WITH THE TAB CONTRACTOR TO DETERMINE THEIR EXACT REQUIREMENTS. ALL HVAC SYSTEMS SHALL BE STARTED PER MANUFACTURER'S START-UP INSTRUCTIONS. REPLACE FILTERS, BELTS, SHEAVES, DAMPERS, VALVES, STARTERS AND HEATERS AS NECESSARY PRIOR TO TAB.

X. CONTRACTOR SHALL PROVIDE ALL TESTING, ADJUSTING, AND BALANCING WORK TO INCLUDE, BUT NOT LIMITED TO, ADJUSTMENT OF DAMPERS, BALANCE AIR DEVICES, VERIFY CORRECT SETPOINT AND CALIBRATION OF THERMOSTATS, VERIFY ALL SEQUENCE OF OPERATION, STAGING OF COOLING/ HEATING AS APPLICABLE, BALANCE OF CONDENSER AND HEATING WATER SYSTEMS, PUMPS, BOILERS, COOLING TOWERS. NOTE DEFICIENCIES IN MECHANICAL SYSTEM, ETC. FOR A CORRECTLY OPERATING MECHANICAL SYSTEM. CONTRACTOR SHALL REPLACE ALL FILTERS AND CLEAN ALL STRAINERS. TESTING AND BALANCING SUBCONTRACTOR MUST BE A MEMBER IN GOOD STANDING OF AABC AND SUBMIT REPORT ON AABC OR SMACNA FORMS FOR APPROVAL BY THE ENGINEER. PROVIDE A TEST AND BALANCE REPORT TO THE MECHANICAL INSPECTOR AT TIME OF HEATING FINAL INSPECTION. TAB CONTRACTOR SHALL COORDINATE WITH THE MECHANICAL CONTRACTOR TO LOCATE DP SENSORS IN PIPING FOR PUMPING SYSTEMS AND STATIC PRESSURE SENSORS IN DUCTWORK FOR FAN SYSTEMS.

Y. MECHANICAL CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR FOR ALL ELECTRICAL POWER REQUIREMENTS. CONTRACTOR SHALL ENSURE THE FURNISHING AND INSTALLATION OF ALL BRANCH ELECTRICAL CIRCUIT WIRING, CONDUITS, PROTECTIVE DEVICES, DISCONNECTS, AND ACCESSORIES FOR ALL ELECTRICAL CONTROL POWER WIRING TO INCLUDE, BUT NOT LIMITED TO, CONTROL PANELS, ACTUATORS, SMOKE DETECTORS, CONTROL / MOTORIZED DAMPER, PRESSURE MONITORS, FIRE/SMOKE DAMPERS, VARIABLE FREQUENCY DRIVES, VAV TERMINALS (24V TRANSFORMER) AND ALL OTHER 120V CONTROLS AS REQUIRED FOR A COMPLETE CONTROL SYSTEM WHETHER SHOWN TO BE PERFORMED BY OTHER OR NOT. ALL ELECTRICAL WORK SHALL BE INSTALLED IN FULL ACCORDANCE WITH REQUIREMENTS OF ELECTRICAL SPECIFICATIONS AND THE NATIONAL ELECTRICAL CODE.

Z. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION AND SIZE OF LOUVERS. BLANK OFF AREA OF LOUVER NOT USED FOR INTAKE OR EXHAUST. LOUVERS SHALL BE DRAINABALE STATIONARY TYPE AND SHALL BE AMCA 500-L CERTIFIED. LOUVERS LOCATED IN HURRICANE-PRONE REGIONS SHALL BE AMCA 550 CERTIFIED. LOUVERS LOCATED IN WIND-BOURNE DEBRIS REGIONS WITHIN 30 FEET OF GRADE SHALL BE AMCA 540 CERTIFIED.

AA. CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING FINISHES AND FURNISHINGS FROM DAMAGE DURING



1 LEVEL 1 COMPOSITE MECHANICAL DEMO & NEW PLAN

1/16" = 1'-0"

MECHANCAL GENERAL NOTES

1. CONTRACTOR SHALL INCLUDE IN PRICING TO CLEAN ALL DUCTWORK THROUGHOUT ENTIRE CAMPUS (SUPPLY, RETURN & EXHAUST).

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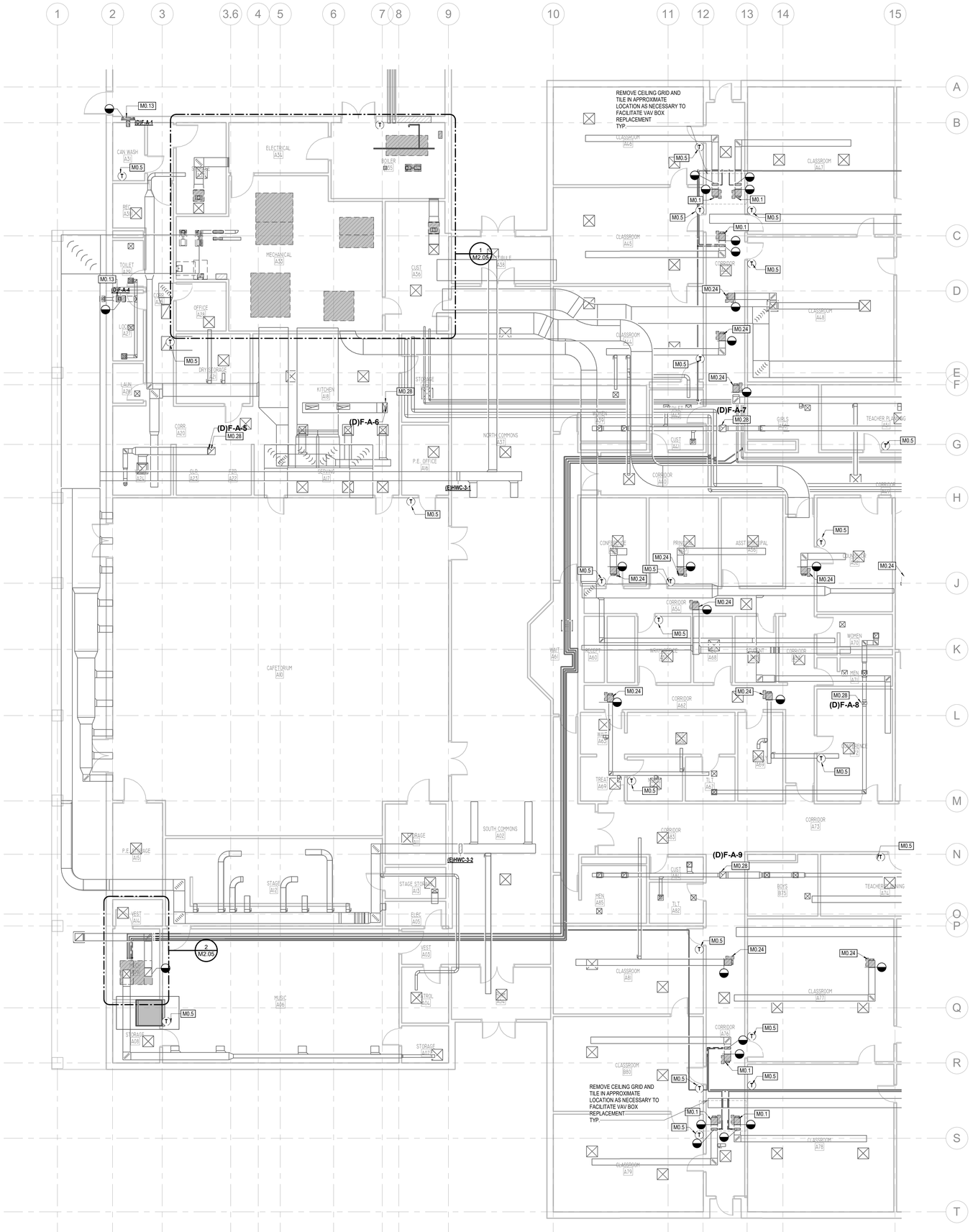
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SHEET TITLE: COMPOSITE MECHANICAL PLAN - DEMO & NEW

SHEET NUMBER: M1.00

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MECHANICAL KEYED NOTES

M0.1 EXISTING VAV BOX / HOT WATER COIL AND ALL ASSOCIATED CONTROLS, ELECTRICAL, VALVES, HANGERS, SUPPORTS, PIPIE CONNECTIONS AND ACCESSORIES SHALL BE REMOVED TO THE ASSOCIATED UNIT. MAIN DUCTWORK, AIR DEVICES AND HYDRONIC PIPING TO REMAIN.

M0.5 EXISTING THERMOSTAT AND ALL ASSOCIATED WIRING SHALL BE DEMOLISHED IN ITS ENTIRETY.

M0.13 DEMOLISH EXISTING FAN AT APPROXIMATE LOCATION SHOWN. DUCTWORK TO REMAIN.

M0.24 EXISTING VAV BOX AND ALL ASSOCIATED CONTROLS, ELECTRICAL, VALVES, HANGERS, SUPPORTS, PIPIE CONNECTIONS AND ACCESSORIES SHALL BE REMOVED. MAIN DUCTWORK, AND AIR DEVICES TO REMAIN.

M0.28 EXISTING DUCTWORK TO BE DISCONNECTED AND RECONNECTED TO NEW ROOFTOP FAN. MODIFY AND EXTEND DUCTWORK AS REQUIRED TO ACCOMMODATE NEW FAN.

1 DEMOLITION MECHANICAL PLANS - AREA A

1/8" = 1'-0"

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SHEET TITLE: MECHANICAL DEMOLITION PLAN - AREA A

SHEET NUMBER: M2.01

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MECHANICAL KEYED NOTES

M0.1 EXISTING VAV BOX / HOT WATER COIL AND ALL ASSOCIATED CONTROLS, ELECTRICAL, VALVES, HANGERS, SUPPORTS, PIPE CONNECTIONS AND ACCESSORIES SHALL BE REMOVED TO THE ASSOCIATED UNIT. MAIN DUCTWORK, AIR DEVICES AND HYDRONIC PIPING TO REMAIN.

M0.5 EXISTING THERMOSTAT AND ALL ASSOCIATED WIRING SHALL BE DEMOLISHED IN ITS ENTIRETY.

M0.24 EXISTING VAV BOX AND ALL ASSOCIATED CONTROLS, ELECTRICAL, VALVES, HANGERS, SUPPORTS, PIPE CONNECTIONS AND ACCESSORIES SHALL BE REMOVED. MAIN DUCTWORK, AND AIR DEVICES TO REMAIN.

M0.28 EXISTING DUCTWORK TO BE DISCONNECTED AND RECONNECTED TO NEW ROOFTOP FAN. MODIFY AND EXTEND DUCTWORK AS REQUIRED TO ACCOMMODATE NEW FAN.

REMOVE CEILING GRID AND TILE IN APPROXIMATE LOCATION AS NECESSARY TO FACILITATE VAV BOX REPLACEMENT TYP.

REMOVE CEILING GRID AND TILE IN APPROXIMATE LOCATION AS NECESSARY TO FACILITATE VAV BOX REPLACEMENT TYP.

(D)F-B-1

(D)F-B-2

(D)F-B-3

(D)F-A-8

(D)AHU-8 (D)VFD-AHU-08

(D)AHU-7 (D)VFD-AHU-07

(D)AHU-6 (D)VFD-AHU-06

3 M2.05

1 DEMOLITION MECHANICAL PLANS - AREA B

1/8" = 1'-0"

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SHEET TITLE: MECHANICAL DEMOLITION PLAN - AREA B

SHEET NUMBER: M2.02

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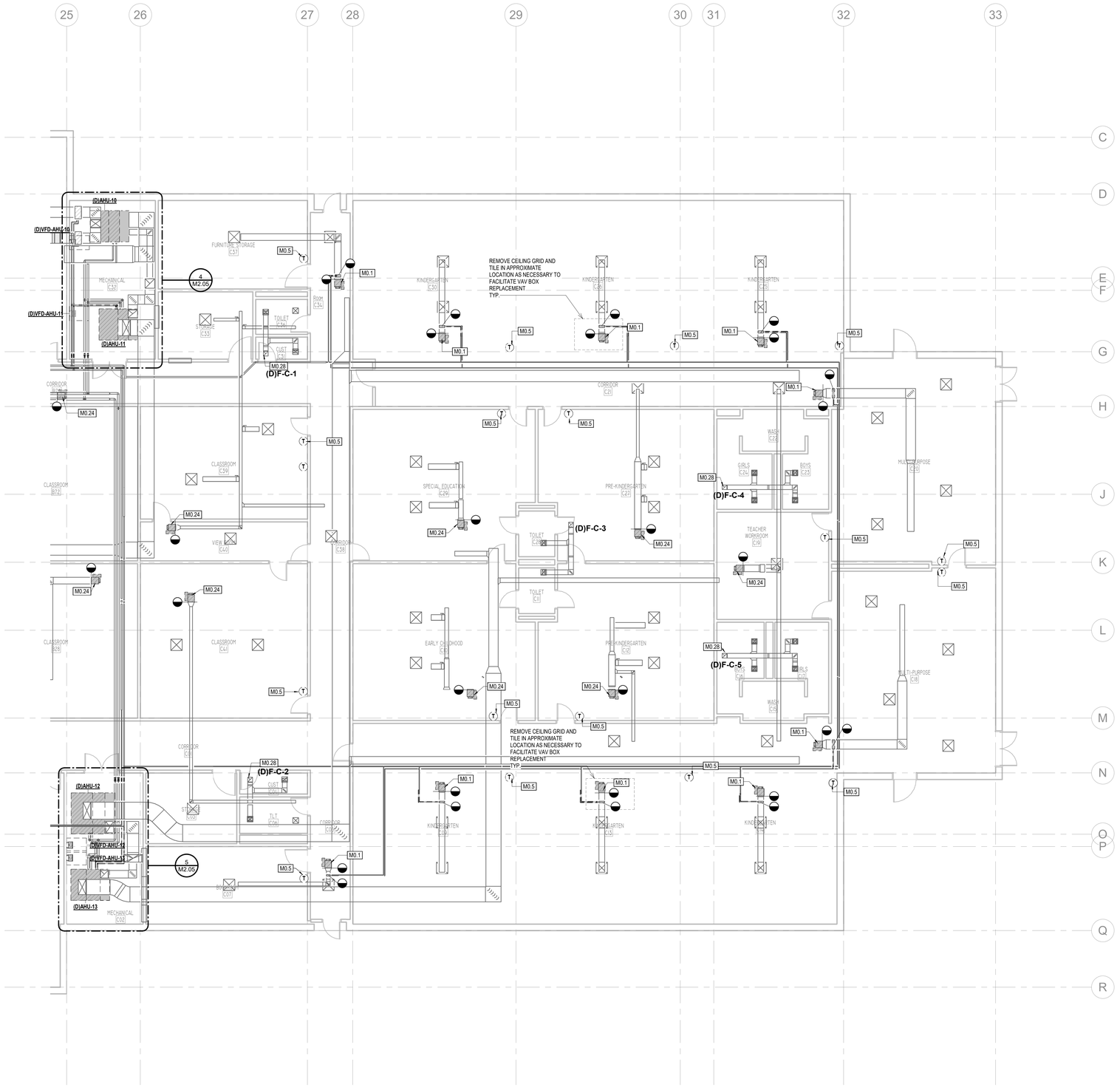
MECHANICAL KEYED NOTES

M0.1 EXISTING VAV BOX / HOT WATER COIL AND ALL ASSOCIATED CONTROLS, ELECTRICAL, VALVES, HANGERS, SUPPORTS, PIPIE CONNECTIONS AND ACCESSORIES SHALL BE REMOVED TO THE ASSOCIATED UNIT. MAIN DUCTWORK, AIR DEVICES AND HYDRONIC PIPING TO REMAIN.

M0.5 EXISTING THERMOSTAT AND ALL ASSOCIATED WIRING SHALL BE DEMOLISHED IN ITS ENTIRETY.

M0.24 EXISTING VAV BOX AND ALL ASSOCIATED CONTROLS, ELECTRICAL, VALVES, HANGERS, SUPPORTS, PIPIE CONNECTIONS AND ACCESSORIES SHALL BE REMOVED. MAIN DUCTWORK, AND AIR DEVICES TO REMAIN.

M0.28 EXISTING DUCTWORK TO BE DISCONNECTED AND RECONNECTED TO NEW ROOFTOP FAN. MODIFY AND EXTEND DUCTWORK AS REQUIRED TO ACCOMMODATE NEW FAN.



1 DEMOLITION MECHANICAL PLANS - AREA C

1/8" = 1'-0"

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SHEET TITLE: MECHANICAL DEMOLITION PLAN - AREA C

SHEET NUMBER: M2.03

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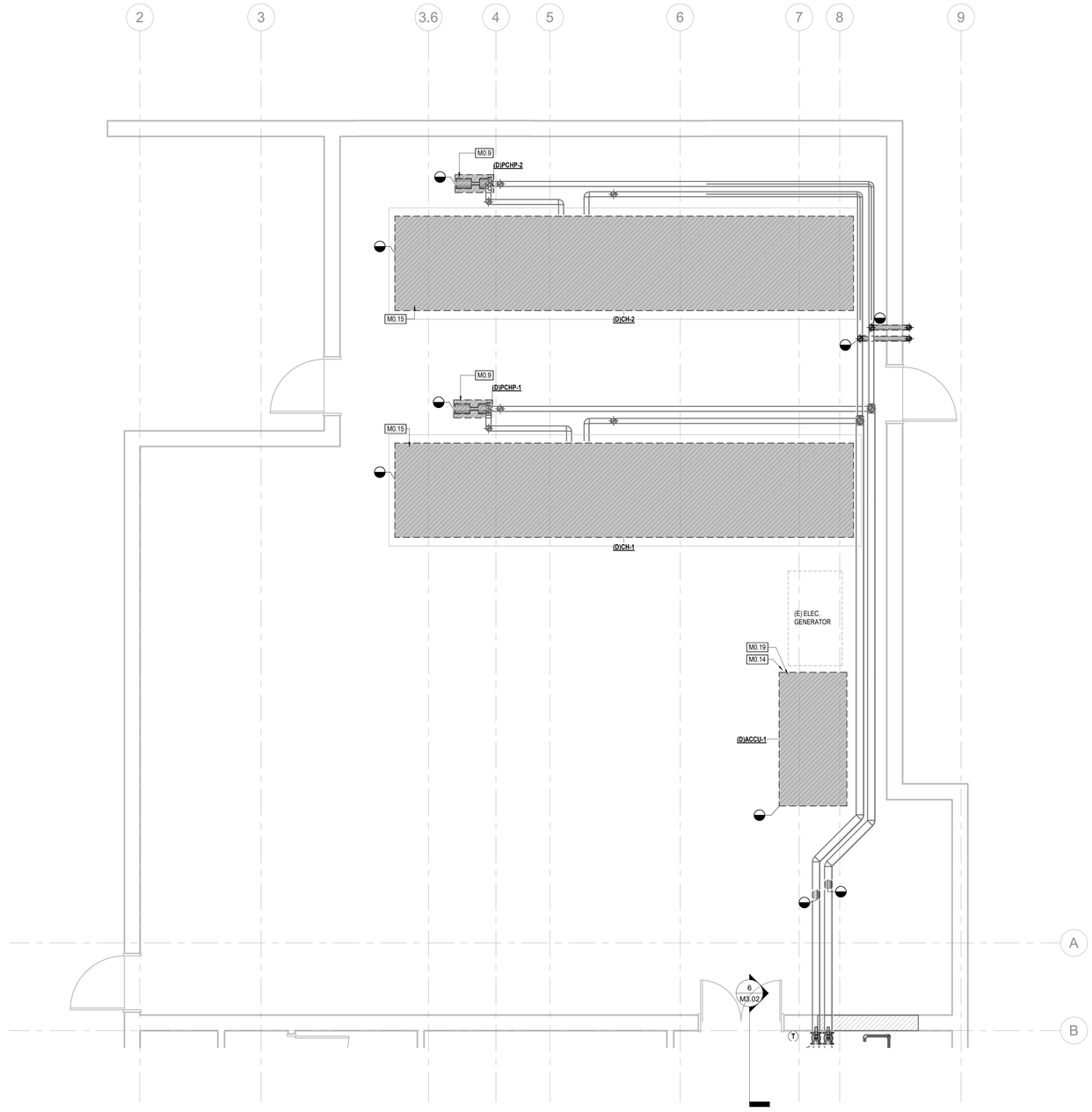
MECHANICAL KEYED NOTES

M0.9 DEMOLISH EXISTING PUMP AT APPROXIMATE LOCATION SHOWN. HOUSEKEEPING PAD TO REMAIN.

M0.14 DEMOLISH EXISTING GROUND MOUNTED AIR COOLED CONDENSING UNIT AT APPROXIMATE LOCATION SHOWN. HOUSEKEEPING PAD TO REMAIN.

M0.15 DEMOLISH EXISTING GROUND MOUNTED AIR COOLED CHILLER AT APPROXIMATE LOCATION SHOWN. HOUSEKEEPING PAD TO REMAIN.

M0.19 DEMOLISH EXISTING REFRIGERANT LINES BACK TO INDOOR UNIT. PROVIDE WITH NEW.



1 DEMOLITION MECHANICAL PLAN - SERVICE YARD

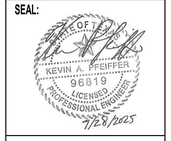
1/4" = 1'-0"

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SHEET TITLE: MECHANICAL DEMOLITION PLAN - SERVICE YARD

SHEET NUMBER: M2.04

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MECHANCAL GENERAL NOTES

1. CONTRACTOR SHALL INCLUDE IN PRICING TO CLEAN ALL DUCTWORK THROUGHOUT ENTIRE CAMPUS (SUPPLY, RETURN & EXHAUST).

2. REPLACE ALL EXISTING PIPING INSULATION IN ALL MECHANICAL ROOMS BACK TO MECHANICAL ROOM WALL.

3. EXISTING CHILLED/HOT WATER EXPANSION TANK TO REMAIN.

MECHANICAL KEYED NOTES

M0.5 EXISTING THERMOSTAT AND ALL ASSOCIATED WIRING SHALL BE DEMOLISHED IN ITS ENTIRETY.

M0.6 DEMOLISH EXISTING BOILER. SCOPE OF WORK TO BE LIMITED TO BOILER, HYDRONIC PIPING CONNECTIONS, FLUE, VENT DUCT CONNECTIONS, NATURAL GAS PIPING AND ELECTRICAL CONNECTIONS AT BOILER. DDC CONTROLS TO BE DISCONNECTED AND RECONNECTED. THE EXISTING OPENINGS OF THE FLUES WILL BE REQUIRED TO BE PATCHED, SEALED, AND INSULATED TO MATCH EXISTING ROOF.

M0.9 DEMOLISH EXISTING PUMP AT APPROXIMATE LOCATION SHOWN. HOUSEKEEPING PAD TO REMAIN.

M0.10 DEMOLISH EXISTING GROUND MOUNTED AHU AT APPROXIMATE LOCATION SHOWN. DEMOLISH HOUSEKEEPING AS REQUIRED TO ACCOMMODATE NEW AHU FOOTPRINT. DUCK WORK TO BE DEMOLISHED AS REQUIRED TO FACILITATE NEW FOOTPRINT OF UNIT.

M0.11 DEMOLISH EXISTING VFD AND SUPPORT BRACKET.

M0.12 DEMOLISH EXISTING GROUND MOUNTED AHU AT APPROXIMATE LOCATION SHOWN. HOUSEKEEPING PAD TO REMAIN. ALL ASSOCIATED PIPING AND DUCTWORK SHALL BE A DISCONNECT AND RECONNECT BASIS.

M0.13 DEMOLISH EXISTING FAN AT APPROXIMATE LOCATION SHOWN. DUCTWORK TO REMAIN.

M0.16 DEMOLISH EXISTING ELECTRIC UNIT HEATER AT APPROXIMATE LOCATION SHOWN.

M0.17 DEMOLISH EXISTING PUMP AT APPROXIMATE LOCATION SHOWN. HOUSEKEEPING PAD TO BE DEMOLISHED.

M0.18 DEMOLISH EXISTING AIR DIRT SEPARATOR.

M0.21 DEMOLISH EXISTING REFRIGERANT LINES BACK TO OUTDOOR UNIT. PROVIDE WITH NEW.

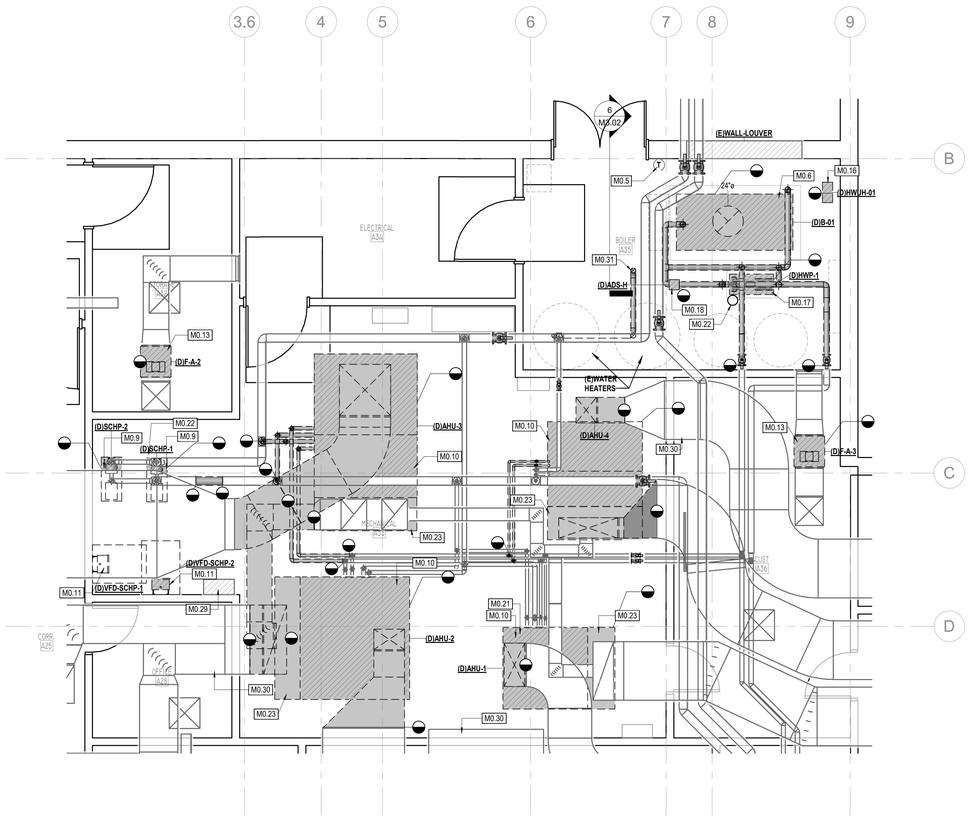
M0.22 DEMOLISH EXISTING CHEMICAL POT FEEDER AND REPLACE WITH NEW.

M0.23 DEMOLISH EXISTING MIXING PLENUM BOX. DEMOLISH MOTORIZED DAMPER AND REPLACE WITH NEW.

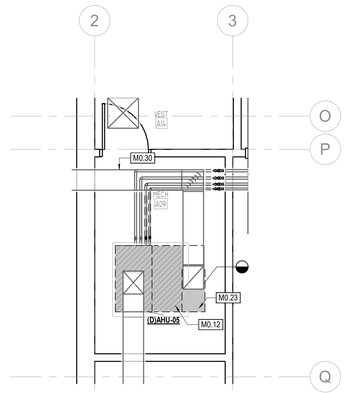
M0.29 EXISTING BAS SYSTEM TO REMAIN.

M0.30 EXISTING RETURN AIR BOOT, WALL OPENING, AND DUCTED-RETURN TO REMAIN.

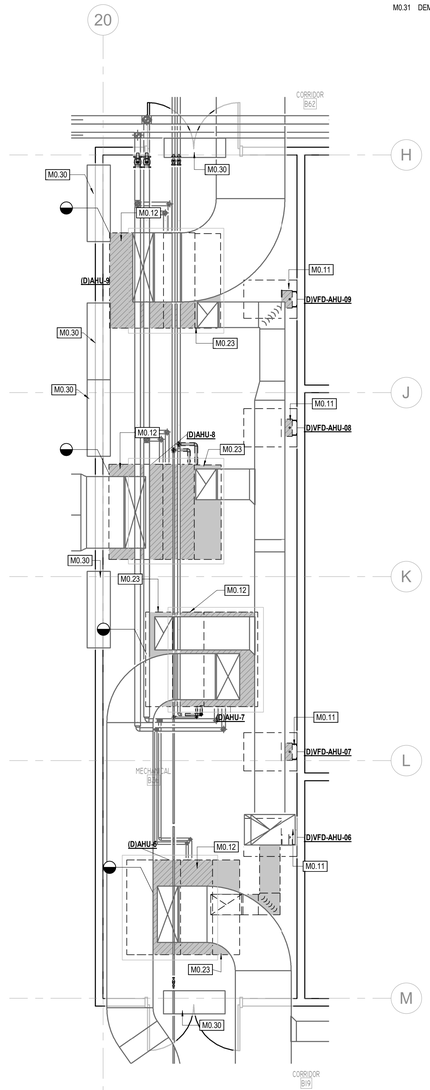
M0.31 DEMOLISH EXISTING WATER HEATER FLUES.



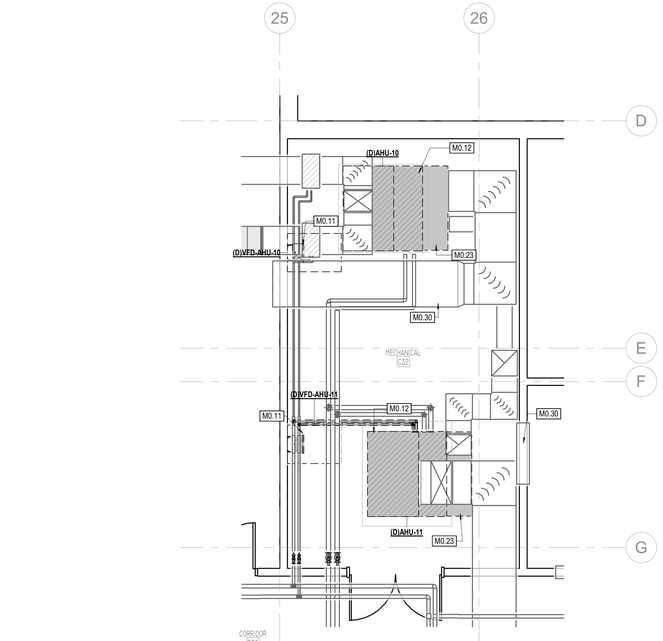
1 ENLARGED DEMOLITION MECHANICAL PLAN - MECH ROOM 1
1/4" = 1'-0"



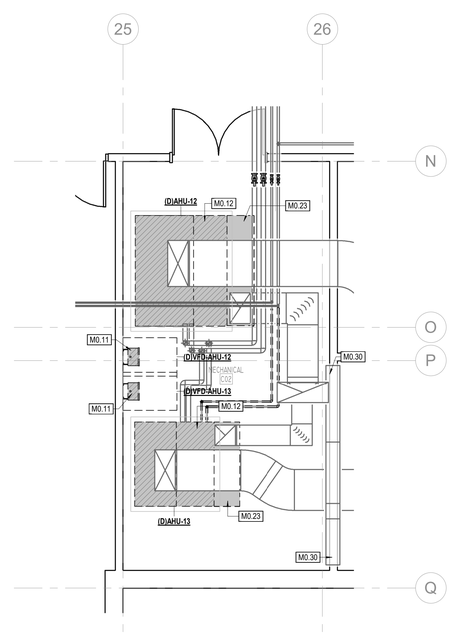
2 ENLARGED DEMOLITION MECHANICAL PLAN - MECH ROOM 2
1/4" = 1'-0"



3 ENLARGED DEMOLITION MECHANICAL PLAN - MECH ROOM 3
1/4" = 1'-0"



4 ENLARGED DEMOLITION MECHANICAL PLAN - MECH ROOM 4
1/4" = 1'-0"



5 ENLARGED DEMOLITION MECHANICAL PLAN - MECH ROOM 5
1/4" = 1'-0"

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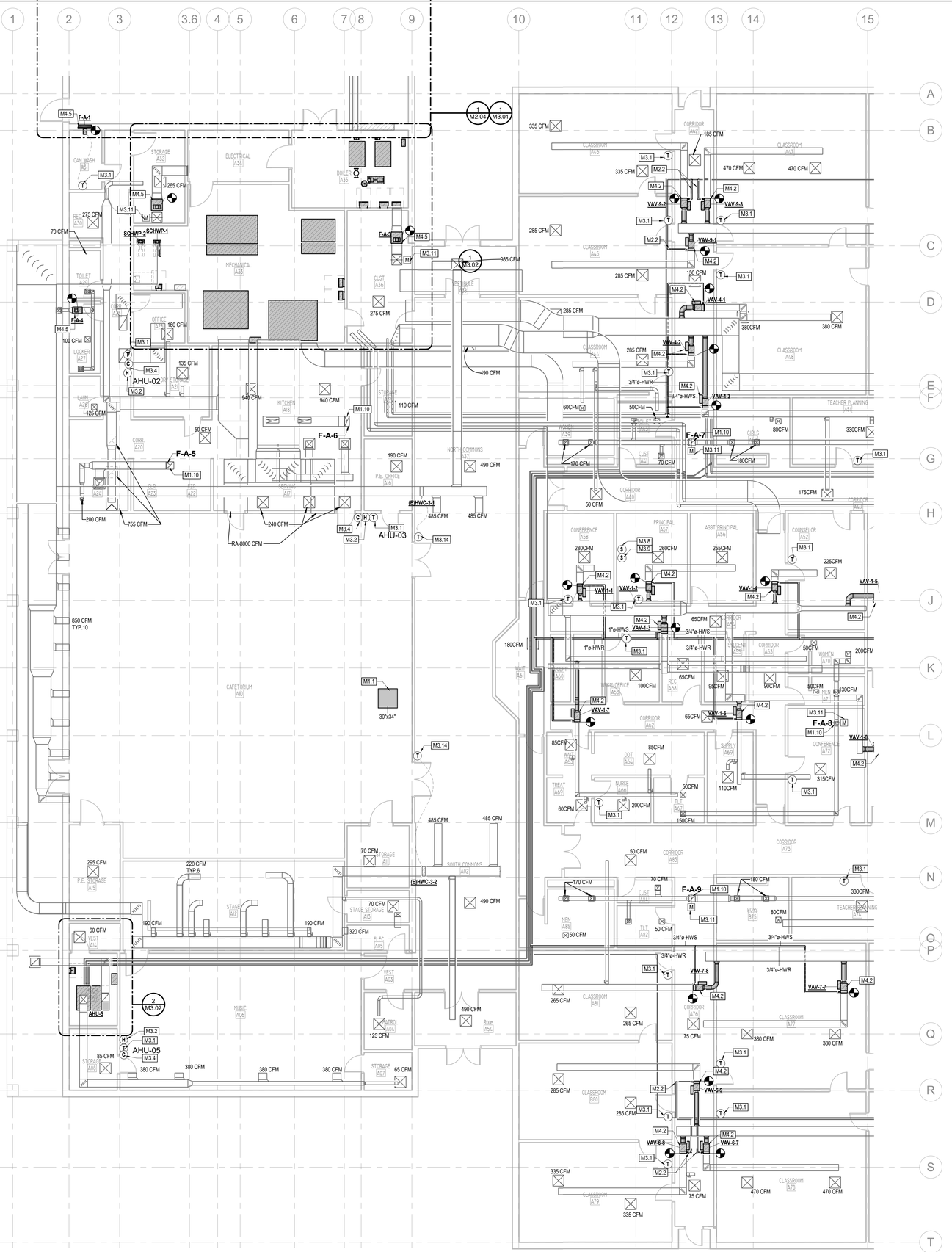
PROJECT NUMBER 250054.000

SHEET TITLE: MECHANICAL DEMOLITION PLAN - ENLARGED MECHANICAL ROOMS

SHEET NUMBER: M2.05

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MECHANICAL KEYED NOTES

M1.1 ROUTE DUCTWORK UP TO ROOF AND TERMINATE AT RELIEF AIR HOOD. SIZE AS INDICATED ON PLANS. RE: 31/M6.01

M1.10 DUCTWORK TO BE ROUTED TO NEW FAN. MODIFY / EXTEND AS REQUIRED FOR NEW CONNECTION.

M2.2 RE-ROUTE EXISTING HOT WATER COILS TO NEW VAV HOT WATER COIL BOX.

M3.1 PROVIDE THERMOSTAT AT APPROXIMATE LOCATION SHOWN. THERMOSTAT SHALL BE INSTALLED AT SAME ELEVATION AS LIGHT SWITCHES. COORDINATE FINAL LOCATION WITH ARCHITECT AND OTHER TRADES TO AVOID CONFLICTS.

M3.2 PROVIDE HUMIDISTAT AT APPROXIMATE LOCATION SHOWN. HUMIDISTAT SHALL BE INSTALLED AT SAME ELEVATION AS LIGHT SWITCHES. COORDINATE FINAL LOCATION WITH ARCHITECT AND OTHER TRADES TO AVOID CONFLICTS.

M3.4 PROVIDE WALL MOUNTED CO2 SENSOR AT APPROXIMATE LOCATION SHOWN. CO2 SENSOR SHALL BE INSTALLED AT SAME ELEVATION AS LIGHT SWITCHES. COORDINATE FINAL LOCATION WITH ARCHITECT AND OTHER TRADES TO AVOID CONFLICTS. CO2 SENSOR SHALL MONITOR SPACE CO2 CONCENTRATION AND SHALL BE UTILIZED TO CONTROL OUTSIDE AIRFLOW SETPOINT AS INDICATED IN THE ASSOCIATED AIR HANDLING UNIT SEQUENCE OF OPERATIONS.

M3.8 PROVIDE HVAC EMERGENCY SHUT OFF AT APPROXIMATE LOCATION SHOWN. COORDINATE EXACT MOUNTING HEIGHT AND LOCATION WITH ARCHITECT/OWNER AND OTHER TRADES PRIOR TO ROUGH-IN TO AVOID CONFLICT.

M3.9 PROVIDE MUSHROOM HEAD PUSH BUTTON FOR DX OVERRIDE. COORDINATE WITH ARCHITECT PRIOR TO INSTALL.

M3.11 PROVIDE MOTORIZED DAMPER AT APPROXIMATE LOCATION SHOWN. CONTRACTOR TO FIELD VERIFY DUCTWORK SIZE AND INSTALL IN AN ACCESSIBLE LOCATION FOR MAINTENANCE.

M3.14 PROVIDE THERMOSTAT FOR HOT WATER COIL AT APPROXIMATE LOCATION SHOWN. THERMOSTAT SHALL BE INSTALLED AT SAME ELEVATION AS LIGHT SWITCHES. COORDINATE FINAL LOCATION WITH ARCHITECT AND OTHER TRADES TO AVOID CONFLICTS.

M4.2 PROVIDE SINGLE DUCT VAV WITH HOT WATER COILS TERMINAL UNIT AT APPROXIMATE LOCATION SHOWN. SUPPORT UNIT FROM STRUCTURE. PROVIDE ALL CLEARANCES AS REQUIRED BY EQUIPMENT MANUFACTURER. COORDINATE WITH ADJACENT PIPING, WALLS, CONDUIT, STRUCTURAL MEMBERS, ETC. RE: DETAIL 16/M6.01.

M4.5 PROVIDE IN-LINE FAN AT APPROXIMATE LOCATION SHOWN. SUSPEND FAN FROM STRUCTURE. PROVIDE NECESSARY DUCT TRANSITIONS FROM FAN INLET AND DISCHARGE. RE: DETAIL 11/M6.01.

MECHANCAL GENERAL NOTES

1. CONTRACTOR SHALL INCLUDE IN PRICING TO REPLACE ALL CONTROL VALVES AND MANUAL VALVES FOR VAV BOXES DURING BID PROCESS.

2. CONTRACTOR SHALL INCLUDE IN PRICING TO CLEAN ALL DUCTWORK THROUGHOUT ENTIRE CAMPUS (SUPPLY, RETURN & EXHAUST).

3. ALL HOT WATER COILS THAT ARE TO REMAIN ARE TO BE CLEANED.

1 **MECHANICAL PLANS - AREA A**
1/8" = 1'-0"

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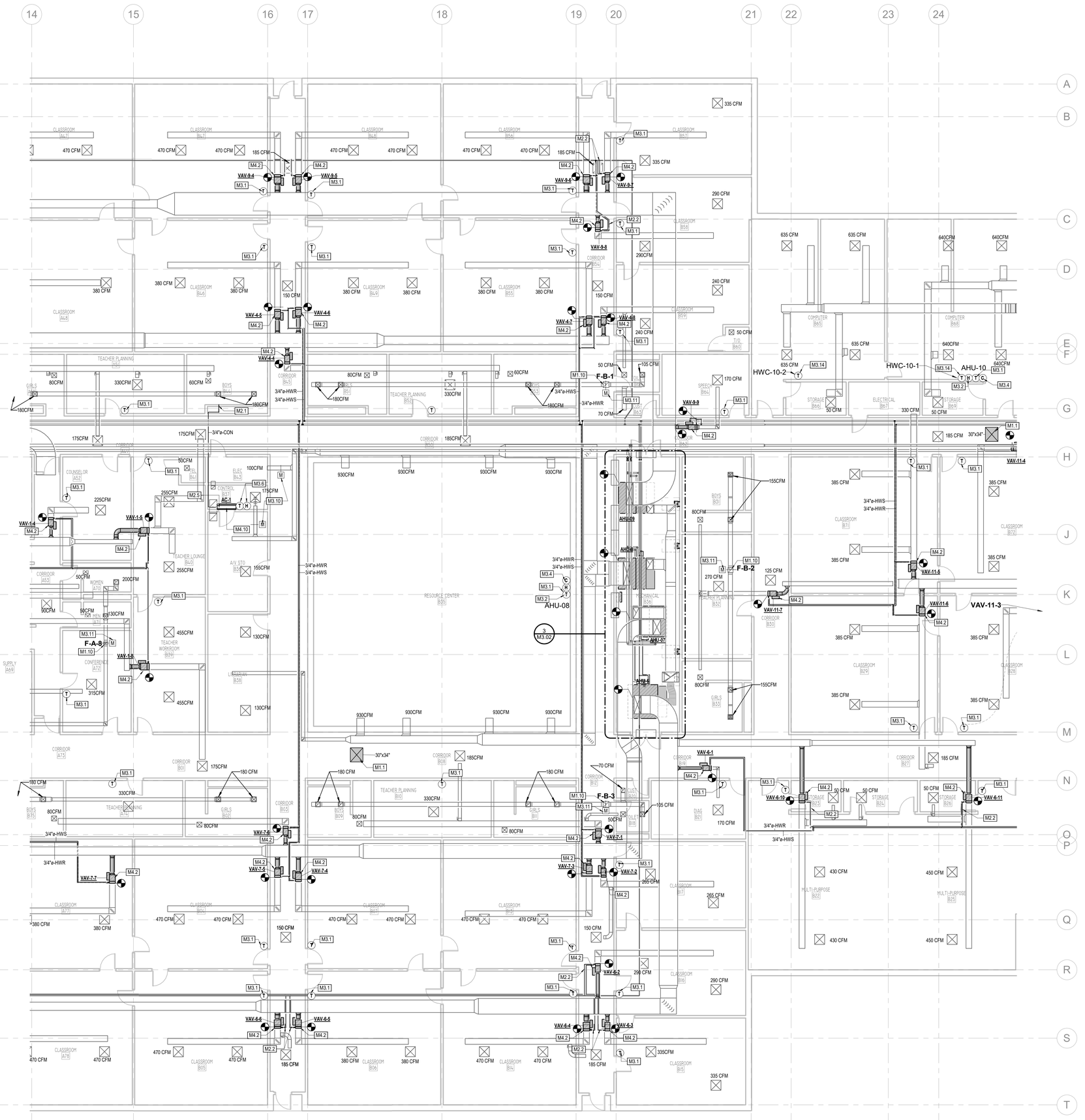
SHEET TITLE: MECHANICAL PLAN - AREA A

SHEET NUMBER: M2.11

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1 **LEVEL 1 MECHANICAL PLANS - AREA B**
1/8" = 1'-0"

MECHANICAL KEYED NOTES

M1.1 ROUTE DUCTWORK UP TO ROOF AND TERMINATE AT RELIEF AIR HOOD. SIZE AS INDICATED ON PLANS. RE: 31/M6.01

M1.10 DUCTWORK TO BE ROUTED TO NEW FAN. MODIFY / EXTEND AS REQUIRED FOR NEW CONNECTION.

M2.1 ROUTE 3/4" CONDENSATE DRAIN LINE FROM FAN COIL UNIT TO FUNNEL DRAIN LOCATED BELOW SINK. COORDINATE EXACT DRAIN LOCATION WITH PLUMBING.

M2.2 RE-ROUTE EXISTING HOT WATER COILS TO NEW VAV HOT WATER COIL BOX.

M2.5 ROUTE REFRIGERANT PIPING FROM WALL MOUNTED DUCTLESS FAN COIL UNIT TO ASSOCIATED AIR COOLED CONDENSING UNIT. REFRIGERANT PIPING SHALL BE SIZED PER MANUFACTURER'S RECOMMENDATIONS. FIELD COORDINATE EXACT ROUTING. RE: DETAIL 25/M6.01.

M3.1 PROVIDE THERMOSTAT AT APPROXIMATE LOCATION SHOWN. THERMOSTAT SHALL BE INSTALLED AT SAME ELEVATION AS LIGHT SWITCHES. COORDINATE FINAL LOCATION WITH ARCHITECT AND OTHER TRADES TO AVOID CONFLICTS.

M3.2 PROVIDE HUMIDISTAT AT APPROXIMATE LOCATION SHOWN. HUMIDISTAT SHALL BE INSTALLED AT SAME ELEVATION AS LIGHT SWITCHES. COORDINATE FINAL LOCATION WITH ARCHITECT AND OTHER TRADES TO AVOID CONFLICTS.

M3.4 PROVIDE WALL MOUNTED CO2 SENSOR AT APPROXIMATE LOCATION SHOWN. CO2 SENSOR SHALL BE INSTALLED AT SAME ELEVATION AS LIGHT SWITCHES. COORDINATE FINAL LOCATION WITH ARCHITECT AND OTHER TRADES TO AVOID CONFLICTS. CO2 SENSOR SHALL MONITOR SPACE CO2 CONCENTRATION AND SHALL BE UTILIZED TO CONTROL OUTSIDE AIRFLOW SETPOINT AS INDICATED IN THE ASSOCIATED AIR HANDLING UNIT SEQUENCE OF OPERATIONS.

M3.6 PROVIDE WIRED WALL MOUNTED CONTROLLER FOR DUCTLESS AIR CONDITIONING UNIT. CONTROLLER SHALL BE PROVIDED BY DUCTLESS AIR CONDITIONING UNIT MANUFACTURER. INSTALL AT SAME ELEVATION AS LIGHT SWITCHES. COORDINATE FINAL LOCATION WITH ARCHITECT AND OTHER TRADES TO AVOID CONFLICTS.

M3.10 PROVIDE MOTORIZED DAMPER TO CLOSE WHEN AHU-08 IS IN HEATING MODE. DAMPER SHALL ONLY BE OPEN DURING COOLING MODE. FOR BASE BUILDING AIR.

M3.11 PROVIDE MOTORIZED DAMPER AT APPROXIMATE LOCATION SHOWN. CONTRACTOR TO FIELD VERIFY DUCTWORK SIZE AND INSTALL IN AN ACCESSIBLE LOCATION FOR MAINTENANCE.

M3.14 PROVIDE THERMOSTAT FOR HOT WATER COIL AT APPROXIMATE LOCATION SHOWN. THERMOSTAT SHALL BE INSTALLED AT SAME ELEVATION AS LIGHT SWITCHES. COORDINATE FINAL LOCATION WITH ARCHITECT AND OTHER TRADES TO AVOID CONFLICTS.

M4.2 PROVIDE SINGLE DUCT VAV WITH HOT WATER COILS TERMINAL UNIT AT APPROXIMATE LOCATION SHOWN. SUPPORT UNIT FROM STRUCTURE. PROVIDE ALL CLEARANCES AS REQUIRED BY EQUIPMENT MANUFACTURER. COORDINATE WITH ADJACENT PIPING, WALLS, CONDUIT, STRUCTURAL MEMBERS, ETC. RE: DETAIL 16/M6.01.

M4.10 PROVIDE WALL MOUNTED DUCTLESS FAN COIL UNIT AT APPROXIMATE LOCATION SHOWN. INSTALL UNIT AS HIGH AS POSSIBLE ON WALL. CONDENSATE PUMP AND RESPECTIVE CONDENSING UNIT TO BE PLACED EMERGENCY POWER.

MECHANCAL GENERAL NOTES

1. CONTRACTOR SHALL INCLUDE IN PRICING TO REPLACE ALL CONTROL VALVES AND MANUAL VALVES FOR VAV BOXES DURING BID PROCESS.

2. CONTRACTOR SHALL INCLUDE IN PRICING TO CLEAN ALL DUCTWORK THROUGHOUT ENTIRE CAMPUS (SUPPLY, RETURN & EXHAUST).

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PROFESSIONAL ENGINEER
7/28/2025

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SHEET TITLE: MECHANICAL PLAN - AREA B

SHEET NUMBER: M2.12

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MECHANICAL KEYED NOTES

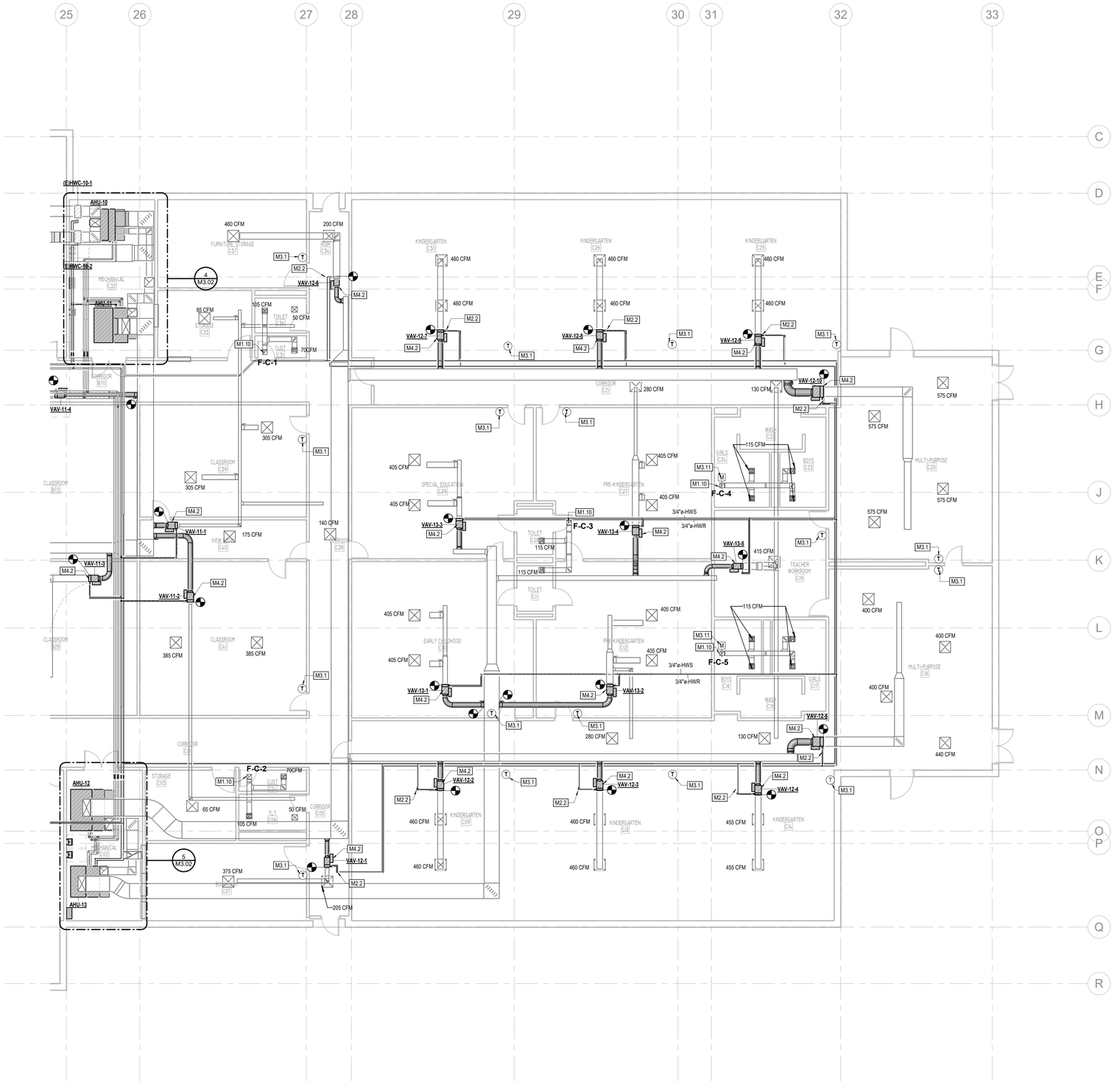
M1.10 DUCTWORK TO BE ROUTED TO NEW FAN. MODIFY / EXTEND AS REQUIRED FOR NEW CONNECTION.

M2.2 RE-ROUTE EXISTING HOT WATER COILS TO NEW VAV HOT WATER COIL BOX.

M3.1 PROVIDE THERMOSTAT AT APPROXIMATE LOCATION SHOWN. THERMOSTAT SHALL BE INSTALLED AT SAME ELEVATION AS LIGHT SWITCHES. COORDINATE FINAL LOCATION WITH ARCHITECT AND OTHER TRADES TO AVOID CONFLICTS.

M3.11 PROVIDE MOTORIZED DAMPER AT APPROXIMATE LOCATION SHOWN. CONTRACTOR TO FIELD VERIFY DUCTWORK SIZE AND INSTALL IN AN ACCESSIBLE LOCATION FOR MAINTENANCE.

M4.2 PROVIDE SINGLE DUCT VAV WITH HOT WATER COILS TERMINAL UNIT AT APPROXIMATE LOCATION SHOWN. SUPPORT UNIT FROM STRUCTURE. PROVIDE ALL CLEARANCES AS REQUIRED BY EQUIPMENT MANUFACTURER. COORDINATE WITH ADJACENT PIPING, WALLS, CONDUIT, STRUCTURAL MEMBERS, ETC. RE: DETAIL 16/M6.01.



1 **MECHANICAL PLANS - AREA C**
1/8" = 1'-0"

MECHANCAL GENERAL NOTES

1. CONTRACTOR SHALL INCLUDE IN PRICING TO REPLACE ALL CONTROL VALVES AND MANUAL VALVES FOR VAV BOXES DURING BID PROCESS.

2. CONTRACTOR SHALL INCLUDE IN PRICING TO CLEAN ALL DUCTWORK THROUGHOUT ENTIRE CAMPUS (SUPPLY, RETURN & EXHAUST).

3. ALL HOT WATER COILS THAT ARE TO REMAIN ARE TO BE CLEANED.

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SHEET NUMBER: M2.13

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MECHANICAL KEYED NOTES

M1.6 PROVIDE NEW CONTROL WIRE CONDUIT BACK TO LOCATION SHOWN.

M2.6 ROUTE REFRIGERANT PIPING FROM AIR COOLED CONDENSING UNIT DOWN TO INDOOR FAN COIL UNIT. REFRIGERANT PIPING SHALL BE SIZED PER MANUFACTURER'S RECOMMENDATIONS. FIELD VERIFY EXACT PIPING ROUTING. RE: DETAIL 25/M6.01.

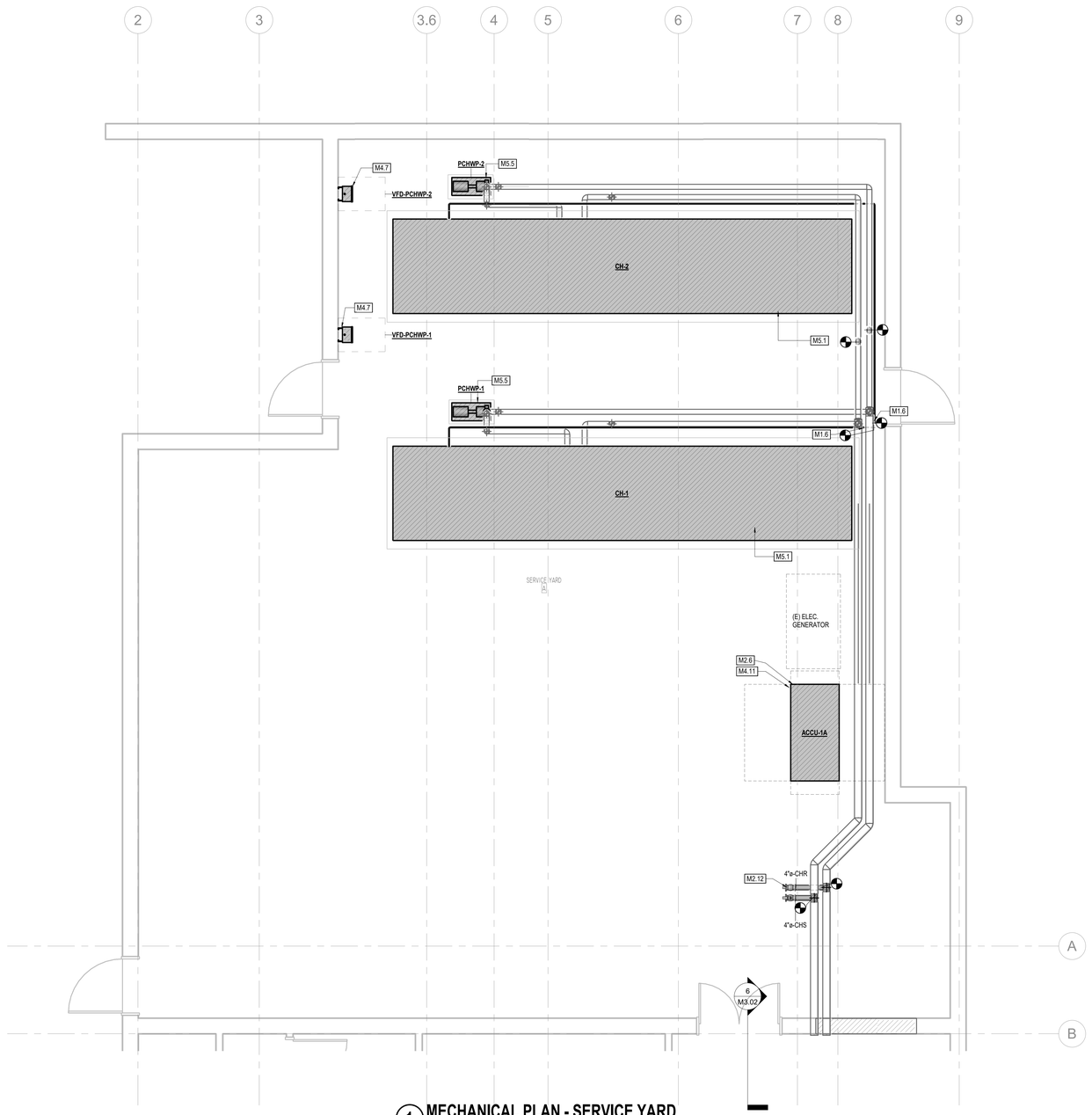
M2.12 PROVIDE A TEE CONNECTION FOR TEMP CHILLER WITH BLIND FLANGES.

M4.7 PROVIDE VARIABLE FREQUENCY DRIVE AT APPROXIMATE LOCATION SHOWN. COORDINATE FINAL LOCATION WITH ELECTRICAL AND CONTROLS CONTRACTORS.

M4.11 PROVIDE GROUND MOUNTED AIR COOLED CONDENSING UNIT AT APPROXIMATE LOCATION SHOWN. INSTALL UNIT ON EXISTING HOUSEKEEPING PAD. PROVIDE ALL CLEARANCES AROUND CONDENSER AS REQUIRED BY EQUIPMENT MANUFACTURER.

M5.1 PROVIDE AIR COOLED CHILLER AT APPROXIMATE LOCATION SHOWN. PROVIDE ALL AIR FLOW CLEARANCES AS REQUIRED BY EQUIPMENT MANUFACTURER. INSTALL ON EXISTING 6" HIGH CONCRETE HOUSEKEEPING PAD. EXISTING CHILLED WATER PIPING CONNECTIONS TO BE TIED BACK INTO NEW CHILLER. PROVIDE NECESSARY TRANSITIONS AS REQUIRED.

M5.5 PROVIDE END SUCTION PUMP AT APPROXIMATE LOCATION SHOWN. INSTALL PER MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS. INSTALL ON EXISTING 6" HIGH CONCRETE HOUSEKEEPING PAD. MODIFY / EXTEND AS REQUIRED. PROVIDE NEW CHILLED WATER PIPING CONNECTIONS TO TIE INTO NEW PUMP AS REQUIRED.



1 **MECHANICAL PLAN - SERVICE YARD**
1/4" = 1'-0"

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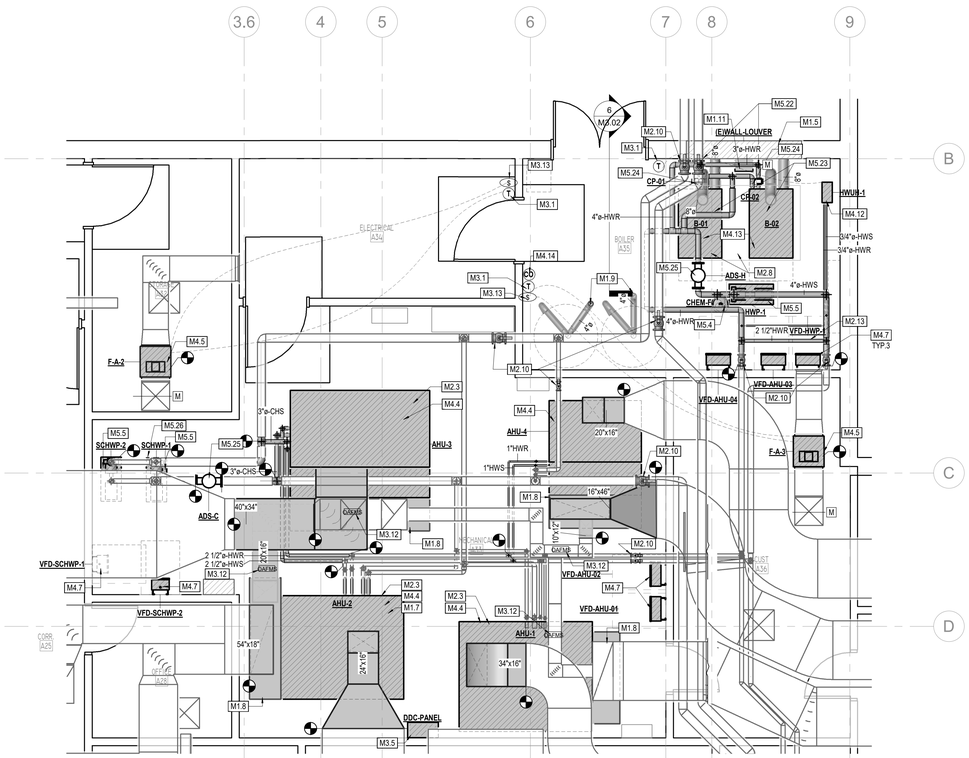
SHEET NUMBER: M3.01

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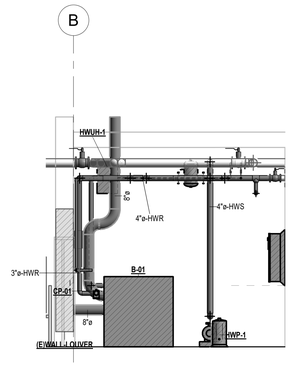
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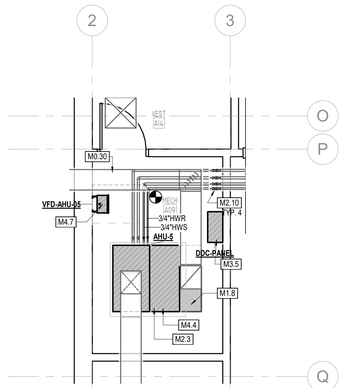
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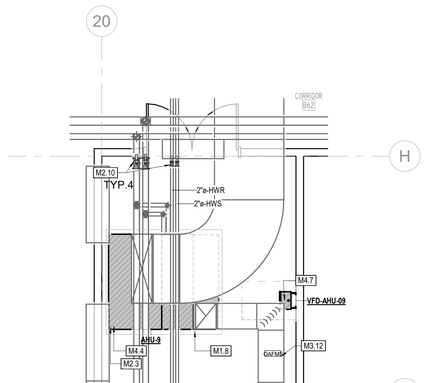
1 ENLARGED MECHANICAL PLAN - MECH ROOM 1
1/4" = 1'-0"



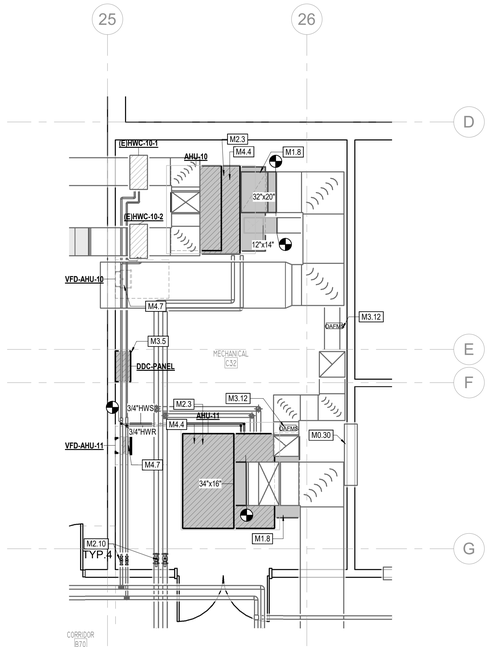
6 Boiler room section view
1/4" = 1'-0"



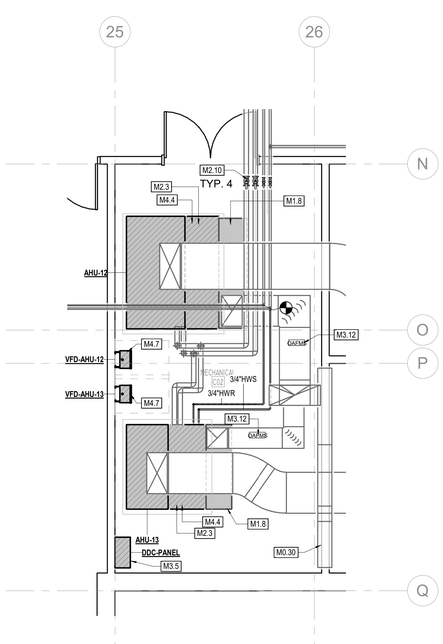
2 ENLARGED MECHANICAL PLAN - MECH ROOM 2
1/4" = 1'-0"



3 ENLARGED MECHANICAL PLAN - MECH ROOM 3
1/4" = 1'-0"



4 ENLARGED MECHANICAL PLAN - MECH ROOM 4
1/4" = 1'-0"



5 ENLARGED MECHANICAL PLAN - MECH ROOM 5
1/4" = 1'-0"

MECHANCAL GENERAL NOTES
1. CONTRACTOR SHALL INCLUDE IN PRICING TO CLEAN ALL DUCTWORK THROUGHOUT ENTIRE CAMPUS (SUPPLY, RETURN & EXHAUST).

2. REPLACE ALL EXISTING PIPING INSULATION IN ALL MECHANICAL ROOMS BACK TO MECHANICAL ROOM WALL.

3. ALL HOT WATER COILS THAT ARE TO REMAIN ARE TO BE CLEANED.

MECHANICAL KEYED NOTES

M0.30 EXISTING RETURN AIR BOOT, WALL OPENING, AND DUCTED-RETURN TO REMAIN.

M1.5 BOTTOM HALF OF LOUVER SHALL BE PARTITIONED AND SEALED TO BE DEDICATED FOR EACH RESPECTIVE BOILER .

M1.7 COIL PULL TO BE VERTICAL IN LIEU OF HORIZONTAL. COORDINATE WITH STRUCTURAL AND OTHER TRADES FOR COIL PULL CLEARANCE.

M1.8 PROVIDE MIXING PLENUM BOX FOR NEW AHU SHOWN. IT SHALL BE 24" DEEP (ALLOWABLE). PROVIDE NEW TRANSITIONS TO TAP INTO PLENUM BOX. PROVIDE MOTORIZED DAMPERS AS REQUIRED.

M1.9 PROVIDE 4" CONCENTRIC VENTING FOR GAS WATER HEATER AT APPROXIMATE LOCATION SHOWN. ROUTE TO ROOF AND PROVIDE MANUFACTURER ROOF CAP. COORDINATE WITH OTHER TRADES FOR ROUTING OFF FLUES TO TERMINATE ON EXISTING ROOF.

M1.11 TOP HALF OF LOUVER SHALL BE SEALED. PROVIDE 16"X16" DUCTWORK WITH 18" DEEP PLENUM BOX WITH MOTORIZED DAMPER AS INDICATED.

M2.3 ROUTE COOLING COIL CONDENSATE DRAIN LINE TO FLOOR DRAIN WITHIN MECHANICAL ROOM. SIZE AS INDICATED ON DRAWING. COORDINATE WITH PLUMBING FOR EXACT LOCATION OF FLOOR DRAIN.

M2.8 PROVIDE NEW GAS PIPING, OF EQUAL OR GREATER SIZE OF EXISTING GAS LINE AS INDICATED ON PLANS TO (2) NEW GAS BOILERS (APPROX. 2000 CFH EACH). PROVIDE NEW REGULATOR, OPD, SHUT OFF VALVE, AND VALVE TRAIN. TO REGULATE FROM 5 PSI DOWN TO MANUFACTURERS RECOMMENDED SERVICE PRESSURE. COORDINATE WITH DIVISION 22 CONTRACTOR.

M2.10 PROVIDE LINE-SIZE MANUAL SHUTOFF VALVES AT SUPPLY & RETURN PIPING WHERE PIPING ENTERS MECHANICAL ROOM. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

M2.13 PROVIDE PIPING BYPASS AT APPROXIMATE LOCATION SHOWN. RE: 2/M6.01 NOTE #6.

M3.1 PROVIDE THERMOSTAT AT APPROXIMATE LOCATION SHOWN. THERMOSTAT SHALL BE INSTALLED AT SAME ELEVATION AS LIGHT SWITCHES. COORDINATE FINAL LOCATION WITH ARCHITECT AND OTHER TRADES TO AVOID CONFLICTS.

M3.5 PROVIDE DDC CONTROLS PANEL. COORDINATE EXACT LOCATION WITH CONTROLS AND ELECTRICAL CONTRACTORS.

M3.12 PROVIDE OUTSIDE AIR FLOW MEASURING STATION AT LOCATION SHOWN.

M3.13 PROVIDE LOCAL SWITCH AT APPROXIMATE LOCATION SHOWN. COORDINATE EXACT MOUNTING HEIGHT AND LOCATION WITH ARCHITECT/OWNER AND OTHER TRADES PRIOR TO ROUGH-IN TO AVOID CONFLICT.

M4.4 PROVIDE AIR HANDLING UNIT AT APPROXIMATE LOCATION SHOWN. PROVIDE ALL CLEARANCES AS REQUIRED BY EQUIPMENT MANUFACTURER. INSTALL UNIT ON EXISTING 6" HIGH HOUSEKEEPING PAD, TO MODIFY / EXTEND AS REQUIRED. EXISTING DUCTWORK, DRAIN LINES AND HYDRONIC PIPING WILL REMAIN AND BE ATTACHED TO NEW AHU. REUSE BIPOLAR IONIZATION KIT ON REPLACEMENT AHU. MODIFY AS REQUIRED AND FOLLOW BIPOLAR IONIZATION KIT MANUFACTURER'S RECOMMENDATIONS. IF UNABLE TO REUSE, PROVIDE NEW.

M4.5 PROVIDE IN-LINE FAN AT APPROXIMATE LOCATION SHOWN. SUSPEND FAN FROM STRUCTURE. PROVIDE NECESSARY DUCT TRANSITIONS FROM FAN INLET AND DISCHARGE. RE: DETAIL 11/M6.01.

M4.7 PROVIDE VARIABLE FREQUENCY DRIVE AT APPROXIMATE LOCATION SHOWN. COORDINATE FINAL LOCATION WITH ELECTRICAL AND CONTROLS CONTRACTORS.

M4.12 PROVIDE HOT WATER UNIT HEATER AT APPROXIMATE LOCATION SHOWN. MOUNT AT 10 FEET A.F.F. PROVIDE THERMOSTAT. MOUNT THERMOSTAT AT SAME ELEVATION AS LIGHT SWITCHES. COORDINATE WITH ARCHITECT AND OTHER TRADES PRIOR TO CONSTRUCTION TO AVOID CONFLICT WITH EQUIPMENT. HEATER SHALL BE SET TO TURN ON THE HEATER WHEN SPACE TEMPERATURE FALLS BELOW 45°F. (ADJUSTABLE).

M4.13 PROVIDE NEW BOILER AS SCHEDULED. MODIFY/EXTEND EXISTING CONCRETE PAD. PROVIDE NEW HOT WATER PIPING AND REQUIRED FITTINGS, CONTROLS/CONTROL VALVES AND CONNECT TO EXISTING MAINS AS SHOWN. ROUTE FLUE CONDENSATE THRU CONDENSATE NEUTRALIZER AND TO NEAREST FLOOR DRAIN.

M4.14 PROVIDE NEW CARBON MONOXIDE DETECTION SYSTEM. FIELD VERIFY EXACT LOCATION PRIOR TO INSTALL. COORDINATE WITH ELECTRICAL FOR 120 VOLTAGE POWER TO PANEL. CO DETECTION SYSTEM TO SHUT OFF BOILERS & EXISTING WATER HEATERS UPON ALERT ACTIVATION.

M5.4 PROVIDE CHEMICAL FILTER FEEDER AT APPROXIMATE LOCATION SHOWN. INSTALL ON 4" HIGH HOUSEKEEPING PAD. RE: DETAIL 12/M6.01.

M5.5 PROVIDE END SUCTION PUMP AT APPROXIMATE LOCATION SHOWN. INSTALL PER MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS. INSTALL ON EXISTING 6" HIGH CONCRETE HOUSEKEEPING PAD, MODIFY / EXTEND AS REQUIRED. PROVIDE NEW CHILLED WATER PIPING CONNECTIONS TO TIE INTO NEW PUMP AS REQUIRED.

M5.22 PROVIDE 8" COMBUSTION AIR INTAKE. DIRECT VENTING TO THEIR RESPECTIVE BOILER. FLUE TO EXISTING WALL LOUVER. SEAL AS REQUIRED.

M5.23 PROVIDE 8" STAINLESS STEEL CAT IV EXHAUST FLUE. FLUE TO PENETRATE THROUGH ROOF FOR NEW OPENING. PROVIDE EXHAUST FLUE WITH CONDENSATE NEUTRALIZER AT DRIP LEG AND PROVIDE PIPING ROUTING TO NEAREST FLOOR DRAIN IN BOILER ROOM. PROVIDE NEW ROOF OPENINGS AS REQUIRED FOR NEW FLUES. THE EXISTING OPENINGS WILL BE REQUIRED TO BE PATCHED, SEALED, AND INSULATED TO MATCH EXISTING ROOF.

M5.24 PROVIDE CIRCULATOR PUMPS AT APPROXIMATE LOCATION SHOWN.

M5.25 PROVIDE NEW AIR DIRT SEPARATOR AT APPROXIMATE LOCATION SHOWN.

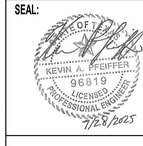
M5.26 CONTRACTOR TO FIELD VERIFY EXISTING CHILLED WATER POT FEEDER AND REPLACE WITH NEW.

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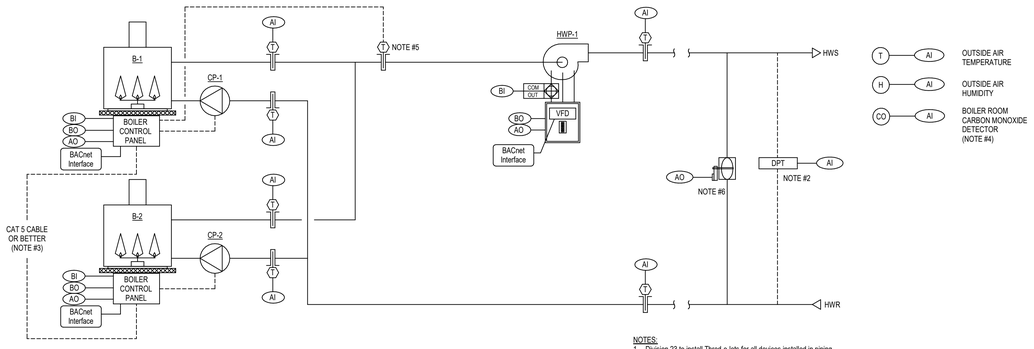
SHEET TITLE: MECHANICAL PLAN - ENLARGED MECHANICAL ROOMS

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NOTES:
1. Division 23 to install Thred-o-lets for all devices installed in piping.
2. Field verify differential pressure transmitter in accessible location approximately 2/3 down main loop.
3. EMCS contractor shall be responsible for point-to-point ethernet connection between boiler controllers.
4. EMCS contractor shall be responsible for wiring carbon monoxide detector to auxiliary input at lead boiler controller.
5. Temperature sensor provided by the boiler manufacturer and installed by Division 23. The lead boiler controller shall sequence the boiler system based on this boiler manufacturer provided temperature sensor.
6. Bypass valve shall be sized based on the minimum flow rate of a single boiler. Confirm minimum boiler flow rate with final equipment submittal prior to valve selection.

System Off - When the system is off:
The boilers shall be off.
The pumps shall be off.
The control loops shall be disabled.

System Startup - System startup shall be initiated:
Manually by an Operator command on the heating water system graphic at the EMCS.
Automatically by the EMCS, when a call for heating has been received.
The heating water system shall be disabled if the outside air temperature is greater than the outside air temperature lockout setpoint unless heating water is required for dehumidification.

System Operation - When system start-up has been initiated:
The outside air temperature must be below the outside air lockout setpoint before the heating water system can be activated. The number of heating requests required and the length of time the requests must be received before activating the heating water system shall be adjustable. The boilers and pumps shall be lead/lag and rotated weekly at a time and on a day of the week when the heating water system is not in operation. Rotation shall be based on accumulated runtime for each type of equipment.

When the heating water system is activated, the EMCS shall enable the lead pump. A current switch shall prove the pump status at the EMCS, which shall generate an alarm, if the switch is not made within 45 seconds (adjustable). There shall also be a 10 second (adjustable) de-bounce time to prevent nuisance alarms from a bouncing switch. If the pump run status is not proven, the EMCS shall discontinue the enable signal to the pump and rotate pumps. The EMCS shall then energize a lag pump to run in the same manner as described above. That pump shall become the lead pump.

After the pump status has been proven, the EMCS shall send a signal to enable the lead boiler to fire provided all safeties have been met. A contact in the boiler control panel will provide status to the EMCS. If the heating water supply temperature is less than 100 °F (adjustable) or a heating water pump status is not indicating a heating water pump is running, the EMCS control module will broadcast that heating water is not available.

Whenever the boilers are de-activated, the heating water pump will continue to run for 5 minutes (adjustable) to avoid excessive temperature buildup in the boiler.

The boiler room shall be provided with a manual reset type carbon monoxide (CO) detector. The CO detector shall be interlocked with the boiler control panel such that the burners will not operate when the measured level of carbon monoxide in the room rises above 50 ppm. The boiler control panel should also disable the burners in the event that there is a loss of power to the CO detector.

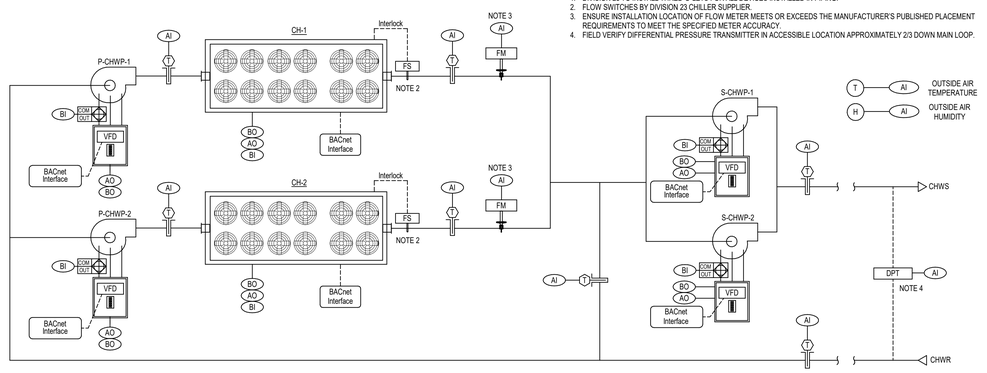
The EMCS shall receive inputs from temperature sensors located in the boiler heating water supply and return piping. The heating water supply setpoint shall be reset based on the outdoor air temperature, the limits shall be 170 °F when the outdoor air is at 35 °F and 110 °F when the outdoor air temperature is 65 °F (all adjustable). The boiler system controller shall enable the lag boiler if the heating water supply temperature is more than 5 °F (adjustable) below setpoint for 10 minutes (adjustable). If the heating water supply temperature is not more than 5 °F (adjustable) below setpoint and the heating water delta-T is less than 5 °F for 10 minutes (adjustable) the lag boiler shall be disabled.

A differential pressure sensor across the heating water supply and return lines shall monitor building differential pressure. The EMCS shall modulate the speed of the operating heating water pumps to maintain the building heating water differential pressure at setpoint (adjustable). If the differential pressure is 2 psi below setpoint and the active pumps output are above the pump stage-up setpoint for 15 minutes (adjustable), a lag pump shall be enabled. When more than one pump is operating and the active pumps output are below the pump stage-down setpoint for 15 minutes (adjustable), the lag pump shall be de-energized. All active pumps shall be modulated with the same ramp signal.

The EMCS shall monitor the position of all of the heating water valves at the units that the plant serves and the differential pressure setpoint shall be reset based on achieving a target valve position of 90%. There shall be a dead band of 5% to prevent hunting of the reset program. The differential pressure setpoint shall not change by more than 1 psi per 5 minute (adj.) interval. The target valve position, the reset time, the dead band, and the rate of change values shall be operator adjustable.

System Setpoints - The setpoints for the system shall be set as follows:
The outside air temperature lockout setpoint shall be 65 °F (adjustable).
The heating water system differential pressure setpoint shall be initially set at 12 psi (adjustable) and shall have reset limits of 8 psi to 16 psi (adjustable).
The pump stage-up setpoint shall be 95% (adjustable).
The pump stage-down setpoint shall be 50% (adjustable).

2 Hot Water System - Decoupled Loop - Control Schematic and Sequence of Operations
NOT TO SCALE



NOTES:
1. DIVISION 23 TO INSTALL THRED-O-LETS FOR ALL DEVICES INSTALLED IN PIPING.
2. FLOW SWITCHES BY DIVISION 23 CHILLER SUPPLIER.
3. ENSURE INSTALLATION LOCATION OF FLOW METER MEETS OR EXCEEDS THE MANUFACTURER'S PUBLISHED PLACEMENT REQUIREMENTS TO MEET THE SPECIFIED METER ACCURACY.
4. FIELD VERIFY DIFFERENTIAL PRESSURE TRANSMITTER IN ACCESSIBLE LOCATION APPROXIMATELY 2/3 DOWN MAIN LOOP.

System Off - When the system is off:
The chillers shall be off.
The pumps shall be off.
The control loops shall be disabled.

System Startup - System startup shall be initiated:
Manually by an Operator command on the chiller graphic at the EMCS.
Automatically by the EMCS, when a call for cooling has been received.

System Operation - When system start-up has been initiated:
The outside air temperature must be above the outside air lockout setpoint, before the chiller can be activated. The number of cooling requests required and the length of time the requests must be received before activating the chiller plant shall be adjustable. The chiller/pump systems shall be lead/lag and rotated weekly at a time and on a day of the week when the chiller plant is not in operation. Rotation shall be based on accumulated runtime for each type of equipment.
When the chiller plant is activated, the lead secondary pump shall be enabled. A differential pressure sensor monitoring the pressure between the building CHWS and CHWR piping shall be used to modulate the speed of the secondary pumps. A PID control loop shall modulate the speed of the secondary CHW pumps from their minimum speed to their maximum speed as the differential pressure deviates from setpoint. If the differential pressure is 2 psi below setpoint and the active pumps output are above the pump stage-up setpoint for 15 minutes (adjustable), the lag secondary pump shall be enabled. When more than one secondary pump is operating and the active secondary pumps output are below the pump stage-down setpoint for 15 minutes (adjustable), the lag secondary pump shall be de-energized. All active secondary pumps shall be modulated with the same ramp signal.
The EMCS shall enable the lead chiller primary pump. A current switch shall prove the pump status at the EMCS, which shall generate an alarm, if the switch is not made within 45 seconds (adjustable). There shall also be a 10 second (adjustable) de-bounce time to prevent nuisance alarms from a bouncing switch. If the pump run status is not proven, the EMCS shall discontinue the enable signal to the pump and rotate chiller systems. The EMCS shall then energize the lag chiller primary pump to run in the same manner as described above. The lag chiller system shall become the lead chiller system.
When the lead primary pump status is proven, the EMCS shall enable the lead chiller. A flow switch in the chilled water piping shall complete the circuit to the chiller factory installed controller proving that evaporator flow has been established. If the chiller alarm input closes (indicating that the chiller has alarm), the EMCS shall generate an alarm, discontinue the enable signal to the lead chiller system and energize the lag chiller system to run in the same manner as described above. The lag chiller system shall become the lead chiller system. The chiller shall run to maintain the supply water temperature setpoint.

The EMCS shall monitor temperature inputs from sensors mounted in the common supply and return piping and flow meters mounted in the chiller supply piping, and calculate the Building Load in Tons. The combined total Nominal Capacity in Tons of all operating chillers shall be the Total Capacity.
If the value of ((Building Load / Total Capacity) * 100) is greater than the stage-up setpoint for 10 minutes (adjustable) or the CHW supply temperature rises greater than 4 °F (adjustable) above setpoint, the lag chiller system shall be enabled into operation. If the value of ((Building Load / Total Capacity) * 100) is less than the stage-down setpoint for 10 minutes (adjustable), the lag chiller system shall be disabled.
The EMCS shall monitor the position of all of the chilled water valves at the units that the plant serves and the differential pressure setpoint shall be reset based on achieving a target valve position of 90%. There shall be a dead band of 5% to prevent hunting of the reset program. The differential pressure setpoint shall not change by more than 1 psi per 5 minute (adj.) interval. The target valve position, the reset time, the deadband, and the rate of change values shall be adjustable.
When a chiller system is to be disabled, the EMCS shall discontinue the command for the chiller system to run. The EMCS shall continue to run the associated primary pump until the chiller status has indicated that it is off. Then the EMCS shall discontinue the command for the primary pump to run.
When the outdoor air temperature drops below the freeze protection setpoint, the EMCS shall open the chilled water valves to 50% open (adj.) for flow through the AHU coils and the lead secondary pump shall be activated to run at its minimum referenced speed value until ambient temperature has risen above the freeze protection setpoint for 10 minutes (adj.).
The EMCS shall monitor the outside air temperature and humidity. The EMCS shall calculate the outside air enthalpy, wet bulb temperature, and dew point temperature. These values shall be displayed on all air and water systems graphics.

System Setpoints - The setpoints for the system shall be set as follows:
The outside air temperature lockout setpoint shall be 50 °F (adjustable).
The chiller leaving water temperature setpoint shall be 42 °F (adjustable).
The chiller stage-up setpoint shall be 95% (adjustable).
The chiller stage-down setpoint shall be 50% (adjustable).
The chilled water system differential pressure setpoint shall be initially set at 12 psi (adj.) and shall have reset limits of 8 psi to 16 psi (adjustable).
The pump stage-up setpoint shall be 95% (adjustable).
The pump stage-down setpoint shall be 50% (adjustable).
The outdoor air temperature freeze protection setpoint shall be 37 °F (adjustable).

1 Chilled Water System - Air Cooled - Decoupled Loop - Control Schematic and Sequence of Operations
NOT TO SCALE

THERMAL STORAGE TANK:
ALL CONTROL POINTS PERTAINING TO THERMAL STORAGE TANK TO BE REMOVED FROM THE BAS. CONTROL WIRING AND CONDUIT ROUTED TO TANK SHALL BE ABANDONED AND CAPPED BELOW GRADE

Outdoor Air Conditions
The sensors shall be mounted in an area on the north side of the building where the representative temperature and humidity can be monitored, both shall have sun shields. Based on the outdoor air temperature and humidity the EMCS shall calculate the outdoor air enthalpy, wet bulb and dew point temperatures. These outdoor air conditions shall be broadcast as global data points for use by other control programs. These shall be displayed on all major air and water systems graphics.

Emergency Generator Monitoring
The EMCS shall monitor the run status and alarm output of the generator. The EMCS shall display the values and trend log all Change of State (COS) events. The EMCS shall report alarms to the computers, pagers, and/or text message compatible devices designated by the Owner.

IDF and MDF Room Monitoring
The EMCS shall monitor the space temperature and humidity in the IDF and MDF rooms. The primary cooling for IDF and MDF rooms will be supplied by the packaged computer room units. The EMCS shall report high/low temperature/humidity alarms to the computers, pagers, and/or text message compatible devices designated by the Owner. Alarms shall be sent if the space conditions deviate from the following, temperature between 60 °F and 80 °F (adj), humidity between 40% RH and 70% RH (adj), for more than 10 minutes.

HVAC Ventilation Emergency Shutdown Switch
A mushroom button type, local override switch shall be installed to deactivate the building's ventilation and exhaust systems in case of emergency. All 100% outside air conditioning units or outside air supply fans shall be deactivated and all outside air dampers shall be closed. All exhaust and relief fans shall be deactivated and their associated isolation dampers shall be closed. Once depressed, the switch must be manually reset to allow the ventilation and exhaust systems to resume normal operation. The final location of the switch shall be determined by the Owner.

Split DX AHU After Hours Operation
A mushroom button type, local override switch shall be provided to energize the afterhours DX system when chilled water is unavailable from the central plant. Once the switch has been pressed, a 2-hour (adj.) timer will start and stage the compressor(s) of the condensing unit as required to maintain the supply air temperature and the air handling unit to supply air to the desired spaces as described in the sequence of operations. A maximum of 8-hour override can be applied. once time has expired, unit shall de-energize and return to normal operations.

4 MISCELLANEOUS SYSTEMS
NOT TO SCALE

AI	ANALOG INPUT	S	WALL SENSOR
AO	ANALOG OUTPUT	T	THERMOSTAT
DI/BI	DIGITAL/BINARY INPUT	CO2	CARBON DIOXIDE SENSOR
DO/BO	DIGITAL/BINARY OUTPUT	SP	SET POINT
MD	ON-OFF MOTORIZED DAMPER	S/A	SUPPLY AIR
MMD	MODULATING TYPE MOTORIZED DAMPER	R/A	RETURN AIR
AFMS	AIR FLOW MEASURING STATION	O/A	OUTSIDE AIR
MCV	CONTROL VALVE MODULATING TYPE	HC	HEATING COIL
VFD	VARIABLE FREQUENCY DRIVE	CC	COOLING COIL
CSR	CURRENT SENSING RELAY	DX	DIRECT EXPANSION COOLING COIL
FRZ	FREEZESTAT	PICCV	PRESSURE INDEPENDENT CHARACTERIZED CONTROL VALVE
HSL	HIGH STATIC LIMIT	AFC	AIRFLOW CROSS
SPT	STATIC PRESSURE TRANSMITTER	DPS	DIFFERENTIAL PRESSURE SWITCH
DPT	DIFFERENTIAL PRESSURE TRANSDUCER		
FM	FLOW METER		
FS	FLOW SWITCH		
DAT	DISCHARGE AIR TEMPERATURE SENSOR		

3 CONTROL SCHEMATIC LEGEND
NOT TO SCALE

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ISSUANCE:

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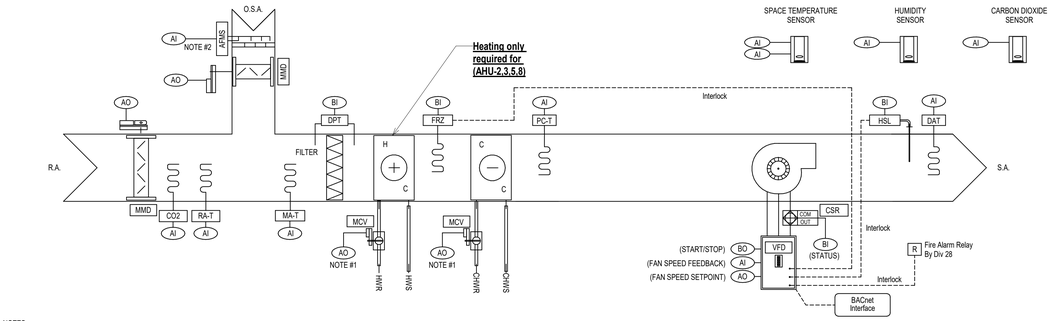
HUMBLE ISD - OAK FOREST ES - HVAC UPGRADES - 6400 KINGWOOD GLEN DR, 77346

TBPE Firm Registration No. 2234

DATE: 07/28/25
DRAWN BY: DBR
CHECKED BY: DBR
PROJECT NUMBER 250054.000
SHEET TITLE: CONTROL SEQUENCES AND SCHEMATICS
SHEET NUMBER: M4.01

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NOTES:
1. Provide 2-way automatic control valve unless otherwise indicated in mechanical schedules or control specifications.
2. Provide adequate length before and after air flow measuring station as recommended by manufacturer.

System Off - When the system is off:
The outside air damper shall be closed.
The return air damper shall be open.
The supply air fan shall be off.
The chilled water coil valve shall be closed.
The hot water coil valve(s) shall be closed.
The control loops shall be disabled.

System Start-up - System start-up shall be initiated:
By an operator entered manual command at the EMCS.
Automatically by the EMCS based on Pre-Start Mode or Night-Setback Mode.

Pre-Start Mode:
The system shall be enabled by an operator entered manual command at the EMCS or automatically by the EMCS based on the Optimal Start/Stop algorithm. Once enabled, the system shall operate per the System Operation section as detailed below. Operation of the system during Pre-Start Mode shall not include ventilation air, with the exception that Economizer mode shall be permitted to operate per the System Operation section as detailed below.

Night-Setback Mode:
The system shall be enabled automatically by the EMCS when the space temperature drifts outside the active Unoccupied Cooling or Heating Setpoint. Once enabled, the system shall operate per the System Operation section as detailed below. Operation of the system during Night-Setback Mode shall not include ventilation air, with the exception that Economizer mode shall be permitted to operate per the System Operation section as detailed below.

System Operation - When system start-up has been initiated:
The variable speed supply air fan shall start. Following a confirmation of fan start status, the supply fan shall initially be indexed to its minimum speed reference value. The speed of the fan shall not be adjusted by more than 20 Hz in any one-minute period.
OUTSIDE AIR CFM AND DAMPER CONTROL: When the system is commanded to start, the EMCS shall index the outside air damper to the scheduled maximum outside airflow rate as measured by the outside airflow measuring station.
OUTSIDE AIR DAMPER / RETURN AIR DAMPER INTEGRATION WITH SUPPLY FAN VFD: The EMCS shall provide dynamic control of the outside air damper and return air damper positions through the full range of the supply fan VFD modulation. The outside air and return air motorized dampers shall modulate in sequence to maintain the active outside air flow rate setpoint. The outside air damper shall first modulate open. If the outside air damper has reached the 100% open position and still cannot achieve the active outside air flow rate setpoint, then the return air damper shall begin to modulate closed. The return air damper position shall have a low limit of 50% (adj) during normal system operation. Damper positions shall not be adjusted by more than 20% (adj) in any one-minute time period.
DEMAND CONTROL VENTILATION: During occupied building hours, the EMCS shall allow the outside air damper to modulate from its scheduled maximum flow rate to its scheduled minimum flow rate. If the space CO2 level is at least 100 ppm (adj) less than its active high limit setpoint for a time period of 10 minutes (adj), the EMCS shall index the outside air damper to maintain its minimum scheduled outside air flow rate. If the space CO2 level rises to within 50 ppm (adj) of its active high limit, the EMCS shall index the outside air damper to maintain its scheduled maximum outside air flow rate.
COOLING MODE: The EMCS shall modulate the chilled water control valve as required to maintain the active coil discharge air temperature setpoint. The EMCS shall modulate the supply fan VFD from its minimum setting to its maximum setting as required to maintain the active space temperature setpoint.

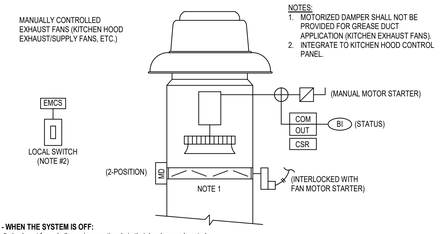
DE-HUMIDIFICATION MODE: When space humidity rises above its active setpoint and the space temperature is below its active setpoint, the EMCS shall modulate the supply fan VFD to its minimum setting and modulate the chilled water control valve to maintain the de-humidication chilled water coil discharge air temperature setpoint. The EMCS shall modulate the hot water re-heat control valve to maintain the space temperature setpoint as required. The unit shall return to cooling mode when the space humidity setpoint has been satisfied for at least 10 minutes (adj).
PREHEAT COIL: The EMCS shall modulate the hot water preheat control valve to maintain the pre heat coil discharge air temperature setpoint.
FREEZE PROTECTION: When the outdoor air temperature drops below the freeze protection setpoint, the EMCS shall open the chilled water control valve(s) to 50% open (adj.) for water circulation through the coil. The control valve shall return to normal operating conditions when the ambient temperature is above the freeze protection setpoint for 10 minutes (adj.). Refer to the Chilled Water System Control Diagram for further information.

System Setpoints - The setpoints for the system shall be determined as follows:
The maximum speed reference value shall be the VFD speed required to obtain the design supply airflow value from the unit schedule on the Mechanical Drawings.
The minimum speed reference value shall be VFD speed required to obtain 50% of the design supply airflow value from the unit schedule on the mechanical drawings but not less than the active outside air flow rate setpoint.
The occupied heating space temperature setpoint shall be set at 70°F (adj) with a low-limit alarm of 66°F (adj).
The occupied cooling space temperature setpoint shall be set at 75°F (adj) with a high-limit alarm of 79°F (adj).
The unoccupied heating space temperature setpoint shall be set at 55°F (adj) with a low-limit alarm of 51°F (adj).
The unoccupied cooling space temperature setpoint shall be set at 85°F (adj) with a high-limit alarm of 89°F (adj).
The chilled water coil discharge air temperature setpoint shall be set at 53°F (adj) with a low-limit alarm of 48°F (adj).
The de-humidification chilled water coil discharge air temperature setpoint shall be set at 50°F (adj) with a low-limit alarm of 45°F (adj).
The pre-heat coil discharge air temperature setpoint shall be set at 50°F (adj).
The space humidity setpoint shall be set at 55% RH (adj) with a high-limit alarm of 60% RH (adj).
The minimum outside air flowrate setpoint shall be set at the scheduled minimum flowrate from the unit schedule on the mechanical drawings.
The maximum outside air flowrate setpoint shall be set at the scheduled maximum flowrate from the unit schedule on the mechanical drawings.
The space carbon dioxide high-limit setpoint shall be set at 1000 ppm (adj).
The supply duct static pressure high-limit setpoint shall be set at 2.0 in. wc. (adj).
The air filter pressure differential high-limit setpoint shall be set at 1.0 in. wc. (adj).
The freeze-stat low-limit trip setpoint shall be set at 37°F(adj).
The outdoor air temperature freeze protection setpoint shall be 37°F (adj).

System Shutdown - System shutdown shall be initiated:
By operator entered manual command at the EMCS.
Automatically by the EMCS based on Night-Setback or Time of Day schedule.
Automatically by the high-static pressure shut down.
Automatically by the unit freeze-stat shut down.
Automatically by a supply fan current sensor status failure.
Automatically by the auxiliary fire alarm relay when an alarm condition has been initiated.

System Alarms - The EMCS shall generate an alarm condition for each of the following:
If the space temperature is outside the active low or high-limit for 5 minutes (adj).
If the supply air temperature drops below the chilled water coil discharge air temperature low-limit for 5 minutes (adj).
If the supply air temperature rises above the heating coil discharge air temperature high-limit for 5 minutes (adj).
If the space humidity level exceeds its high-limit for more than 20 minutes (adj).
If the space carbon dioxide level exceeds its high-limit for more than 20 minutes (adj) or the space carbon dioxide level exceeds the high-limit by 10% or more.
If the supply duct static pressure exceeds the high-limit setpoint.
If the unit freeze-stat trips.
If the filter differential pressure exceeds the trip point.
If the current sensor relay indicates a supply fan failure status.
All alarms shall be inhibited when the supply fan is not operating except the space temperature alarms. The alarms, except the fan failure and the space temperature alarms, shall remain inhibited following startup of the unit for 2 minutes.

1 **Single Zone VAV AHU Chilled Water Cooling, Hot Water Heating, De-Humidification, Demand Control Ventilation - Control Schematic and Sequence of Operations (AHU-02,03,05,08,10)**
NOT TO SCALE



SYSTEM OFF - WHEN THE SYSTEM IS OFF:
Manually controlled exhaust fans shall remain operational via their local manual controls.

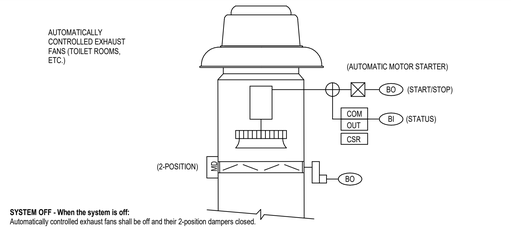
SYSTEM START-UP - SYSTEM START-UP SHALL BE INITIATED:
By an operator command at local manual control.

MANUALLY CONTROLLED EXHAUST FANS: Manually controlled exhaust fans shall utilize two-position motorized damper interlocked with their manual motor starter. The EMCS shall monitor the status of each manually controlled exhaust fan and shall assign the scheduled exhaust numerical CFM value to each fan as indicated on the mechanical equipment schedules.

Fan Status:
The controller shall monitor the fan status.

Alarms shall be provided as follows:
Fan Failure: Commanded on, but the status is off.
Fan in Hand: Commanded off, but the status is on.
Fan Runtime Exceeded: Fan status runtime exceeds a user definable limit (adj.).

2 **Manually Controlled Exhaust/Supply Fans - Control Schematic and Sequence of Operations**
NOT TO SCALE



SYSTEM OFF - When the system is off:
Automatically controlled exhaust fans shall be off and their 2-position dampers closed.

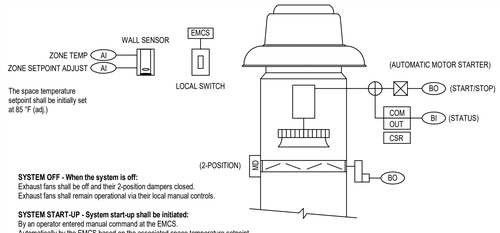
SYSTEM START-UP - System start-up shall be initiated:
By an operator entered manual command at the EMCS.
Automatically by the EMCS based on Night-Setback or Time of Day schedule.

AUTOMATICALLY CONTROLLED EXHAUST FANS: Upon activation of building occupied mode and start-up of the air handling system, the EMCS shall energize all automatically controlled exhaust fans and open their respective two-position motorized dampers. The EMCS shall monitor the status of each automatically controlled exhaust fan and shall assign the scheduled exhaust numerical CFM value to each fan as indicated on the mechanical equipment schedules. Upon activation of the building unoccupied mode, the automatically controlled building exhaust fans shall be de-energized.

Fan Status:
The controller shall monitor the fan status.

Alarms shall be provided as follows:
Fan Failure: Commanded on, but the status is off.
Fan in Hand: Commanded off, but the status is on.
Fan Runtime Exceeded: Fan status runtime exceeds a user definable limit (adj.).

3 **Automatically Controlled Exhaust/Supply Fans - Control Schematic and Sequence of Operations**
NOT TO SCALE



SYSTEM OFF - When the system is off:
Exhaust fans shall be off and their 2-position dampers closed.
Exhaust fans shall remain operational via their local manual controls.

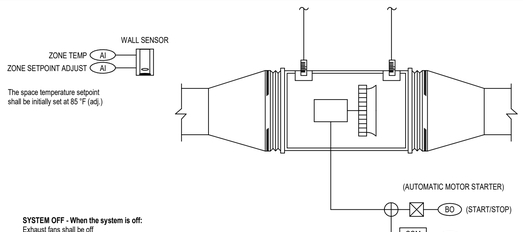
SYSTEM START-UP - System start-up shall be initiated:
By an operator entered manual command at the EMCS.
Automatically by the EMCS based on the associated space temperature setpoint.
By an operator command at local manual control.

AUTOMATICALLY CONTROLLED (TEMP. BASED) EXHAUST FANS: Upon activation of building occupied mode and start-up of the air handling system, the EMCS shall allow exhaust fans to be energized based on the associated space temperature setpoint, and their respective two-position motorized dampers shall open. The EMCS shall monitor the status of each exhaust fan and shall assign the scheduled exhaust numerical CFM value to each fan as indicated on the mechanical equipment schedules. Upon activation of the building unoccupied mode, the automatically controlled building exhaust fans shall be de-energized and shall only become energized via the local override switch.

Fan Status:
The controller shall monitor the fan status.

Alarms shall be provided as follows:
Fan Failure: Commanded on, but the status is off.
Fan in Hand: Commanded off, but the status is on.

4 **Automatically Controlled Temperature Based Exhaust Fans with Local Override Switch - Control Schematic and Sequence of Operations**
NOT TO SCALE



SYSTEM OFF - When the system is off:
Exhaust fans shall be off

SYSTEM START-UP - System start-up shall be initiated:
By an operator entered manual command at the EMCS.
Automatically by the EMCS based on the associated space temperature setpoint.

AUTOMATICALLY CONTROLLED (TEMP. BASED) EXHAUST FANS: Upon activation of building occupied mode and start-up of the air handling system, the EMCS shall allow exhaust fans to be energized based on the associated space temperature setpoint, and their respective two-position motorized dampers shall open. The EMCS shall monitor the status of each exhaust fan and shall assign the scheduled exhaust numerical CFM value to each fan as indicated on the mechanical equipment schedules. Upon activation of the building unoccupied mode, the automatically controlled building exhaust fans shall be de-energized.

Fan Status:
The controller shall monitor the fan status.

Alarms shall be provided as follows:
Fan Failure: Commanded on, but the status is off.
Fan in Hand: Commanded off, but the status is on.

5 **Automatically Controlled Temperature Based Exhaust Fans - Control Schematic and Sequence of Operations**
NOT TO SCALE

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SEAL:



HUMBLE ISD - OAK FOREST ES - HVAC UPGRADES - 6400 KINGWOOD GLEN DR, 77346

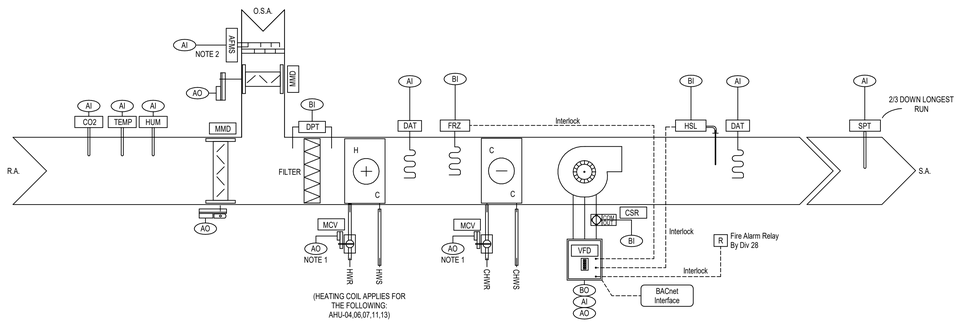
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SHEET TITLE: CONTROL SEQUENCES AND SCHEMATICS
SHEET NUMBER: M4.02

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NOTES:
1. Provide automatic coil control valve as indicated in mechanical schedules and control specifications.
2. Provide adequate length before and after air flow measuring station as recommended by manufacturer.
3. Adding CO2 Sensor in return path of AHU.

System off - When the system is off:
The outside air damper shall be closed.
The return air damper shall be open.
The unit supply fan shall be off.
The cooling coil valve shall be closed.
The heating coil valve shall be closed.
All control loops shall be disabled.

System Start-up - System start-up shall be initiated:
By an operator entered manual command at the EMCS.
Automatically by the EMCS based on Pre-Start Mode or Night-Setback Mode.

PRE-START MODE:
The system shall be enabled by an operator entered manual command at the EMCS or automatically by the EMCS based on the Optimal Start/Stop algorithm. Once enabled, the system shall operate per the **System Operation** section, as detailed below. Operation of the system during Pre-Start Mode shall not include ventilation air, with the exception that Economizer mode shall be permitted to operate per the System Operation section as detailed below.

NIGHT-SETBACK MODE:
The system shall be enabled automatically by the EMCS based on the cooling demand of 5 (adjustable) or more associated terminal units whose space temperature has exceeded the terminal units Unoccupied Cooling Setpoint. Once enabled, the system shall operate per the **System Operation** section, as detailed below. Operation of the system during Night-Setback Mode shall not include ventilation air., with the exception that Economizer mode shall be permitted to operate per the System Operation section as detailed below.

OCCUPIED MODE:
The system shall be enabled automatically by the EMCS based on the actual space occupancy. When the Time of Day schedule (TOD) is active, the system shall operate per the **System Operation** section, as detailed below, and the Demand Control Ventilation sequence shall be active.
Demand Control Ventilation - The outside air intake damper shall be modulated to maintain the scheduled minimum outside air flowrate setpoint. If the space carbon dioxide concentration for any zone served by the associated AHU is above the defined high-limit, then the OSA damper shall be modulated to maintain the scheduled maximum outside air flowrate setpoint. If the OSA damper is above 95% open and the maximum outside air flowrate setpoint cannot be met, then modulate the return air damper closed until the flowrate is achieved. Do not modulate the return air damper to less than 60% open. Once the space carbon dioxide concentration for all associated zones has been below the defined high limit for 5 minutes (adj.), the OSA damper shall be modulated to maintain the scheduled minimum outside air flowrate setpoint.
Outside Airflow and Damper Control: When the system is commanded to start, the EMCS shall index the outside air damper to the scheduled maximum outside airflow rate as measured by the outside airflow measuring station.
Outside Air Damper / Return Air Damper Integration with Supply Fan VFD: The EMCS shall provide dynamic control of the outside air damper and return air damper positions through the full range of the supply fan VFD modulation. The outside air and return air motorized dampers shall modulate in sequence to maintain the active outside air flow rate setpoint. The outside air damper shall first modulate open. If the outside air damper has reached the 100% open position and still cannot achieve the active outside air flow rate setpoint, then the return air damper shall begin to modulate closed. The return air damper position shall have a low limit of 50% (adj) during normal system operation. Damper positions shall not be adjusted by more than 20% (adj) in any one-minute time period.

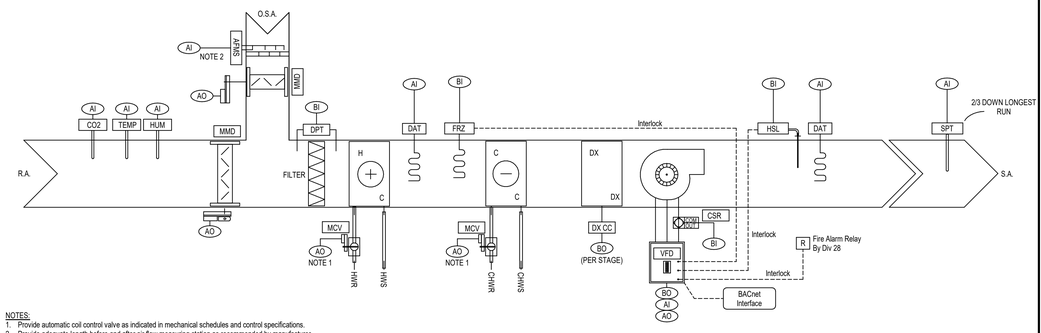
System Operation - When system start-up has been initiated:
The variable speed supply fan shall start at its minimum speed. Following a confirmation of fan start status, the supply fan speed shall be modulated to maintain the supply air static pressure at setpoint. The speed of the fan shall not be adjusted by more than 20% in any one-minute period. The static pressure setpoint shall be reset via the control algorithm below to optimize the energy usage.
Supply Air Static Pressure Reset - The static pressure setpoint shall be reset up in defined increments at defined intervals until the primary air damper position to all of the associated terminal units have been below the defined value for more than the defined interval. The static pressure setpoint shall be reset down in defined increments at defined intervals until the primary air damper position to at least one (critical zone) of the associated terminal units has been above the defined value for more than the defined interval. The setpoints are detailed in the **System Setpoint** section below.
Cooling Coil - The chilled water coil control valve shall be modulated to maintain the active supply air temperature setpoint. The supply air temperature setpoint shall be reset via the control algorithm below to optimize the energy usage.
Supply Air Temperature Reset - The supply air temperature setpoint shall be reset based on the actual return air temperature, according to the defined reset schedule detailed in the **System Setpoint** section below. If the Demand Control Ventilation sequence is in maximum outdoor air flow mode or Economizer Mode is active, then the supply air temperature reset shall be disabled and the setpoint shall be set to the initial value.
Pre-Heating Coil - The hot water pre-heat coil control valve shall be modulated to maintain the pre-heat coil discharge air temperature at setpoint. The control shall be active when the outside air temperature is below 45 °F. (adj)
Freeze Protection - When the outdoor air temperature drops below the freeze protection setpoint, the EMCS shall open the chilled water control valve(s) to 50% open (adj.) for water circulation through the coil. The control valve shall return to normal operating conditions when the ambient temperature is above the freeze protection setpoint for 10 minutes (adj.). Refer to the Chilled Water System Control Diagram for further information.

System Setpoints - The setpoints for the system shall be determined as follows:
The maximum speed reference value shall be the VFD speed required to obtain the design supply airflow value from the unit schedule on the Mechanical Drawings.
The minimum speed reference value shall be VFD speed required to obtain 50% of the design supply airflow value from the unit schedule on the mechanical drawings but not less than the active outside air flow rate setpoint.
The supply air static pressure setpoint shall be set initially at 1.25 inches w.c. (adj) and shall have reset limits of 0.20 to 2.00 inches w.c. (adj)
The time interval for static pressure reset shall be set at 10 minutes (adj).
The static pressure reset increment shall be set at 0.05 inches w.c. (adj)
The terminal unit primary damper position setpoint shall be 90% open. (adj)
The time interval for terminal unit primary damper position shall be set at 15 minutes. (adj)
The supply air temperature setpoint shall be set initially at 54 °F. (adj)
The supply air temperature setpoint shall be reset to 54 °F (adj) when the return air temperature is at 78 °F. (adj)
The supply air temperature setpoint shall be reset to 58 °F (adj) when the return air temperature is at 72 °F. (adj)
The pre-heat coil discharge air temperature setpoint shall be set at 50°F (adj).
The minimum outside air flowrate setpoint shall be set at the scheduled minimum flowrate from the unit schedule on the mechanical drawings.
The maximum outside air flowrate setpoint shall be set at the scheduled maximum flowrate from the unit schedule on the mechanical drawings.
The space carbon dioxide high-limit setpoint be set at 1000 ppm (adj).
The supply duct static pressure high-limit setpoint shall be set at 2.5 in. wc. (adj).
The air filter pressure differential high-limit setpoint shall be set at 1.0 in. wc. (adj).
The freeze-stat low-limit trip setpoint shall be set at 37°F(adj).
The outdoor air temperature freeze protection setpoint shall be 37°F (adj).

System Shutdown - System shutdown shall be initiated:
By operator entered manual command at the EMCS.
Automatically by the EMCS based on Night-Setback or Time of Day schedule.
Automatically by the high-static pressure shut down.
Automatically by the unit freeze-stat shut down.
Automatically by a supply fan current sensor status failure.
Automatically by the auxiliary fire alarm relay when an alarm condition has been initiated.

System Alarms - The EMCS shall generate an alarm if:
If the supply air temperature is outside the limits, which shall be set at +/- 5 °F around setpoint.
If the space carbon dioxide level for any associated zone exceeds its high-limit for more than 20 minutes (adj) or exceeds the high-limit by 10% or more.
If the supply duct static pressure exceeds the high-limit setpoint.
If the unit freeze-stat trips.
If the filter differential pressure exceeds the trip point.
If the current sensor relay indicates a supply fan failure status.
All alarms shall be inhibited when the supply fan is not operating.

2 **VAV Air Handling Unit - Control Schematic and Sequence of Operations (AHU-04,06,07,09,11,12,13)**
NOT TO SCALE



NOTES:
1. Provide automatic coil control valve as indicated in mechanical schedules and control specifications.
2. Provide adequate length before and after air flow measuring station as recommended by manufacturer.
3. Adding CO2 sesnor in return air path for AHU.
4. DX cooling coil shall be for after hour use. Provide unit with after hours overide to activate DX cooling coil sequence. RE: Misc. system (M4.01)

System off - When the system is off:
The outside air damper shall be closed.
The return air damper shall be open.
The unit supply fan shall be off.
The cooling coil valve shall be closed.
The DX coil shall be disabled.
The condensing unit shall be disabled.
The heating coil valve shall be closed.
All control loops shall be disabled.

System Start-up - System start-up shall be initiated:
By an operator entered manual command at the EMCS.
Automatically by the EMCS based on Pre-Start Mode or Night-Setback Mode.

PRE-START MODE:
The system shall be enabled by an operator entered manual command at the EMCS or automatically by the EMCS based on the Optimal Start/Stop algorithm. Once enabled, the system shall operate per the **System Operation** section, as detailed below. Operation of the system during Pre-Start Mode shall not include ventilation air.

NIGHT-SETBACK MODE:
The system shall be enabled automatically by the EMCS based on the cooling demand of 5 (adjustable) or more associated terminal units whose space temperature has exceeded the terminal units Unoccupied Cooling Setpoint. Once enabled, the system shall operate per the **System Operation** section, as detailed below. Operation of the system during Night-Setback Mode shall not include ventilation air.

OCCUPIED MODE:
The system shall be enabled automatically by the EMCS based on the actual space occupancy. When the Time of Day schedule (TOD) is active, the system shall operate per the **System Operation** section, as detailed below, and the Demand Control Ventilation sequence shall be active.
Demand Control Ventilation -
The outside air intake damper shall be modulated to maintain the scheduled minimum outside air flowrate setpoint. If the space carbon dioxide concentration for any zone served by the associated AHU is above the defined high-limit, then the OSA damper shall be modulated to maintain the scheduled maximum outside air flowrate setpoint. If the OSA damper is above 95% open and the maximum outside air flowrate setpoint cannot be met, then modulate the return air damper closed until the flowrate is achieved. Do not modulate the return air damper to less than 60% open. Once the space carbon dioxide concentration for all associated zones has been below the defined high limit for 5 minutes (adj.), the OSA damper shall be modulated to maintain the scheduled minimum outside air flowrate setpoint.
Outside Airflow and Damper Control: When the system is commanded to start, the EMCS shall index the outside air damper to the scheduled maximum outside airflow rate as measured by the outside airflow measuring station.
Outside Air Damper / Return Air Damper Integration with Supply Fan VFD: The EMCS shall provide dynamic control of the outside air damper and return air damper positions through the full range of the supply fan VFD modulation. The outside air and return air motorized dampers shall modulate in sequence to maintain the active outside air flow rate setpoint. The outside air damper shall first modulate open. If the outside air damper has reached the 100% open position and still cannot achieve the active outside air flow rate setpoint, then the return air damper shall begin to modulate closed. The return air damper position shall have a low limit of 50% (adj) during normal system operation. Damper positions shall not be adjusted by more than 20% (adj) in any one-minute time period.

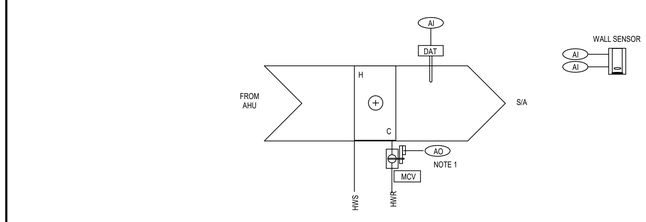
System Operation - When system start-up has been initiated:
The variable speed supply fan shall start at its minimum speed. Following a confirmation of fan start status, the supply fan speed shall be modulated to maintain the supply air static pressure at setpoint. The speed of the fan shall not be adjusted by more than 20% in any one-minute period. The static pressure setpoint shall be reset via the control algorithm below to optimize the energy usage.
Supply Air Static Pressure Reset - The static pressure setpoint shall be reset up in defined increments at defined intervals until the primary air damper position to all of the associated terminal units have been below the defined value for more than the defined interval. The static pressure setpoint shall be reset down in defined increments at defined intervals until the primary air damper position to at least one (critical zone) of the associated terminal units has been above the defined value for more than the defined interval. The setpoints are detailed in the **System Setpoint** section below.
Cooling Coil - The chilled water coil control valve shall be modulated to maintain the active supply air temperature setpoint. The supply air temperature setpoint shall be reset via the control algorithm below to optimize the energy usage.
Supply Air Temperature Reset - The supply air temperature setpoint shall be reset based on the actual return air temperature, according to the defined reset schedule detailed in the **System Setpoint** section below. If the Demand Control Ventilation sequence is in maximum outdoor air flow mode, then the supply air temperature reset shall be disabled and the setpoint shall be set to the initial value.
After-Hours Cooling - When chilled water is unavailable from the central plant or when after hours button is enabled, the supplemental DX system shall be enabled. The controller shall measure the cooling supply air temperature and stage the compressor in the associated DX condensing unit to maintain the active cooling supply air temperature setpoint. If the inlet air temperature to the DX coil is below the freezestat setpoint initially set to 50 °F (adj.), the associated condensing unit shall be locked out and prevented from operating to protect the compressor.
Pre-Heating Coil - The hot water pre-heat coil control valve shall be modulated to maintain the pre-heat coil discharge air temperature at setpoint. The control shall be active when the outside air temperature is below 45 °F. (adj)
Freeze Protection - When the outdoor air temperature drops below the freeze protection setpoint, the EMCS shall open the chilled water control valve(s) to 50% open (adj.) for water circulation through the coil. The control valve shall return to normal operating conditions when the ambient temperature is above the freeze protection setpoint for 10 minutes (adj.). Refer to the Chilled Water System Control Diagram for further information.

System Setpoints - The setpoints for the system shall be determined as follows:
The maximum speed reference value shall be the VFD speed required to obtain the design supply airflow value from the unit schedule on the Mechanical Drawings.
The minimum speed reference value shall be VFD speed required to obtain 50% of the design supply airflow value from the unit schedule on the mechanical drawings but not less than the active outside air flow rate setpoint.
The supply air static pressure setpoint shall be set initially at 1.25 inches w.c. (adj) and shall have reset limits of 0.20 to 2.00 inches w.c. (adj)
The time interval for static pressure reset shall be set at 10 minutes (adj).
The static pressure reset increment shall be set at 0.05 inches w.c. (adj)
The terminal unit primary damper position setpoint shall be 90% open. (adj)
The time interval for terminal unit primary damper position shall be set at 15 minutes. (adj)
The supply air temperature setpoint shall be set initially at 54 °F. (adj)
The supply air temperature setpoint shall be reset to 54 °F (adj) when the return air temperature is at 78 °F. (adj)
The supply air temperature setpoint shall be reset to 58 °F (adj) when the return air temperature is at 72 °F. (adj)
The pre-heat coil discharge air temperature setpoint shall be set at 50°F (adj).
The minimum outside air flowrate setpoint shall be set at the scheduled minimum flowrate from the unit schedule on the mechanical drawings.
The maximum outside air flowrate setpoint shall be set at the scheduled maximum flowrate from the unit schedule on the mechanical drawings.
The space carbon dioxide high-limit setpoint be set at 1000 ppm (adj).
The supply duct static pressure high-limit setpoint shall be set at 2.5 in. wc. (adj).
The air filter pressure differential high-limit setpoint shall be set at 1.0 in. wc. (adj).
The freeze-stat low-limit trip setpoint shall be set at 37°F(adj).
The outdoor air temperature freeze protection setpoint shall be 37°F (adj).

System Shutdown - System shutdown shall be initiated:
By operator entered manual command at the EMCS.
Automatically by the EMCS based on Night-Setback or Time of Day schedule.
Automatically by the high-static pressure shut down.
Automatically by the unit freeze-stat shut down.
Automatically by a supply fan current sensor status failure.
Automatically by the auxiliary fire alarm relay when an alarm condition has been initiated.

System Alarms - The EMCS shall generate an alarm if:
If the supply air temperature is outside the limits, which shall be set at +/- 5 °F around setpoint.
If the space carbon dioxide level for any associated zone exceeds its high-limit for more than 20 minutes (adj) or exceeds the high-limit by 10% or more.
If the supply duct static pressure exceeds the high-limit setpoint.
If the unit freeze-stat trips.
If the filter differential pressure exceeds the trip point.
If the current sensor relay indicates a supply fan failure status.
All alarms shall be inhibited when the supply fan is not operating.

1 **VAV Air Handling Unit W/ DX - Control Schematic and Sequence of Operations (AHU-01)**
NOT TO SCALE



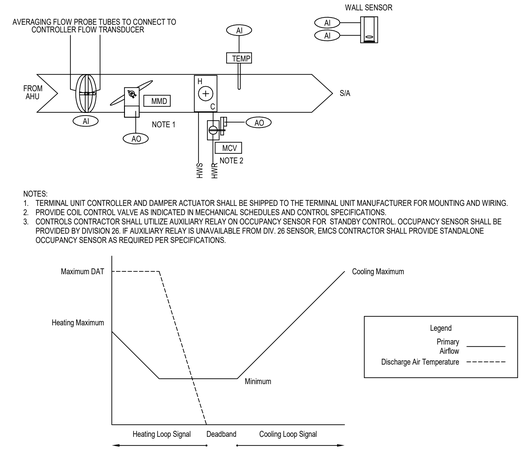
NOTES:
1. PICVV 2-WAY CONTROL VALVE.

HEATING MODE: When the space temperature is below the Heating Setpoint, the hot water coil valve shall be modulated between 0-100%, to maintain the space temperature within +/- 0.5 °F of the Heating Setpoint. The hot water coil discharge temperature shall not be allowed to go above the heating coil high-limit setpoint.
The heating shall be enabled whenever:
- Outside air temperature is less than 65°F (adj.),
- AND the zone temperature is below heating setpoint.
- AND the associated air handling unit supply fan status is on.
- AND the cooling is not active.

System Setpoints - The setpoints for the system shall be set as follows:
The Heating Setpoint shall be set initially at 70 °F (adjustable).
The heating coil high-limit setpoint shall be set initially at 120 °F (adjustable).
The design airflow rates shall be set at the values given in the Mechanical Drawings.

System Alarms - The EMCS shall generate an alarm as follows:
If the space temperature is 2 °F (adj.) above or below the heating setpoint depending upon active mode.

4 **Hot Water Reheat Coil - Control Schematic and Sequence of Operation**
NOT TO SCALE



NOTES:
1. TERMINAL UNIT CONTROLLER AND DAMPER ACTUATOR SHALL BE SHIPPED TO THE TERMINAL UNIT MANUFACTURER FOR MOUNTING AND WIRING.
2. PROVIDE COIL CONTROL VALVE AS INDICATED IN MECHANICAL SCHEDULES AND CONTROL SPECIFICATIONS.
3. CONTROLS CONTRACTOR SHALL UTILIZE AUXILIARY RELAY ON OCCUPANCY SENSOR FOR STANDBY CONTROL. OCCUPANCY SENSOR SHALL BE PROVIDED BY DIVISION 26. IF AUXILIARY RELAY IS UNAVAILABLE FROM DIV. 26 SENSOR, EMCS CONTRACTOR SHALL PROVIDE STANDALONE OCCUPANCY SENSOR AS REQUIRED PER SPECIFICATIONS.

System Off - When the system is off:
The primary air damper shall be closed.
The heating coil shall be disabled.
The control loops shall be disabled.

System Startup - Startup shall be initiated automatically by the EMCS:
In Unoccupied when the corresponding AHU is in UNOCCUPIED MODE.
In Occupied when the corresponding AHU is in PRE-START MODE.
In Unoccupied when the corresponding AHU is in NIGHT-SETBACK MODE.
In Occupied when the corresponding AHU is in OCCUPIED MODE.
In Standby when the corresponding AHU is in OCCUPIED MODE and the zone-mounted Occupancy Sensor times out.

System Operation - When system start-up has been initiated, the following sequences shall be implemented:
The primary air damper shall be modulated between the minimum and maximum flow values to maintain the space temperature within +/- 0.5 °F of the active Cooling Setpoint.
When the space temperature falls below the deadband, the primary air damper shall modulate to maintain the heating minimum flow value and the hot water control valve shall be modulated to maintain the space temperature within +/- 0.5 °F of the active Heating Setpoint.
If the space temperature drops below the active Heating Setpoint and the discharge air temperature is at its active setpoint, the primary air damper shall be modulated between the heating minimum and maximum heating flow values to maintain the space temperature within +/- 0.5°F of the active Heating Setpoint and the hot water control valve shall be modulated to maintain the discharge air temperature setpoint.

System Setpoints - The setpoints for the system shall be set as follows:
The Occupied Heating Setpoint shall be set initially at 70 °F (adjustable).
The Occupied Cooling Setpoint shall be set initially at 74 °F (adjustable).
The Unoccupied Heating Setpoint shall be set initially at 55 °F (adjustable).
The Unoccupied Cooling Setpoint shall be set initially at 85 °F (adjustable).
The Standby Heating Setpoint shall be set initially at 66 °F (adjustable).
The Standby Cooling Setpoint shall be set initially at 78 °F (adjustable).
The maximum heating mode discharge air temperature shall be set at 85 F (adjustable).
The minimum and maximum primary airflow rates shall be set at the values given in the Mechanical Drawings.

System Alarms - The EMCS shall generate an alarm as follows:
If, during the Occupied Mode, the space temperature is 5 °F above or below the cooling setpoint.

3 **VAV Terminal Unit with Hot Water Reheat - Control Schematic and Sequence of Operations**
NOT TO SCALE

DBR
SERVICE | QUALITY | INTEGRITY | SUSTAINABILITY
9990 Richmond Avenue
South Building, Suite 310
Houston, Texas 77042
713.914.4333 p 713.914.9260 f

ISSUANCE:

No.	DATE	DESCRIPTION
	07/28/25	ISSUE FOR BID

SEAL:



HUMBLE ISD - OAK FOREST ES - HVAC UPGRADES - 6400 KINGWOOD GLEN DR, 77346

TBPE Firm Registration No. 2234

DATE: 07/28/25

DRAWN BY: DBR

CHECKED BY: DBR

PROJECT NUMBER 250054.000

SHEET TITLE: CONTROL SEQUENCES AND SCHEMATICS

SHEET NUMBER: M4.03

DBR
713.914.0888 p
https://www.dbrinc.com
TBPE Firm Registration No. 2234
DBR Project # 250054.000

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VAV AIR HANDLING UNIT SCHEDULE

FAN	MARK	AHU-1
	LOCATION	MECH A
	SERVES	ADMINSTRATION
	TYPE	DRAW-THRU
	ARRANGEMENT	VERTICAL
	DISCHARGE	TOP
	DESIGN SUPPLY AIR (CFM)	4225
	MINIMUM SUPPLY AIR (CFM)	1690
	DESIGN OUTDOOR AIR (CFM)	585
	FAN TYPE / MOTOR TYPE	FC / TEFC
	EXT. S.P. (IN. W.G.)	1.5
	FAN MOTOR HORSEPOWER (HP)	5
	VOLTS/PHASE/HERTZ	480 / 3 / 60
	MAX. FAN RPM	1,676
	TOTAL FULL LOAD AMPS (FLA)	6.9
	MCA/MOP	8.6 / 15
PREHEAT COIL	MAX. COIL FACE VELOCITY (FPM)	500
	MINIMUM COIL ROWS	4
	MAX. FINS PER INCH	11
	COIL CFM	4,225
	EAT DB (°F)	46.2
	LAT DB (°F)	55.0
	HEATING CAPACITY (MBH)	40.2
	EWT/LWT (°F)	180 / 150
	CONTROL VALVE	2-WAY
	COIL WATER FLOW (GPM)	2.7
	HW BRANCH PIPING SIZE	1-1/2"
	MAX. WATER P.D. (FT. HD.)	15.0
COOLING COIL	MAX. COIL FACE VELOCITY (FPM)	500
	MINIMUM COIL ROWS	4
	MAX. FINS PER INCH	11
	COIL CFM	4,225
	EAT DB (°F)	83.6
	EAT WB (°F)	66.5
	LAT DB (°F)	55.0
	LAT WB (°F)	54.9
	TOTAL COOLING CAPACITY (MBH)	164.6
	SENSIBLE COOLING CAPACITY (MBH)	130.5
	EWT/LWT (°F)	44 / 56
	CONTROL VALVE	2-WAY
	COIL WATER FLOW (GPM)	27
	CHW BRANCH PIPING SIZE (IN)	2
DX COIL	MAX. COIL FACE VELOCITY (FPM)	500
	COIL CFM	4,225
	EAT (°F)	73.6 / 61.0
	LAT (°F)	55 / 54
	MINIMUM TOTAL COOLING CAPACITY (MBH)	164.6
	SENSIBLE COOLING CAPACITY (MBH)	131.6
	AMBIENT TEMPERATURE	105.0
	CONDENSATE PIPING SIZE	1
	REFRIGERANT TYPE	R-454B
	MAX. WATER P.D. (FT. HD.)	15.0
MANUFACTURER		CARRIER
MODEL NUMBER		39MN
EXISTING HOUSEKEEPING PAD DIMENSIONS L X W (IN.)		73.5 X 72 x 57
EXISTING UNIT DIMENSIONS L X W X H (IN.)		66 X 64 X 67
MANUFACTURER DIMENSIONS L X W X H (IN.)		104 x 86 x 78
OPERATING WEIGHT (LBS.)		2722
NOTES		ALL

NOTES:

1. MANUFACTURERS OTHER THAN BASIS OF DESIGN ARE TO FIT WITHIN DIMENSION SPECIFIED SUCH THAT THE EXISTING CONCRETE PAD IS ABLE TO BE REUSED.
2. REUSE BIPOLAR IONIZATION KIT ON REPLACEMENT AHU. MODIFY AS REQUIRED AND FOLLOW BIPOLAR IONIZATION KIT MANUFACTURER'S RECOMMENDATIONS. IF UNABLE TO REUSE, PROIVDE NEW.
3. EXTERNAL STATIC PRESSURE DOES NOT INCLUDE LOSSES DUE TO COILS, FILTERS, AND CASING.
5. REPLACE AUTOMATIC CONTROL VALVE AS SCHEDULED.
6. CONTRACTOR SHALL VERIFY ALTERNATE MANUFACTURER UNIT AND CLEARANCES ARE MAINTAINED PRIOR TO ORDERING.
7. CONTRACTOR TO VERIFY UNIT HANDING PRIOR TO ORDERING.
8. CONTRACTOR TO ENSURE ALL MODULES ARE ABLE TO BE TRANSPORTED THROUGH 3'-0" DOORS SUCH THAT NO MODIFICATIONS TO WALLS AND/OR DOOR FRAMES ARE REQUIRED FOR INSTALL. IF FURTHER DISASSEMBLY OF MODULES IS REQUIRED, MANUFACTURER CERTIFIED TECHNICIAN TO BE PRESENT FOR FURTHER DISASSEMBLY & REASSEMBLY OF MODULES.
9. PROVIDE UNIT WITH MERV-13 FILTER(S) AND FILTER RACK ON BACK OF UNIT. FILTER MUST BE READILY ACCESSIBLE. ANY QUESTIONABLE MEANS OF ACCESS WILL BE REPLACED AT NO ADDITIONAL COST TO THE OWNER.
10. PROVIDE CHILLED WATER PIPING WITH GLOBE ISOLATION VALVE AND BALANCING VALVE AT...
11. PROVIDE UNITS WITH AN ADDITIONAL FAN BELT TO BE TURNED OVER TO MAINTENANCE.
12. DUCT MOUNTED SMOKE DETECTORS ARE EXISTING TO REMAIN AND PRESENT ON UNITS DISCHARGING IN EXCESS OF 2,000 CFM. DISCONNECT CONTROL WIRING FROM AIR HANDLER TO SMOKE DETECTOR AND RECONNECT TO NEW AIR HANDLER.
13. PROVIDE STAINLESS STEEL SECONDARY DRAIN PAN WITH FLOAT SWITCH TO DE-ENERGIZE UNIT WHEN PRIMARY DRAIN BECOMES RESTRICTED.

SINGLE ZONE AIR HANDLING UNIT SCHEDULE

FAN	MARK	AHU-2	AHU-3	AHU-5	AHU-8	AHU-10
	LOCATION	MECH A33	MECH A	MECH A	MECH B	MECH C
	SERVES	KITCHEN	CAFETORIUM	MUSIC	LIBRARY	COMPUTERS
	TYPE	DRAW-THRU	DRAW-THRU	DRAW-THRU	DRAW-THRU	DRAW-THRU
	ARRANGEMENT	VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL
	DISCHARGE	TOP	FRONT	TOP	FRONT	TOP
	DESIGN SUPPLY AIR (CFM)	9220	15825	1670	8100	5150
	MINIMUM SUPPLY AIR (CFM)	3690	6330	670	3240	2060
	DESIGN OUTDOOR AIR (CFM)	2060	4500	375	750	840
	FAN TYPE / MOTOR TYPE	FC / TEFC	FC / TEFC	FC / TEFC	FC / TEFC	FC / TEFC
	EXT. S.P. (IN. W.G.)	0.75	0.75	0.5	0.75	1.25
	FAN MOTOR HORSEPOWER (HP)	10	20	2	7.5	7.5
	VOLTS/PHASE/HERTZ	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60
	MAX. FAN RPM	753	636	1,426	1,013	1,133
	TOTAL FULL LOAD AMPS (FLA)	12.0	24	6.1	9.5	9.5
	MCA/MOP	15 / 27	30 / 54	7.6 / 13.7	11.9 / 21.4	11.9 / 21.4
PREHEAT COIL	MAX. COIL FACE VELOCITY (FPM)	500	500	500	500	-
	MINIMUM COIL ROWS	4	4	4	4	-
	MAX. FINS PER INCH	11	11	11	11	-
	COIL CFM	9,220	15,825	1,670	8,100	-
	EAT DB (°F)	56.7	53.1	56.7	64.5	-
	LAT DB (°F)	85.0	85.0	85.0	85.0	-
	HEATING CAPACITY (MBH)	281.8	545.0	51.0	179.3	-
	EWT/LWT (°F)	180 / 150	180 / 150	180 / 150	180 / 150	-
	CONTROL VALVE	2-WAY	2-WAY	3-WAY	2-WAY	-
	COIL WATER FLOW (GPM)	18.8	36.3	3.4	12.0	`
	HW BRANCH PIPING SIZE	2	2-1/2	3/4	1-1/4	-
	MAX. WATER P.D. (FT. HD.)	15.0	15.0	15.0	15.0	-
COOLING COIL	MAX. COIL FACE VELOCITY (FPM)	500	500	500	500	500
	MINIMUM COIL ROWS	4	4	4	4	4
	MAX. FINS PER INCH	11	11	11	11	11
	COIL CFM	9,220	15,825	1,670	8,100	5,150
	EAT DB (°F)	83.6	83.6	83.6	83.6	83.6
	EAT WB (°F)	66.5	66.5	66.5	66.5	66.5
	LAT DB (°F)	55.0	55.0	55.0	55.0	55.0
	LAT WB (°F)	54.9	54.9	54.9	54.9	54.9
	TOTAL COOLING CAPACITY (MBH)	384.2	736.2	72.2	274.4	200.9
	SENSIBLE COOLING CAPACITY (MBH)	287.7	480.2	51.8	218.1	158.9
	EWT/LWT (°F)	44 / 56	44 / 56	44 / 56	44 / 56	44 / 56
	CONTROL VALVE	2-WAY	2-WAY	2-WAY	2-WAY	2-WAY
	COIL WATER FLOW (GPM)	64	123	12	46	33.5
	CHW BRANCH PIPING SIZE (IN)	2-1/2	3	1-1/4	2	2
	MAX. WATER P.D. (FT. HD.)	15.0	15.0	15.0	15.0	15.0
MANUFACTURER		CARRIER	CARRIER	CARRIER	CARRIER	CARRIER
MODEL NUMBER		39MN	39MN	39L	39MN	39MN
EXISTING HOUSEKEEPING PAD DIMENSIONS L X W (IN.)		104 X 93.5	88 X 119.5	59 X 58	74.5 X 82.5	69.5 X 74
EXISTING UNIT DIMENSIONS L X W X H (IN.)		96 X 85.5 X 56	80.5 X 112.5 X 127.5	52 X 52 X 70	66.5 X 74.5 X 93	62 X 66.5 X 80.5
MANUFACTURER DIMENSIONS L X W X H (IN.)		96 X 81 X 61	84 X 111 X 142	33 X 46 X 53	84 X 81 X 98	54 X 69 X 92
OPERATING WEIGHT (LBS.)		3094	5796	592	2942	2150
NOTES		ALL	ALL	ALL	ALL	ALL

NOTES:

1. MANUFACTURERS OTHER THAN BASIS OF DESIGN ARE TO FIT WITHIN DIMENSION SPECIFIED SUCH THAT THE EXISTING CONCRETE PAD IS ABLE TO BE REUSED.
2. REUSE BIPOLAR IONIZATION KIT ON REPLACEMENT AHU. MODIFY AS REQUIRED AND FOLLOW BIPOLAR IONIZATION KIT MANUFACTURER'S RECOMMENDATIONS. IF UNABLE TO REUSE, PROIVDE NEW.
3. EXTERNAL STATIC PRESSURE DOES NOT INCLUDE LOSSES DUE TO COILS, FILTERS, AND CASING.
5. REPLACE AUTOMATIC CONTROL VALVE AS SCHEDULED.
6. CONTRACTOR SHALL VERIFY ALTERNATE MANUFACTURER UNIT AND CLEARANCES ARE MAINTAINED PRIOR TO ORDERING.
7. CONTRACTOR TO VERIFY UNIT HANDING PRIOR TO ORDERING.
8. CONTRACTOR TO ENSURE ALL MODULES ARE ABLE TO BE TRANSPORTED THROUGH 3'-0" DOORS SUCH THAT NO MODIFICATIONS TO WALLS AND/OR DOOR FRAMES ARE REQUIRED FOR INSTALL. IF FURTHER DISASSEMBLY OF MODULES IS REQUIRED, MANUFACTURER CERTIFIED TECHNICIAN TO BE PRESENT FOR FURTHER DISASSEMBLY & REASSEMBLY OF MODULES.
9. PROVIDE UNIT WITH MERV-13 FILTER(S) AND FILTER RACK ON BACK OF UNIT. FILTER MUST BE READILY ACCESSIBLE. ANY QUESTIONABLE MEANS OF ACCESS WILL BE REPLACED AT NO ADDITIONAL COST TO THE OWNER.
10. PROVIDE CHILLED WATER PIPING WITH GLOBE ISOLATION VALVE AND BALANCING VALVE AT THE UNIT IF NOT ALREADY PRESENT. FIELD VERIFY.
11. DUCT MOUNTED SMOKE DETECTORS ARE EXISTING TO REMAIN AND PRESENT ON UNITS DISCHARGING IN EXCESS OF 2,000 CFM. DISCONNECT CONTROL WIRING FROM AIR HANDLER TO SMOKE DETECTOR AND...
12. PROVIDE STAINLESS STEEL SECONDARY DRAIN PAN WITH FLOAT SWITCH TO DE-ENERGIZE UNIT WHEN PRIMARY DRAIN BECOMES RESTRICTED.

VAV AIR HANDLING UNIT SCHEDULE

FAN	MARK	AHU-4	AHU-6	AHU-7	AHU-9	AHU-11	AHU-12	AHU-13
	LOCATION	MECH A	MECH B	MECH B	MECH B	MECH C	MECH C	MECH C
	SERVES	CLASSROOMS	CLASSROOM	CLASSROOMS	CLASSROOMS	CLASSROOMS	CLASSROOMS	CLASSROOMS
	TYPE	DRAW-THRU	DRAW-THRU	DRAW-THRU	DRAW-THRU	DRAW-THRU	DRAW-THRU	DRAW-THRU
	ARRANGEMENT	VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL
	DISCHARGE	FRONT	TOP	TOP	TOP	FRONT	TOP	TOP
	DESIGN SUPPLY AIR (CFM)	6605	7995	6605	7645	6480	10590	4560
	MINIMUM SUPPLY AIR (CFM)	2645	3200	2645	3060	2595	4240	1825
	DESIGN OUTDOOR AIR (CFM)	2520	2760	2520	2010	2250	3000	1500
	FAN TYPE / MOTOR TYPE	FC / TEFC	FC / TEFC	FC / TEFC	FC / TEFC	FC / TEFC	FC / TEFC	FC / TEFC
	EXT. S.P. (IN. W.G.)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	FAN MOTOR HORSEPOWER (HP)	7.5	10	7.5	7.5	7.5	15	7.5
	VOLTS/PHASE/HERTZ	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60
	MAX. FAN RPM	1,093	1,141	1,075	1,070	1,162	965	1,162
	TOTAL FULL LOAD AMPS (FLA)	9.5	12	9.5	9.5	9.5	18.1	9.5
	MCA/MOP	11.9 / 21.4	15 / 27	11.9 / 21.4	11.9 / 21.4	11.9 / 21.4	22.6 / 40.7	11.9 / 21.4
PREHEAT COIL	MAX. COIL FACE VELOCITY (FPM)	500	500	500	-	500	-	500
	MINIMUM COIL ROWS	4	4	4	-	4	-	4
	MAX. FINS PER INCH	11	11	11	-	11	-	11
	COIL CFM	6,605	7,995	6,605	-	6,480	-	4,560
	EAT DB (°F)	47.3	49.5	47.3	-	49.3	-	50.4
	LAT DB (°F)	55.0	55.0	55.0	-	55.0	-	55.0
	HEATING CAPACITY (MBH)	54.9	47.5	54.9		39.9		22.7
	EWT/LWT (°F)	180 / 150	180 / 150	180 / 150	-	180 / 150	-	180 / 150
	CONTROL VALVE	2-WAY	2-WAY	2-WAY	-	2-WAY		3-WAY
	COIL WATER FLOW (GPM)	4	3	4	-	3	-	2
	HW BRANCH PIPING SIZE	1	3/4	3/4	-	3/4	-	3/4
	MAX. WATER P.D. (FT. HD.)	15.0	15.0	15.0	-	15.0	-	15.0
COOLING COIL	MAX. COIL FACE VELOCITY (FPM)	500	500	500	500	500	500	500
	MINIMUM COIL ROWS	4	4	4	4	4	4	4
	MAX. FINS PER INCH	11	11	11	11	11	11	11
	COIL CFM	6,605	7,995	6,605	7,645	6,480	10,590	4,560
	EAT DB (°F)	83.6	83.6	83.6	83.6	83.6	83.6	83.6
	EAT WB (°F)	66.5	66.5	66.5	66.5	66.5	66.5	66.5
	LAT DB (°F)	55.0	55.0	55.0	55.0	55.0	55.0	55.0
	LAT WB (°F)	54.9	54.9	54.9	54.9	54.9	54.9	54.9
	TOTAL COOLING CAPACITY (MBH)	386.1	451.8	493.8	276.6	368.7	528.5	254.9
	SENSIBLE COOLING CAPACITY (MBH)	249.0	291.4	311.3	259.7	240.6	367.1	168.5
	EWT/LWT (°F)	44 / 56	44 / 56	44 / 56	44 / 56	44 / 56	44 / 56	44 / 56
	CONTROL VALVE	2-WAY	2-WAY	2-WAY	2-WAY	3-WAY	3-WAY	2-WAY
	COIL WATER FLOW (GPM)	65	76	83	63	62	88	43
	CHW BRANCH PIPING SIZE (IN)	2-1/2	2-1/2	3	2-1/2	2-1/2	3	2
	MAX. WATER P.D. (FT. HD.)	15.0	15.0	15.0	15.0	15.0	15.0	15.0
MANUFACTURER		CARRIER	CARRIER	CARRIER	CARRIER	CARRIER	CARRIER	CARRIER
MODEL NUMBER		39MN	39MN	39MN	39MN	39MN	39MN	39MN
EXISTING HOUSEKEEPING PAD DIMENSIONS L X W (IN.)		76 X 82	74.5 X 82	74.5 X 82	74.5 X 82	70 X 82	79 X 94	69.5 X 74
EXISTING UNIT DIMENSIONS L X W X H (IN.)		66.5 X 74 X 92.5	67 X 74 X 92.5	66.5 X 74 X 92.5	66.5 X 74 X 93	62 X 66.5 X 80.5	71.5 X 86.5 X 105	62 X 74 X 80.5
MANUFACTURER DIMENSIONS L X W X H (IN.)		72 X 74 X 92	72 x 81 x 98	72 X 74 X 92	60 X 81 X 98	72 X 74 X 92	72 X 88 X 118	60 X 69 X 78
OPERATING WEIGHT (LBS.)		2767	3112	2797	2623	2767	3769	2195
NOTES		ALL	ALL	ALL	ALL	ALL	ALL	ALL

NOTES:

1. MANUFACTURERS OTHER THAN BASIS OF DESIGN ARE TO FIT WITHIN DIMENSION SPECIFIED SUCH THAT THE EXISTING CONCRETE PAD IS ABLE TO BE REUSED.
2. REUSE BIPOLAR IONIZATION KIT ON REPLACEMENT AHU. MODIFY AS REQUIRED AND FOLLOW BIPOLAR IONIZATION KIT MANUFACTURER'S RECOMMENDATIONS. IF UNABLE TO REUSE, PROIVDE NEW.
3. EXTERNAL STATIC PRESSURE DOES NOT INCLUDE LOSSES DUE TO COILS, FILTERS, AND CASING.
5. REPLACE AUTOMATIC CONTROL VALVE AS SCHEDULED.
6. CONTRACTOR SHALL VERIFY ALTERNATE MANUFACTURER UNIT AND CLEARANCES ARE MAINTAINED PRIOR TO ORDERING.
7. CONTRACTOR TO VERIFY UNIT HANDING PRIOR TO ORDERING.
8. CONTRACTOR TO ENSURE ALL MODULES ARE ABLE TO BE TRANSPORTED THROUGH 3'-0" DOORS SUCH THAT NO MODIFICATIONS TO WALLS AND/OR DOOR FRAMES ARE REQUIRED FOR INSTALL. IF FURTHER DISASSEMBLY OF MODULES IS REQUIRED, MANUFACTURER CERTIFIED TECHNICIAN TO BE PRESENT FOR FURTHER DISASSEMBLY & REASSEMBLY OF MODULES.
9. PROVIDE UNIT WITH MERV-13 FILTER(S) AND FILTER RACK ON BACK OF UNIT. FILTER MUST BE READILY ACCESSIBLE. ANY QUESTIONABLE MEANS OF ACCESS WILL BE REPLACED AT NO ADDITIONAL COST TO THE OWNER.
10. PROVIDE CHILLED WATER PIPING WITH GLOBE ISOLATION VALVE AND BALANCING VALVE AT THE UNIT IF NOT ALREADY PRESENT. FIELD VERIFY.
11. PROVIDE UNITS WITH AN ADDITIONAL FAN BELT TO BE TURNED OVER TO MAINTENANCE.
12. DUCT MOUNTED SMOKE DETECTORS ARE EXISTING TO REMAIN AND PRESENT ON UNITS DISCHARGING IN EXCESS OF 2,000 CFM. DISCONNECT CONTROL WIRING FROM AIR HANDLER TO SMOKE DETECTOR AND RECONNECT TO NEW AIR HANDLER.
13. PROVIDE STAINLESS STEEL SECONDARY DRAIN PAN WITH FLOAT SWITCH TO DE-ENERGIZE UNIT WHEN PRIMARY DRAIN BECOMES RESTRICTED.

BOILER SCHEDULE

MARK	B-1, 2
FUEL	NAT. GAS
STYLE	CONDENSING
INPUT CAPACITY (MBH)	1,500
OUTPUT CAPACITY (MBH)	1,455
TURNDOWN RATIO	10:1
GPM	97
EWT/LWT (°F)	150 / 180
THERMAL EFFICIENCY	97%
MAX. PRESSURE DROP (FT. HD.)	15
FLUE CATEGORY	IV
FLUE SIZE	8"
VOLTAGE/PHASE/FREQUENCY	208 / 1 / 60
MCA (AMPS)	20
MOCP (AMPS)	20
MANUFACTURER	PATTERSON-KELLEY
MODEL NUMBER	ST-1500
OPERATING WEIGHT (LBS)	1,150
NOTES	ALL

NOTES:

1. BOILER MUST MEET LATEST LOW NOx REQUIREMENTS FOR TEXAS.
2. BOILER SHALL BE SEQUENCED WITH AMBIENT OUTDOOR AIR TEMPERATURE RESET. RE: CONTROL DIAGRAMS FOR HOT WATER SYSTEM CONTROL SCHEMATIC AND SEQUENCE OF OPERATION.
3. PROVIDE BOILER WITH COMMUNICATION MODULE FOR BACNET INTERFACE WITH EXISTING EMCS. EXTERNAL POWER SUPPLY, IF REQUIRED, SHALL BE PROVIDED BY BOILER MANUFACTURER. WIRING TO BE PROVIDED BY ELECTRICAL CONTRACTOR.
4. PROVIDE BOILER WITH MANUFACTURER CONDENSATION NEUTRALIZATION KIT, SUPPLIED BY BOILER MANUFACTURER, INSTALLED BY CONTRACTOR.
5. CAT-IV DOUBLE WALL STAINLESS STEEL BOILER FLUE TO BE SUPPLIED.
6. BOILER MANUFACTURER TO PROVIDE FLUE. REFER TO FLOOR PLANS FOR ROUTING.
7. PROVIDE WITH CIRCULATING PUMP. SIZED BY BOILER MANUFACTURER TO ENSURE CONSTANT FLOW THROUGH BOILER. PUMP TO BE SHIPPED LOOSE. STARTER AND DISCONNECT BY ELECTRICAL CONTRACTOR BUT CONTROLLED BY BOILER. CONTRACTOR TO WIRE FROM BOILER PUMP CONTROL CIRCUIT ON BOILER TO PUMP STARTER RELAY.

PUMP SCHEDULE

MARK	HWP-1	CP-1, CP-2	S-CHWP-1,S-CHWP-2	P-CHWP-1,P-CHWP-2
MANUFACTURER	B & G	B & G	B & G	B & G
TYPE	END SUCTION	IN-LINE CIRCULATOR	END SUCTION	END SUCTION
SERVES	BUILDING HOT WATER LOOP	B1 / B2	BUILDING COLD WATER LOOP	CH-1,CH-2
MODEL NUMBER	e-1510	V2D7A-CC	e-1510	e-1510
FLOW GPM	195	96	320	277
PUMP SIZE	2GB	VIL	3EB	2BD
HEAD (FT. H2O)	120	25	100	50
APPROX. PUMP EFF. (%)	66.2	--	65.6	71.1
APPROX. IMPELLER DIA. (INCHES)	12.000	--	10.75	8.75
MOTOR RPM	1,800	1,800	1,800	1,800
BRAKE HORSEPOWER	14.70	--	10.7	4.71
HORSEPOWER	15	1.5	15	7.5
VOLTS/PHASE/HERTZ	480 / 3 /60	480 / 3 /60	480 / 3 /60	480 / 3 /60
NOTES	1,2,3,6,7	1,3,5,7,9	1,2,3,6,7	1,2,4,6

NOTES:

1. PUMP SHALL BE NON-OVERLOADING ACROSS ENTIRE GPM RANGE.
2. PROVIDE WITH VARIABLE FREQUENCY DRIVE.
3. PROVIDE WITH PREMIUM EFFICIENCY ODP MOTOR FOR OPERATION WITH VARIABLE FREQUENCY DRIVE.
4. PROVIDE WITH PREMIUM EFFICIENCY TEFC MOTOR FOR OPERATION WITH VARIABLE FREQUENCY DRIVE.
5. PUMP TO BE POWERED FROM ASSOCIATED BOILER.
6. PROVIDE PUMPS WITH SUCTION DIFFUSERS.
7. PROVIDE PUMPS WITH VIBRATION ISOLATORS.
8. PROVIDE COOL BLUE INDUCTIVE ABSORBERS FOR PUMP GROUNDING RINGS
9. PROVIDE WITH CIRCULATING PUMP, SIZED BY BOILER MANUFACTURER TO ENSURE CONSTANT FLOW THROUGH BOILER. PUMP TO BE SHIPPED LOOSE. STARTER AND DISCONNECT BY ELECTRICAL CONTRACTOR BUT CONTROLLED BY BOILER. CONTRACTOR TO WIRE FROM BOILER PUMP CONTROL CIRCUIT ON BOILER TO PUMP STARTER RELAY.

AIR COOLED CHILLER SCHEDULE

MARK	CH-1	CH-2
NOMINAL TONS	200.0	200
DESIGN TONS	161.8	161.8
DESIGN GPM	277.0	277
MINIMUM GPM	210.0	210
EWT/LWT (°F)	56 / 42	56 / 42
AMBIENT DESIGN TEMPERATURE (°F)	105	105
MINIMUM AMBIENT TEMPERATURE (°F)	15	15
MAX. PRESSURE DROP (FT. HD.)	15	15
FOULING FACTOR (HR-FT2-°F/BTU)	0.0001	0.0001
COMPRESSOR TYPE	SCREW	SCREW
EER (AT AHRI CONDITIONS)	9.7	9.7
IPLV (AT AHRI CONDITIONS)	17.7	17.7
EER (AT DESIGN CONDITIONS)	9.729	9.729
IPLV (AT DESIGN CONDITIONS)	18.63	18.63
VOLTS/PHASE/HERTZ	460/3/60	460/3/60
MINIMUM CIRCUIT AMPACITY (A)	372	372
REFRIGERANT TYPE	R-513A	R-513A
MAXIMUM OVER-CURRENT PROTECTION (A)	500	500
UNIT DIMENSIONS (LXWXH)	253 X 88 X 99	253 X 88 X 99
MANUFACTURER	CARRIER	CARRIER
MODEL NUMBER	30XV200	30XV200
OPERATING WEIGHT (LBS)	14,212	14,212
NOTES	ALL	ALL

NOTES:

1. MAIN CIRCUIT BREAKER SHALL BE RATED AT 65,000 AIC. REFER TO ELECTRICAL.
2. PROVIDE SOUND ATTENUATION PACKAGE ON COMPRESSORS AND CASING AND LOW NOISE CONDENSER FAN OPTION. SOUND ATTENUATION TO MAINTAIN 73 DBA OF SOUND PRESSURE.
3. PROVIDE WITH FACTORY INSTALLED EVAPORATOR WATER FLOW SWITCH.
4. PROVIDE CHILLER WITH LOW AMBIENT HEAD PRESSURE CONTROL.
5. PROVIDE WITH BACNET INTERFACE CARD FOR INTEGRATION WITH EMCS.
6. PROVIDE INTEGRAL NON-FUSED DISCONNECT SWITCH WITH NEMA 3R ENCLOSURE.
7. PROVIDE UNIT WITH FACTORY EPOXY COATED CONDENSER COILS.
8. PROVIDE UNIT WITH DEDICATED 120V/1PH/60HZ 20AMP CIRCUIT FOR FREEZE PROTECTION KIT AND UNIT CONTROLLER.

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DBR Project # 250054.000
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9990 Richmond Avenue
South Building, Suite 310
Houston, Texas 77042
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ISSUANCE:

No.	DATE	DESCRIPTION
	07/28/25	ISSUE FOR BID

SEAL:



HUMBLE ISD - OAK FOREST ES - HVAC UPGRADES - 6400 KINGWOOD GLEN DR, 77346

TBPE Firm Registration No. 2234

DATE: 07/28/25

DRAWN BY: DBR

CHECKED BY: DBR

PROJECT NUMBER 250054.000

SHEET TITLE: MECHANICAL SCHEDULES

SHEET NUMBER: M5.01

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FAN SCHEDULE (1/2)

MARK	F-A-1	F-A-2	F-A-3	F-A-4	F-A-5	F-A-6	F-A-7	F-A-8	F-A-9	F-B-1	F-B-2	F-B-3
AREA	CAN WASH A31	ELECTRICAL A34	BOILER A36	TOILET A29, LOCKER A27	DISHWASHER	HOODS	WOMEN A39,TOILET A43, CUST A41, GIRLS A50, BOYS B44	WOMEN A70, MEN A71, TLT A67	MEN A85,TLTA82, CUST A84, BOYS B75, GIRLS B02	GIRLS B51, BOYS B53,TOILET B61, CUST B63	BOYS B31, GIRLS B33	BOYS B09, GIRLS B11, TOILET B18, CUST B20
TYPE/DRIVE	PROP / DIRECT	CENT/BELT	CENT/DIRECT	CENT/DIRECT	CENT/DIRECT	CENT/BELT	CENT/BELT	CENT/DIRECT	CENT/DIRECT	CENT/BELT	CENT/DIRECT	CENT/DIRECT
INTERLOCK	TEMP	SENSOR	EMCS / TEMP	EMCS	KITCHEN EQUIP.	KITCHEN EQUIP.	EMCS	EMCS	EMCS	EMCS	EMCS	EMCS
CFM	1,975	1,600	1,200	260	1,500	4,800	875	460	875	535	740	535
EXT. S.P. (IN. W.G.)	0.375	0.250	0.375	0.375	0.50	1	1	1	1	0.375	0.375	0.375
HORSEPOWER	1/2	1/2	1/4	1/15	1/2	2	1/2	1/4	1/2	1/6	1/6	1/6
FAN SPEED (RPM)	1,665	1,545	1,674	1,703	1,099	1,005	2,453	1,665	2,453	1,338	1,545	1,338
SONES (MAX.)	11.9	11.2	11.1	5.6	10.0	18.0	15.5	9.9	15.5	6.7	8.7	6.7
VOLTS/PHASE/HERTZ	120 / 1 /60	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60	480 / 3 / 60	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
MANUFACTURER	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK
MODEL NUMBER	SEI-14-436-VG	SQ-120-VG	SQ-9-M1-VG	G-070-VG	CUE-140-VG	CUBE-220-HP	G-100HP-VG	G-098-VG	G-100HP-VG	G-095-VG	G-095-VG	G-095-VG
NOTES	1,9,10	1,3,5,8,9,10	1,3,8,9,10	1,2,11	1,6,7	1,6,7	1,2,3,11	1,2,3,11	1,2,3,11	1,2,3,11	1,2,3,11	1,2,3,11

NOTES:
1. EXTERNAL STATIC PRESSURE DOES NOT ACCOUNT FOR LOSSES DUE TO FILTERS, HOUSING, NOR ACCESSORIES.
2. PROVIDE WITH ROOF CURB ADAPTER, WEATHERPROOF DISCONNECT SWITCH, AND ALUMINUM BIRD SCREEN.
3. PROVIDE WITH MOTORIZED DAMPER INTERLOCKED WITH FAN OPERATION SUCH THAT DAMPER SHALL OPEN WHEN FAN IS ENERGIZED AND SHUT WHEN FAN IS DE-ENERGIZED. DAMPER SHALL BE INSTALLED IN ACCESSIBLE LOCATION.
4. FAN SHALL BE HARDWIRE INTERLOCKED WITH ASSOCIATED AHU OPERATION. REFER TO CONTROLS FOR MORE DETAILS.
5. PROVIDE UNIT WITH AN ADDITIONAL FAN BELT TO BE TURNED OVER TO MAINTENANCE.
6. FAN SHALL BE LISTED TO COMPLY WITH UL-705: POWER VENTILATORS FOR RESTAURANT EXHAUST APPLIANCES.
7. PROVIDE WITH PRE-FABRICATED ROOF CURB, VENTED CURB EXTENSION, DRAIN CONNECTION, GREASE TRAP, HEAT BAFFLE, HINGING KIT, AND WEATHERPROOF COMBINATION STARTER DISCONNECT SWITCH.
8. FAN SHALL BE HARDWIRE INTERLOCKED WITH ASSOCIATED (HOOD/WALL) SWITCH.
9. FAN SHALL BE INTERLOCKED WITH TEMPERATURE SENSOR SUCH THAT WHEN SPACE REACHES OVER 85°I (ADJ.) FAN WILL ENERGIZE.
10. FAN SHALL BE PROVIDED WITH VIBRATION ISOLATORS.
11. PROVIDE FAN WITH TOOGLE SWITCH.

FAN SCHEDULE (2/2)

MARK	F-C-1	F-C-2	F-C-3	F-C-4	F-C-5
AREA	TOILET C36, CUST C31	TLT C06, CUST C04	TOILET C28, TOILET C11	GIRLS C24, BOYS C23	BOYS C16, GIRLS C17
TYPE/DRIVE	CENT/DIRECT	CENT/DIRECT	CENT/DIRECT	CENT/DIRECT	CENT/DIRECT
INTERLOCK	EMCS	EMCS	EMCS	EMCS	EMCS
CFM	175	175	230	460	460
EXT. S.P. (IN. W.G.)	0.375	0.375	0.375	0.375	0.375
HORSEPOWER	1/4	1/4	1/4	1/4	1/4
FAN SPEED (RPM)	1,214	1,214	1,399	1,232	1,232
SONES (MAX.)	5.7	5.7	7.3	6.6	6.6
VOLTS/PHASE/HERTZ	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
MANUFACTURER	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK
MODEL NUMBER	G-097-VG	G-097-VG	G-095-VG	G-098-VG	G-098-VG
NOTES	1,2,5	1,2,5	1,2,5	1,2,3,5	1,2,3,5

NOTES:
1. EXTERNAL STATIC PRESSURE DOES NOT ACCOUNT FOR LOSSES DUE TO FILTERS, HOUSING, NOR ACCESSORIES.
2. PROVIDE WITH ROOF CURB ADAPTER, WEATHERPROOF DISCONNECT SWITCH, AND ALUMINUM BIRD SCREEN.
3. PROVIDE WITH MOTORIZED DAMPER INTERLOCKED WITH FAN OPERATION SUCH THAT DAMPER SHALL OPEN WHEN FAN IS ENERGIZED AND SHUT WHEN FAN IS DE-ENERGIZED. DAMPER SHALL B...
4. FAN SHALL BE HARDWIRE INTERLOCKED WITH ASSOCIATED AHU OPERATION. REFER TO CONTROLS FOR MORE DETAILS.
5. PROVIDE FAN WITH TOOGLE SWITCH.

AIR-DIRT SEPARATOR SCHEDULE

MARK	ADS-H	ADS-C
SERVES	HOT WATER	CHILLED WATER
SYSTEM OPERATING PRESSURE (PSIG)	125	125
DESIGN FLOW (GPM)	97	200
MAX. FLOW (GPM)	190	300
TANK DIAMETER - INCHES	10.75	12.75
TANK HEIGHT - INCHES	26.88	31.44
WEIGHT (LBS)	173	263
ASME CERTIFIED, U-STAMPED VESSEL	YES	YES
MFG	BELL & GOSSET	BELL & GOSSET
MODEL	RL-3F	RL-4F
NOTES	1	1

NOTES:
1. PROVIDE TANK WITH LIFTING RINGS.

HOT WATER UNIT HEATER SCHEDULE

MARK	HWUH-1
SERVES	BOILER ROOM
CFM	1340
HORSE POWER (HP)	1/20
MCA / MOCP	2.09 / 15
FAN DIAMETER	18
FAN RPM	1050
VOLTS/PHASE/HERTZ	115 / 1 / 60
GPM	3.5
CAPACITY (BTUH)	51471
EWT / LWT (°F)	180 / 150
MANUFACTURER	REZNOR
MODEL NUMBER	UWS
NOTES	ALL

NOTES:
1. INSTALL PER MANUFACTURER'S SPECIFICATIONS.
2. MOUNT UNIT HEATER 12" BELOW STRUCTURE.
3. PROVIDE THERMOSTAT TO CONTROL HEATER. MOUNT AT SAME ELEVATION AS LIGHT SWITCHES. THERMOSTAT SHALL ENERGIZE HEATER WHEN TEMPERATURE REACHES 50°F (ADJ.).

RELIEF VENTS

MARK	RH-1	RH-2	RH-3
TYPE/DRIVE	FABRA HOOD	FABRA HOOD	FABRA HOOD
CFM	2,040	2,040	2,040
THORAT SIZE (IN.)	30X34	30X34	30X34
THORAT VELOCITY (FT/MIN)	288	288	288
MANUFACTURER	GREENHECK	GREENHECK	GREENHECK
MODEL NUMBER	FGR-30X34	FGR-30X34	FGR-30X34
NOTES	ALL	ALL	ALL

NOTES:
1. EXTERNAL STATIC PRESSURE DOES NOT ACCOUNT FOR LOSSES DUE TO FILTERS, HOUSING, NOR ACCESSORIES.
2. PROVIDE WITH ROOF CURB AND ALUMINUM BIRD SCREEN.
3. PROVIDE BAROMETRIC RELIEF DAMPER & FACTORY CURB.

AIR COOLED CONDENSING UNIT SCHEDULE

MARK	ACCU-A1
SERVES	AHU-A1
TONS	15
TOTAL COOLING CAPACITY (MBH)	164
AMBIENT TEMP. (°F)	105
STEPS OF CAPACITY	2
REFRIGERANT	R-454B
EER AHRI	11
IEER	14.2
VOLTS/PHASE/HERTZ	460 / 3 / 60
MCA	29.0
MOCP	40.0
MANUFACTURER	CARRIER
MODEL NUMBER	38AXD016
OPERATING WEIGHT (LBS.)	731
NOTES	ALL

NOTES:
1. INSTALL PER MANUFACTURER'S SPECIFICATIONS.
2. REFRIGERANT LINES TO BE SIZED BY MANUFACTURER.
3. PROVIDE WITH CONDENSER COIL HAIL GUARD.
4. PROVIDE WITH LOW AMBIENT HEAD PRESSURE CONTROL.

DUCTLESS SPLIT A/C SCHEDULE

INDOOR UNIT	MARK	AC-1
	SERVES	CONTROL ROOM
	MAX SUPPLY AIR (CFM)	450
	TOTAL COOLING CAPACITY...	18.0
	MCA	1
	FAN MOTOR FLA	0.19
	VOLTS/PHASE/HERTZ	208/1/60
	MODEL NUMBER	PKA-A18LA
	NOTES	1, 2, 3
OUTDOOR UNIT	MARK	CU-1
	SERVES	1.5 TON WALL MOUNTED SPLIT
	GRAND TOTAL COOLING (MBH)	18
	AMBIENT TEMP. (°F)	105
	S.E.E.R.2	20.2
	E.E.R.2	10.7
	MCA	11
	MOCP	28
	VOLTS/PHASE/HERTZ	208/1/60
	MODEL NUMBER	PUY-A18NKA7
	NOTES	1, 2, 3, 4, 5
	MANUFACTURER	MITSUBISHI

NOTES:
1. PROVIDE WITH SINGLE POINT POWER TO INCLUDE CONDENSING UNIT AND REMOTE THERMOSTAT. INDOOR UNIT SHALL BE POWERED FROM OUTDOOR UNIT.
2. INSTALL PER MANUFACTURER'S SPECIFICATIONS.
3. REFRIGERANT LINES TO BE SIZED BY MANUFACTURER.
4. PROVIDE SINGLE CIRCUIT CONDENSING UNIT.
5. PROVIDE CONDENSATE PUMP FOR WALL MOUNTED UNIT.

VAV TERMINAL UNITS W/ HOTWATER HEATING SCHEDULE

MARK	PRIMARY AIR CFM		HEATING CFM	HOT WATER HEATING				INLET SIZE	HAND	VOLTAGE	MFR	MODEL NO.
	MAX.	MIN.		EAT (°F DB)	BTUH	GPM	PIPE SIZE					
VAV-9-1	570	170	400	55	12,960	0.9	3/4"	8"Ø	RIGHT	24 VAC	TITUS	DESV-8
VAV-9-2	1125	340	790	55	25,596	1.7	3/4"	12"Ø	RIGHT	24 VAC	TITUS	DESV-12
VAV-9-3	940	280	660	55	21,384	1.4	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-9-4	1125	340	790	55	25,596	1.7	3/4"	12"Ø	LEFT	24 VAC	TITUS	DESV-12
VAV-9-5	940	280	660	55	21,384	1.4	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-9-6	1125	340	790	55	25,596	1.7	3/4"	12"Ø	LEFT	24 VAC	TITUS	DESV-12
VAV-9-7	670	200	470	55	15,228	1.0	3/4"	8"Ø	RIGHT	24 VAC	TITUS	DESV-8
VAV-9-8	580	175	410	55	13,284	0.9	3/4"	8"Ø	RIGHT	24 VAC	TITUS	DESV-8
VAV-9-9	170	50	120	55	3,888	0.3	3/4"	6"Ø	RIGHT	24 VAC	TITUS	DESV-6
VAV-4-1	910	275	640	55	20,736	1.4	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-4-2	730	220	515	55	16,686	1.1	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-4-3	645	195	455	55	14,742	1.0	3/4"	8"Ø	RIGHT	24 VAC	TITUS	DESV-8
VAV-4-4	655	195	460	55	14,904	1.0	3/4"	8"Ø	LEFT	24 VAC	TITUS	DESV-8
VAV-4-5	910	275	640	55	20,736	1.4	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-4-6	760	230	535	55	17,334	1.2	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-4-7	910	275	640	55	20,736	1.4	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-4-8	580	175	410	55	13,284	0.9	3/4"	8"Ø	RIGHT	24 VAC	TITUS	DESV-8
VAV-4-9	170	50	120	55	3,888	0.3	3/4"	6"Ø	RIGHT	24 VAC	TITUS	DESV-6

NOTES:
1. HOT WATER COILS SHALL BE 1 OR 2 ROWS AND A MAX OF 10 FINS PER INCH. EAT SHALL BE 180°F AND PRESSURE DROP THRU COIL SHALL NOT EXCEED 5 FT. WG AT SCHEDULED GPM.
2. PROVIDE AEROCROSS MULTI-POINT CENTER AVERAGING VELOCITY SENSOR IN PRIMARY AIR INLET.
3. HOT WATER COILS SHALL BE 1 OR 2 ROWS AND A MAX OF 10 FINS PER INCH. EAT SHALL BE 180°F AND PRESSURE DROP THRU COIL SHALL NOT EXCEED 5 FT. WG AT SCHEDULED GPM.
4. PROVIDE HOT WATER REHEAT COIL WITH 2-WAY AUTOMATIC CONTROL VALVE.
5. EMCS CONTRACTOR SHALL PROVIDE 24VAC TO PRIMARY AIR INLET DAMPER ACTUATOR.
6. THE MAXIMUM ALLOWABLE PRESSURE DROP ACROSS HOT WATER COILS SHALL BE 10 FT.HD.

VAV TERMINAL UNITS W/ HOTWATER HEATING SCHEDULE

MARK	PRIMARY AIR CFM		HEATING CFM	HOT WATER HEATING				INLET SIZE	HAND	VOLTAGE	MFR	MODEL NO.
	MAX.	MIN.		EAT (°F DB)	BTUH	GPM	PIPE SIZE					
VAV-6-1	170	50	120	55	3,888	0.3	3/4"	6"Ø	RIGHT	24 VAC	TITUS	DESV-6
VAV-6-2	580	175	410	55	13,284	0.9	3/4"	8"Ø	RIGHT	24 VAC	TITUS	DESV-8
VAV-6-3	670	200	470	55	15,228	1.0	3/4"	8"Ø	RIGHT	24 VAC	TITUS	DESV-8
VAV-6-4	1125	340	790	55	25,596	1.7	3/4"	12"Ø	RIGHT	24 VAC	TITUS	DESV-12
VAV-6-5	760	230	535	55	17,334	1.2	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-6-6	1125	340	790	55	25,596	1.7	3/4"	12"Ø	RIGHT	24 VAC	TITUS	DESV-12
VAV-6-7	940	280	660	55	21,384	1.4	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-6-8	745	225	525	55	17,010	1.1	3/4"	10"Ø	LEFT	24 VAC	TITUS	DESV-10
VAV-6-9	570	170	400	55	12,960	0.9	3/4"	8"Ø	LEFT	24 VAC	TITUS	DESV-8
VAV-6-10	960	290	675	55	21,870	1.5	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-6-11	950	285	665	55	21,546	1.4	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-7-1	725	220	510	55	16,524	1.1	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-7-2	680	205	480	55	15,552	1.0	3/4"	8"Ø	RIGHT	24 VAC	TITUS	DESV-8
VAV-7-3	940	280	660	55	21,384	1.4	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-7-4	940	280	660	55	21,384	1.4	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-7-5	1090	325	765	55	24,786	1.7	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-7-6	490	145	345	55	11,178	0.7	3/4"	8"Ø	RIGHT	24 VAC	TITUS	DESV-8
VAV-7-7	835	250	585	55	18,954	1.3	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-7-8	680	205	480	55	15,552	1.0	3/4"	8"Ø	RIGHT	24 VAC	TITUS	DESV-8
VAV-1-1	280	85	200	55	6,480	0.4	3/4"	6"Ø	RIGHT	24 VAC	TITUS	DESV-6
VAV-1-2	515	155	365	55	11,826	0.8	3/4"	8"Ø	LEFT	24 VAC	TITUS	DESV-8
VAV-1-3	760	230	535	55	17,334	1.2	3/4"	10"Ø	LEFT	24 VAC	TITUS	DESV-10
VAV-1-4	225	70	160	55	5,184	0.3	3/4"	6"Ø	RIGHT	24 VAC	TITUS	DESV-6
VAV-1-5	735	220	515	55	16,686	1.1	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-1-6	425	130	300	55	9,720	0.6	3/4"	8"Ø	RIGHT	24 VAC	TITUS	DESV-8
VAV-1-7	480	145	340	55	11,016	0.7	3/4"	8"Ø	RIGHT	24 VAC	TITUS	DESV-8
VAV-1-8	1085	325	760	55	24,624	1.6	3/4"	10"Ø	LEFT	24 VAC	TITUS	DESV-10

NOTES:
1. HOT WATER COILS SHALL BE 1 OR 2 ROWS AND A MAX OF 10 FINS PER INCH. EAT SHALL BE 180°F AND PRESSURE DROP THRU COIL SHALL NOT EXCEED 5 FT. WG AT SCHEDULED GPM.
2. PROVIDE AEROCROSS MULTI-POINT CENTER AVERAGING VELOCITY SENSOR IN PRIMARY AIR INLET.
3. PROVIDE TERMINAL UNIT CASING WITH 1" INTERNALLY LINED FIBERGLASS FREE INSULATION.
4. PROVIDE HOT WATER REHEAT COIL WITH 2-WAY AUTOMATIC CONTROL VALVE.
5. EMCS CONTRACTOR SHALL PROVIDE 24VAC TO PRIMARY AIR INLET DAMPER ACTUATOR.
6. THE MAXIMUM ALLOWABLE PRESSURE DROP ACROSS HOT WATER COILS SHALL BE 10 FT.HD.

VAV TERMINAL UNITS W/ HOTWATER HEATING SCHEDULE

MARK	PRIMARY AIR CFM		HEATING CFM	HOT WATER HEATING				INLET SIZE	HAND	VOLTAGE	MFR	MODEL NO.
	MAX.	MIN.		EAT (°F DB)	BTUH	GPM	PIPE SIZE					
VAV-11-1	1040	310	730	55	23,652	1.6	3/4"	10"Ø	LEFT	24 VAC	TITUS	DESV-10
VAV-11-2	885	265	620	55	20,088	1.3	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-11-3	770	230	540	55	17,496	1.2	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-11-4	770	230	540	55	17,496	1.2	3/4"	10"Ø	LEFT	24 VAC	TITUS	DESV-10
VAV-11-5	1285	385	900	55	29,160	1.9	3/4"	12"Ø	RIGHT	24 VAC	TITUS	DESV-12
VAV-11-6	955	285	670	55	21,708	1.4	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-11-7	555	165	390	55	12,636	0.8	3/4"	8"Ø	RIGHT	24 VAC	TITUS	DESV-8
VAV-12-1	580	175	410	55	13,284	0.9	3/4"	8"Ø	RIGHT	24 VAC	TITUS	DESV-8
VAV-12-2	920	275	645	55	20,898	1.4	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-12-3	920	275	645	55	20,898	1.4	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-12-4	910	275	640	55	20,736	1.4	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-12-5	1640	490	1150	55	37,260	2.5	3/4"	14"Ø	RIGHT	24 VAC	TITUS	DESV-14
VAV-12-6	660	200	465	55	15,066	1.0	3/4"	8"Ø	RIGHT	24 VAC	TITUS	DESV-8
VAV-12-7	920	275	645	55	20,898	1.4	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-12-8	920	275	645	55	20,898	1.4	3/4"	10"Ø	RIGHT	24 VAC	TITUS	DESV-10
VAV-12-9	920	275	645	55	20,898	1.4	3/4"	10"Ø	LEFT	24 VAC	TITUS	DESV-10
VAV-12-10	2300	690	1610	55	52,164	3.5	3/4"	16"Ø	RIGHT	24 VAC	TITUS	DESV-16
VAV-13-1	810	250	570	56	18,468	1.2	3/4"	10"Ø	RIGHT	25 VAC	TITUS	DESV-10
VAV-13-2	1090	350	765	57	24,786	1.7	3/4"	10"Ø	RIGHT	26 VAC	TITUS	DESV-10
VAV-13-3	810	265	570	58	18,468	1.2	3/4"	10"Ø	RIGHT	27 VAC	TITUS	DESV-10
VAV-13-4	1090	370	765	59	24,786	1.7	3/4"	10"Ø	RIGHT	28 VAC	TITUS	DESV-10
VAV-13-5	675	205	475	55	15,390	1.0	3/4"	8"Ø	RIGHT	24 VAC	TITUS	DESV-8

NOTES:
1. HOT WATER COILS SHALL BE 1 OR 2 ROWS AND A MAX OF 10 FINS PER INCH. EAT SHALL BE 180°F AND PRESSURE DROP THRU COIL SHALL NOT EXCEED 5 FT. WG AT SCHEDULED GPM.
2. PROVIDE AEROCROSS MULTI-POINT CENTER AVERAGING VELOCITY SENSOR IN PRIMARY AIR INLET.
3. PROVIDE TERMINAL UNIT CASING WITH 1" INTERNALLY LINED FIBERGLASS FREE INSULATION.
4. PROVIDE HOT WATER REHEAT COIL WITH 2-WAY AUTOMATIC CONTROL VALVE.
5. EMCS CONTRACTOR SHALL PROVIDE 24VAC TO PRIMARY AIR INLET DAMPER ACTUATOR.
6. THE MAXIMUM ALLOWABLE PRESSURE DROP ACROSS HOT WATER COILS SHALL BE 10 FT.HD.

DBR
SERVICE | QUALITY | INTEGRITY | SUSTAINABILITY
9990 Richmond Avenue
South Building, Suite 310
Houston, Texas 77042
713.914.4333 p 713.914.9260 f

ISSUANCE:

No.	DATE	DESCRIPTION
	07/28/25	ISSUE FOR BID

SEAL:



HUMBLE ISD - OAK FOREST ES - HVAC UPGRADES - 6400 KINGWOOD GLEN DR, 77346

TBPE Firm Registration No. 2234

DATE: 07/28/25

DRAWN BY: DBR

CHECKED BY: DBR

PROJECT NUMBER 250054.000

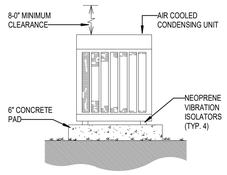
SHEET TITLE: MECHANICAL SCHEDULES

SHEET NUMBER: M5.02

DBR
713.914.0888 p
https://www.dbrinc.com
TBPE Firm Registration No. 2234
DBR Project # 250054.000

RA	RM	LB	TN	-

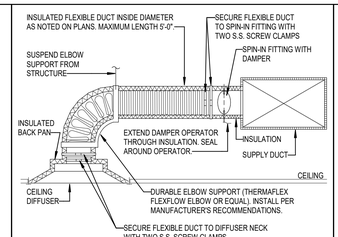
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NOTE:
PROVIDE CLEARANCE AROUND UNIT FOR AIR FLOW AND SERVICE PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.

"NOT TO SCALE"

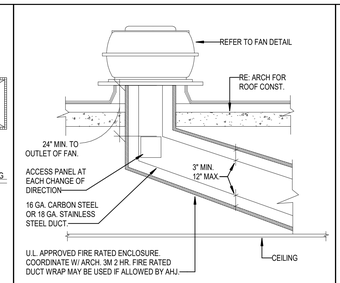
7 CONDENSING UNIT MOUNTING ON GRADE



NOTES:
1. SEAL ALL JOINTS PER SPECIFICATIONS.
2. FLEX DUCT SAG LIMITED TO 1/2" PER FOOT.
3. MAX 30° OFFSET ALLOWED IN FLEX DUCT ROUTING.

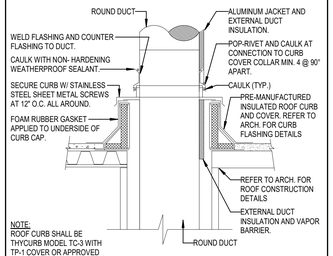
"NOT TO SCALE"

6 CEILING DIFFUSER CONNECTION



"NOT TO SCALE"

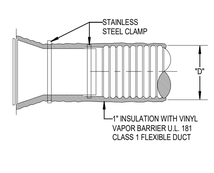
5 KITCHEN EXHAUST



NOTE:
ROOF CURB SHALL BE THYCURB MODEL TC-3 WITH TP-1 COVER OR APPROVED EQUAL.

"NOT TO SCALE"

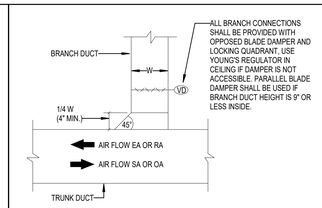
4 ROUND DUCT ROOF CURB PENETRATION



NOTES:
1. ALL FLEXIBLE DUCT OFFSETS AND BENDS SHALL MAINTAIN A RADIUS OF 1.5 X ("D") MINIMUM 3'-0" AND MAXIMUM 5'-0".
2. TYPICAL OF ROUND DUCT CONNECTIONS TO VAV BOXES FROM RECTANGULAR MAIN DUCTS.
3. ALL JOINTS SHALL BE SEALED WITH MASTIC AND FIBER CLOTH PER SPECIFICATIONS.

"NOT TO SCALE"

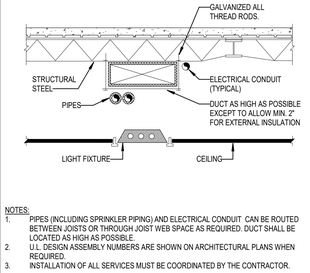
3 CONICAL SPIN-IN



NOTES:
THIS CONNECTION SHALL BE TYPICAL FOR ALL RECTANGULAR BRANCH DUCT CONNECTIONS TO RECTANGULAR TRUNK DUCTS, INCLUDING SUPPLY, RETURN, OUTSIDE AIR AND EXHAUST DUCTS.

"NOT TO SCALE"

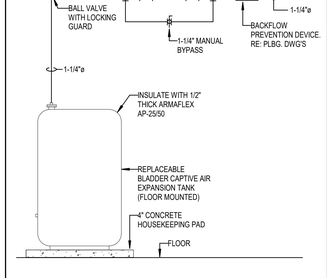
2 RECTANGULAR BRANCH DUCT TAP



NOTES:
1. PIPES (INCLUDING SPRINKLER PIPING) AND ELECTRICAL CONDUIT CAN BE ROUTED BETWEEN JOISTS OR THROUGH JOIST WEB SPACE AS REQUIRED. DUCT SHALL BE LOCATED AS HIGH AS POSSIBLE.
2. U.L. DESIGN ASSEMBLY NUMBERS ARE SHOWN ON ARCHITECTURAL PLANS WHEN REQUIRED.
3. INSTALLATION OF ALL SERVICES MUST BE COORDINATED BY THE CONTRACTOR.

"NOT TO SCALE"

1 TYPICAL MEP INSTALLATION



"NOT TO SCALE"

13 CENTRIFUGAL UPBLAST EXHAUST FAN

NOTE:
INSULATE FILTER FEEDER AND ALL ASSOCIATED PIPING WITH 1/2" ARMAFLEX AP-25/50

"NOT TO SCALE"

12 CHEMICAL FILTER FEEDER

"NOT TO SCALE"

11 IN-LINE EXHAUST FAN

"NOT TO SCALE"

10 DUPLEX CONDENSING BOILER

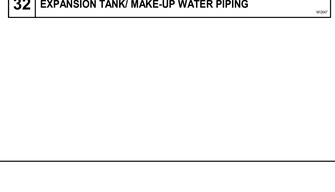
"NOT TO SCALE"

9 END SUCTION PUMP WITH SUCTION DIFFUSER

NOTE:
SUPPORT ALL PIPING FROM PIPE SUPPORTS AT GRADE; NO PIPE WEIGHT IS TO BE IMPOSED ON CHILLER CONNECTIONS.

"NOT TO SCALE"

8 AIR COOLED CHILLER PIPING



NOTE: CONTRACTOR SHALL SECURE STRUCT. ENG. APPROVAL FOR ANY AND ALL PIPE MOUNTING DETAILS AT CONCRETE OR STEEL STRUCTURE.

"NOT TO SCALE"

20 PIPE HANGER (4-PIPE)



NOTE: INSTALL 3-WAY CONTROL VALVE ORIENTATION PER MFGR. INSTALLATION INSTRUCTIONS

"NOT TO SCALE"

19 3-WAY CONTROL VALVE AND COIL PIPING

NOTES:
1. INSTALL 2-WAY CONTROL VALVE ORIENTATION PER MFGR. INSTALLATION INSTRUCTIONS.
2. PROVIDE STRAIGHT PIPE LENGTH 5 TIMES NOMINAL PIPE DIA. UPSTREAM OF CTRL. VALVE.

"NOT TO SCALE"

18 TWO-WAY CONTROL VALVE AND COIL PIPING

"NOT TO SCALE"

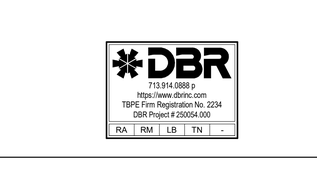
17 VARIABLE FREQUENCY DRIVE FLOOR SUPPORT

"NOT TO SCALE"

16 INTERIOR VAV TERMINAL UNIT

"NOT TO SCALE"

15 CENTRIFUGAL ROOF EXHAUST FAN



CONTRACTOR SHALL PROVIDE:
- WALL-MOUNTED THERMOSTAT
- LOW VOLTAGE CONTROL TRANSFORMER
- UNIVERSAL WALL AND CEILING-MOUNTED BRACKET
- AUTOMATIC RESET THERMAL CUT-OUT
- ADJUSTABLE DISCHARGE
- REMOTE SUMMER FAN SWITCH

"NOT TO SCALE"

14 ELECTRIC UNIT HEATER

"NOT TO SCALE"

32 EXPANSION TANK/ MAKE-UP WATER PIPING

H = FAN INLET PRESSURE (IN. W.C.) + 1 IN.

NOTE:
MAINTAIN MINIMUM 1" AIR GAP AT FLOOR DRAIN, FLOOR SINK, OR ROOF DRAIN.

"NOT TO SCALE"

26 COOLING COIL CONDESNATE DRAIN (DRAW-THRU UNIT)

NOTE:
1. COMPLY WITH MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS.
2. TYPICAL FOR EACH SEPARATE REFRIGERANT CIRCUIT.
3. PROVIDE FILTER DRYER ON ALL SYSTEMS.
4. USE "ACR" HARD DRAWN COPPER REFRIGERANT PIPE.

"NOT TO SCALE"

25 REFRIGERANT PIPING SCHEMATIC

NOTE: CONTRACTOR SHALL SECURE STRUCT. ENGR. APPROVAL FOR ANY AND ALL PIPE MOUNTING DETAILS TO CONCRETE OR STEEL STRUCTURE.

"NOT TO SCALE"

24 PIPE HANGER

NOTE:
CONTRACTOR SHALL SECURE STRUCT. ENGR. APPROVAL FOR ANY AND ALL PIPE MOUNTING DETAILS TO CONCRETE OR STEEL STRUCTURE. CONTRACTOR SHALL CONFORM TO ALL MAXIMUM SPAN DISTANCES PER SPECIFICATIONS FOR HANGER SPACING. RE: 230529

"NOT TO SCALE"

23 PIPE HANGER (1-PIPE)

NOTE:
MAINTAIN MINIMUM 1" AIR GAP AT FLOOR DRAIN OR ROOF DRAIN.

"NOT TO SCALE"

22 COOLING COIL CONDENSATE DRAIN

NOTE:
FILLET WELD ALL SEAMS. HOT DIP GALVANIZE AFTER FABRICATION.

"NOT TO SCALE"

21 PIPE SUPPORT AT SLAB

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HUMBLE ISD - OAK FOREST ES - HVAC UPGRADES - 6400 KINGWOOD GLEN DR, 77346

TBPE Firm Registration No. 2234

DATE: 07/28/25

DRAWN BY: DBR

CHECKED BY: DBR

PROJECT NUMBER 250054.000

SHEET TITLE: MECHANICAL DETAILS

SHEET NUMBER: M6.01

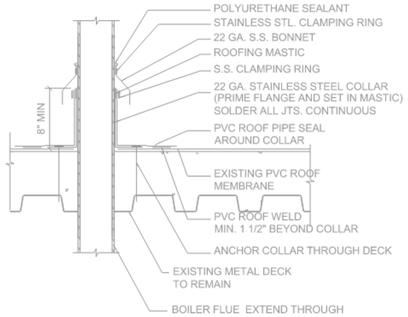
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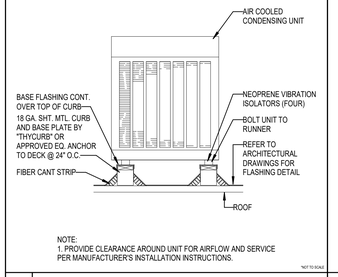
REMOVE ALL EXISTING
FLASHING AS REQUIRED
FOR NEW WORK

COORDINATE ALL
PENETRATIONS WITH
ROOF MANUFACTURER

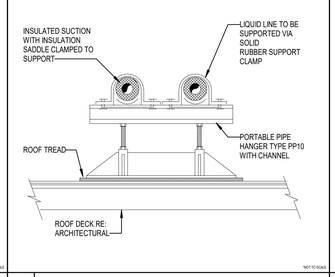
REFER TO ARCHITECTURAL
SHEET METAL MANUAL 7TH
EDITION FIGURE 8-9C



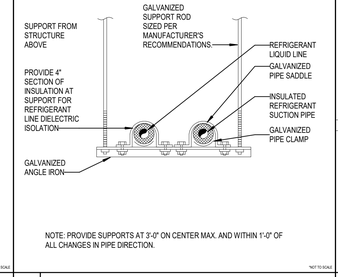
6 BOILER DETAIL



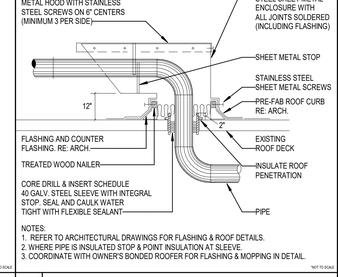
5 CONDENSING UNIT ROOF MOUNTING M5006



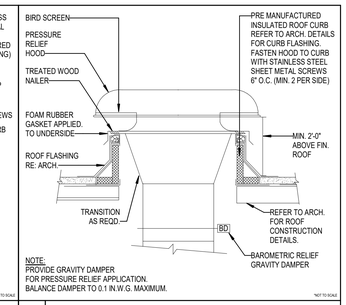
4 ROOF MOUNTED REFRIGERANT PIPE SUPPORT M7002



3 REFRIGERANT PIPE HANGER M7001



2 EXISTING ROOF PENETRATION M7004



1 BAROMETRIC RELIEF AIR HOOD M5008

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SHEET TITLE: MECHANICAL DETAILS

SHEET NUMBER: M6.02

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ABBREVIATIONS

AC	ALTERNATING CURRENT
AF	AMPERE FUSE, AMPERE FRAME
AFC	ABOVE FINISHED CEILING
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AIC	AMPERE INTERRUPT CAPACITY
AL	ALUMINUM
AM	AMMETER
AMP	AMPLIFIER
ANN	ANNUNCIATOR
ASC	AMPERES SHORT CIRCUIT
AT	AMPERE TRIP RATING
ATS	AUTOMATIC TRANSFER SWITCH
AUX	AUXILIARY
BKR	BREAKER
BLDG.	BUILDING
C	CONDUIT, CELSIUS
CKT	CIRCUIT
CLG.	CEILING
CONT.	CONTINUOUS,CONTINUATION
CONTR	CONTROLLER, CONTRACTOR
CT	CURRENT TRANSFORMER/COOLING TOWER
CU	COPPER
DAS	DISTRIBUTED ANTENNA SYSTEM
DC	DIRECT CURRENT
DISC	DISCONNECT
DP	DISTRIBUTION PANEL
DPDT	DOUBLE-POLE, DOUBLE-THROW
DPST	DOUBLE-POLE, SINGLE-THROW
DWG	DRAWING
ELEV.	ELEVATOR
EPO	EMERGENCY POWER OFF
ERRC	EMERGENCY RESPONDER RADIO COVERAGE SYSTEM
FA	FIRE ALARM
FF	FURNITURE FEED
FLA	FULL LOAD AMPS
FTL	FEED-THRU LUGS
GA	GAUGE
GEN	GENERATOR
GND	GROUND
GTD	GENERATOR TRANSFER DEVICE
IG	ISOLATED GROUND
LF	LINEAR FEET
LTG	LIGHTING
LV	LOW VOLTAGE
LVL	LEVEL
MAX.	MAXIMUM
MC	METAL CLAD CABLE
MCA	MINIMUM CIRCUIT AMPS
MCB	MAIN CIRCUIT BREAKER
MCCB	MOLDED CASE CIRCUIT BREAKER
MD	MOTORIZED DAMPER
MDP	MAIN DISTRIBUTION PANEL
MFR	MANUFACTURER
MIC	MICROPHONE
MIN.	MINIMUM
MLO	MAIN LUGS ONLY
MOCP	MAXIMUM OVER-CURRENT PROTECTION
MSB	MAIN SWITCHBOARD
N3R	NEMA 3R
N4X	NEMA 4X
N.C.	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NF	NON-FUSED
NFS	NON-FUSED SWITCH
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
N.O.	NORMALLY OPEN
NO.	NUMBER
NTS	NOT TO SCALE
PH	PHASE
POS	POINT OF SALE
QTY	QUANTITY
RCP	REFLECTED CEILING PLAN
RCPT	RECEPTACLE
RE	REFERENCE, REFER
SF	SQUARE FOOT
SIM	SIMILAR
SKVA	STARTING KILOVOLT-AMPS
SPD	SURGE PROTECTION DEVICE
SPDT	SINGLE-POLE, DOUBLE-THROW
SPST	SINGLE-POLE, SINGLE-THROW
SPEC	SPECIFICATION
SQFT	SQUARE FOOT
ST	SHUNT TRIP
SWB	SWITCHBOARD
TL	TWIST-LOCK
TOC	TOP OF CURB
TOS	TOP OF STEEL
TR	TAMPER RESISTANT RECEPTACLE
TV	TELEVISION
TYP	TYPICAL
UG	UNDERGROUND
UNO	UNLESS NOTED OTHERWISE
UPS	UNINTERRUPTIBLE POWER SYSTEM
VFD	VARIABLE FREQUENCY DRIVE
WP	WEATHERPROOF
WT	WATERTIGHT, WEIGHT
W/SF	WATTS PER SQUARE FOOT
XFMR	TRANSFORMER

MANY ABBREVIATIONS NOT LISTED MAY BE FOUND IN THE NATIONAL ELECTRIC CODE, OR IN THE INTERNATIONAL AND UNIFORM CODES

PHASING

(E)	EXISTING (TO REMAIN)
(D)	SHALL BE DEMOLISHED
(N)	PROVIDE NEW
(R)	RELOCATED ELEMENT

ELECTRICAL SYMBOLS

MOTORS AND CONTROLS

- M — MOTOR RATED SWITCH WITH THERMAL OVERLOADS
- 5 — SINGLE OR THREE PHASE MOTOR NUMBER INDICATES HORSE POWER
- ELECTRIC DUCT HEATER
- DISCONNECT (SAFETY) SWITCH "200/3/150" DENOTES AMPERES/POLE/FUSE. "NF" DENOTES NON-FUSED "NSR" DENOTES NEMA 3R
- B — ENCLOSED CIRCUIT BREAKER- "200/3/150" DENOTES AMPERES/POLE/TRIP.
- MOTOR STARTER FURNISHED BY DIVISION 23 AND INSTALLED BY DIVISION 26.
- COMBINATION DISCONNECT (SAFETY) SWITCH AND MOTOR STARTER. "30/3/15/80" DENOTES AMPERES/POLES/FUSE/ STARTER SIZE, "NF" DENOTES NON-FUSED. FURNISHED BY DIVISION 23 AND INSTALLED BY DIVISION 26.
- VFD — VARIABLE FREQUENCY DRIVE PROVIDED BY DIVISION 23 AND INSTALLED BY DIVISION 26.
- EPO — EMERGENCY POWER OFF BUTTON.

RECEPTACLES AND OUTLETS

ALL RECEPTACLES SHALL BE MOUNTED 18" ABOVE FINISHED FLOOR TO CENTER OF DEVICE UNLESS NOTED OTHERWISE. REFER TO SPECIFICATIONS AND DRAWINGS FOR ADDITIONAL REQUIREMENTS.

ABBREVIATIONS APPLICABLE TO RECEPTACLES:
- "GFCI" GROUND FAULT INTERRUPTER
- "WP" WEATHERPROOF
- "IG" ISOLATED GROUND
- "TR" TAMPER RESISTANT
- "USB" RECEPTACLE WITH USB CHARGING PORTS
- "AC" ABOVE COUNTER MOUNTING
- "UC" UNDER COUNTER MOUNTING
- "H" HORIZONTALLY ORIENTED RECEPTACLE

- SIMPLEX WALL RECEPTACLE, NEMA 5-20R, 20A, 125V.
- DUPLEX WALL RECEPTACLE, NEMA 5-20R, 20A, 125V. SHADED INDICATES SPLIT-WIRED
- FOURPLEX (QUADRUPLEX) RECEPTACLE
- DUPLEX RECEPTACLE (PEDESTAL MOUNTED)
- CONTROLLED WALL RECEPTACLE. DUPLEX: SPLIT-WIRED QUAD: SEPARATELY WIRED UNDER A COMMON COVERPLATE.
- POWER DEVICE RED IN COLOR, ON EMERGENCY POWER CIRCUIT
- CEILING RECEPTACLE/QUAD, EMERGENCY POWER SYMBOL MAY APPLY
- SPECIAL RECEPTACLE, NEMA CONFIGURATION PER PLAN OR EQUIPMENT
- TV — TV ROUGH-IN: 3-GANG RECESSED TV BOX, CONTAINING 1 DUPLEX RECEPTACLE, 1 GANG FOR AV, 1 GANG FOR DATA.
- FLOOR BOX OR POKE THRU. POKE-THRU'S WHERE IN SUSPENDED SLABS, RECESSED IN FOUNDATION WHERE SLAB ON GRADE
- FLUSH ELECTRICAL FLOOR OUTLET. REFER TO FLOOR BOX SCHEDULE, FIRE RATED POKE-THROUGH SCHEDULE AND KEYED NOTES.
- DC — DROP CORD WITH SIMPLEX RECEPTACLE UNLESS OTHERWISE NOTED
- CR — CORD REEL WITH DUPLEX RECEPTACLE UNLESS OTHERWISE NOTED
- J — JUNCTION BOX
  - "MD" INDICATES POWER CONNECTION TO SERVE MOTOR DAMPER
  - "HD" INDICATES POWER CONNECTION TO SERVE HAND DRYER
  - "FV" INDICATES POWER CONNECTION TO SERVE FLUSH VALVES
- P — PULL BOX (OVER 4" SQUARE)
- BELL/BUZZER/CHIME
- PUSH BUTTON/DOOR BELL/START-STOP
- PP — POWER POLE
- POINT OF DIRECT CONNECTION TO EQUIPMENT
- C (2) — CLOCK RECEPTACLE SHALL BE MOUNTED 12" BELOW FINISHED CEILING. (2) DENOTES DOUBLE SIDED CLOCK.

LIGHTING

LETTER(S) DENOTE TYPE- SEE LIGHTING FIXTURE SCHEDULE FOR ADDITIONAL INFORMATION.

2' X 4' 2' X 2' 1' X 4' 1' X 2' 1' X 1'

- STRIP LIGHTING FIXTURES.
- ROUND DOWNLIGHT FIXTURE.
- SQUARE DOWNLIGHT FIXTURE.
- WALL MOUNTED LIGHTING FIXTURE.
- TRACK LIGHTING FIXTURE. MOUNTED AS SHOWN ON LIGHTING FIXTURE SCHEDULE.
- CEILING MOUNTED EXIT SIGN; ARROWS AS INDICATED. SHADED AREA DENOTES FACE.
- WALL MOUNTED EXIT SIGN; ARROWS AS INDICATED. SHADED AREA DENOTES FACE.
- EMERGENCY WALL MOUNTED LIGHTING FIXTURE. BATTERY OPERATED UNLESS NOTED OTHERWISE.
- SITE LIGHTING FIXTURE.

HATCHING PATTERNS BELOW SHALL APPLY TO ALL LIGHTING FIXTURE SYMBOLS.

- NL — EMERGENCY LIGHT FIXTURE WITH BATTERY PACK. PROVIDE WITH UNSWITCHED HOT FOR LOSS OF VOLTAGE AND CHARGING (SAME CIRCUIT AS NORMAL POWER LIGHTING). FIXTURES SHALL BE WIRED IN A MANNER AS TO ALLOW SWITCHING OF FIXTURES WITHOUT DISCHARGING THE EMERGENCY BATTERY. BATTERY PACK IS TO ONLY OPERATE IN THE EVENT OF A POWER OUTAGE.
  "NL" NIGHT LIGHT ON UNSWITCHED 24HR OPERATION
- EM CIRCUIT — LIGHT FIXTURE ON LIFE SAFETY BRANCH CIRCUIT, GENERATOR TRANSFER DEVICES REQUIRED (UL1008 OR UL924) PROVIDE UNSWITCHED HOT, NEUTRAL AND GROUND FOR ALL LIFE SAFETY LIGHTING ORIGINATING FROM THE LIFE SAFETY CIRCUIT SHOWN.
- CRITICAL OPERATIONS LIGHTING ORIGINATING FROM THE CRITICAL CIRCUIT INDICATED. HATCHED AS INDICATED. HATCHING TYPICAL FOR ALL CRITICAL BRANCH LIGHT FIXTURES

RACEWAYS AND WIRING

- CAP AND STAKE
- CONDUIT CONCEALED IN WALL OR CEILING
- UNDERGROUND, UNDERSLAB, CONCEALED ROUTING
- OHE — OVERHEAD ELECTRIC PRIMARY UTILITY POWER LINE
- CONDUIT UP/DOWN
- HASH MARKS INDICATE NUMBER OF CONDUCTORS. LEFT TO RIGHT: PHASE/NEUTRAL/GROUND/ISOLATED GROUND. NO HASH MARKS INDICATES EMPTY CONDUIT, 1" MINIMUM. UNLESS NOTED OTHERWISE.
- 1LA-2,4,6 — HOMERUN TO PANEL WITH CIRCUIT NUMBER(S) AS INDICATED.
- PARTIAL/SHARED CIRCUIT HOMERUN TO PANEL.
- (ON)1LA-6
- TELECOMMUNICATIONS CABLE TRAY SHALL BE CONCEALED ABOVE ACCESSIBLE CEILING UNLESS OTHERWISE NOTED.

ELECTRICAL EQUIPMENT

- DISTRIBUTION PANEL
- MSB — SWITCHBOARD, MAIN DISTRIBUTION PANEL OR MOTOR CONTROL CENTER
- PANELBOARD (FLUSH/SURFACE MOUNT)
- FLOOR MOUNTED DRY-TYPE TRANSFORMER
- SUSPENDED OR WALL MOUNTED TRANSFORMER
- ATS — AUTOMATIC TRANSFER SWITCH
- FIRE RATED PLYWOOD TERMINAL BOARD, TYPE AS NOTED, 4' X 8' X 3/4" UNLESS NOTED OTHERWISE

COMMUNICATIONS

DEFAULT ELEVATION (UNLESS INDICATED OTHERWISE) TO CENTER OF ROUGH-IN: 18" ABOVE FINISHED FLOOR (AFF)

- DATA/COMM/AV ROUGH-IN. CONDUIT TO PLENUM AND BOX ONLY
- HS DS — SCHOOL INTERCOMMUNICATION SYSTEM HANDSET.

DEFAULT ELEVATION (UNLESS INDICATED OTHERWISE) TO CENTER OF ROUGH-IN: 42" AFF

- VC — VOLUME CONTROL - WALL MOUNTED
- CB — INTERCOM/PA SYSTEM CALL-IN OR CALL-BACK DEVICE

DEFAULT ELEVATION (UNLESS INDICATED OTHERWISE) TO CENTER OF ROUGH-IN: 120" AFF OR 12" BELOW CEILING, WHICHEVER IS LOWER

- S L — INTERCOM/PA SPEAKER "L" LOCAL SOUND REINFORCEMENT

CEILING MOUNTED DEVICES:

- S VC — INTERCOM/PA SPEAKER. "VC" INDICATES VOLUME CONTROL ON SPEAKER.

REFERENCE TECHNOLOGY/SECURITY SHEET FOR ADDITIONAL INFORMATION.

ONE-LINE DIAGRAM

- TRANSFORMER, TYPE AND RATINGS AS NOTED
- 800A/3P — SWITCH, RATING AS SHOWN
- 400A — FUSE, RATING AS SHOWN
- ST — SHUNT TRIP
- GFP — GROUND FAULT PROTECTION
- K — KIRK-KEY INTERLOCK
- M — DIGITAL METER OR SUB-METER INTEGRATED INTO EQUIPMENT
- 1200/5 — CURRENT TRANSFORMER, RATED AS SHOWN
- GROUND CONNECTION
- AUTOMATIC TRANSFER SWITCH
- BUS DUCT PLUG
- M — ELECTRICAL UTILITY REVENUE METER
- SPD — SURGE PROTECTION DEVICE
- GANN — GENERATOR ANNUNCIATOR PANEL
- CIRCUIT BREAKER
- DRAW-OUT CIRCUIT BREAKER

DAYLIGHT ZONES

- DAYLIGHT ZONE/PRIMARY DAYLIGHT ZONE
- SECONDARY DAYLIGHT ZONE

DAYLIGHT ZONES SHALL BE INCLUSIVE OF THE FIXTURES WITHIN THE SHADED REGION, AND SHALL BE DIMMED USING ON-BOARD OR EXTERNAL CONTROL IN ACCORDANCE WITH IECC 2021. IECC 2018 OR 2015 MAY BE REFERENCED ONLY WHERE ADOPTED BY LOCAL AHJ.

GENERAL NOTES:

A. NOT ALL SYMBOLS SHOWN ON THIS SYMBOL LIST ARE USED IN THE CONTRACT DOCUMENTS.

MISCELLANEOUS

- F — SHADED SYMBOLS INDICATE EXISTING DEVICES TO REMAIN, UNLESS OTHERWISE NOTED.
- INDICATES WALL-MOUNTED WHEN ATTACHED TO ANY SYMBOL
- 1 — DRAWING NOTE REFERENCE
- SOS — AREA OF RESCUE ASSISTANCE

FIRE ALARM

- W — WATER FLOW SWITCH
- SP — SUPERVISORY SWITCH
- S — SMOKE DETECTOR - MULTI CRITERIA DETECTOR
- S # — SMOKE DETECTOR - "SB" INDICATES IN INTEGRAL SOUNDER BASE "D" INDICATES DUCT TYPE "R" INDICATES 120 VOLT RESIDENTIAL TYPE
- H — HEAT DETECTOR
- S BT — BEAM DETECTOR TRANSMITTER, HIGH IN CEILING WALL DIRECT LINE OF SIGHT.
- S BR — BEAM DETECTOR RECEIVER, HIGH IN CEILING WALL DIRECT LINE OF SIGHT.
- S — FIRE ALARM SPEAKER STROBE / CEILING MOUNTED
- S — FIRE ALARM SPEAKER / CEILING MOUNT.
- DH — MAGNETIC DOOR HOLDER
- R — AUXILIARY CONTROL RELAY
- FH — FIRE FIGHTER HANDSET
- F — FIRE ALARM PULL STATION +42" AFF
- F — FIREMAN'S TELEPHONE JACK +42" AFF
- AUDIO VISUAL FIRE ALARM HORN STROBE +80" AFF- 15/75cd U.N.O.
- VISUAL FIRE ALARM (STROBE) CEILING MOUNT - 15/75cd U.N.O.
- AUDIO FIRE ALARM HORN +80" AFF
- FACP — FIRE ALARM CONTROL PANEL
- ANN — REMOTE FIRE ALARM ANNUNCIATOR PANEL
- RPS — REMOTE POWER SUPPLY FOR AUDIO/VISUAL FIRE ALARM DEVICES.
- FSD — FIRE SMOKE DAMPER
- • — REMOTE LED INDICATOR LIGHT

SECURITY

- PB — ADA AUTO DOOR OPEN BUTTON
- DR — DOOR RELEASE BUTTON
- CR — WALL MOUNTED CARD READER

REFERENCE TECHNOLOGY/SECURITY SHEET FOR ADDITIONAL INFORMATION.

SWITCHES AND LIGHTING CONTROL DEVICES

ALL SWITCH TYPES AND SENSORS TYPES FOUND ON 'LIGHTING CONTROL DEVICE SCHEDULE' LOCATED ON ELECTRICAL SCHEDULE SHEETS

SWITCH ANNOTATION AS FOLLOWS:
- X — TYPE, PER SCHEDULE; NO TYPE INDICATES SINGLE POLE TOGGLE SWITCH
- $a,b,c — SWITCH LEGS, PER PLAN, SHOWN HERE AS 3 (a,b,c)

OCCUPANCY SENSOR ANNOTATION, AS FOLLOWS:
- OCx — OCCUPANCY / VACANCE SENSOR 'x' INDICATES TYPE, PER SCHEDULE
- CEILING SENSOR
- WITH BRACKET INDICATES WALL / CORNER MOUNT

LIGHT SENSOR ANNOTATION, AS FOLLOWS:
- PC — DIGITAL PHOTOCELL
- DS — DAYLIGHT HARVESTING SENSOR

RELAY PANELS, CONTACTORS, TIME SWITCHES:
- XX — RELAYS/CONTACTORS/TIMERS/DEVICES WHERE 'XX' INDICATES: "LC" LIGHTING CONTRACTOR "LCP" LIGHTING CONTROL PANEL "TS" TIME SWITCH "TC" TIME CLOCK

DRAWING/DETAIL REFERENCE KEY

RE: 1 /E3-2 — REFER TO DRAWING/DETAIL NUMBER; SHEET NUMBER (1 / E3-2)

PANELBOARD NOMENCLATURE

5 DP C H A 1
- SUB PANEL
- AREA
- VOLTAGE: H: 480Y/277V; L: 208Y/120V
- BRANCH: NONE: NORMAL; E: LIFE SAFETY; O: EQUIPMENT; C: CRITICAL; R: LEGALLY REQUIRED; X: OPTIONAL STAND-BY
- DISTRIBUTION PANEL (IF APPLICABLE)
- LEVEL

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TBPE Firm Registration No. 2234

DATE: 07/28/25

DRAWN BY: DBR

CHECKED BY: DBR

PROJECT NUMBER 250054.000

SHEET TITLE: ELECTRICAL SYMBOL LEGEND

SHEET NUMBER: E0.01

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GENERAL ELECTRICAL DEMOLITION NOTES:

A. IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAVE VERIFIED THE EXISTING JOB SITE CONDITIONS DURING THE BIDDING PERIOD TO OBTAIN THE SCOPE OF ELECTRICAL WORK INVOLVED AS A RESULT OF THE ARCHITECTURAL MODIFICATIONS TO THE EXISTING CONDITIONS. THE SCOPE OF WORK SHALL INCLUDE MATERIALS AND OUTLETS, CONSISTING OF FIXTURES, DEVICES, EQUIPMENT OR APPARATUS, WHICH MUST BE REROUTED, RELOCATED OR REMOVED EITHER TEMPORARILY OR PERMANENTLY, OR WHICH MUST BE PROVIDED SO THAT THE REMODELING WORK MAY BE ACCOMPLISHED. NOT ALL EXISTING OUTLETS ARE NECESSARILY INDICATED ON THE DRAWINGS.

B. CONTRACTOR SHALL REVIEW DEMOLITION AND NEW WORK PLANS SIMULTANEOUSLY TO IDENTIFY SCOPE THAT IS TO BE MODIFIED FOR REUSE WITH NEW SCOPE.

C. CONTRACTOR SHALL VERIFY AND DOCUMENT EXISTING CONDITIONS OF ALL OUTLETS THAT ARE INDICATED OR REQUIRED TO BE REMOVED AND REINSTALLED TO FACILITATE THE WORK REQUIRED BY ALL TRADES. THE CONTRACTOR SHALL REPLACE NON-OPERABLE DEVICES AT NO ADDITIONAL COST TO THE OWNER. DOCUMENT OUTLETS IN NON-WORKING CONDITION PRIOR TO REMOVAL AND NOTIFY THE OWNER.

D. OWNER SHALL HAVE FIRST RIGHT OF REFUSAL TO ALL REMOVED MATERIALS. CONTRACTOR SHALL COORDINATE WITH OWNER FOR LOCATION TO RETURN ANY AND ALL MATERIAL FOR OWNER STORAGE. FAILURE TO TURN OVER REMOVED MATERIAL TO OWNER MAY REQUIRE CONTRACTOR TO REPLACE EQUIPMENT REMOVED WITH NEW.

E. REMOVE ALL ELECTRICAL DEVICES WITHIN DEMOLISHED WALLS INCLUDING RECEPTACLES, DATA/TELEPHONE DROPS, P/A DEVICES, CONDUIT, AND WIRING. ALL EXISTING DEVICES MAY NOT BE DOCUMENTED ON PLANS. REFER TO ARCHITECTURAL DEMOLITION PLANS FOR DEMOLISHED WALLS. REMOVE CONDUIT AND WIRING BACK TO PANEL OR LAST ACTIVE JUNCTION BOX.

F. ALL ABANDONED CONDUIT AND BOXES FOUND IN CRAWLSPACES, CEILINGS SPACES, CHASES, OR UTILITY SPACES SHALL BE REMOVED. EXISTING UNDERGROUND CONDUIT MAY BE ABANDONED. CAP ABANDONED UNDERGROUND CONDUIT FLUSH WITH GRADE.

G. OWNER SHALL RESERVE THE RIGHT TO CLAIM ALL EQUIPMENT AND CABLING REMOVED DURING DEMOLITION.

H. RE-ESTABLISH SERVICE TO ALL OUTLETS THAT MAY BE INTERRUPTED DUE TO REMODELING WORK.

I. PROVIDE ALL APPURTENANCES REQUIRED TO REROUTE, RELOCATE, REMOVE OR REINSTALL ALL ITEMS REQUIRED BY SCOPE OF REMODEL.

J. ALL ABANDONED MATERIAL SHALL BE REMOVED FROM JOBSITE PRIOR TO PROJECT COMPLETION.

K. IDENTIFICATION AND LABELING SHALL BE PROVIDED IN ACCORDANCE WITH SPECIFICATIONS.

L. CIRCUIT NUMBERS ARE FOR PLAN REFERENCE ONLY. CONTRACTOR SHALL RELABEL ALL CIRCUIT DIRECTORIES WITH LOAD NAMES FOR ALL EXISTING AND NEW PANELS THAT WERE MODIFIED WITHIN THIS PROJECT.

GENERAL LIGHTING DEMOLITION NOTES:

A. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS PRESENT ON SITE PRIOR TO BIDDING, AND SHALL BE EXPECTED TO PERFORM DEMOLITION AND INSTALL NEW AS SHOWN ON THE DOCUMENTS, INCLUDING SCOPE THAT MAY NOT FEASIBLY BE INDICATED ON PLAN.

B. CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF ALL EXISTING ELECTRICAL DEVICES ON EXISTING CEILING. ALL ABANDONED DEVICES IN CEILING WITHIN SCOPE OF WORK SHALL BE REMOVED.

C. OWNER SHALL HAVE FIRST RIGHT OF REFUSAL TO ALL REMOVED MATERIALS. CONTRACTOR SHALL COORDINATE WITH OWNER FOR LOCATION TO RETURN ANY AND ALL MATERIAL FOR OWNER STORAGE. FAILURE TO TURN OVER REMOVED MATERIAL TO OWNER MAY REQUIRE CONTRACTOR TO REPLACE EQUIPMENT REMOVED WITH NEW.

D. REMOVE ALL ELECTRICAL DEVICES WITHIN DEMOLISHED WALLS INCLUDING SWITCHES AND FIRE ALARM DEVICES. REFER TO ARCHITECTURAL DEMO PLAN. THIS SCOPE MAY NOT BE DIRECTLY IMPLIED BY NOTES ON DEMO PLANS AS IT IS ASSUMED THIS SCOPE EXISTS BASED ON ARCHITECTURAL DEMOLITION PLANS.

E. CONTRACTOR SHALL REVIEW DEMO AND NEW WORK PLANS SIMULTANEOUSLY TO IDENTIFY SCOPE THAT IS TO BE MODIFIED FOR REUSE WITH NEW SCOPE.

F. ALL FIXTURES REMOVED AND REINSTALLED SHALL BE CLEANED, RELAMPED AS REQUIRED AND TOUCHED UP WITH PAINT. ALL DAMAGED PARTS MUST BE REPLACED. THE FIXTURES SHALL THEN BE REINSTALLED AS REQUIRED. PROVIDE NEW DRIVERS AS REQUIRED ALL EXISTING SWITCHING ZONES SHALL REMAIN UNCHANGED UNLESS DIRECTED OTHER ON PLANS.

G. ALL LIGHTING CIRCUITS SHALL BE DEMOLISHED AS REQUIRED BY THE DEMOLITION SCOPE ON THE DOCUMENTS. REPAIR ANY CIRCUITS THAT ARE PARTIALLY DEMOLISHED AND CONTAIN OUTLETS THAT ARE 'NOT IN SCOPE' OR OUTSIDE OF THE LIMITS OF CONSTRUCTION TO WORKING CONDITION. PROVIDE ADDITIONAL CONDUIT, WIRE AND BOXES AS NEEDED.

H. MODIFIED LIGHTING CIRCUITS SHALL NOT EXCEED 50% CIRCUIT LOAD BASED ON CIRCUIT AMPACITY.

GENERAL POWER DEMOLITION NOTES:

A. EXISTING CIRCUIT BREAKERS VACATED DUE TO REMODELING WORK SHALL REMAIN AS SPARE BREAKERS AND LEFT IN THE 'OFF' POSITION.

B. WHERE INDICATED OR REQUIRED BY OTHER TRADES, CONTRACTOR SHALL REMOVE ALL ELECTRICAL CONNECTIONS TO EXISTING PREWIRED FURNITURE. REMOVE CONDUIT AND WIRING BACK TO LAST ACTIVE JUNCTION. ALL DATA CABLING SHALL BE REMOVED.

C. CONTRACTOR SHALL REPORT ANY DAMAGED DEVICES THAT ARE SHOWN AS EXISTING TO REMAIN. ALL DEVICES FOUND TO BE DAMAGED AT THE TIME OF SUBSTANTIAL COMPLETION THAT NOT REPORTED PRIOR TO STARTING WORK SHALL BE REPLACED AT THE CONTRACTOR'S COST.

D. DEMOLISHED POKE-THRUS SHALL BE DISCONNECTED FROM EXISTING BRANCH CIRCUIT, DATA AND/OR AV CONDUCTORS. CAP WITH A UL LISTED FIRE RATED POKE-THRU COVER.

E. EXISTING RECEPTACLE OR MECHANICAL CIRCUITS MODIFIED IN FIELD SHALL NOT EXCEED 80% CAPACITY BASED ON AMP-RATING OF CIRCUIT.

F. CONTRACTOR SHALL UNINSTALL/REINSTALL ALL EXISTING CEILING MOUNTED DEVICES AND LIGHTS AS REQUIRED FOR CEILING UNINSTALL/REINSTALL FOR UNIT REPLACEMENT.

GENERAL ELECTRICAL NOTES:

A. ELECTRICAL DEVICE LOCATIONS SHOWN ARE NOT EXACT. ALL DEVICE LOCATIONS SHALL BE VERIFIED WITH ARCHITECTURAL MILLWORK, CASEWORK, AND GENERAL ELEVATION VIEWS.

B. ELECTRICAL CONTRACTOR SHALL PROVIDE CONDUIT, OUTLET BOXES, JUNCTION BOXES FOR ALL TECHNOLOGY, LOW VOLTAGE, ACCESS CONTROL SECURITY, SURVEILLANCE, AND OTHER DIVISION 27/28 SCOPE. REFER TO DIVISION 27/28 DRAWINGS AND SPECIFICATIONS FOR ALL WORK REQUIRED. OMISSION OF THIS SCOPE FROM DIV 26 SCOPE OF WORK IS PROHIBITED.

C. HVAC AND PLUMBING EQUIPMENT LOCATIONS ARE NOT EXACT, AND THE EXACT POINT OF CONNECTION TO EQUIPMENT MAY VARY. COORDINATE EXACT ROUGH-IN REQUIREMENTS IN FIELD AND WITH FINAL SUBMITTALS.

D. PROVIDE LABELING OF ALL DEVICES, CONDUIT, PANELS, AND JUNCTION BOXES WITH TYPE-WRITTEN LABEL IDENTIFYING CIRCUIT ON THE BACK OF DEVICE COVER PLATES AND ON COVER OF JUNCTION BOXES IN ACCORDANCE WITH ELECTRICAL SPECIFICATIONS.

E. ROOF PENETRATIONS SHALL BE MINIMIZED. WHERE ABLE, ROUTE ALL CONDUIT FOR ROOF MOUNTED EQUIPMENT THROUGH ROOF CURB. CONTRACTOR WILL BE RESPONSIBLE FOR COORDINATING NECESSARY WATER PROOFING AROUND ROOF PENETRATIONS WITH ROOFING INSTALLER.

F. ALL RECEPTACLES LOCATED IN RESTROOMS, JANITOR CLOSETS, MECHANICAL ROOMS, ELEVATOR PITS OR SHAFTS, ELEVATOR EQUIPMENT ROOMS, SERVING ELECTRIC DRINKING FOUNTAINS OR VENDING MACHINES, LOCATED WITHIN 6' OF A SINK, LOCATED ABOVE A WET COUNTERTOP OR IN A KITCHEN OR COFFEE BAR SHALL BE GFCI. FEED-THRU GFCI/GFI IS PROHIBITED, ALL GFCI/GFI DEVICES SHALL BE PROVIDED WITH INDIVIDUAL TEST/RESET FEATURES. ALL GFCI RECEPTACLES SHALL BE ACCESSIBLE. PROVIDE SEPARATE RECEPTACLE PROTECTED BY "FACELESS GFCI." REQUIRED TO COMPLY WITH CURRENTLY ADOPTED NEC.

G. MULTI-WIRE HOME RUNS SHALL NOT BE ALLOWED. PROVIDE DEDICATED NEUTRALS FOR ALL CIRCUITS. SHARING CONDUIT IS PERMISSIBLE WHERE TOTAL CONDUCTOR AMPACITY DERATING HAS BEEN PERFORMED BY ELECTRICAL CONTRACTOR. THE NEUTRAL IS CONSIDERED CURRENT-CARRYING. ROUTE A MAXIMUM OF THE 3 BRANCH CIRCUITS IN A SINGLE 3/4" RACEWAY. EACH NEUTRAL SHALL BE LABELED TO INDICATE THE CIRCUIT NUMBER CORRESPONDING TO THE HOT CONDUCTOR. THIS LABEL SHALL INCLUDE THE PANELBOARD, JUNCTION BOXES AND OUTLET BOXES.

H. WHERE MULTI-WIRE HOMERUNS ARE INSTALLED, GROUP HOMERUNS WITH THREE HOTS (A,B, AND C PHASE), AND #10 NEUTRAL TO PROVIDE MULTI-WIRE BRANCH CIRCUITS. NO MORE THAN 2 MULTI-WIRE HOMERUNS PER CONDUIT. CONTRACTOR IS REQUIRED TO FURNISH CALCULATIONS PROVING CONDUCTOR DE-RATING HAS BEEN INCORPORATED, INCLUDING CONDUIT FILL PERCENTAGE AND MULTI-CONDUCTOR DE-RATING FOR MULTI-WIRE CIRCUITS. THE NEUTRAL IS CONSIDERED A CURRENT CARRYING CONDUCTOR FOR ALL PHASE CONFIGURATIONS. MULTI-WIRE BRANCH CIRCUITS SHARING A COMMON NEUTRAL SHALL BE PROVIDED WITH GROUPED BREAKER HANDLE TIES PER NEC ARTICLE 210.4 & 240.15(B).

I. ALL RECEPTACLES SHALL BE TAMPER RESISTANT TYPE EXCEPT IN MDF/IDF CLOSETS.

J. CONTRACTOR SHALL PROVIDE PLENUM RATED MATERIAL FOR ALL INFRASTRUCTURE LOCATED IN PLENUMS NOT PROTECTED BY CONDUIT OR ANOTHER APPROVED/LISTED FIRE ENCLOSURE.

K. NEW ELECTRICAL EQUIPMENT LOCATED IN ELECTRICAL ROOMS SHALL BE ARRANGED TO COMPLY WITH LATEST NEC ARTICLE 110.

L. ELECTRICAL AND TECHNOLOGY OUTLETS SHOWN IN SOUND RATED PARTITIONS SHALL NOT BE PLACED BACK-TO-BACK. OFFSET AT LEAST ONE STUD AND SEAL FOR SOUND AS REQUIRED.

M. ALL RECEPTACLES SHALL BE TAMPER RESISTANT TYPE. CONTRACTOR PAY PROVIDE NON-TAMPER RESISTANT RECEPTACLES WHERE NOT REQUIRED PER CURRENT NEC ARTICLE 406.

N. ALL VFDS, MOTOR STARTERS, OR DISCONNECT SWITCHES SHALL BE SUPPLIED BY DIVISION 23 AND INSTALLED BY DIVISION 26 UNLESS NOTED OTHERWISE. ELECTRICAL CONNECTIONS SHALL BE PROVIDED BY DIVISION 26. DIVISION 26 SHALL COORDINATE WITH DIVISION 23 PRIOR TO ROUGH-IN.

O. PROVIDE SMOKE DETECTORS IN SUPPLY DUCTWORK FOR ALL AIR HANDLING UNITS. PROVIDE CONNECTION FROM RELAY TO FIRE ALARM PANEL AS NECESSARY. DIVISION 26 SHALL COORDINATE WITH DIVISION 23 PRIOR TO STARTING ANY WORK.

P. CONTRACTOR SHALL UNINSTALL/REINSTALL ALL EXISTING CEILING MOUNTED DEVICES AND LIGHTS AS REQUIRED FOR CEILING UNINSTALL/REINSTALL FOR UNIT REPLACEMENT.

Q. PROVIDE BAKELITE NAMEPLATE WITH ENGRAVING OF THE EQUIPMENTS ELETRICAL CIRCUIT CONDUCTOR/WIRE SIZES, NUMBER OF WIRES, NUMBER OF SETS AND CONDUIT SIZE.

R. ALL HVAC EQUIPMENT SHALL BE PROVIDED WITH VFD'S, MOTOR STARTERS AND DISCONNECT SWITCHES UNLESS OTHERWISE NOTED. CONTRACTOR SHALL INSTALL AND PROVIDE POWER FOR ALL HVAC EQUIPMENT.

FIRE ALARM REMODELING NOTES:

A. ALL FIRE ALARM CONTRACTORS ARE RESPONSIBLE FOR VISITING THE SITE AND VERIFYING THE EXISTING FIRE ALARM SYSTEM AND SCOPE OF WORKED REQUIRED PER PLANS AND SPECIFICATIONS, PRIOR TO BIDDING. VISIBLE EXISTING SITE CONDITIONS, MAKE AND MODEL OF CURRENT FIRE ALARM SYSTEM, NECESSITY OF ANY FRONT-END UPGRADES, CODE COMPLIANCE OF EXISTING DEVICES LOCATED WITHIN THE SCOPE OF WORK AREA, IS ASSUMED TO BE KNOWN BY FIRE ALARM CONTRACTOR UPON DESIGN OF FIRE ALARM SHOP DRAWINGS.

B. REFER TO THE FIRE ALARM PLAN FOR FIRE ALARM DEVICES, NEW OR EXISTING. BEING ADDED, RE-USED OR REMOVED BY THIS REMODEL.

C. THE INTENT OF THIS PLAN IS TO INCORPORATE NEW AND RELOCATED DEVICES WITH THE EXISTING BUILDING FIRE ALARM SYSTEM.

D. ALL NOTIFICATION DEVICES SHALL BE ACTIVATED AS REQUIRED BY APPLICABLE CODE WHEN FIRE ALARM SYSTEM IS INITIATED.

E. IT IS ASSUMED WITH THIS REMODEL THAT THE EXISTING SYSTEM MEETS REQUIRED CODES FOR THE ORIGINAL DATE OF INSTALLATION, AND BUILDING MANAGEMENT HAS MAINTAINED SYSTEM IN COMPLIANCE WITH LIFE SAFETY 101. FOR SEQUENCE OF OPERATIONS AND SPECIFICATIONS, REFER TO ORIGINAL SYSTEM DOCUMENT. COORDINATE WITH BUILDING MANAGEMENT.

F. THE EQUIPMENT SUPPLIER AND INSTALLING CONTRACTOR SHALL BE LICENSED BY THE STATE FIRE MARSHALL TO SELL, INSTALL, AND SERVICE FIRE ALARM SYSTEMS AS REQUIRED BY LOCAL CODES AND INSURANCE CODE.

G. ALL NEW EQUIPMENT REQUIRED FOR THIS REMODEL SHALL BE COMPATIBLE WITH THE EXISTING BUILDING SYSTEM AND IS TO BE A PART OF THE SUBMITTAL PROCESS AS NOTED IN THE ELECTRICAL SPECIFICATIONS FOR THIS PROJECT. PROVIDE ADDITION SYSTEM POWER BOOSTER WHERE REQUIRED.

H. VERIFY QUANTITIES OF NEW DEVICES TO INTERFACE WITH THE EXISTING BUILDING SYSTEM. THE CONTRACTOR SHALL COORDINATE WITH BUILDING MANAGEMENT AND SHALL NOTIFY THE ENGINEER IF ANY CONFLICT EXISTS PREVENTING MODIFICATIONS REQUIRED IN THESE PLANS.

I. THE SYSTEM WHEN MODIFIED, SHALL BE A COMPLETE AND WORKING SYSTEM, AND COMPLY WITH THE MOST RECENT RULES, REGULATIONS, AND ORDINANCES THAT PRESENTLY APPLY TO THIS REMODEL.

J. ANY DEVICE THAT SUFFERS MALFUNCTION DURING RENOVATION SHALL BE REPLACED AT NO COST TO OWNER. CONTRACTOR SHALL TAKE PROPER STEPS TO ENSURE DUST AND DEBRIS DOES NOT NEGATIVELY INTERFERE WITH OPERATION OF ANY EXISTING EQUIPMENT LEFT OPERATIONAL DURING RENOVATION.

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HUMBLE ISD - OAK FOREST ES - HVAC UPGRADES - 6400 KINGWOOD GLEN DR, 77346

TBPE Firm Registration No. 2234

DATE: 07/28/25

DRAWN BY: Author

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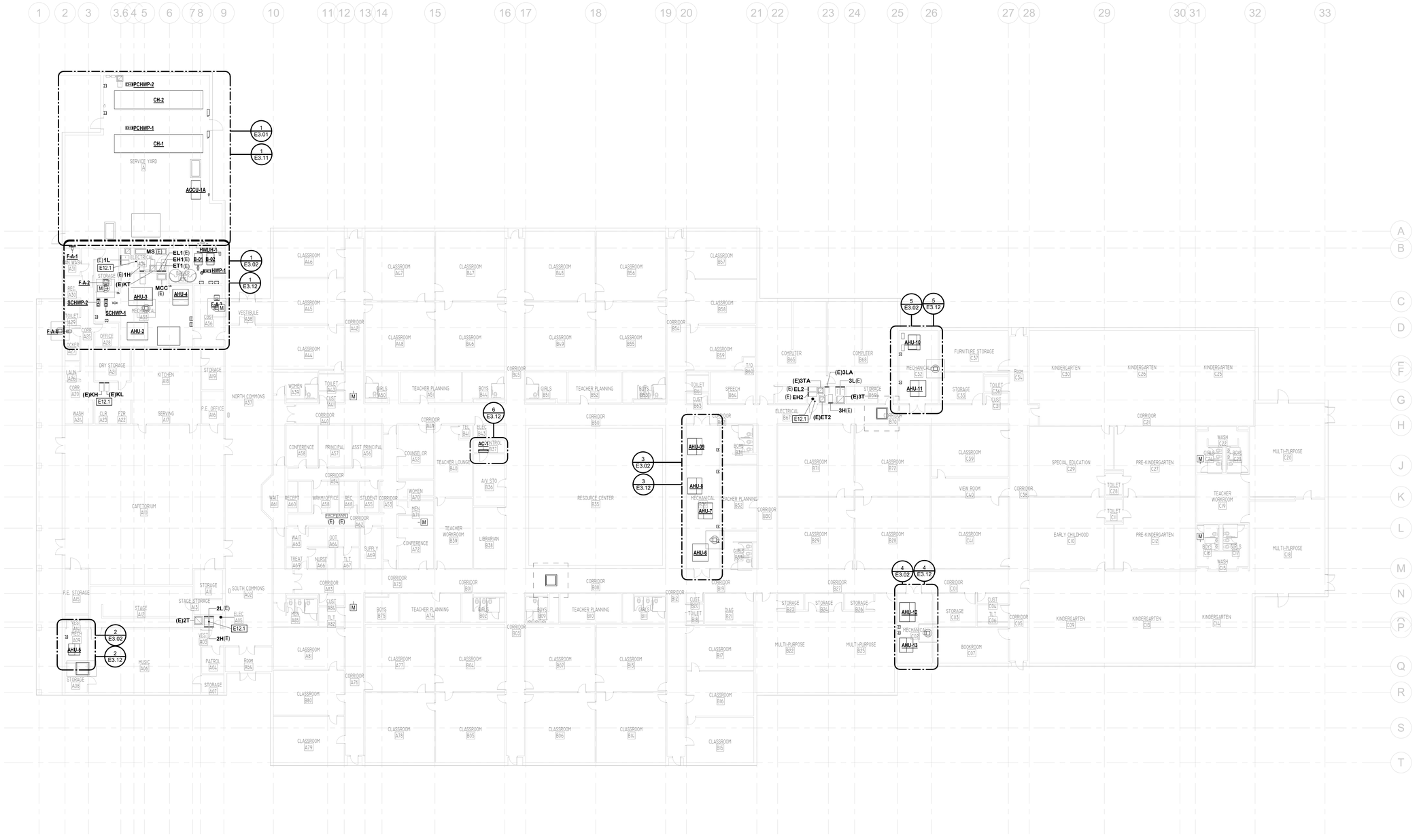
PROJECT NUMBER 250054.000

SHEET TITLE: ELECTRICAL GENERAL NOTES

SHEET NUMBER: E0.02

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1 LEVEL 1 COMPOSITE ELECTRICAL POWER PLAN

1/16" = 1'-0"

GENERAL ELECTRICAL NOTES:

A. REFER TO SHEET E0.02 FOR ALL GENERAL ELECTRICAL NOTES.

ELECTRICAL KEYED NOTES

E12.1 EXISTING ELECTRICAL PANELS AND TRANSFORMERS WITHIN THIS ROOM ARE EXISTING TO REMAIN UNLESS NOTED OTHERWISE.

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SHEET TITLE: COMPOSITE ELECTRICAL POWER PLAN - DEMO & NEW

SHEET NUMBER: E1.00

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GENERAL ELECTRICAL NOTES:

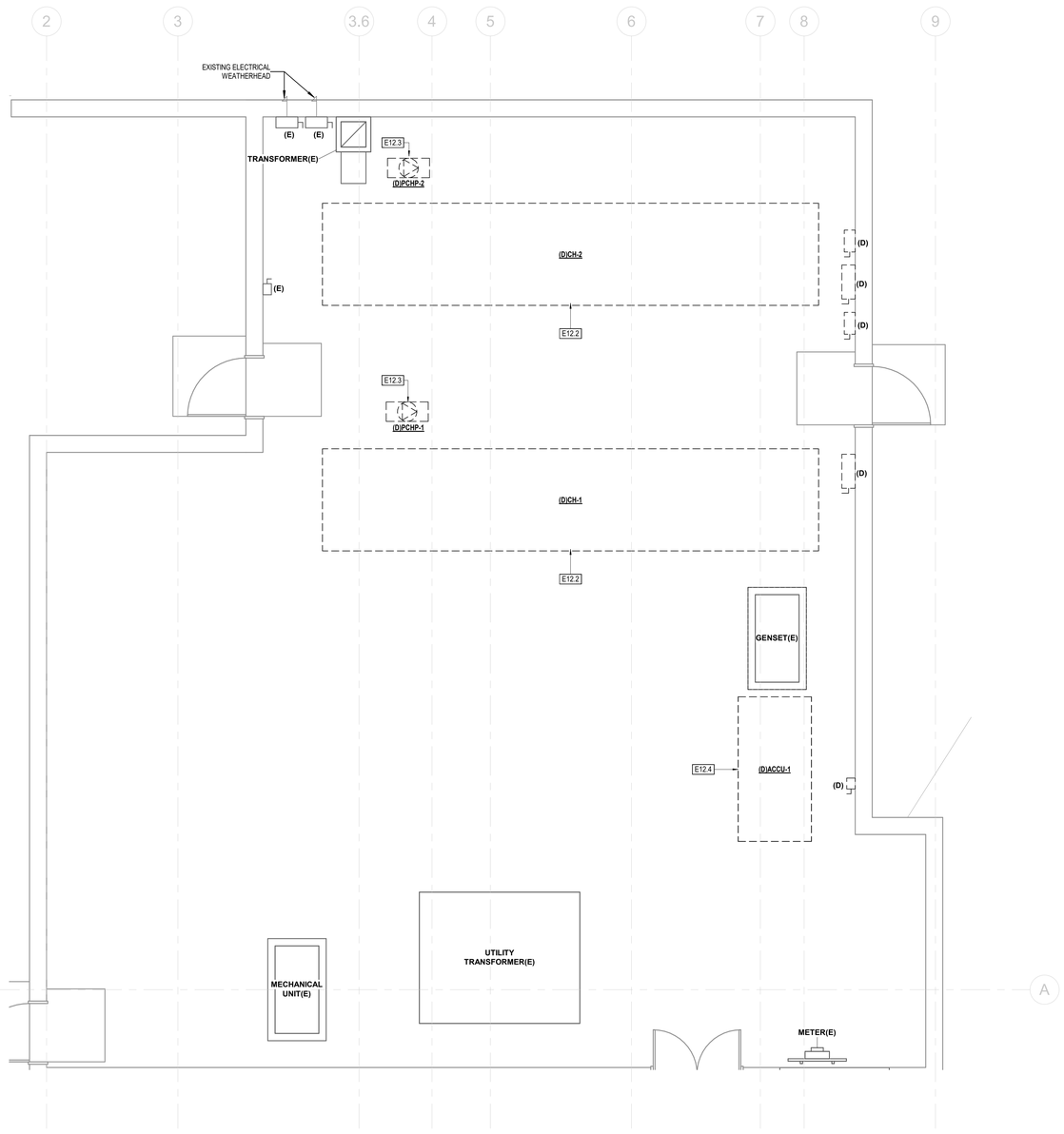
A. REFER TO SHEET E0.02 FOR ALL GENERAL ELECTRICAL NOTES.

ELECTRICAL KEYED NOTES

E12.2 EXISTING CHILLER UNIT BEING DEMOLISHED AND REPLACED WITH NEW, REFERENCE NEW PLANS. CONTRACTOR SHALL DEMOLISH EXISTING DISCONNECT AND MOTOR STARTER AND REMOVE CONDUIT AND WIRE CIRCUIT BACK TO PANEL. ANY UNDER SLAB CONDUIT MAY BE ABANDONED IN PLACE. CONTRACTOR SHALL FIELD VERIFY EXISTING ELECTRICAL EQUIPMENT AND COORDINATE WITH MECHANICAL CONTRACTOR, CONTROLS CONTRACTOR AND OWNER PRIOR TO STARTING ANY WORK.

E12.3 EXISTING PUMP UNIT BEING DEMOLISHED AND REPLACED WITH NEW, REFERENCE NEW PLANS. CONTRACTOR SHALL DEMOLISH EXISTING DISCONNECT AND MOTOR STARTER AND REMOVE CONDUIT AND WIRE CIRCUIT BACK TO PANEL. ANY UNDER SLAB CONDUIT MAY BE ABANDONED IN PLACE. CONTRACTOR SHALL FIELD VERIFY EXISTING ELECTRICAL EQUIPMENT AND COORDINATE WITH MECHANICAL CONTRACTOR, CONTROLS CONTRACTOR AND OWNER PRIOR TO STARTING ANY WORK.

E12.4 EXISTING MECHANICAL UNIT BEING DEMOLISHED AND REPLACED WITH NEW, REFERENCE NEW PLANS. CONTRACTOR SHALL DEMOLISH EXISTING DISCONNECT/MOTOR STARTER AND REMOVE CONDUIT AND WIRE CIRCUIT BACK TO PANEL. ANY UNDER SLAB CONDUIT MAY BE ABANDONED IN PLACE. CONTRACTOR SHALL FIELD VERIFY EXISTING ELECTRICAL EQUIPMENT AND COORDINATE WITH MECHANICAL CONTRACTOR, CONTROLS CONTRACTOR AND OWNER PRIOR TO STARTING ANY WORK.



1 **LEVEL 1 ELECTRICAL DEMOLITION POWER PLAN - SERVICE YARD**
1/4" = 1'-0"

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SHEET TITLE: ELECTRICAL DEMOLITION PLAN - ENLARGED CENTRAL PLANT

SHEET NUMBER: E3.01

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GENERAL ELECTRICAL NOTES:

A. REFER TO SHEET E0.02 FOR ALL GENERAL ELECTRICAL NOTES.

☐ ELECTRICAL KEYED NOTES

E12.1 EXISTING ELECTRICAL PANELS AND TRANSFORMERS WITHIN THIS ROOM ARE EXISTING TO REMAIN UNLESS NOTED OTHERWISE.

E12.3 EXISTING PUMP UNIT BEING DEMOLISHED AND REPLACED WITH NEW, REFERENCE NEW PLANS. CONTRACTOR SHALL DEMOLISH EXISTING DISCONNECT AND MOTOR STARTER AND REMOVE CONDUIT AND WIRE CIRCUIT BACK TO PANEL. ANY UNDER SLAB CONDUIT MAY BE ABANDONED IN PLACE. CONTRACTOR SHALL FIELD VERIFY EXISTING ELECTRICAL EQUIPMENT AND COORDINATE WITH MECHANICAL CONTRACTOR. CONTROLS CONTRACTOR AND OWNER PRIOR TO STARTING ANY WORK.

E12.4 EXISTING MECHANICAL UNIT BEING DEMOLISHED AND REPLACED WITH NEW, REFERENCE NEW PLANS. CONTRACTOR SHALL DEMOLISH EXISTING DISCONNECT/MOTOR STARTER AND REMOVE CONDUIT AND WIRE CIRCUIT BACK TO PANEL. ANY UNDER SLAB CONDUIT MAY BE ABANDONED IN PLACE. CONTRACTOR SHALL FIELD VERIFY EXISTING ELECTRICAL EQUIPMENT AND COORDINATE WITH MECHANICAL CONTRACTOR, CONTROLS CONTRACTOR AND OWNER PRIOR TO STARTING ANY WORK.

E12.5 EXISTING VARIABLE FREQUENCY DRIVE SHALL BE REMOVED AND RETURNED TO OWNER. REMOVE CONDUIT AND WIRE CIRCUIT BACK TO PANEL. ANY UNDER SLAB CONDUIT MAY BE ABANDONED IN PLACE. CONTRACTOR SHALL FIELD VERIFY EXISTING ELECTRICAL EQUIPMENT AND COORDINATE WITH MECHANICAL CONTRACTOR, CONTROLS CONTRACTOR AND OWNER PRIOR TO STARTING ANY WORK.

E12.6 EXISTING BOILER BEING DEMOLISHED AND REPLACED WITH NEW, REFERENCE NEW PLANS. CONTRACTOR SHALL DEMOLISH EXISTING ELECTRICAL POWER CONNECTION AND REMOVE CONDUIT AND WIRE CIRCUIT BACK TO PANEL. ANY UNDER SLAB CONDUIT MAY BE ABANDONED IN PLACE. CONTRACTOR SHALL FIELD VERIFY EXISTING ELECTRICAL EQUIPMENT AND COORDINATE WITH MECHANICAL CONTRACTOR. CONTROLS CONTRACTOR AND OWNER PRIOR TO STARTING ANY WORK.

☐ ELECTRICAL KEYED NOTES

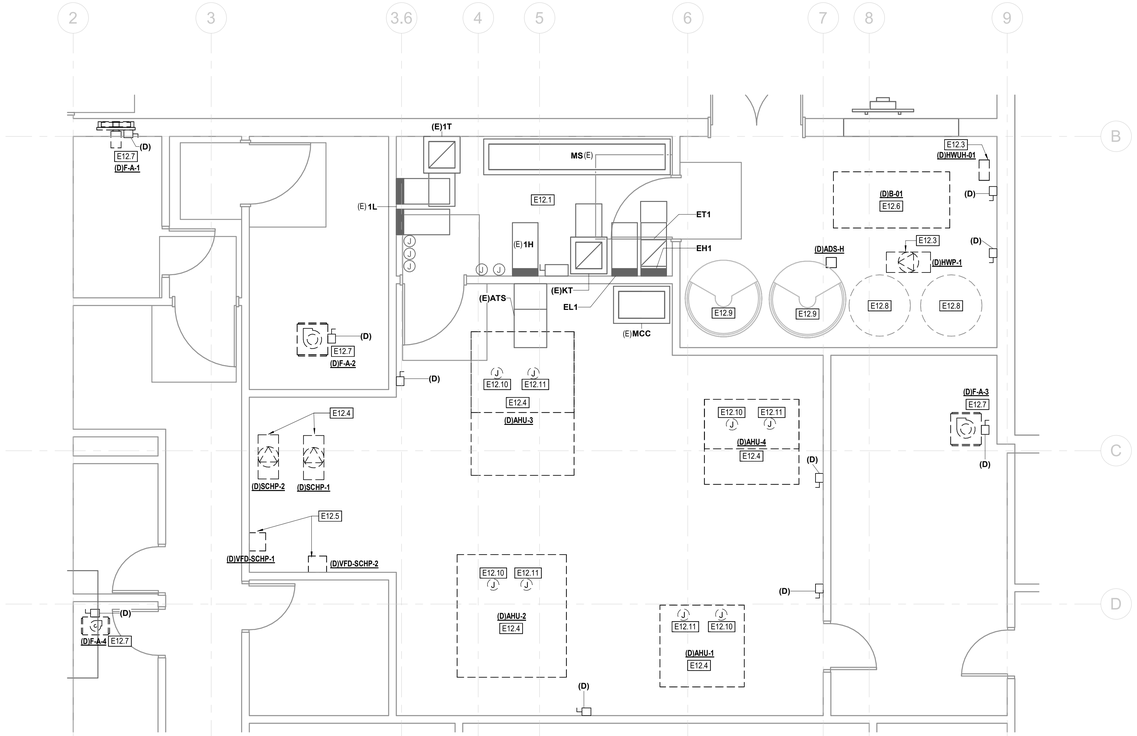
E12.7 EXISTING MECHANICAL UNIT SHALL BE REMOVED AND REPLACED WITH NEW. REFERENCE NEW PLANS. DISCONNECT UNIT BEING REMOVED AND RECONNECT NEW UNIT AS REQUIRED WITH NEW ELECTRICAL EQUIPMENT. REUSE EXISTING CIRCUIT SERVING REMOVED UNIT, EXTEND CONDUCTORS AND CONDUIT AS REQUIRED TO MAKE CONNECTION TO NEW UNIT AS NECESSARY. CONTRACTOR SHALL FIELD VERIFY EXISTING ELECTRICAL EQUIPMENT AND COORDINATE WITH MECHANICAL CONTRACTOR AND OWNER PRIOR TO STARTING ANY WORK.

E12.8 EXISTING PLUMBING EQUIPMENT BEING DEMOLISHED. CONTRACTOR SHALL DEMOLISH EXISTING ELECTRICAL EQUIPMENT SERVING WATER SOFTENER. REMOVE CONDUIT AND WIRE CIRCUITS BACK TO PANEL.

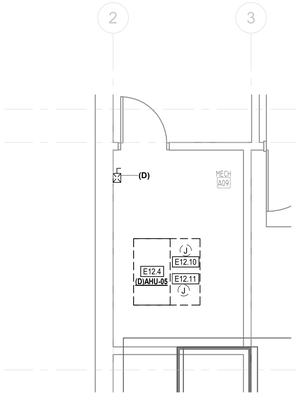
E12.9 ALTERNATE 1 - EXISTING PLUMBING EQUIPMENT BEING DEMOLISHED AND REPLACED WITH NEW. CONTRACTOR SHALL DEMOLISH EXISTING ELECTRICAL EQUIPMENT SERVING GAS WATER HEATER, CIRCULATION PUMP, AND TIME SWITCH. REMOVE CONDUIT AND WIRE CIRCUITS BACK TO PANEL.

E12.10 EXISTING BIPOLAR IONIZATION KIT SHALL BE REMOVED AND REPLACED WITH NEW. REFERENCE NEW PLANS. DISCONNECT BIPOLAR IONIZATION KIT BEING REMOVED AND RECONNECT NEW AS REQUIRED WITH NEW ELECTRICAL EQUIPMENT. REUSE EXISTING CIRCUIT SERVING REMOVED BIPOLAR IONIZATION KIT, EXTEND CONDUCTORS AND CONDUIT AS REQUIRED TO MAKE CONNECTION TO NEW EQUIPMENT AS NECESSARY. CONTRACTOR SHALL FIELD VERIFY EXISTING ELECTRICAL EQUIPMENT AND COORDINATE WITH MECHANICAL CONTRACTOR AND OWNER PRIOR TO STARTING ANY WORK.

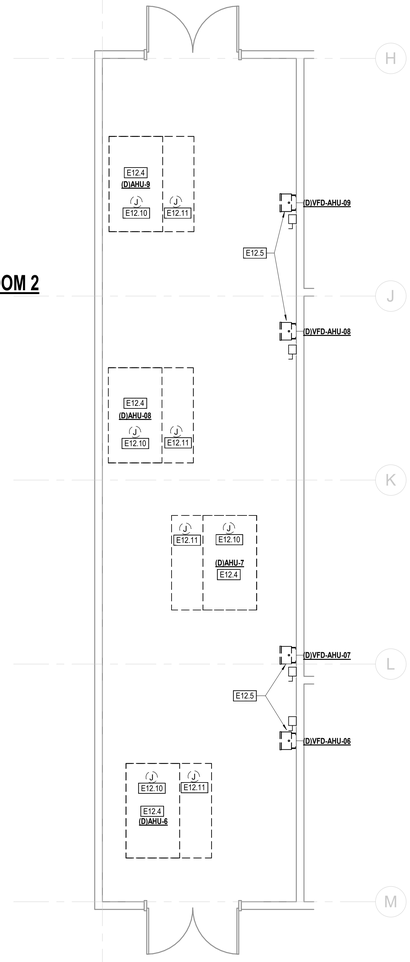
E12.11 EXISTING DUCT SMOKE DETECTORS SHALL BE REMOVED AND REINSTALLED AS REQUIRED, REFERENCE NEW PLANS. REUSE EXISTING CIRCUIT AND RELAY SERVING DUCT SMOKE DETECTORS, EXTEND CONDUCTORS AND CONDUIT AS REQUIRED TO MAKE CONNECTION AS NECESSARY. CONTRACTOR SHALL FIELD VERIFY EXISTING ELECTRICAL EQUIPMENT AND COORDINATE WITH MECHANICAL CONTRACTOR AND OWNER PRIOR TO STARTING ANY WORK.



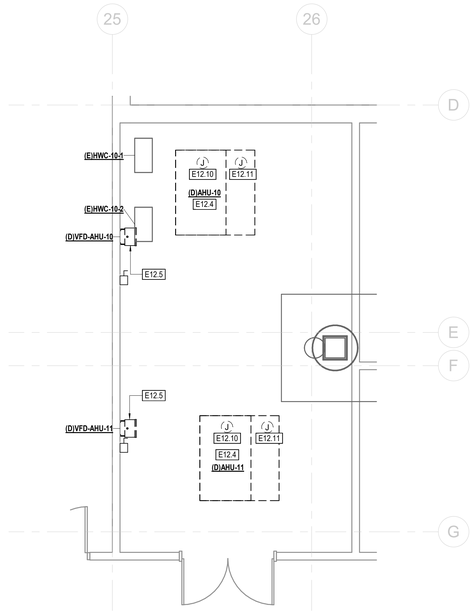
1 ENLARGED DEMOLITION ELECTRICAL POWER PLAN - MECH ROOM 1
1/4" = 1'-0"



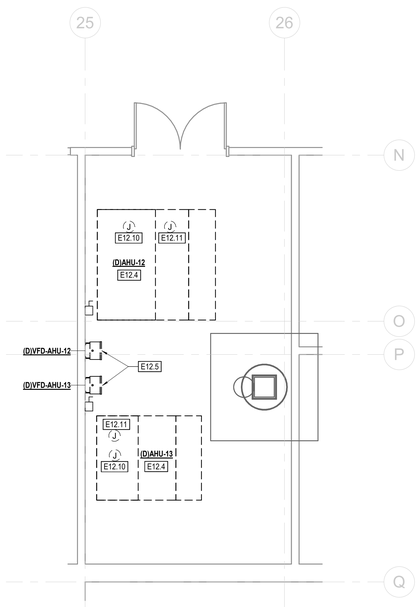
2 ENLARGED DEMOLITION ELECTRICAL POWER PLAN - MECH ROOM 2
1/4" = 1'-0"



3 ENLARGED DEMOLITION ELECTRICAL POWER PLAN - MECH ROOM 3
1/4" = 1'-0"



5 ENLARGED DEMOLITION ELECTRICAL POWER PLAN - MECH ROOM 4
1/4" = 1'-0"



4 ENLARGED DEMOLITION ELECTRICAL POWER PLAN - MECH ROOM 5
1/4" = 1'-0"

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BRENT B. MOE
117260
LICENSED
PROFESSIONAL ENGINEER
7-28-25

TBPE Firm Registration No. 2234

DATE: 07/28/25

DRAWN BY: Author

CHECKED BY: Checker

PROJECT NUMBER 250054.000

SHEET TITLE: ELECTRICAL DEMOLTION PLAN - ENLARGED MECHANICAL ROOMS

SHEET NUMBER: E3.02

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GENERAL ELECTRICAL NOTES:

A. REFER TO SHEET E0.02 FOR ALL GENERAL ELECTRICAL NOTES.

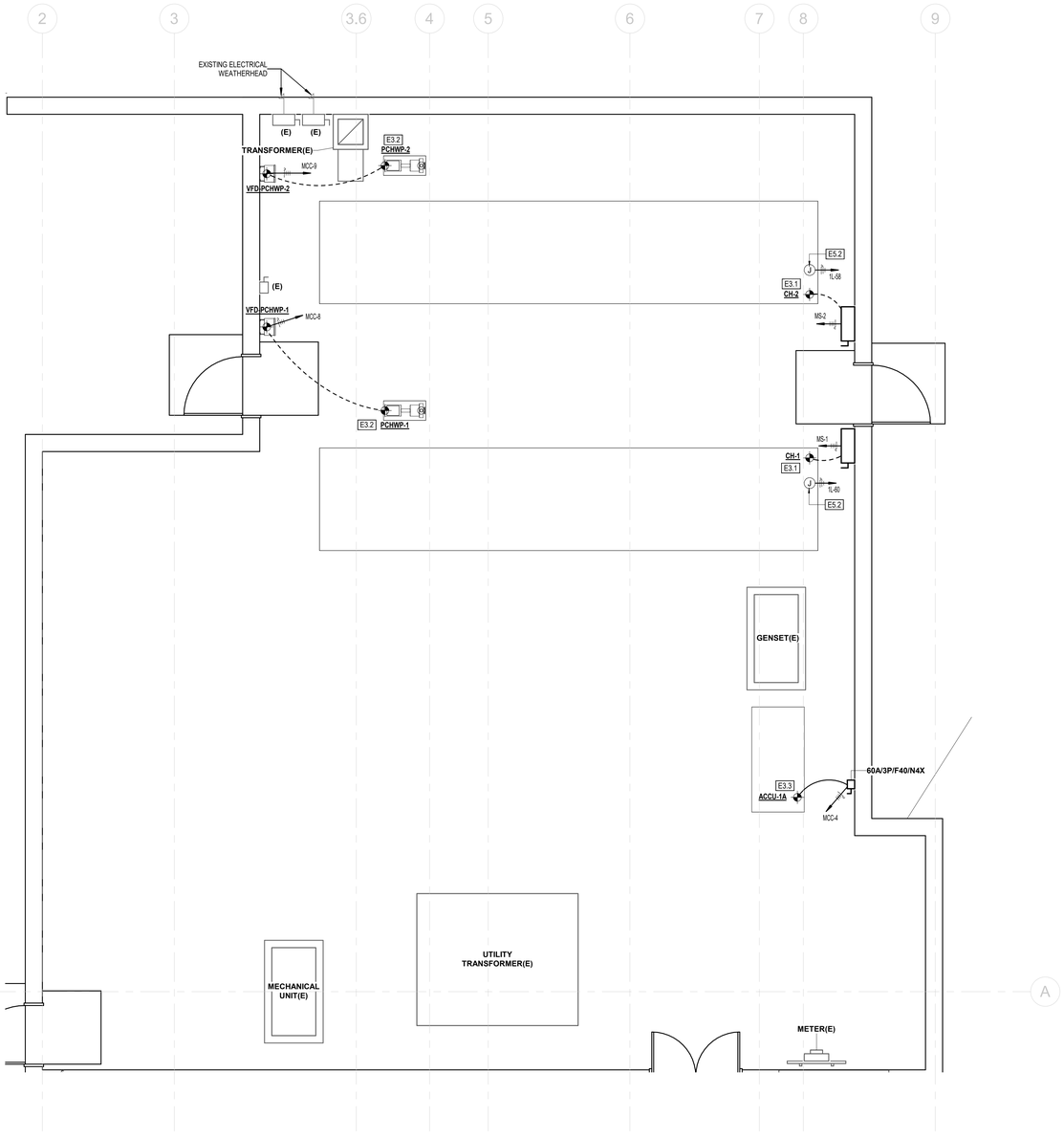
ELECTRICAL KEYED NOTES

E3.1 NEW CHILLER REPLACING EXISTING CHILLER. REFERENCE ELECTRICAL DEMO PLANS FOR EXISTING MECHANICAL UNIT BEING REPLACED. PROVIDE NEW ELECTRICAL EQUIPMENT AND ENTIRELY NEW CIRCUIT AS PROVIDED ON PLANS. CONTRACTOR SHALL FIELD VERIFY EXISTING ELECTRICAL EQUIPMENT AND COORDINATE WITH MECHANICAL CONTRACTOR, CONTROLS CONTRACTOR AND OWNER PRIOR TO STARTING ANY WORK.

E3.2 NEW PUMP REPLACING EXISTING PUMP. REFERENCE ELECTRICAL DEMO PLANS FOR EXISTING PUMP BEING REPLACED. PROVIDE NEW ELECTRICAL EQUIPMENT AND ENTIRELY NEW CIRCUIT AS PROVIDED ON PLANS. CONTRACTOR SHALL FIELD VERIFY EXISTING ELECTRICAL EQUIPMENT AND COORDINATE WITH MECHANICAL CONTRACTOR, CONTROLS CONTRACTOR AND OWNER PRIOR TO STARTING ANY WORK.

E3.3 NEW MECHANICAL UNIT REPLACING EXISTING UNIT, REFERENCE ELECTRICAL DEMO PLANS FOR EXISTING MECHANICAL UNIT BEING REPLACED. PROVIDE NEW ELECTRICAL EQUIPMENT AND ENTIRELY NEW CIRCUIT AS PROVIDED ON PLANS. CONTRACTOR SHALL FIELD VERIFY EXISTING ELECTRICAL EQUIPMENT AND COORDINATE WITH MECHANICAL CONTRACTOR, CONTROLS CONTRACTOR AND OWNER PRIOR TO STARTING ANY WORK.

E5.2 PROVIDE 120V POWER FOR FREEZE PROTECTION KIT AND CONTROLLER. COORDINATE EXACT EQUIPMENT INSTALLATION REQUIREMENTS WITH CHILLER MANUFACTURERS REQUIREMENTS. CONTRACTOR SHALL FIELD VERIFY EXISTING ELECTRICAL EQUIPMENT AND COORDINATE WITH MECHANICAL CONTRACTOR, CONTROLS CONTRACTOR AND OWNER PRIOR TO STARTING ANY WORK.



1 LEVEL 1 ELECTRICAL POWER PLAN - SERVICE YARD

1/4" = 1'-0"

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7-28-25

HUMBLE ISD - OAK FOREST ES - HVAC UPGRADES - 6400 KINGWOOD GLEN DR, 77346

TBPE Firm Registration No. 2234

DATE: 07/28/25

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PROJECT NUMBER 250054.000

SHEET TITLE: ELECTRICAL PLAN - ENLARGED CENTRAL PLANT

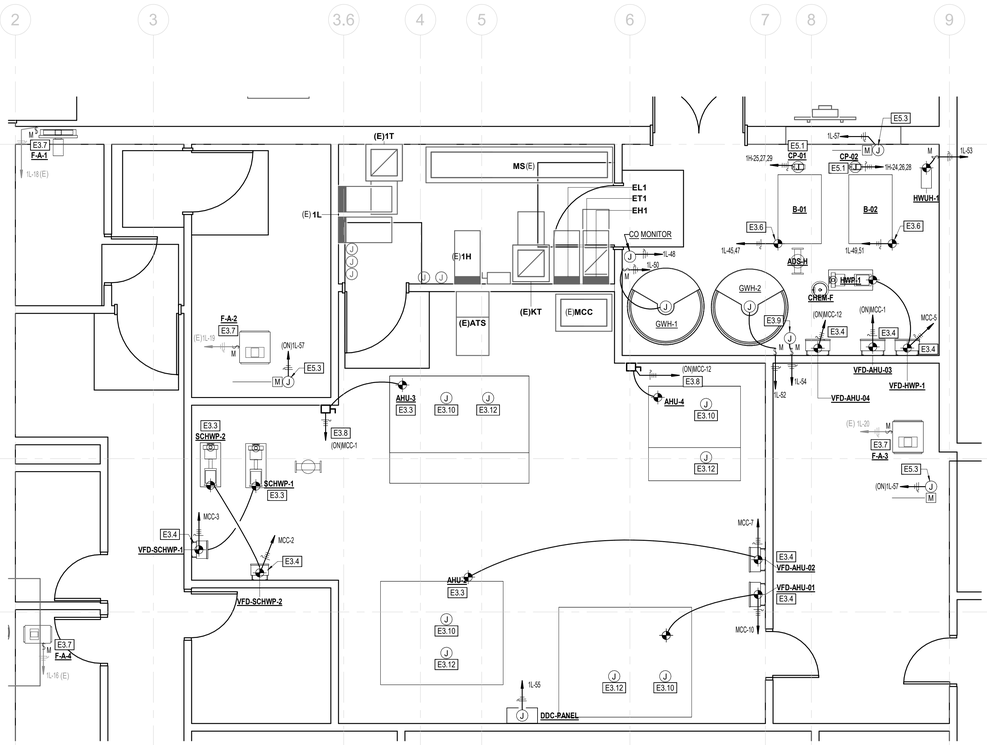
SHEET NUMBER: E3.11

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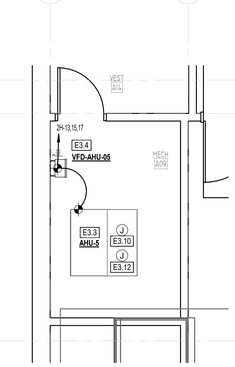
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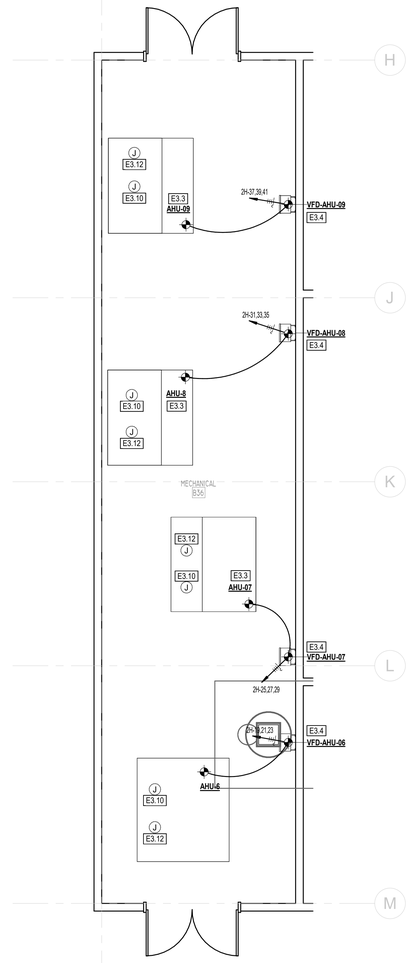
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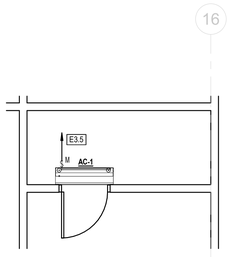
1 ENLARGED ELECTRICAL POWER PLAN - MECH ROOM 1
1/4" = 1'-0"



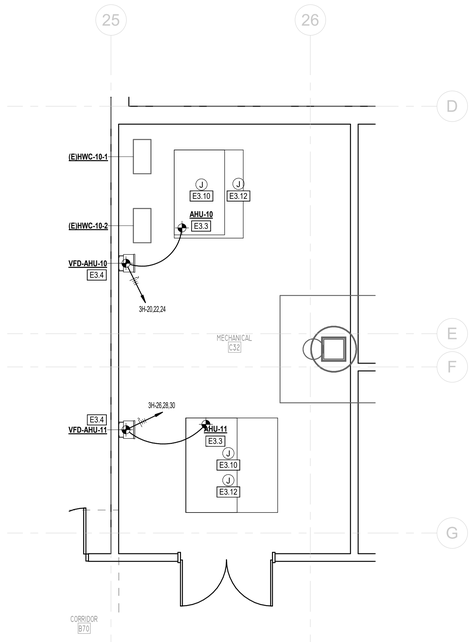
2 LEVEL 1 ENLARGED ELECTRICAL POWER PLAN - MECH ROOM 2
1/4" = 1'-0"



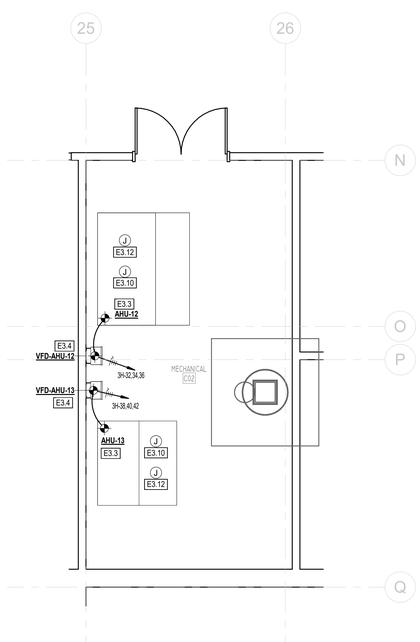
3 LEVEL 1 ENLARGED ELECTRICAL POWER PLAN - MECH ROOM 3
1/4" = 1'-0"



6 LEVEL 1 ENLARGED ELECTRICAL POWER PLAN - CONTROL B37
1/4" = 1'-0"



5 LEVEL 1 ENLARGED ELECTRICAL POWER PLAN - MECH ROOM 4
1/4" = 1'-0"



4 LEVEL 1 ENLARGED ELECTRICAL POWER PLAN - MECH ROOM 5
1/4" = 1'-0"

GENERAL ELECTRICAL NOTES:

A. REFER TO SHEET E0.02 FOR ALL GENERAL ELECTRICAL NOTES.

ELECTRICAL KEYED NOTES

E3.3 NEW MECHANICAL UNIT REPLACING EXISTING UNIT. REFERENCE ELECTRICAL DEMO PLANS FOR EXISTING MECHANICAL UNIT BEING REPLACED. PROVIDE NEW ELECTRICAL EQUIPMENT AND ENTIRELY NEW CIRCUIT AS PROVIDED ON PLANS. CONTRACTOR SHALL FIELD VERIFY EXISTING ELECTRICAL EQUIPMENT AND COORDINATE WITH MECHANICAL CONTRACTOR, CONTROLS CONTRACTOR AND OWNER PRIOR TO STARTING ANY WORK.

E3.4 NEW VFD SHALL BE CONNECTED TO ASSOCIATED MECHANICAL EQUIPMENT. VFD SHALL BE PROVIDED BY DIVISION 23, INSTALLED BY DIVISION 26.

E3.5 PROVIDE SINGLE POINT OF POWER AT CONDENSING UNIT FOR SPLIT DX SYSTEM INDOOR UNIT SHALL BE POWERED FROM OUTDOOR UNIT. PROVIDE DISCONNECTING MEANS FOR BOTH PIECES OF EQUIPMENT. REFERENCE DUCTLESS SPLIT ELECTRICAL CONNECTION DETAIL.

E3.6 PROVIDE SINGLE POINT OF POWER AT CONDENSING BOILER. PROVIDE DISCONNECTING MEANS FOR BOILER FOR POWER ASSOCIATED TO THE BOILER.

E3.7 NEW MECHANICAL UNIT REPLACING EXISTING UNIT ONE FOR ONE. REFERENCE ELECTRICAL DEMO PLANS FOR EXISTING MECHANICAL UNITS BEING REPLACED. DISCONNECT UNIT BEING REMOVED AND RECONNECT NEW UNIT AS REQUIRED WITH NEW ELECTRICAL EQUIPMENT. REUSE EXISTING CIRCUIT SERVING REMOVED UNIT. EXTEND CONDUCTORS AND CONDUIT AS REQUIRED TO MAKE CONNECTION TO NEW UNIT AS NECESSARY. REFER TO PANEL SCHEDULE FOR ADDITIONAL INFORMATION/NOTES. CONTRACTOR SHALL FIELD VERIFY EXISTING ELECTRICAL EQUIPMENT AND COORDINATE WITH MECHANICAL CONTRACTOR AND OWNER PRIOR TO STARTING ANY WORK.

ELECTRICAL KEYED NOTES

E3.8 NEW MECHANICAL UNIT FED THROUGH VFD-AHU-03/VFD-AHU-04. PROVIDE DISCONNECT WITH AUXILIARY CONTACTS. ROUTE AN ADDITIONAL 3/4" CONDUIT AND WIRE TO ASSOCIATED VARIABLE FREQUENCY DRIVE AT ELECTRICAL/MECHANICAL ROOM WHERE VFD SERVING PUMP IS LOCATED. COORDINATE WIRING WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN.

E3.9 PROVIDE 120V POWER TO CIRCULATION PUMP AND TIME SWITCH. PROVIDE DISCONNECTING MEANS FOR ALL EQUIPMENT. COORDINATE EXACT CONNECTION POINT AND REQUIREMENTS WITH PLUMBING CONTRACTOR PRIOR TO ROUGH-IN.

E3.10 NEW BIPOLAR IONIZATION KIT REPLACING EXISTING BIPOLAR IONIZATION KIT. DISCONNECT EXISTING KIT BEING REMOVED AND RECONNECT NEW AS REQUIRED WITH NEW ELECTRICAL EQUIPMENT. REUSE EXISTING CIRCUIT SERVING REMOVED UNIT, EXTEND CONDUCTORS AND CONDUIT AS REQUIRED TO MAKE CONNECTION TO NEW BIPOLAR IONIZATION KIT AS NECESSARY. CONTRACTOR SHALL FIELD VERIFY EXISTING ELECTRICAL EQUIPMENT AND COORDINATE WITH MECHANICAL CONTRACTOR AND OWNER PRIOR TO STARTING ANY WORK.

E3.12 EXISTING DUCT SMOKE DETECTORS SHALL BE REINSTALLED AS REQUIRED. REUSE EXISTING CIRCUIT AND RELAY SERVING DUCT SMOKE DETECTORS, EXTEND CONDUCTORS AND CONDUIT AS REQUIRED TO MAKE CONNECTION AS NECESSARY. CONTRACTOR SHALL FIELD VERIFY EXISTING ELECTRICAL EQUIPMENT AND COORDINATE WITH MECHANICAL CONTRACTOR AND OWNER PRIOR TO STARTING ANY WORK.

E5.1 PROVIDE 120V POWER TO PUMP AS NOTED ON PLANS. PROVIDE ASSOCIATED CIRCULATING PUMP STARTER AND DISCONNECT AS REQUIRED. COORDINATE EXACT EQUIPMENT INSTALLATION REQUIREMENTS WITH PUMP AND BOILER MANUFACTURERS REQUIREMENTS. COORDINATE CONTROLS WITH MECHANICAL CONTRACTOR AND CONTROLS CONTRACTOR PRIOR TO STARTING ANY WORK. PROVIDE ROUGH-IN/CONNECTIONS FOR CONTROLS AS REQUIRED.

E5.3 PROVIDE 120V POWER TO MOTORIZED DAMPERS. PROVIDE DISCONNECTING MEANS AT EACH DAMPER. COORDINATE EXACT PLACEMENT AND CONNECTION REQUIREMENTS TO MOTORIZED DAMPERS WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN.

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7-28-25

HUMBLE ISD - OAK FOREST ES - HVAC UPGRADES - 6400 KINGWOOD GLEN DR, 77346

TBPE Firm Registration No. 2234

DATE: 07/28/25

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PROJECT NUMBER 250054.000

SHEET TITLE: ELECTRICAL PLAN - ENLARGED MECHANICAL ROOMS

SHEET NUMBER: E3.12

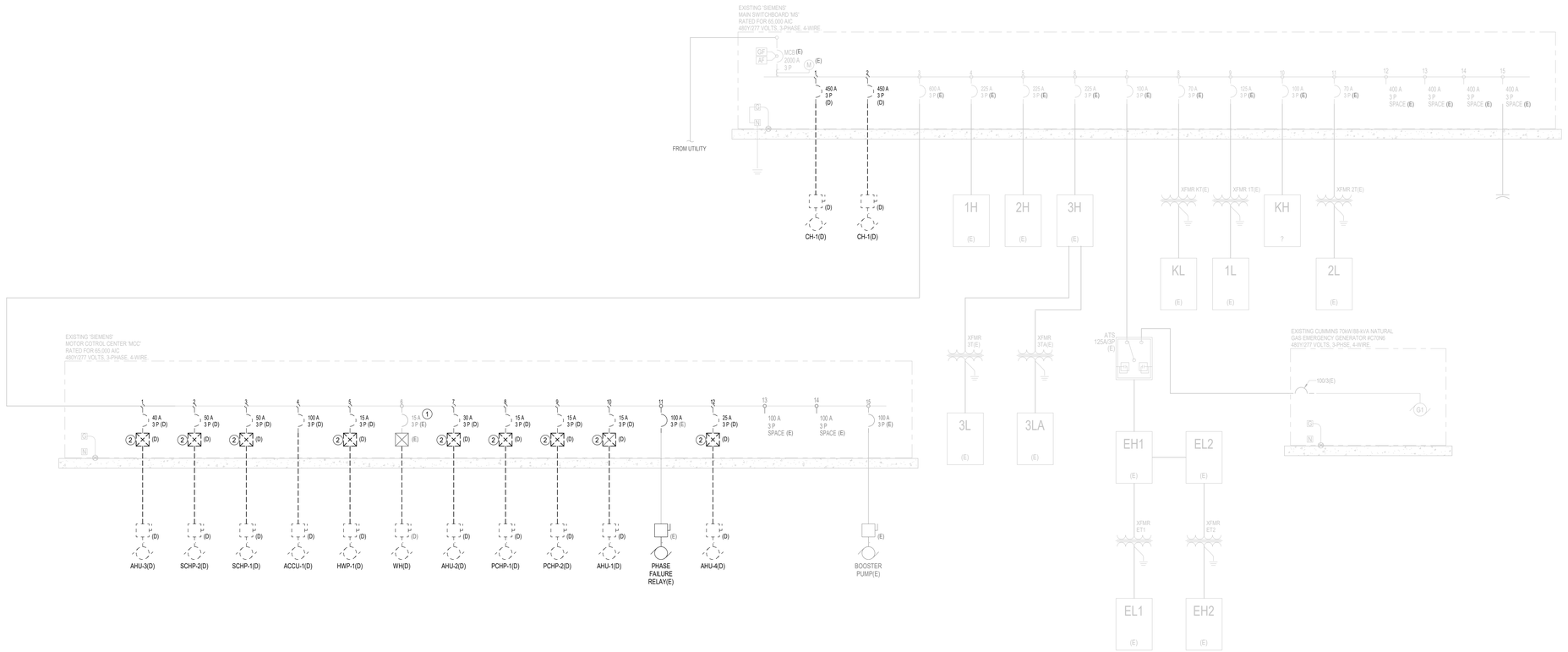
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ALL EQUIPMENT IS EXISTING UNLESS NOTED OTHERWISE (TYPICAL)



1 ELECTRICAL ONE-LINE DIAGRAM - DEMO

NOT TO SCALE

ONE-LINE DIAGRAM GENERAL NOTES:

A. CONTRACTOR SHALL UTILIZE THE MANUFACTURER OF ELECTRICAL EQUIPMENT TO PROVIDE A SHORT CIRCUIT, COORDINATION, AND ARC FLASH STUDY OF THE ENTIRE ELECTRICAL SYSTEM.

1. CONTRACTOR SHALL SUBMIT FULL STUDY PRIOR TO RELEASE OF ELECTRICAL EQUIPMENT FOR MANUFACTURE TO ENSURE EQUIPMENT IS IN COMPLIANCE WITH ALL STUDIES. STUDIES SHALL BE SIGNED AND SEALED BY A LICENSED PROFESSIONAL ENGINEER.
2. PROVIDE DATA TO ENSURE SHORT CIRCUIT INTERRUPTING RATINGS OF EQUIPMENT IS GREATER THAN FAULT CURRENT AVAILABLE AT EQUIPMENT. COORDINATION STUDY SHALL PROVIDE SETTINGS FOR BREAKERS AND/OR FUSE SELECTION TO SELECTIVELY COORDINATE IN EMERGENCY, LEGALLY REQUIRED STANDBY, FIRE PUMPS AND ELEVATOR (NEC ARTICLE 700, 701, 620, 695) AREAS OF THE SYSTEM AND PROVIDE BEST COORDINATION SETTINGS IN THE BALANCE OF SYSTEM. .1 SECONDS DOES NOT COMPLY WITH NEC ARTICLE 700.32.
3. SERIES RATINGS MAY BE USED EXCEPT FOR SWITCHBOARDS AND DISTRIBUTION PANELS. SWITCHBOARDS AND DISTRIBUTION PANELS SHALL BE FULLY RATED. WHERE SERIES RATINGS ARE UTILIZED, EQUIPMENT SHALL BEAR BLUE LABELS INDICATING SERIES RATED EQUIPMENT ON THE EXTERIOR OF EACH ENCLOSURE.
4. ARC FLASH STUDY SHALL PROVIDE ARC INCIDENT ENERGY LEVELS, ARC FLASH BOUNDARY, AND PPE INFORMATION TO BE PRINTED AND APPLIED TO EACH EQUIPMENT IN THE SYSTEM. PROVIDE ALL TRIP CURVE, BREAKER/FUSE TESTED PAIR DATA AS WELL AS EQUIPMENT INTERRUPTING DATA AS PART OF STUDY.
5. REFER TO SPECIFICATIONS SECTION 26.05.73.
6. ALL CONDUCTORS SHALL BE COPPER.

ONE-LINE DIAGRAM KEYED NOTES:

1. EXISTING BREAKER IN THE PANEL SHALL REMAIN AS SPARE, FLIPPED TO THE OFF POSITION AND LABELED ON THE NEW PANEL DIRECTORY AS A SPARE BREAKER. CONTRACTOR SHAL FIELD VERIFY.
2. REMOVE EXISTING INTERNAL MOTOR STARTER AND PROVIDE NEW VFD, REFER TO NEW PLANS. TYPICAL.

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TBPE Firm Registration No. 2234

DATE: 07/28/25

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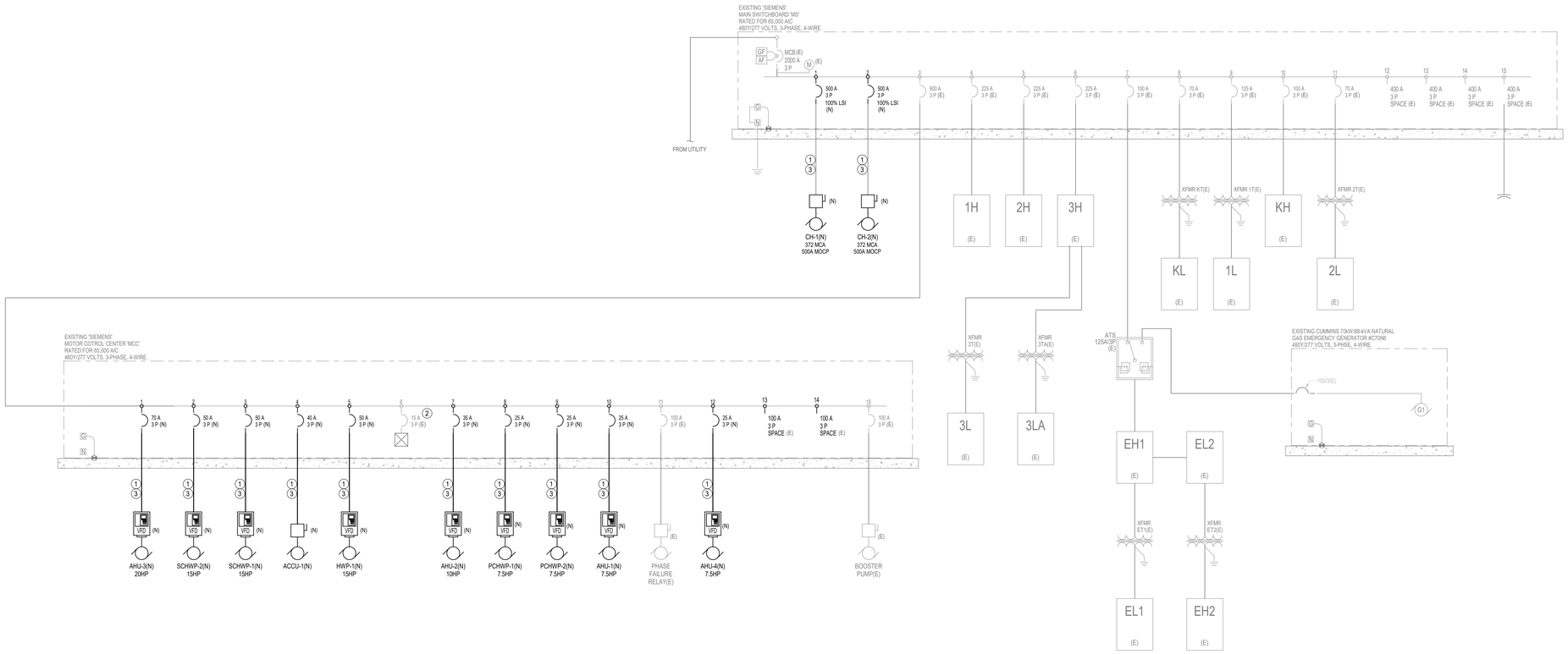
PROJECT NUMBER 250054.000

SHEET TITLE: ELECTRICAL ONE-LINE DIAGRAM - DEMO

SHEET NUMBER: E4.01

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1 ELECTRICAL ONE-LINE DIAGRAM - NEW

NOT TO SCALE

Load Analysis - Humble ISD - Oak Forest ES							
480 / 277 , 3 -PHASE, 4 -WIRE						Date: 7/26/2025	
DESCRIPTION						**NEC**	**KVA**
EXISTING LOAD:							
PEAK KVA FROM CPE =	538,000	VA	X	125%		220.87	672.5
REMOVED LOAD:							
COOLING LOADS							
CH-1	309,265	VA					-309.3
CH-2	309,265	VA					-309.3
ACCH-1	19,287	VA					-19.3
HEAT LOADS							
BOILER	100	VA					-0.1
EUH-1	100	VA					-0.1
MISCELLANOUS LOADS							
SCHWP-1	17,458	VA					-17.5
SCHWP-2	17,458	VA					-17.5
PCHWP-1	9,144	VA					-9.1
PCHWP-2	9,144	VA					-9.1
HWP-1	11,639	VA					-11.6
FANS							
ALL FAN LOADS:	138,994	VA					-139.0
ADDED LOAD:							
COOLING LOADS							
CH-1	309,256	VA	X	100%			309.3
CH-2	309,256	VA	X	100%			309.3
ACCU-1	19,287	VA	X	100%			19.3
CU-1/AC-1	1,830	VA	X	100%			1.8
HEAT LOADS							
BOILER	100	VA	X	100%			0.1
EUH-1	100	VA	X	100%			0.1
MISCELLANOUSE LOADS							
SCHWP-1	17,458	VA	X	100%			17.5
SCHWP-2	17,458	VA	X	100%			17.5
PCHWP-1	9,144	VA	X	100%			9.1
PCHWP-2	9,144	VA	X	100%			9.1
HWP-1	11,639	VA	X	100%			11.6
FANS							
ALL FAN LOADS	138,994	VA	X	100%			139.0
						TOTAL NEW LOAD (KVA)=	674.3
						NEW LOAD (AMPS):	811.1
						EX. SERVICE SIZE (AMPS):	2000.0
						SPARE AMPACITY:	1188.9

ONE-LINE DIAGRAM GENERAL NOTES:

A. CONTRACTOR SHALL UTILIZE THE MANUFACTURER OF ELECTRICAL EQUIPMENT TO PROVIDE A SHORT CIRCUIT, COORDINATION, AND ARC FLASH STUDY OF THE ENTIRE ELECTRICAL SYSTEM.

1. CONTRACTOR SHALL SUBMIT FULL STUDY PRIOR TO RELEASE OF ELECTRICAL EQUIPMENT FOR MANUFACTURE TO ENSURE EQUIPMENT IS IN COMPLIANCE WITH ALL STUDIES. STUDIES SHALL BE SIGNED AND SEALED BY A LICENSED PROFESSIONAL ENGINEER.
2. PROVIDE DATA TO ENSURE SHORT CIRCUIT INTERRUPTING RATINGS OF EQUIPMENT IS GREATER THAN FAULT CURRENT AVAILABLE AT EQUIPMENT. COORDINATION STUDY SHALL PROVIDE SETTINGS FOR BREAKERS AND/OR FUSE SELECTION TO SELECTIVELY COORDINATE IN EMERGENCY, LEGALLY REQUIRED STANDBY, FIRE PUMPS AND ELEVATOR (NEC ARTICLE 700, 701, 620, 695) AREAS OF THE SYSTEM AND PROVIDE BEST COORDINATION SETTINGS IN THE BALANCE OF SYSTEM. .1 SECONDS DOES NOT COMPLY WITH NEC ARTICLE 700.32.
3. SERIES RATINGS MAY BE USED EXCEPT FOR SWITCHBOARDS AND DISTRIBUTION PANELS. SWITCHBOARDS AND DISTRIBUTION PANELS SHALL BE FULLY RATED. WHERE SERIES RATINGS ARE UTILIZED, EQUIPMENT SHALL BEAR BLUE LABELS INDICATING SERIES RATED EQUIPMENT ON THE EXTERIOR OF EACH ENCLOSURE.
4. ARC FLASH STUDY SHALL PROVIDE ARC INCIDENT ENERGY LEVELS, ARC FLASH BOUNDARY, AND PPE INFORMATION TO BE PRINTED AND APPLIED TO EACH EQUIPMENT IN THE SYSTEM. PROVIDE ALL TRIP CURVE, BREAKER/FUSE TESTED PAIR DATA AS WELL AS EQUIPMENT INTERRUPTING DATA AS PART OF STUDY.
5. REFER TO SPECIFICATIONS SECTION 26.05.73.
6. ALL CONDUCTORS SHALL BE COPPER.

ONE-LINE DIAGRAM KEYED NOTES: (#) ←

1. REFERENCE FEEDER SCHEDULE.
2. EXISTING BREAKER IN THE PANEL SHALL REMAIN AS SPARE, FLIPPED TO THE OFF POSITION AND LABELED ON THE NEW PANEL DIRECTORY AS A SPARE BREAKER. CONTRACTOR SHALL FIELD VERIFY.
3. PROVIDE BAKELITE PLATE WITH ENGRAVING OF THE ELECTRICAL CIRCUIT NUMBER WITH THE NUMBER OF CONDUCTORS, CONDUCTOR SIZES, NUMBER OF SETS, CONDUCTOR TYPE AND CONDUIT SIZE. PLACE ENGRAVED PLATE NEXT TO EQUIPMENT NAMEPLATE. COORDINATE FINAL LOCATION WITH MECHANICAL CONTRACTOR AND OWNER PRIOR TO ROUGH-IN.

FEEDER SCHEDULE
COPPER ONLY

RATING	SETS	CONDUCTOR SIZE	CONDUIT
30A	1	4#10, 1#10 G.	3/4"
40A	1	4#8, 1#10 G.	1"
50A	1	4#8, 1#10 G.	1"
60A	1	4#6, 1#10 G.	1"
70A	1	4#4, 1#8 G.	1 1/4"
80A	1	4#4, 1#8 G.	1 1/4"
90A	1	4#3, 1#8 G.	1 1/4"
100A	1	4#3, 1#8 G.	1 1/4"
125A	1	4#1, 1#6 G.	1 1/2"
150A	1	4#1/0, 1#6 G.	1 1/2"
175A	1	4#2/0, 1#6 G.	2"
200A	1	4#3/0, 1#6 G.	2"
225A	1	4#4/0, 1#4 G.	2 1/2"
250A	1	4#250, 1#4 G.	2 1/2"
300A	1	4#350, 1#4 G.	3"
350A	1	4#500, 1#3 G.	3 1/2"
400A	1	4#600, 1#3 G.	4"
450A	2	4#4/0, 1#2 G.	2 1/2"
500A	2	4#250, 1#2G.	2 1/2"
600A	2	4#350, 1#1G.	3"
700A	2	4#500, 1#1/0G.	4"
800A	2	4#600, 1#1/0G.	4"
1000A	3	4#500, 1#2/0G.	4"
1200A	4	4#350, 1#3/0G.	3"
1600A	4	4#600, 1#4/0G.	4"
	5	4#500, 1#4/0G.	4"
2000A	5	4#600, 1#250 G.	4"
	6	4#500, 1#250 G.	4"
2500A	6	4#600, 1#350 G.	4"
	7	4#500, 1#350 G.	4"
3000A	8	4#500, 1#400 G.	4"
3500A	9	4#600, 1#500 G.	4"
	10	4#500, 1#500 G.	4"
4000A	10	4#600, 1#500 G.	4"
	11	4#500, 1#500 G.	4"
5000A	12	4#600, 1#750 G.	4"
	14	4#500, 1#750 G.	4"

1. ELECTRICAL CONTRACTOR SHALL PROVIDE THE NUMBER OF LUGS AND PROPER LUG SIZES TO ACCEPT CONDUCTOR SIZES SHOWN.
2. GROUND NOT REQUIRED AT SERVICE LATERAL.

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HUMBLE ISD - OAK FOREST ES - HVAC
UPGRADES - 6400 KINGWOOD GLEN DR, 77346

TBPE Firm Registration No. 2234

DATE: 07/28/25

DRAWN BY: DBR

CHECKED BY: DBR

PROJECT NUMBER 250054.000

SHEET TITLE: ELECTRICAL ONE-LINE DIAGRAM - NEW

SHEET NUMBER: E4.02

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Panelboard 1H

65000 A AIC Rating
New
X Existing

480/277 Wye Volt, 3 Phase, 4 Wire | Mains Type: MLO | 0 A -- -- | LUGS: SINGLE FEED THRU | Mounting Stye: SURFACE
1 Section
Type 1 -Nema Rating

NOTE	LOAD (VA)	TYPE	DESCRIPTION	WIRE	CB	CKT	CB	WIRE	DESCRIPTION	TYPE	LOAD (VA)	NOTE
1	675 VA	L	EXISTING LOAD	12	20 A	1 2	20 A	12	EXISTING LOAD	L	2250 VA	1
1	2850 VA	L	EXISTING LOAD	12	20 A	3 4	20 A	12	EXISTING LOAD	L	3200 VA	1
1	3750 VA	L	EXISTING LOAD	12	20 A	5 6	20 A	12	EXISTING LOAD	L	3000 VA	1
1	2827 VA	F	F-A-6(E) 2HP	12	15 A	7 8	20 A	12	EXISTING LOAD	L	4050 VA	1
						9 10	20 A	12	EXISTING LOAD	L	4050 VA	1
						11 12	20 A	12	EXISTING LOAD	L	1050 VA	1
1	180 VA	M	EXISTING LOAD	12	20 A	13 14						
1	700 VA	L	EXISTING LOAD	12	20 A	15 16	20 A	12	EXISTING LOAD	L	6000 VA	1
1	2350 VA	L	EXISTING LOAD	12	20 A	17 18						
						19 20	20 A	12	EXISTING LOAD	F	430 VA	1
1	7438 VA	H	EXISTING LOAD	12	15 A	21 22	20 A	12	EXISTING LOAD	F	1130 VA	1
						23 24						
3	2826 VA	M	CP-01	12	15 A	25 26	15 A	12	CP-02	M	2826 VA	3
						27 28						
						29 30	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	31 32	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	33 34	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	35 36	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	37 38	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	39 40	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	41 42	--	12	Space	--	0 VA	

NEC REF:	Load Type	Conn.	Fct.	Diversity	NEC REF:	Load Type	Conn.	Fct.	Diversity
220.47	(R)Receptacle				210.20A	(L)Lighting	33925 VA	125.00%	42406 VA
220.56	(K)Kitchen					(EL)Ext. Ltg.			
220.60	(C)Cooling			0 VA	620.14	(E)Elevators			
220.60	(H)Heating	7438 VA	100.00%	7438 VA		(WH)Wat. Htr.			
220.60	(F)Fans	4387 VA	100.00%	4387 VA	220.50	(MT)Lrg. Motor			
	(M)Misc.	5832 VA	100.00%	5832 VA		(SP)Sub Pnl.			
					630.11B	(W) Welders			

Total Connected Load: 51582 VA VA = 62 A
Total Load (Diversified): 60063 VA VA = 72 A

Location of Panel: Space 72

Panelboard 2L

10000 A AIC Rating
X New
Existing

120/208 Wye Volt, 3 Phase, 4 Wire | Mains Type: MCB | 225 A MCB -- 250 A BUS (Copper) -- | LUGS: -- -- | Mounting Stye: SURFACE
2 Section
Type 1 -Nema Rating

NOTE	LOAD (VA)	TYPE	DESCRIPTION	WIRE	CB	CKT	CB	WIRE	DESCRIPTION	TYPE	LOAD (VA)	NOTE
1	0 VA	--	EXISTING LOAD	12	20 A	1 2	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	3 4	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	5 6	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	7 8	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	9 10	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	11 12	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	13 14	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	15 16	20 A	12	EXISTING LOAD	--	0 VA	1
1	1356 VA	F	F-A-9 (E) 1/2 HP & 1 RECEP(E)	12	20 A	17 18	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	19 20	20 A	12	EXISTING LOAD	--	0 VA	1
1	876 VA	F	F-A-8 (E) 1/4 HP & 1 RECEP(E)	12	20 A	21 22	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	23 24	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	25 26	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	10	30 A	27 28	20 A	12	EXISTING LOAD	--	0 VA	1
						29 30	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	31 32	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	33 34	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	35 36	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	37 38	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	39 40	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	41 42	20 A	12	F-B-2(E) 1/6 HP & 1 RECEP(E)	F	708 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	43 44	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	45 46						
1	0 VA	--	EXISTING LOAD	12	20 A	47 48	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	49 50	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	51 52	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	53 54	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	55 56	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	57 58	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	59 60	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	61 62	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	63 64	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	65 66	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	67 68	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	69 70	20 A	12	WP/GFCI ROOF	R	720 VA	2
1	0 VA	--	EXISTING LOAD	12	20 A	71 72	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	73 74	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	75 76	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	77 78	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	79 80	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	81 82	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	83 84	--	12	Space	--	0 VA	

NEC REF:	Load Type	Conn.	Fct.	Diversity	NEC REF:	Load Type	Conn.	Fct.	Diversity
220.47	(R)Receptacle	720 VA	100.00%	720 VA	210.20A	(L)Lighting			
220.56	(K)Kitchen					(EL)Ext. Ltg.			
220.60	(C)Cooling			0 VA	620.14	(E)Elevators			
220.60	(H)Heating			0 VA		(WH)Wat. Htr.			
220.60	(F)Fans	2940 VA	100.00%	2940 VA	220.50	(MT)Lrg. Motor			
	(M)Misc.					(SP)Sub Pnl.			
					630.11B	(W) Welders			

Total Connected Load: 3660 VA VA = 10 A
Total Load (Diversified): 3660 VA VA = 10 A

Location of Panel: Space 38

Panelboard 1L

10000 A AIC Rating
New
X Existing

120/208 Wye Volt, 3 Phase, 4 Wire | Mains Type: MCB | 150 A MCB -- 225 A BUS (Copper) -- | LUGS: -- FEED THRU | Mounting Stye: SURFACE
2 Section
Type 1 -Nema Rating

NOTE	LOAD (VA)	TYPE	DESCRIPTION	WIRE	CB	CKT	CB	WIRE	DESCRIPTION	TYPE	LOAD (VA)	NOTE
1	180 VA	M	EXIST.LOAD	12	20 A	1 2	20 A	12	EXIST.LOAD	L	180 VA	1
1	930 VA	M	EXIST.LOAD	12	20 A	3 4	20 A	12	F-A-7(E) 1/2 HP & 1 RECEP(E)	F	1356 VA	1
1	1000 VA	M	EXIST.LOAD	12	20 A	5 6	20 A	12	EXIST.LOAD	R	500 VA	1
1	1080 VA	R	EXIST.LOAD	12	20 A	7 8	20 A	12	EXIST.LOAD	M	750 VA	1
1	900 VA	R	EXIST.LOAD	12	20 A	9 10	20 A	12	EXIST.LOAD	R	720 VA	1
1	1260 VA	R	EXIST.LOAD	12	20 A	11 12	20 A	12	F-A-5(E) 1/2 HP & 1 RECEP(E)	F	1356 VA	1
1	1200 VA	M	EXIST.LOAD	10	30 A	13 14	20 A	12	EXIST.LOAD	M	500 VA	1
						15 16	20 A	12	F-A-4(E) 1/15 HP & 1 RECEP(E)	F	876 VA	1
1	1620 VA	R	EXIST.LOAD	12	20 A	17 18	20 A	12	F-A-1(E) 1/2 HP	F	1176 VA	1
1	1176 VA	F	F-A-2(E) 1/2 HP	12	20 A	19 20	15 A	12	F-A-3(E) 1/4 HP	F	696 VA	4
1	900 VA	R	EXIST.LOAD	12	20 A	21 22	20 A	12	EXIST.LOAD	M	200 VA	1
1	180 VA	M	EXIST.LOAD	12	20 A	23 24	20 A	12	EXIST.LOAD	M	200 VA	1
1	500 VA	M	EXIST.LOAD	12	20 A	25 26	20 A	12	EXIST.LOAD	M	500 VA	1
1	1500 VA	M	EXIST.LOAD	12	20 A	27 28	20 A	12	EXIST.LOAD	M	1000 VA	1
1	750 VA	M	EXIST.LOAD	12	20 A	29 30	20 A	12	EXIST.LOAD	R	1620 VA	1
1	1080 VA	R	EXIST.LOAD	12	20 A	31 32	20 A	12	F-B-1(E) 1/6 HP & 1 RECEP(E)	F	708 VA	1
1	1620 VA	R	EXIST.LOAD	12	20 A	33 34	20 A	12	EXIST.LOAD	R	1620 VA	1
1	180 VA	M	EXIST.LOAD	12	20 A	35 36	30 A	10	EXIST.LOAD	M	1590 VA	1
1	360 VA	R	EXIST.LOAD	12	20 A	37 38	30 A	10	EXIST.LOAD	M	1590 VA	1
1	180 VA	M	EXIST.LOAD	12	20 A	39 40	30 A	10	EXIST.LOAD	M	1590 VA	1
1	180 VA	M	EXIST.LOAD	12	20 A	41 42	30 A	10	EXIST.LOAD	M	1590 VA	1
2	0 VA	--	Spare	12	20 A	43 44	20 A	12	EXIST.LOAD	M	500 VA	1
3	3328 VA	H	B-01	12	20 A	45 46	20 A	12	EXIST.LOAD	M	500 VA	1
						47 48	20 A	12	CO PANEL	M	360 VA	3
3	3328 VA	H	B-02	12	20 A	49 50	20 A	12	GWH-1	WH	600 VA	3
						51 52	20 A	12	GWH-1	WH	600 VA	3
3	780 VA	M	HWUH-1	12	15 A	53 54	20 A	12	CP-1	WH	500 VA	3
3	360 VA	M	DDC PANEL	12	20 A	55 56	20 A	12	ROOF MTD WP/GFCI	R	1080 VA	3
3	540 VA	M	MOTOR DAMPERS	12	20 A	57 58	20 A	12	FREEZE PROTECTION	M	360 VA	3
	0 VA	--	Space	12	--	59 60	20 A	12	FREEZE PROTECTION	M	360 VA	3
	0 VA	--	Space	12	--	61 62	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	63 64	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	65 66	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	67 68	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	69 70	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	71 72	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	73 74	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	75 76	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	77 78	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	79 80	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	81 82	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	83 84	--	12	Space	--	0 VA	

NEC REF:	Load Type	Conn.	Fct.	Diversity	NEC REF:	Load Type	Conn.	Fct.	Diversity
220.47	(R)Receptacle	14360 VA	84.82%	12180 VA	210.20A	(L)Lighting	180 VA	125.00%	225 VA
220.56	(K)Kitchen					(EL)Ext. Ltg.			
220.60	(C)Cooling			0 VA	620.14	(E)Elevators			
220.60	(H)Heating	6656 VA	100.00%	6656 VA		(WH)Wat. Htr.	1700 VA	100.00%	1700 VA
220.60	(F)Fans	7344 VA	100.00%	7344 VA	220.50	(MT)Lrg. Motor			
	(M)Misc.	20050 VA	100.00%	20050 VA		(SP)Sub Pnl.			
					630.11B	(W) Welders			

Total Connected Load: 50290 VA VA = 140 A
Total Load (Diversified): 48155 VA VA = 134 A

Location of Panel: Space 72

Panelboard 3H

65000 A AIC Rating
New
X Existing

480/277 Wye Volt, 3 Phase, 4 Wire | Mains Type: MLO | 0 A -- 250 A BUS (Copper) -- | LUGS: SINGLE FEED THRU | Mounting Stye: SURFACE
1 Section
Type 1 -Nema Rating

NOTE	LOAD (VA)	TYPE	DESCRIPTION	WIRE	CB	CKT	CB	WIRE	DESCRIPTION	TYPE	LOAD (VA)	NOTE
1	1500 VA	L	EXISTING LOAD	12	20 A	1 2	20 A	12	EXISTING LOAD	L	1500 VA	1
1	1500 VA	L	EXISTING LOAD	12	20 A	3 4	20 A	12	EXISTING LOAD	L	1500 VA	1
1	1500 VA	L	EXISTING LOAD	12	20 A	5 6	20 A	12	EXISTING LOAD	L	1500 VA	1
1	1500 VA	L	EXISTING LOAD	12	20 A	7 8	20 A	12	EXISTING LOAD	L	1500 VA	1
1	1500 VA	L	EXISTING LOAD	12	20 A	9 10	20 A	12	EXISTING LOAD	L	1500 VA	1
1	1500 VA	L	EXISTING LOAD	12	20 A	11 12	20 A	12	EXISTING LOAD	L	1500 VA	1
1	1500 VA	L	EXISTING LOAD	12	20 A	13 14	20 A	12	EXISTING LOAD	L	1500 VA	1
1	1500 VA	L	EXISTING LOAD	12	20 A	15 16	20 A	12	EXISTING LOAD	L	1500 VA	1
1	1500 VA	L	EXISTING LOAD	12	20 A	17 18	20 A	12	EXISTING LOAD	L	1500 VA	1
						19 20						
1	39905 VA	M	EXISTING LOAD	4	80 A	21 22	25 A	10	AHU-10 (7.5HP)	F	9144 VA	5, 6
						23 24						
	0 VA	--	Space	12	--	25 26						
	0 VA	--	Space	12	--	27 28	25 A	10	AHU-11 (7.5HP)	F	9144 VA	5, 6
	0 VA	--	Space	12	--	29 30						
1	0 VA	SP	3T(E)	8	45 A	31 32	50 A	8	AHU-12 (15HP)	F	15047 VA	5, 6
						33 34						
						35 36						
1	0 VA	SP	3TA(E)	3	100 A	37 38	25 A	10	AHU-13 (7.5HP)	F	9144 VA	5, 6
						39 40						
						41 42						

NEC REF:	Load Type	Conn.	Fct.	Diversity	NEC REF:	Load Type	Conn.	Fct.	Diversity
220.47	(R)Receptacle				210.20A	(L)Lighting	27000 VA	125.00%	33750 VA
220.56	(K)Kitchen					(EL)Ext. Ltg.			
220.60	(C)Cooling			0 VA	620.14	(E)Elevators			
220.60	(H)Heating			0 VA		(WH)Wat. Htr.			
220.60	(F)Fans	42479 VA	100.00%	42479 VA	220.50	(MT)Lrg. Motor			
	(M)Misc.	39905 VA	100.00%	39905 VA		(SP)Sub Pnl.			
					630.11B	(W) Welders			

Total Connected Load: 109384 VA VA = 132 A
Total Load (Diversified): 116134 VA VA = 140 A

Location of Panel: Space 61

Panelboard 2H

65000 A AIC Rating
New
X Existing

480/277 Wye Volt, 3 Phase, 4 Wire | Mains Type: MLO | 0 A -- 250 A BUS (Copper) -- | LUGS: SINGLE FEED THRU | Mounting Stye: SURFACE
1 Section
Type 1 -Nema Rating

NOTE	LOAD (VA)	TYPE	DESCRIPTION	WIRE	CB	CKT	CB	WIRE	DESCRIPTION	TYPE	LOAD (VA)	NOTE
1	1500 VA	L	EXISTING LOAD	12	20 A	1 2	20 A	12	EXISTING LOAD	L	1500 VA	1
1	1500 VA	L	EXISTING LOAD	12	20 A	3 4	20 A	12	EXISTING LOAD	L	1500 VA	1
1	1500 VA	L	EXISTING LOAD	12	20 A	5 6	20 A	12	EXISTING LOAD	L	1500 VA	1
1	1500 VA	L	EXISTING LOAD	12	20 A	7 8	20 A	12	EXISTING LOAD	L	1500 VA	1
1	1500 VA	L	EXISTING LOAD	12	20 A	9 10	20 A	12	EXISTING LOAD	L	1500 VA	1
1	1500 VA	L	EXISTING LOAD	12	20 A	11 12	20 A	12	EXISTING LOAD	L	1500 VA	1
						13 14	20 A	12	EXISTING LOAD	L	1500 VA	1
5, 6	5071 VA	F	AHU-5 (2HP)	12	15 A	15 16	20 A	12	EXISTING LOAD	L	1500 VA	1
						17 18	20 A	12	EXISTING LOAD	L	1500 VA	1
						19 20	20 A	12	EXISTING LOAD	L	1500 VA	1
5, 6	11639 VA	F	AHU-6 (10HP)	8	35 A	21 22	20 A	12	EXISTING LOAD	L	1500 VA	1
						23 24	20 A	12	EXISTING LOAD	L	1500 VA	1
						25 26	20 A	12	EXISTING LOAD	L	1500 VA	1
5, 6	9144 VA	F	AHU-7 (7.5HP)	10	25 A	27 28	20 A	12	EXISTING LOAD	L	1500 VA	1
						29 30	20 A	12	EXISTING LOAD	L	1500 VA	1
						31 32	20 A	12	EXISTING LOAD	L	1500 VA	1
5, 6	9144 VA	F	AHU-8 (7.5HP)	10	25 A	33 34	20 A	12	EXISTING LOAD	L	1500 VA	1
						35 36	20 A	12	EXISTING LOAD	L	1500 VA	1
						37 38	--	12	Space	--	0 VA	
5, 6	9144 VA	F	AHU-9 (7.5HP)	10	25 A	39 40	--	12	Space	--	0 VA	
						41 42	--	12	Space	--	0 VA	
1	0 VA	--	Spare	12	20 A	43 44	20 A	12	Spare	--	0 VA	1
1	0 VA	--	Spare	12	20 A	45 46	20 A	12	Spare	--	0 VA	1
1	0 VA	--	Spare	12	20 A	47 48	20 A	12	Spare	--	0 VA	1
	0 VA	--	Space	12	--	49 50	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	51 52	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	53 54	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	55 56	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	57 58	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	59 60	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	61 62	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	63 64	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	65 66	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	67 68	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	69 70	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	71 72	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	73 74	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	75 76	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	77 78	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	79 80	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	81 82	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	83 84	--	12	Space	--	0 VA	

NEC REF:	Load Type	Conn.	Fct.	Diversity	NEC REF:	Load Type	Conn.	Fct.	Diversity
220.47	(R)Receptacle				210.20A	(L)Lighting	36000 VA	125.00%	45000 VA
220.56	(K)Kitchen					(EL)Ext. Ltg.			
220.60	(C)Cooling			0 VA	620.14	(E)Elevators			
220.60	(H)Heating			0 VA		(WH)Wat. Htr.			
220.60	(F)Fans	44142 VA	100.00%	44142 VA	220.50	(MT)Lrg. Motor			
	(M)Misc.					(SP)Sub Pnl.			
					630.11B	(W) Welders			

Total Connected Load: 80142 VA VA = 96 A
Total Load (Diversified): 89142 VA VA = 107 A

Location of Panel: Space 38

Panelboard 3L

10000 A AIC Rating
New
X Existing

120/208 Wye Volt, 3 Phase, 4 Wire | Mains Type: MCB | 225 A MCB -- 250 A BUS (Copper) -- | LUGS: -- -- | Mounting Stye: SURFACE
2 Section
Type 1 -Nema Rating

NOTE	LOAD (VA)	TYPE	DESCRIPTION	WIRE	CB	CKT	CB	WIRE	DESCRIPTION	TYPE	LOAD (VA)	NOTE
1	0 VA	--	EXISTING LOAD	12	20 A	1 2	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	3 4	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	5 6	20 A	12	F-B-3(E) 1/6 HP & 1 RECEP(E)	F	708 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	7 8	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	9 10	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	11 12	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	13 14	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	15 16	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	17 18	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	19 20	20 A	12	EXISTING LOAD	--	0 VA	1
1	876 VA	F	F-C-1(E) 1/4 HP & 1 RECEP(E)	12	20 A	21 22	20 A	12	F-C-2(E) 1/4 HP & 1 RECEP(E)	F	876 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	23 24	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	25 26	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	27 28	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	29 30	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	31 32	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	33 34	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	35 36	20 A	12	F-C-3(E) 1/4 HP & 1 RECEP(E)	F	876 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	37 38	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	39 40	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	41 42	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	43 44	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	45 46	20 A	12	EXISTING LOAD	--	0 VA	1
1	876 VA	F	F-C-4(E) 1/4 HP & 1 RECEP(E)	12	20 A	47 48	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	49 50	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	51 52	20 A	12	EXISTING LOAD	--	0 VA	1
1	876 VA	F	F-C-5(E) 1/4 HP & 1 RECEP(E)	12	20 A	53 54	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	55 56	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	57 58	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	59 60	20 A	12	EXISTING LOAD	--	0 VA	1
1	0 VA	--	EXISTING LOAD	12	20 A	61 62	20 A	12	EXISTING LOAD	--	0 VA

Panelboard EH1

65000 A AIC Rating
New
X Existing

480/277 Wye Volt, 3 Phase, 4 Wire | 1 Section | Type 1 -Nema Rating | Mains Type: MLO | 0 A -- -- 125 A BUS (Copper) -- | LUGS: SINGLE -- | Mounting Stye: SURFACE

NOTE	LOAD (VA)	TYPE	DESCRIPTION	WIRE	CB	CKT	CB	WIRE	DESCRIPTION	TYPE	LOAD (VA)	NOTE
1	1000 VA	L	EXISTING LOAD	12	20 A	1 2	20 A	12	EXISTING LOAD	L	1000 VA	1
1	1000 VA	L	EXISTING LOAD	12	20 A	3 4	20 A	12	EXISTING LOAD	L	1000 VA	1
1	1000 VA	L	EXISTING LOAD	12	20 A	5 6	20 A	12	EXISTING LOAD	L	1000 VA	1
1	15807 VA	M	ET1(E)	8	50 A	7 8 9 10 11 12	100 A	3	EL2(E)	L; C; M	25872 VA	1
1	24940 VA	M	EXISTING LOAD	8	50 A	13 14 15 16 17 18	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	19 20	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	21 22	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	23 24	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	25 26	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	27 28	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	29 30	--	12	Space	--	0 VA	

NEC REF:	Load Type	Conn.	Fct.	Diversity	NEC REF:	Load Type	Conn.	Fct.	Diversity
220.47	(R)Receptacle				210.20A	(L)Lighting	14400 VA	125.00%	18000 VA
220.56	(K)Kitchen					(EL)Ext. Ltg.			
220.60	(C)Cooling	1830 VA	100.00%	1830 VA	620.14	(E)Elevators			
220.60	(H)Heating			0 VA		(WH)Wat. Htr.			
220.60	(F)Fans				220.50	(MT)Lrg. Motor			
	(M)Misc.	56389 VA	100.00%	56389 VA		(SP)Sub Pnl.			
					630.11B	(W) Welders			

Total Connected Load: 72619 VA VA = 87 A
Total Load (Diversified): 76219 VA VA = 92 A

Location of Panel: Space 72

Panelboard EL1

10000 A AIC Rating
New
X Existing

120/208 Wye Volt, 3 Phase, 4 Wire | 1 Section | Type 1 -Nema Rating | Mains Type: MCB | 50 A MCB -- 250 A BUS (Copper) -- | LUGS: -- | Mounting Stye: SURFACE

NOTE	LOAD (VA)	TYPE	DESCRIPTION	WIRE	CB	CKT	CB	WIRE	DESCRIPTION	TYPE	LOAD (VA)	NOTE
1	500 VA	M	EXISTING LOAD	12	20 A	1 2	20 A	12	EXISTING LOAD	M	500 VA	1
1	500 VA	M	EXISTING LOAD	12	20 A	3 4	20 A	12	EXISTING LOAD	M	500 VA	1
1	500 VA	M	EXISTING LOAD	12	20 A	5 6	20 A	12	EXISTING LOAD	M	500 VA	1
1	6484 VA	M	EXISTING LOAD	10	30 A	7 8 9 10 11 12	20 A	12	EXISTING LOAD	M	500 VA	1
1	4323 VA	M	EXISTING LOAD	12	20 A	13 14 15 16 17 18	20 A	12	EXISTING LOAD	M	500 VA	1
	0 VA	--	Space	12	--	19 20	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	21 22	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	23 24	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	25 26	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	27 28	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	29 30	--	12	Space	--	0 VA	

NEC REF:	Load Type	Conn.	Fct.	Diversity	NEC REF:	Load Type	Conn.	Fct.	Diversity
220.47	(R)Receptacle				210.20A	(L)Lighting			
220.56	(K)Kitchen					(EL)Ext. Ltg.			
220.60	(C)Cooling			0 VA	620.14	(E)Elevators			
220.60	(H)Heating			0 VA		(WH)Wat. Htr.			
220.60	(F)Fans				220.50	(MT)Lrg. Motor			
	(M)Misc.	15807 VA	100.00%	15807 VA		(SP)Sub Pnl.			
					630.11B	(W) Welders			

Total Connected Load: 15807 VA VA = 44 A
Total Load (Diversified): 15807 VA VA = 44 A

Location of Panel: Space 72

PANEL SCHEDULE GENERAL NOTES:

A. ALL CIRCUITS ON EXISTING PANELS ARE EXISTING CIRCUIT/BREAKERS TO REMAIN UNLESS NOTED OTHERWISE BY KEYED NOTE.

B. ALL CONDUCTORS SHALL BE COPPER UNLESS NOTED OTHERWISE SCHEDULED..

C. CONTRACTOR SHALL REFER TO PROJECT SPECIFICATIONS FOR SPARE CONDUITS TO BE PROVIDED PER PANEL.

D. ALL PANEL SCHEDULES SHALL BE UPDATED WITH NEW DIRECTORIES. ANY EXISTING CIRCUITS TO REMAIN SHALL BE CIRCUIT TRACED AND LABELING UPDATED ACCORDINGLY WITH ROOM NAMES, NUMBERS, DEVICE/EQUIPMENT TYPE. ROOM NAMING AND NUMBERING SHALL BE BASED ON THE FINAL ROOM NAMING AND NUMBERING IDENTIFIED BY THE ARCHITECT AND OWNER. REFER TO PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION AND ADDITIONAL DIRECTORY REQUIREMENTS.

PANEL SCHEDULE KEYED NOTES:

1. EXISTING BRANCH CIRCUIT SHALL REMAIN. CONTRACTOR SHALL CIRCUIT TRACE AND FIELD VERIFY THE EXISTING LOAD CIRCUIT. UPDATE THE PANEL DIRECTORY WITH THE DEVICE/EQUIPMENT TYPE, ROOM NUMBER, ROOM NAME, ETC. REFERENCE SPECIFICATIONS AND GENERAL NOTES FOR ADDITIONAL INFORMATION. ANY EXISTING CIRCUITS DETERMINED TO BE SPARES, SHALL BE FLIPPED TO THE OFF POSITION AND PANEL DIRECTORY UPDATED ACCORDINGLY. CONTRACTOR SHALL FIELD VERIFY.

2. REUSE EXISTING PANEL SPACE FOR NEW CIRCUITING AND NEW BREAKER. CONTRACTOR SHALL FIELD VERIFY EXISTING CIRCUITING/EQUIPMENT THAT IS EXSITING TO REMAIN PRIOR TO UTILIZING PANEL SPACE. EQUIPMENT/CIRCUITS DETERMINED TO BE EXISTING TO REMAIN DURING FIELD VERIFICATION SHALL REMAIN IN PLACE AS REQUIRED.

Panelboard EL2

65000 A AIC Rating
New
X Existing

480/277 Wye Volt, 3 Phase, 4 Wire | 1 Section | Type 1 -Nema Rating | Mains Type: MLO | 0 A -- -- 125 A BUS (Copper) -- | LUGS: SINGLE -- | Mounting Stye: SURFACE

NOTE	LOAD (VA)	TYPE	DESCRIPTION	WIRE	CB	CKT	CB	WIRE	DESCRIPTION	TYPE	LOAD (VA)	NOTE
1	3200 VA	L	EXISTING LOAD	12	20 A	1 2	20 A	12	EXISTING LOAD	L	1200 VA	1
1	1000 VA	L	EXISTING LOAD	12	20 A	3 4	20 A	12	EXISTING LOAD	L	1000 VA	1
1	1000 VA	L	EXISTING LOAD	12	20 A	5 6	20 A	12	EXISTING LOAD	L	1000 VA	1
	0 VA	--	Space	12	--	7 8	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	9 10	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	11 12	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	13 14	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	15 16	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	17 18	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	19 20	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	21 22	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	23 24	--	12	Space	--	0 VA	
1	9990 VA	C; M	ET2(E)	10	30 A	25 26 27 28 29 30	15 A	12	EXISTING LOAD	M	7482 VA	1

NEC REF:	Load Type	Conn.	Fct.	Diversity	NEC REF:	Load Type	Conn.	Fct.	Diversity
220.47	(R)Receptacle				210.20A	(L)Lighting	8400 VA	125.00%	10500 VA
220.56	(K)Kitchen					(EL)Ext. Ltg.			
220.60	(C)Cooling	1830 VA	100.00%	1830 VA	620.14	(E)Elevators			
220.60	(H)Heating			0 VA		(WH)Wat. Htr.			
220.60	(F)Fans				220.50	(MT)Lrg. Motor			
	(M)Misc.	15642 VA	100.00%	15642 VA		(SP)Sub Pnl.			
					630.11B	(W) Welders			

Total Connected Load: 25872 VA VA = 31 A
Total Load (Diversified): 27972 VA VA = 34 A

Location of Panel: Space 61

Panelboard EH2

10000 A AIC Rating
New
X Existing

120/208 Wye Volt, 3 Phase, 4 Wire | 1 Section | Type 1 -Nema Rating | Mains Type: MCB | 70 A MCB -- 250 A BUS (Copper) -- | LUGS: -- FEED THRU | Mounting Stye: SURFACE

NOTE	LOAD (VA)	TYPE	DESCRIPTION	WIRE	CB	CKT	CB	WIRE	DESCRIPTION	TYPE	LOAD (VA)	NOTE
1	500 VA	M	EXISTING LOAD	12	20 A	1 2	20 A	12	EXISTING LOAD	M	500 VA	1
1	500 VA	M	EXISTING LOAD	12	20 A	3 4	20 A	12	EXISTING LOAD	M	500 VA	1
1	500 VA	M	EXISTING LOAD	12	20 A	5 6	20 A	12	EXISTING LOAD	M	500 VA	1
1	500 VA	M	EXISTING LOAD	12	20 A	7 8	20 A	12	EXISTING LOAD	M	500 VA	1
1	500 VA	M	EXISTING LOAD	12	20 A	9 10	20 A	12	EXISTING LOAD	M	500 VA	1
1	500 VA	M	EXISTING LOAD	12	20 A	11 12	20 A	12	EXISTING LOAD	M	500 VA	1
1	2160 VA	M	EXISTING LOAD	10	30 A	13 14	30 A	10	CU-1/ AC-1	C	1830 VA	2
	0 VA	--	Space	12	--	15 16						
	0 VA	--	Space	12	--	17 18	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	19 20	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	21 22	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	23 24	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	25 26	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	27 28	--	12	Space	--	0 VA	
	0 VA	--	Space	12	--	29 30	--	12	Space	--	0 VA	

NEC REF:	Load Type	Conn.	Fct.	Diversity	NEC REF:	Load Type	Conn.	Fct.	Diversity
220.47	(R)Receptacle				210.20A	(L)Lighting			
220.56	(K)Kitchen					(EL)Ext. Ltg.			
220.60	(C)Cooling	1830 VA	100.00%	1830 VA	620.14	(E)Elevators			
220.60	(H)Heating			0 VA		(WH)Wat. Htr.			
220.60	(F)Fans				220.50	(MT)Lrg. Motor			
	(M)Misc.	8160 VA	100.00%	8160 VA		(SP)Sub Pnl.			
					630.11B	(W) Welders			

Total Connected Load: 9990 VA VA = 28 A
Total Load (Diversified): 9990 VA VA = 28 A

Location of Panel: Space 61

DBR
SERVICE | QUALITY | INTEGRITY | SUSTAINABILITY
9990 Richmond Avenue
South Building, Suite 310
Houston, Texas 77042
713.914.4333 p 713.914.9260 f

ISSUANCE:

No.	DATE	DESCRIPTION
	07/28/25	ISSUE FOR BID

SEAL:



7-28-25

HUMBLE ISD - OAK FOREST ES - HVAC UPGRADES - 6400 KINGWOOD GLEN DR, 77346

TBPE Firm Registration No. 2234

DATE: 07/28/25

DRAWN BY: DBR

CHECKED BY: DBR

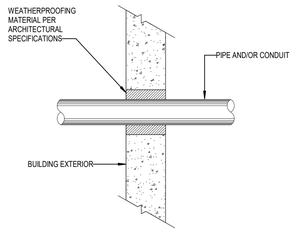
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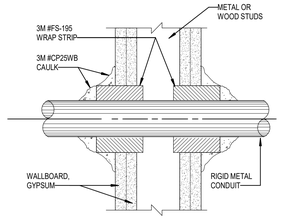
SHEET NUMBER: E5.02

DBR
713.914.0888 p
https://www.dbrinc.com
TBPE Firm Registration No. 2234
DBR Project # 250054.000
RA | RM | LB | TN | -

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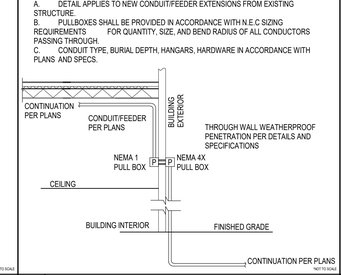


5 PIPE AND/OR CONDUIT PENETRATION E1601

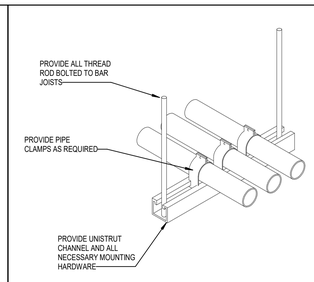


NOTE: FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR INSTALLATION

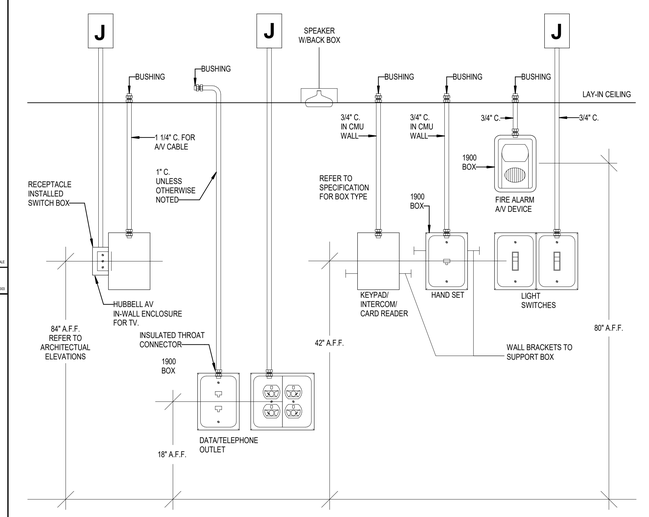
4 2 HR. GYPSUM WALLBOARD PIPE PENETRATION E1601



3 EXISTING BUILDING PENETRATION E1601

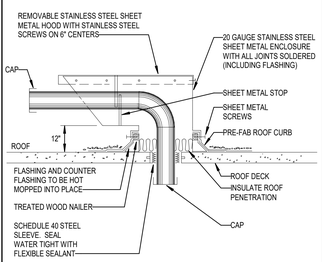


2 UNISTRUT CONDUIT E1601



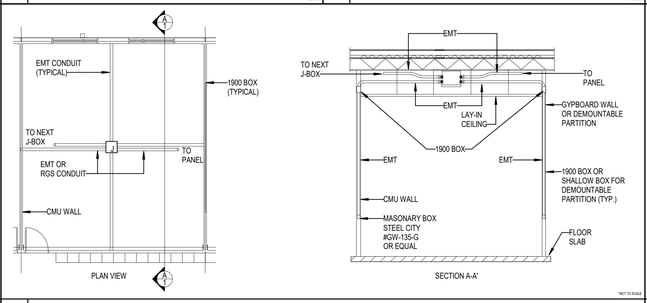
NOTE: COORDINATE EXACT LOCATION OF ALL DEVICES WITH ARCHITECT PRIOR TO ROUGH-IN.

1 TYPICAL DEVICE ELEVATIONS E1601

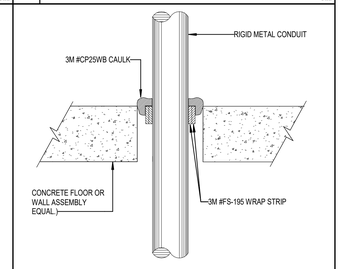


NOTE: REFER TO ARCHITECTURAL DRAWINGS FOR ROOF DETAILS.

8 ROOF CONDUIT PENETRATION E1601

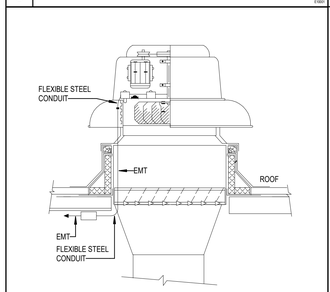


7 TYPICAL RACEWAY CONFIGURATION E1601

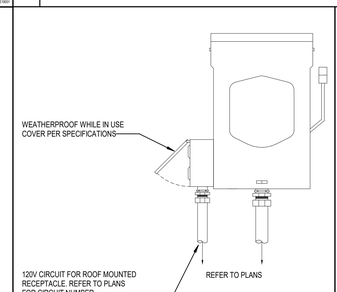


NOTE: FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR INSTALLATION.

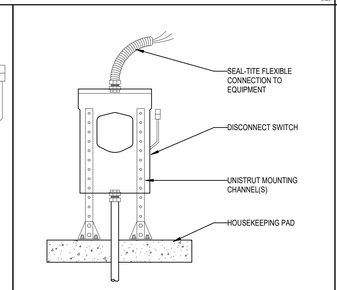
6 2, 3 AND 4 HR. PENETRATIONS FOR CONCRETE E1601



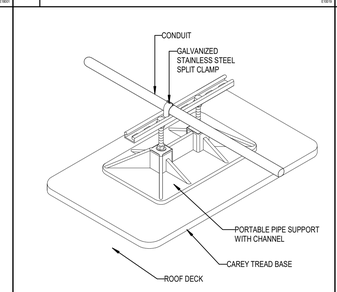
14 ROOF EXH. FAN RECEPTACLE MTG. E1601



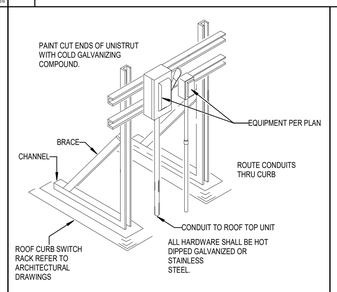
13 ROOF MOUNTED RECEPTACLE E1601



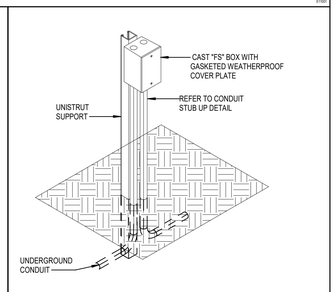
12 DISCONNECT SWITCH MOUNTING AT CONCRETE PAD E1601



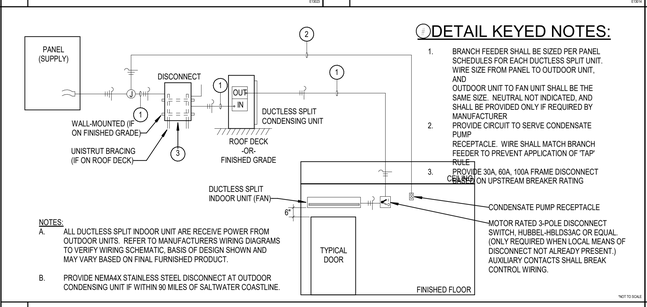
11 ROOF CONDUIT SUPPORT E1601



10 ROOF UNISTRUT RACK E1601



9 JUNCTION BOX MOUNTING E1602



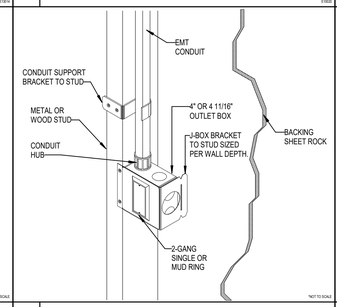
NOTES:
A. ALL DUCTLESS SPLIT INDOOR UNIT ARE RECEIVE POWER FROM OUTDOOR UNITS. REFER TO MANUFACTURERS WIRING DIAGRAMS TO VERIFY WIRING SCHEMATIC, BASIS OF DESIGN SHOWN AND MAY VARY BASED ON FINAL FURNISHED PRODUCT.

B. PROVIDE NEMA4X STAINLESS STEEL DISCONNECT AT OUTDOOR CONDENSING UNIT IF WITHIN 90 MILES OF SALTWATER COASTLINE.

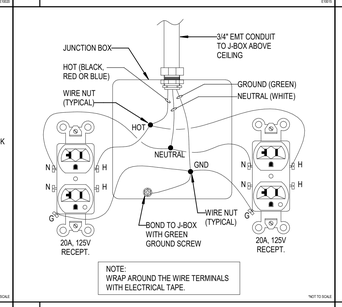
DETAIL KEYED NOTES:

1. BRANCH FEEDER SHALL BE SIZED PER PANEL SCHEDULES FOR EACH DUCTLESS SPLIT UNIT. WIRE SIZE FROM PANEL TO OUTDOOR UNIT, AND OUTDOOR UNIT TO FAN UNIT SHALL BE THE SAME SIZE. NEUTRAL NOT INDICATED, AND SHALL BE PROVIDED ONLY IF REQUIRED BY MANUFACTURER
2. PROVIDE CIRCUIT TO SERVE CONDENSATE PUMP RECEPTACLE. WIRE SHALL MATCH BRANCH FEEDER TO PREVENT APPLICATION OF "TAP" RULE.
3. PROVIDE 30A, 60A, 100A FRAME DISCONNECT RATED ON UPSTREAM BREAKER RATING

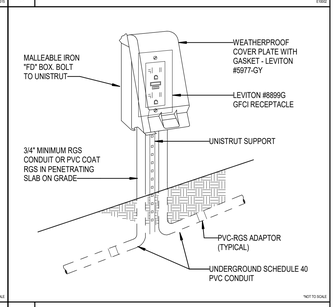
18 DUCTLESS SPLIT ELECTRICAL CONNECTION E1601



17 J-BOX STUD E1601



16 20A, 125V RECEPTACLE WIRING E1601



15 RECEPTACLE MOUNTING E1601

DBR
SERVICE | QUALITY | INTEGRITY | SUSTAINABILITY
9990 Richmond Avenue
South Building, Suite 310
Houston, Texas 77042
713.914.4333 p 713.914.9260 f

ISSUANCE:

No.	DATE	DESCRIPTION
	07/28/25	ISSUE FOR BID

SEAL:



7-28-25

HUMBLE ISD - OAK FOREST ES - HVAC UPGRADES - 6400 KINGWOOD GLEN DR, 77346

TBPE Firm Registration No. 2234

DATE: 07/28/25

DRAWN BY: DBR

CHECKED BY: DBR

PROJECT NUMBER 250054.000

SHEET TITLE: ELECTRICAL DETAILS

SHEET NUMBER: E6.01

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TBPE Firm Registration No. 2234
DBR Project # 250054.000
RA | RM | LB | TN | -

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(NOT ALL ITEMS MAY APPLY TO THIS PROJECT)

ABBREVIATIONS

A

A	AIR (COMPRESSED)
AAV	AIR ADMITTANCE VALVE
AC	AIR COMPRESSOR
AD	AIR DRYER
ADA	AMERICANS WITH DISABILITIES ACT
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
ASPE	AMERICAN SOCIETY OF PLUMBING ENGINEERS
ASSE	AMERICAN SOCIETY OF SANITARY ENGINEERING
AP	ACCESS PANEL
ARCH	ARCHITECT, ARCHITECTURAL
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AUX	AUXILIARY
AV	ACID VENT
AVTR	ACID VENT THROUGH ROOF
AW	ACID WASTE

B

B	BOILER
BF	BOTTLE FILLER
BFF	BELOW FINISH FLOOR
BFG	BELOW FINISHED GRADE
BFP	BACKFLOW PREVENTER
BFV	BUTTERFLY VALVE
BOF	BOTTOM OF FOOTING
BOP	BOTTOM OF PIPE
BOS	BOTTOM OF STRUCTURE
BRF	BELOW RAISED FLOOR
BT	BATH TUB
BTU	BRITISH THERMAL UNIT
BV	BALL VALVE
BWV	BACK WATER VALVE

C

C	CELSIUS
CB	CATCH BASIN
CD	CONDENSATE DRAIN LINE
CI	CAST IRON
CIRC	CIRCULATING
CISPI	CAST IRON SOIL PIPE INSTITUTE
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CFS	CUBIC FEET PER SECOND
CMU	CONCRETE MASONRY UNIT
CL	CENTERLINE
CO	CLEAN OUT
COL	COLUMN
CONC	CONCRETE, CONCENTRIC
CONN	CONNECTION
CP	CIRCULATING PUMP, CHROME PLATE
CPVC	CHLORINATED POLYVINYL CHLORIDE
CW	COLD WATER
CWP	COLD WORKING PRESSURE

D

DBP	DOMESTIC BOOSTER PUMP
DC	DOWNSPOUT COVER
DCVA	DOUBLE CHECK VALVE ASSEMBLY
DDCVA	DOUBLE DETECTOR CHECK VALVE ASSEMBLY
DF	DRINKING FOUNTAIN
DFU	DRAINAGE FIXTURE UNIT
DI	DEIONIZED
DIA	DIAMETER
DIM	DIMENSION
DISC	DISCONNECT
DN	DOWN, DOWNSPOUT NOZZLE
DS	DOWNSPOUT
DW	DISHWASHER
DWG	DRAWING
DWV	DRAINAGE WASTE AND VENT

E

ECC	ECCENTRIC
EDF	ELECTRIC DRINKING FOUNTAIN
EEW	EMERGENCY EYEWASH
EL	ELEVATION
ES	EMERGENCY SHOWER
ESP	ELEVATOR SUMP PUMP
ET	EXPANSION TANK
ETR	EXISTING TO REMAIN
EWC	ELECTRIC WATER COOLER
EWH	ELECTRIC WATER HEATER

F

F	FARENHEIT, FIRE
FBO	FURNISHED BY OTHERS
FCO	FLOOR CLEAN OUT
FCV	FLOOR CONTROL VALVE
FD	FLOOR DRAIN
FDC	FIRE DEPARTMENT CONNECTION
FEC	FIRE EXSTINGUISHER CABINET
FH	FIRE HYDRANT
FHC	FIRE HOSE CABINET
FHR	FIRE HOSE RACK
FHV	FIRE HOSE VALVE
FIXT	FIXTURE
FOG	FATS, OILS, AND GREASE
FLR	FLOOR
FP	FIRE PUMP
FS	FLOW SWITCH, FIRE SPRINKLER FLOOR SINK
FT	FOOT, FEET
FW	FORCE WASTE, FILTER WATER

G

G	GAS
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GCO	GRADE CLEANOUT
GD	GARBAGE DISPOSAL
GI	GREASE INTERCEPTOR
GL	GLOBE VALVE
GPD	GALLONS PER DAY
GPF	GALLONS PER FLUSH
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GT	GREASE TRAP
GV	GATE VALVE, GREASE VENT
GW	GREASE WASTE
GWH	GAS WATER HEATER

H

HB	HOSE BIBB
HC	HANDICAPPED
HD	HEAD, HUB DRAIN
HKP	HOUSEKEEPING PAD
HP	HORSEPOWER
HR	HOSE REEL
HSC	HORIZONTAL SPLIT CASE
HT	HEIGHT
HTR	HEATER
HW	HOT WATER
HWR	HOT WATER RETURN
HZ	HERTZ

I

IAMPO	INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IN	INCH
INSUL	INSULATION
IPC	INTERNATIONAL PLUMBING CODE
IPS	IRON PIPE SIZE
IW	INDIRECT WASTE
IWH	INSTANTANEOU WATER HEATER
IWR	INDIRECT WASTE RECEPTOR

J

JP	JOCKEY PUMP

K

KEC	KITCHEN EQUIPMENT CONTRACTOR
KVA	KILOVOLT- AMPS
KW	KILOWATT

L

L	LAVATORY, LENGTH
LAV	LAVATORY
LF	LINEAR FEET
LP	LOW PRESSURE
LPG	LIQUEFIED PETROLEUM GAS
LT	LINT, LINT TRAP
LVL	LEVEL

M

MAX	MAXIMUM
MBTUH	THOUSAND OF BTU'S PER HOUR
MECH	MECHANICAL
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MS	MOP SINK
MSB	MOP SERVICE BASIN
MTD	MOUNTED

N

N.C.	NORMALLY CLOSED
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
N.O.	NORMALLY OPEN
NPT	NATIONAL PIPE THREAD
NTS	NOT TO SCALE

O

OC	ON CENTER
OD	OUTSIDE DIAMETER, OVERFLOW DRAIN
OS&Y	OUTSIDE OPEN STEM AND YOKE
OZ	OUNCES

P

PD	PRESSURE DROP, PRESSSURE DIFFERENTIAL
PDI	PLUMBING DRAINAGE INSTITUTE
PH	PHASE
PIV	POST INDICATOR VALVE
PLBG	PLUMBING
POU	POINT-OF-USE
PP	POLYPROPYLENE
PPM	PARTS PER MILLION
PRV	PRESSURE REDUCING VALVE
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH GAUGE
PVC	POLYVINYL CHLORIDE
PVDF	POLYVINYLIDENE FLUORIDE

Q

QTY	QUANTITY

R

RCP	REFLECTED CEILING PLAN, REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
RE	REFERENCE,REFER
RECIRC	RECIRCULATE
REFG	REFRIGERATOR
RH	ROOF HYDRANT
RM	ROOM
RO	REVERSE OSMOSIS
RPM	REVOLUTIONS PER MINUTE
RPZ	REDUCED PRESSURE ZONE (BACKFLOW PREVENTER)
RTU	ROOFTOP UNIT
RV	RELIEF VALVE

S

SAN	SANITARY DRAINAGE
SCH	SCHEDULE
SD	STORM DRAIN
SDR	STANDARD DIMENSIONAL RATIO
SECT	SECTION
SF	SQUARE FEET
SH	SHOWER
SI	SOLIDS INTERCEPTOR
SIM	SIMILAR
SK	SINK
SOS	SAND OIL SEPERATOR
SOV	SHUT-OFF VALVE
SP	SUMP PUMP, STATIC PRESSURE
SPEC	SPECIFICATION
SPKR	SPRINKLER
SQ	SQUARE
SS	SERVICE SINK, SANITARY SEWER, STAINLESS STEEL
SSD	SUBSURFACE DRAIN
STD	STANDARD
STL	STEEL
STR	STRAINER
SV	SANITARY VENT
SW	SOFT WATER

T

TCO	TRAFFIC CLEANOUT
TD	TRENCH DRAIN
TDH	TOTAL DYNAMIC HEAD
TDL	TOTAL DEVELOPED LENGTH
TLT	TOILET
TMV	THERMOSTATIC MIXING VALVE
TOB	TOP OF BEAM
TOF	TOP OF FOOTER
TP	TRAP PRIMER
TPD	TRAP PRIMER DEVICE
TS	TAMPER SWITCH
TW	TEMPERED WATER
TYP	TYPICAL

U

U	URINAL
UF	UNDERFLOOR
UG	UNDERGROUND
UH	UNIT HEATER
UL	UL SOLUTIONS
UNO	UNLESS NOTED OTHERWISE
UPC	UNIFORM PLUMBING CODE

V

V	VOLT, VENT
VAC	VACUUM
VB	VALVE BOX, VACUUM BREAKER
VFD	VARIABLE FREQUENCY DRIVE
VP	VACUUM PUMP
VS	VENT STACK
VTR	VENT THRU ROOF

W

W	WATT, WASTE, WIDTH, WASHING MACHINE
W/	WITH
W/O	WITHOUT
WB	WALL BOX
WC	WATER CLOSET, WATER COLUMN
WCO	WALL CLEANOUT
WH	WALL HYDRANT
WHA	WATER HAMMER ARRESTOR
WM	WATER METER
WMB	WASHING MACHINE BOX
WOG	WATER OIL AND GAS
WP	WEATHERPROOF
WS	WATER SOFTENER, WASTE STACK
WSFU	WATER SUPPLY FIXTURE UNIT
WT	WATERTIGHT, WEIGHT

Y

YCO	YARD CLEANOUT
YH	YARD HYDRANT

Z

Z	ZONE
ZV	ZONE VALVE

SYMBOLS

PLUMBING SYSTEMS

- AV — ACID VENT
- AV(E) — EXISTING ACID VENT PIPING - AV(E)
- AW — ACID WASTE, BURIED
- AW(E) — EXISTING ACID WASTE PIPING, BURIED- AW(E)
- AW — ACID WASTE, NOT BURIED
- AW(E) — EXISTING ACID WASTE PIPING, NOT BURIED - AW(E)
- CW — COLD WATER - CW
- CW(E) — EXISTING DOMESTIC COLD WATER - CW(E)
- A — COMPRESSED AIR
- D — DRAIN LINE
- F — FIRE STANDPIPE, FIRE LINE
- FW — FORCE WASTE
- GW — GREASE WASTE, BURIED
- GW — GREASE WASTE, NOT BURIED
- HW — HOT WATER - HW
- HW(E) — EXISTING DOMESTIC HOT WATER - HW(E)
- HOT WATER RECIRCULATION
- HWR(E) — EXISTING DOMESTIC HOT WATER RETURN - HWR(E)
- LT — LINT WASTE
- LP — LIQUIFIED PETROLEUM GAS
- G (4oz) — NATURAL GAS (LOW PRESSURE)
- G (2 PSI) — NATURAL GAS (MEDIUM PRESSURE)
- G (5 PSI) — NATURAL GAS (HIGH PRESSURE)
- N — NITROGEN
- NP-CW — NON-POTABLE - COLD WATER
- OD — OVERFLOW DRAIN, NOT BURIED
- PIPE, TO BE DEMOLISHED
- SANITARY DRAIN, BURIED
- S(E) — EXISTING SANITARY DRAIN, BURIED - S(E)
- SANITARY DRAIN, NOT BURIED
- S(E) — EXISTING SANITARY DRAIN PIPING, NOT BURIED - S(E)
- SW — SOFT WATER
- SD — STORM DRAIN, BURIED
- SD — STORM DRAIN, NOT BURIED
- TW — TEMPERED WATER
- TP — TRAP PRIMER
- VENT
- (E) — EXISTING VENT
- FS — WET AUTOMATIC FIRE SPRINKLER

PIPING FITTINGS

- CAP ON END OF PIPE
- PIPE UP OR PIPE UP AND DOWN
- PIPE DOWN
- VALVE IN DROP
- VALVE IN RISE
- DIRECTION OF FLOW
- DIRECTION OF SLOPE DOWN
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER
- TEE UP
- TEE DOWN
- UNION
- FLANGE
- STRAINER WITH BLOWDOWN VALVE
- GATE VALVE
- GLOBE VALVE
- BALL VALVE
- BALANCING VALVE WITH DIFFERENTIAL PRESSURE TAPS
- OS&Y VALVE
- CHECK VALVE
- BUTTERFLY VALVE
- TWO-WAY MODULATING CONTROL VALVE
- THREE-WAY MODULATING CONTROL VALVE
- SOLENOID VALVE
- PRESSURE REDUCING VALVE
- GAS REGULATOR
- GAS VALVE
- SPRINKLER FLOOR CONTROL VALVE STATION
- MANUAL AIR VENT
- AUTOMATIC AIR VENT
- T&P RELIEF VALVE
- LINE CLEANOUT/ WALL CLEANOUT
- FLOOR CLEANOUT
- GRADE CLEANOUT
- PRESSURE GAUGE WITH GAUGE COCK
- THERMOMETER
- FLOW VENTURI
- VACUUM BREAKER
- VACUUM RELIEF VALVE
- BACKFLOW PREVENTER
- CIRCULATING PUMP
- WATER METER SUB-METER

MISCELLANEOUS

- DRAIN(TYPE AND SIZE AS NOTED ON PLANS)
- ROOF DRAIN OR OVERFLOW DRAIN
- ROOF DRAIN OR OVERFLOW DRAIN(FROM ABOVE)
- HOSE BIBB
- WALL HYDRANT
- PLUMBING FIXTURE
- EXISTING PLUMBING FIXTURE
- POINT OF NEW CONNECTION TO EXISTING PIPING
- LIMIT OF DEMOLITION
- P.X.X — PLUMBING DRAWING NOTE REFERENCE
- 2 / P2.1 — DETAIL NUMBER OR PLAN / SHEET WHERE DETAIL OR PLAN IS SHOWN
- FS — FLOW SWITCH
- TS — TAMPER SWITCH
- ACCESS PANEL (AP)
- FIRE DEPARTMENT CONNECTION(WALL MOUNTED)
- FIRE DEPARTMENT CONNECTION(FREE STANDING)
- P / P7.1 — PLUMBING RISER DIAGRAM NUMBER / SHEET WHERE PLUMBING RISER DIAGRAM IS SHOWN

PLUMBING CODES

2018 INTERNATIONAL PLUMBING CODE
2018 INTERNATIONAL BUILDING CODE

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No.	DATE	DESCRIPTION
	07/28/25	ISSUE FOR BID

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STATE OF TEXAS — ANTHONY S. JASPAL — 95728 — LICENSED — PROFESSIONAL ENGINEER — 07/28/25

HUMBLE ISD - OAK FOREST ES - HVAC UPGRADES - 6400 KINGWOOD GLEN DR, 77346

TBPE Firm Registration No. 2234

DATE: 07/28/25

DRAWN BY: DBR

CHECKED BY: DBR

PROJECT NUMBER 250054.000

SHEET TITLE: PLUMBING SYMBOL LEGEND

SHEET NUMBER: P0.01

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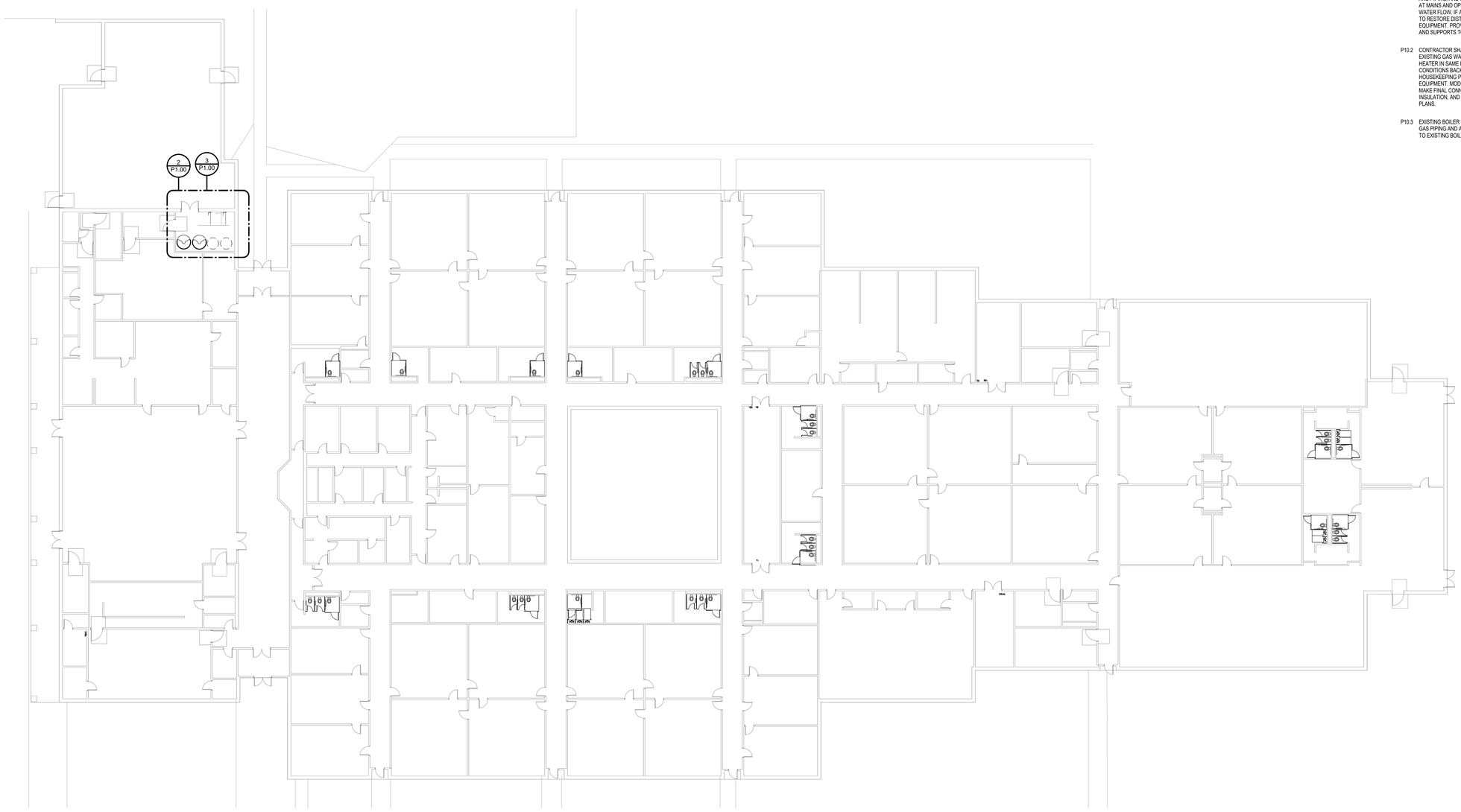
PLUMBING KEYED NOTES

P6.1 PROVIDE NEW GAS PIPING, OF EQUAL OR GREATER SIZE OF EXISTING GAS LINE AS INDICATED ON PLANS TO NEW GAS BOILER (APPROX. 1500 CFH). PROVIDE NEW REGULATOR, OPD, SHUT OFF VALVE, AND VALVE TRAIN TO REGULATE FROM 5 PSI DOWN TO MANUFACTURERS RECOMMENDED SERVICE PRESSURE.

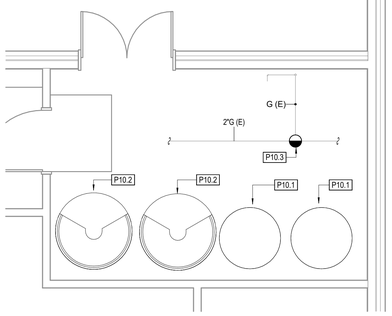
P10.1 REMOVE EXISTING WATER SOFTENING SYSTEM COMPLETELY, INCLUDING: RESIN TANK(S), BRINE TANK, POWER CONNECTION, ASSOCIATED VALVES AND PIPING, AND HOUSEKEEPING PAD(S). CAP ASSOCIATED WATER PIPING AT MAINS AND OPEN NORMALLY CLOSED BYPASS VALVE TO RESTORE WATER FLOW. IF A BYPASS IS NOT PRESENT, RECONNECT EXISTING PIPING TO RESTORE DISTRIBUTION SYSTEM WATER FLOW LESS REMOVED EQUIPMENT. PROVIDE PIPE MATERIAL, SIZE, JOINING METHOD, INSULATION, AND SUPPORTS TO MATCH EXISTING. FIELD VERIFY.

P10.2 CONTRACTOR SHALL DISCONNECT ALL EXISTING PIPING CONNECTIONS AT EXISTING GAS WATER HEATER AND PREPARE FOR NEW GAS WATER HEATER IN SAME PLACE. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS BACK TO THE MAIN. EXPAND OR MODIFY EXISTING HOUSEKEEPING PAD IF AND AS NECESSARY TO ACCOMMODATE NEW EQUIPMENT. MODIFY OR EXTEND ALL EXISTING PIPING AS NECESSARY TO MAKE FINAL CONNECTIONS. PROVIDE PIPE MATERIAL, JOINING METHOD, INSULATION, AND SUPPORTS TO MATCH EXISTING. FIELD VERIFY. RE: NEW PLANS.

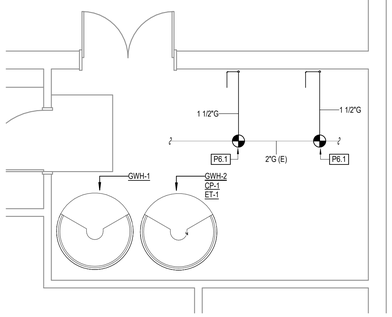
P10.3 EXISTING BOILER TO BE REMOVED UNDER DIVISION 23. REMOVE EXISTING GAS PIPING AND ASSOCIATED VALVES BACK TO MAIN GAS LINE CONNECTED TO EXISTING BOILER.



1 LEVEL 1 COMPOSITE PLUMBING DEMO & NEW PLAN
1/16" = 1'-0"



2 ENLARGED DEMOLITION PLUMBING PLAN - MECH ROOM 1
1/4" = 1'-0"



3 ENLARGED PLUMBING PLAN - MECH ROOM 1
1/4" = 1'-0"

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ISSUANCE:

No.	DATE	DESCRIPTION
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SEAL:

STATE OF TEXAS
ANTHONY B. JASPAL
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LICENSED
PROFESSIONAL ENGINEER

HUMBLE ISD - OAK FOREST ES - HVAC UPGRADES - 6400 KINGWOOD GLEN DR, 77346

TBPE Firm Registration No. 2234

DATE: 07/28/25

DRAWN BY: DBR

CHECKED BY: DBR

PROJECT NUMBER 250054.000

SHEET TITLE: COMPOSITE PLUMBING PLAN - DEMO & NEW

SHEET NUMBER: P1.00

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GAS WATER HEATER SCHEDULE

PLAN MARK	MANUFACTURER	MODEL #	TYPE	FUEL	GALLONS	HEATING LOAD (BTU/hr)	CW INLET	HW OUTLET	GPH RECOVERY @ 80° TEMP RISE	WATER HEATER EFFICIENCY	EXHAUST VENT (in Ø)	ELECTRICAL REQUIREMENTS			
												VOLTS (V)	PHASE	kW	AMPS
GAS WATER HEATER GWH-1	RHEEM	GN100-200	STORAGE TANK	NATURAL GAS	100	199,900	1-1/2"	1-1/2"	242	80%	4	120	SINGLE	n/a	5.0
GAS WATER HEATER GWH-2	RHEEM	GN100-200	STORAGE TANK	NATURAL GAS	100	199,900	1-1/2"	1-1/2"	242	80%	4	120	SINGLE	n/a	5.0

GENERAL NOTES:
1. PROVIDE WITH 4" CONCRETE PAD. REFER TO PLUMBING DETAIL FOR FURTHER CLARIFICATION
2. PROVIDE ASME TEMPERATURE AND PRESSURE RELIEF VALVE, AND DIAL THERMOMETER IN HW OUTLET PIPING
3. FOR POWER AS SCHEDULED ON ELECTRICAL DRAWINGS, VERIFY WITH ELECTRICAL CONTRACTOR PRIOR TO ORDERING EQUIPMENT.

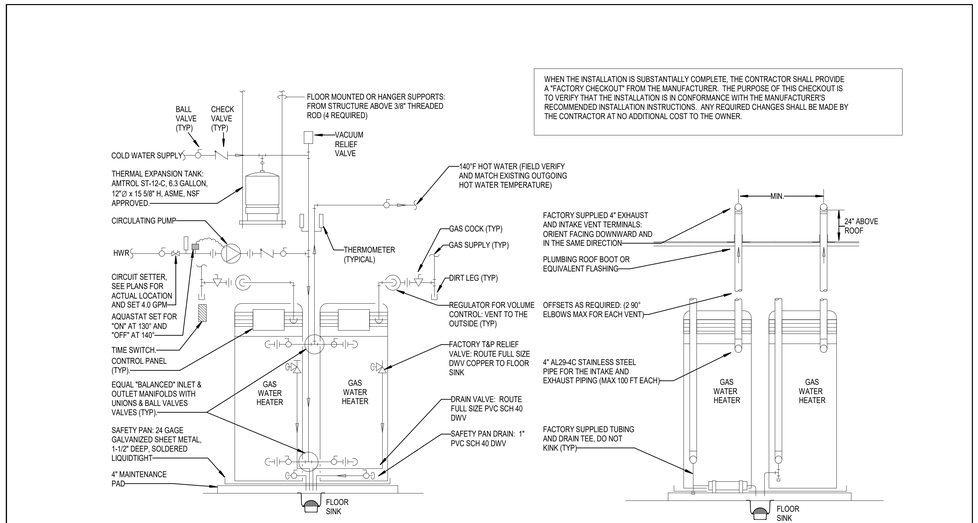
PLAN MARK	MANUFACTURER	MODEL #	DESCRIPTION	ELECTRICAL REQUIREMENTS			
				VOLTS (V)	PHASE	W	HP
CIRCULATION PUMP CP-1 (GWH-1,2)	GRUNDFOS	MAGNA3	ALL STAINLESS STEEL FLANGED PUMP, 1/25 HP WIRED FOR POWER AS SCHEDULED ON ELECTRICAL DRAWINGS AND FITTED WITH REMOTE HEAT SENSING AQUASTAT CONTROLLER. CONTROLLED BY ELECTRICAL CONTRACTOR, DESIGNED AT 15 FT HEAD LOSS.	115	1	85	0.04
THERMAL EXPANSION TANK ET-1 (GWH-1,2)	AMTROL	THERM-X-TROL MODEL ST-12-C	ASME THERMAL EXPANSION ABSORBERS, SAFETY RELIEF VALVE, MAXIMUM WORKING PRESSURE 150 PSIG, TOTAL VOLUME 4.4 GALLONS.	--	--	--	--

DEMOLITION NOTES:

1. FIELD VERIFY AS NECESSARY THE EXACT LOCATIONS/ROUTING/SIZES OF PLUMBING FIXTURES, PIPING, AND EQUIPMENT TO BE REMOVED OR RE-USED. REFER TO ARCHITECTURAL DRAWINGS FOR CLARIFICATION AS REQUIRED.
2. ALL PLUMBING FIXTURES/EQUIPMENT NOT SPECIFICALLY IDENTIFIED FOR REMOVAL SHALL REMAIN. NOTIFY THE ARCHITECT/ENGINEER OF ANY DISCREPANCIES/CONFLICTS FOUND IN THE FIELD.
3. UNLESS NOTED OTHERWISE, WHERE FIXTURES ARE TO BE REMOVED: REMOVE FIXTURE, CARRIER, FAUCET/FLUSH VALVE, SUPPLIES/STOPS, TUBULAR BRASS, AND ASSOCIATED PIPING AS DESCRIBED.
4. UNLESS SPECIFICALLY NOTED OTHERWISE ON THE PLANS, WHERE EACH NEW WALL HUNG FIXTURE WILL BE PROVIDED AND WHERE EACH EXISTING WALL HUNG FIXTURE WILL BE RE-INSTALLED, A NEW CORRESPONDING FIXTURE CARRIER SHALL ALSO BE PROVIDED. THIS REQUIREMENT SHALL APPLY TO ONE-FOR-ONE FIXTURE REPLACEMENTS AND ALL ADJUSTMENTS TO WALL HUNG FIXTURE LOCATIONS AND FIXTURE HEIGHTS. ALL WORK ASSOCIATED WITH PROVIDING SUCH CARRIERS SHALL BE INCLUDED IN THE PROJECT SCOPE WITH NO EXCEPTIONS.
5. ALL PLUMBING FIXTURES AND/OR EQUIPMENT REMOVED SHALL BE SUBMITTED TO THE OWNER WITH THE OPTION TO BE REUSED, WHICH SHALL BE SOLELY AT THE DISCRETION OF THE OWNER. ITEMS THE OWNER DOES NOT WISH TO REUSE BUT WISHES TO RETAIN SHALL BE DELIVERED TO STORAGE AS DIRECTED. ITEMS THE OWNER DOES NOT WISH TO REUSE OR RETAIN SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF LEGALLY.
6. REMOVE ALL PIPING FROM ABOVE FLOOR TO BELOW ROOF/FLOOR ABOVE WHICH WAS PREVIOUSLY ABANDONED OR WHICH SERVES PLUMBING FIXTURES DESIGNATED FOR REMOVAL, UNLESS NEW FIXTURES ARE TO BE INSTALLED IN THOSE LOCATIONS - REFER TO PLUMBING FLOOR PLANS. PRIOR TO ANY REMOVAL, FIELD VERIFY THAT LINES TO BE REMOVED DO NOT SERVE ANY FIXTURES TO REMAIN. CAP REMOVED BRANCH LINES AS CLOSE AS POSSIBLE TO EXISTING MAINS TO REMAIN.
7. WHERE SLAB ON GRADE FLOOR DRAINS OR SIMILAR INSTALLATIONS ARE TO BE REMOVED, THE STRAINER AND DRAIN BODY SHALL BE REMOVED. PLUG THE WASTE PIPE WATERTIGHT BELOW FINISHED FLOOR. PATCH AND REFINISH THE FLOOR TO MATCH EXISTING.
8. AT PLUMBING WASTE/VENT PIPE PENETRATIONS THROUGH SLAB ON GRADE NO LONGER REQUIRED, PLUG THE PIPES WATERTIGHT BELOW FINISHED FLOOR. PATCH AND REFINISH THE FLOOR TO MATCH EXISTING.
9. WHERE BURIED WASTE/VENT BRANCH LINES ARE PLUGGED AND ABANDONED IN PLACE, THE ABANDONED LINES SHALL REMAIN OTHERWISE SERVICEABLE AND THE REMAINING PIPING SYSTEM SHALL REMAIN INTACT AND FUNCTIONAL.
10. WHERE FIXTURES ARE REMOVED, NO NEW FIXTURES ARE TO BE INSTALLED, AND EXISTING VENTS THROUGH ROOF ARE NO LONGER REQUIRED, VENT TERMINALS ARE TO BE COMPLETELY REMOVED UNLESS NOTED OTHERWISE. THE ROOF SHALL BE REPAIRED AND SEALED WATERTIGHT TO MATCH THE EXISTING ROOF SYSTEM.
11. IN THE COURSE OF DEMOLITION, ANY PIPING TO REMAIN THAT IS EXPOSED AND FOUND TO BE UNLABELED SHALL BE IDENTIFIED AND LABELED ACCORDINGLY. PROVIDE PIPE MARKERS TO INDICATE TYPE OF SERVICE AND DIRECTION OF FLOW.
12. IN THE COURSE OF DEMOLITION, THE CONTRACTOR SHALL ASSIST THE OWNER BY BRINGING TO THE DESIGN TEAM'S ATTENTION ANY EXISTING PLUMBING RELATED ITEMS INTENDED TO REMAIN BUT WHICH ARE FOUND TO BE UNFIT FOR SERVICE OR IN NEED OF REPAIR. THIS SHALL INCLUDE, BUT NOT NECESSARILY BE LIMITED TO, THE FOLLOWING: LEAKING OR DETERIORATED PIPING AND VALVES; IMPROPERLY SLOPED/SUPPORTED OR SAGGING PIPE; MISSING, DAMAGED, OR DETERIORATED INSULATION; CODE REQUIRED BUT MISSING BACKFLOW PREVENTION MEASURES; FIXTURES, FLUSH VALVES, FAUCETS, EQUIPMENT, AND APPURTENANCES NOT FUNCTIONING AS INTENDED.
13. IN THE COURSE OF DEMOLITION, THE CONTRACTOR SHALL ASSIST THE OWNER BY BRINGING TO THE DESIGN TEAM'S ATTENTION ANY EXISTING NON-PLENUM RATED PIPING (PVC, ETC.) INTENDED TO REMAIN WHICH IS FOUND IN A RETURN AIR PLENUM SPACE. UNLESS DEEMED UNACCEPTABLE BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) OR OWNER, ALL SUCH PIPING SHALL BE WRAPPED WITH FIRE RESISTANT INSULATION. 3M FIRE BARRIER PLENUM WRAP 5A OR PRE-APPROVED EQUAL THAT HAS BEEN TESTING IN ACCORDANCE WITH ASTM E84 AND UL 910. INSTALLATION SHALL BE IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDED METHODS.

GENERAL WORK NOTES

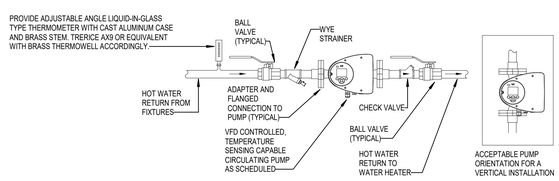
1. ALL WORK, METHODS, AND INSTALLATIONS INVOLVED IN THE PLUMBING DESIGN SHALL BE IN ACCORDANCE WITH THE PREVAILING CODE AND INSPECTION REGULATIONS AND ALL OTHER OFFICIALS HAVING JURISDICTION.
2. CONTRACTOR SHALL FIELD VERIFY EXACT LOCATIONS, ELEVATIONS, DIRECTION OF FLOW, PIPE SIZES & CAPACITIES, AND PIPE MATERIAL & CONDITION AT PROPOSED POINTS OF CONNECTION WITH EXISTING BUILDING PLUMBING LINES AND SITE CIVIL LINES PRIOR TO INSTALLATION OF ANY NEW WORK. MODIFY/REPLACE EXISTING PIPING IF AND AS REQUIRED TO ENSURE PROPER CONNECTIONS. ONLY CONNECT NEW LINES TO SUITABLE EXISTING LINES OF EQUAL OR GREATER SIZE.
3. COORDINATE ROUTING OF BURIED PIPING WITH COLUMN FOOTINGS, GRADE BEAMS, UNDERGROUND UTILITIES, AND ALL OTHER SUB-SURFACE BUILDING ELEMENTS. MAKE ADJUSTMENTS AS REQUIRED AND ADVISE ARCHITECT/ENGINEER OF ANY GRADING CONFLICTS PRIOR TO COMMENCING INSTALLATION.
4. CONTRACTOR SHALL COORDINATE WITH STRUCTURAL CONDITIONS AND PROVIDE PROPER PIPING INSTALLATIONS AS REQUIRED WITHOUT DAMAGE TO STRUCTURE. WHERE STRUCTURAL MODIFICATIONS WILL BE REQUIRED, THE CONTRACTOR SHALL FIRST RECEIVE WRITTEN APPROVAL OF THE ARCHITECT AND STRUCTURAL ENGINEER AND PROVIDE ALL SUCH WORK ACCORDINGLY.
5. COORDINATE IN FIELD TO ENSURE NO LESS THAN 6 INCHES OF EARTHEN COVER FROM TOPS OF DRAINAGE PIPES TO BOTTOMS OF GRADE BEAMS, FOUNDATION WALLS, OR SIMILAR ELEMENTS. WHERE SUCH COVER CANNOT BE PROVIDED DUE TO INVERT ELEVATIONS, PROVIDE SCHEDULE 40 GALVANIZED STEEL PIPE SLEEVES THROUGH THE FOUNDATION ELEMENTS. SLEEVES SHALL BE NO SMALLER THAN TWO PIPE SIZES LARGER THAN THE PIPE SERVED. SEAL WATERTIGHT. COORDINATE WITH AND ADHERE TO ALL RELATED REQUIREMENTS PER THE STRUCTURAL ENGINEER.
6. CONTRACTOR SHALL FIELD COORDINATE LOCATIONS AND ELEVATIONS OF ALL PLUMBING PIPING WITH OTHER TRADES PRIOR TO INSTALLATION. WHERE RELOCATIONS OF NEW WORK ARE REQUIRED TO CORRECT CONFLICTS WITH OTHER TRADES IT SHALL BE DONE AT NO ADDITIONAL COST TO OWNER.
7. ALL PIPE PASSING THROUGH FIRE RATED WALLS AND FLOORS SHALL BE SUPPORTED AT THE PENETRATION AND SHALL BE SEALED WITH APPROVED FIRE STOP MATERIALS AS SPECIFIED AND AS REQUIRED BY CODE AND THE AUTHORITIES HAVING JURISDICTION.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD COORDINATING ALL PLUMBING PIPING SLEEVE LOCATIONS WITH ALL OTHER TRADES PRIOR TO INSTALLATION OF ANY PIPING OR SUPPORTS.
9. HORIZONTAL GRAVITY DRAINAGE PIPING SHALL BE PROVIDED AT NO LESS THAN THE MINIMUM SLOPE AS REQUIRED BY THE PREVAILING PLUMBING CODE.
   A. IN ACCORDANCE WITH THE UPC: GRAVITY DRAINAGE PIPING 3" AND SMALLER SHALL BE PROVIDED AT NO LESS THAN 1/4 INCH PER FOOT UNIFORM SLOPE AND GRAVITY DRAINAGE PIPING 4" AND LARGER SHALL BE PROVIDED AT NO LESS THAN 1/8 INCH PER FOOT UNIFORM SLOPE.
   B. IN ACCORDANCE WITH THE IPC: GRAVITY DRAINAGE PIPING 2-1/2" AND SMALLER SHALL BE PROVIDED AT NO LESS THAN 1/4 INCH PER FOOT UNIFORM SLOPE AND GRAVITY DRAINAGE PIPING 3" AND LARGER SHALL BE PROVIDED AT NO LESS THAN 1/8 INCH PER FOOT UNIFORM SLOPE.
   C. WHERE THE PREVAILING CODE REQUIRES A STEEPER SLOPE THAN INDICATED ABOVE (SUCH AS FOR GREASE WASTE PIPING) THEN SUCH REQUIREMENT SHALL CONTROL.
10. SLOPE ALL VENT PIPE BACK FROM THE VENT TERMINAL AT A MINIMUM 6" PER 100 FEET OF RUN.
11. THE DISCHARGE LINE FROM ANY EJECTOR OR PUMP WHICH CONNECTS TO A HORIZONTAL GRAVITY DRAINAGE LINE SHALL BE FROM THE TOP, THROUGH A WYE BRANCH FITTING.
12. PROVIDE FITTINGS FOR DRAINAGE WASTE AND VENT (DWV) AND STORM PIPING SYSTEMS OF APPROVED DRAINAGE PATTERN AND LONG OR SHORT RADIUS TYPES AS REQUIRED AND APPROVED FOR USE IN COMPLIANCE WITH PLUMBING CODE REQUIREMENTS.
13. PROVIDE CLEANOUTS AT EACH CHANGE OF DRAINLINE DIRECTION GREATER THAN 45° AND IN COMPLIANCE WITH PLUMBING CODE REQUIREMENTS.
14. PROVIDE BRACING TO PREVENT AXIAL MOVEMENT FOR ALL DRAINAGE PIPING. PROVIDE RESTRAINTS AT ALL CHANGES IN DIRECTION AND AT ALL DIAMETER CHANGES GREATER THAN TWO PIPE SIZES. SPECIFICALLY ENGINEERED BRACES, STRAPS, AND CLAMPS CONSISTENT WITH THE PIPE AND COUPLING MANUFACTURER RECOMMENDATIONS, THE APPLICABLE INSTALLATION STANDARDS, AND LOCAL CODE REQUIREMENTS SHALL BE ACCEPTABLE. HOLDRITE OR PRE-APPROVED EQUIVALENT PRODUCTS.
15. PROVIDE ISOLATING BALL VALVES FOR ALL BRANCHES OFF DOMESTIC WATER MAINS. ALL PLUMBING SYSTEM VALVES SHALL BE INSTALLED IN ACCESSIBLE CEILING SPACES. WHERE CEILING IS NOT ACCESSIBLE, OR SPACE IS CONFLICTING, VALVES SHALL BE INSTALLED IN PARTITIONS OR PIPE CHASES. PROVIDE MILCOR STYLE "K" PAINTED STEEL HINGED ACCESS PANELS IN LOCATIONS PRE-APPROVED BY THE ARCHITECT.
16. ALL HOT WATER AND HOT WATER CIRCULATING PIPING SHALL BE PROVIDED WITH FIBERGLASS INSULATION WITH ALL SERVICE JACKET AND SELF SEALING LAP JOINT AS FOLLOWS:
   A. 1" THICK INSULATION FOR PIPE SIZES 1-1/4" AND SMALLER.
   B. 1-1/2" THICK INSULATION FOR PIPE SIZES 1-1/2" AND LARGER.
17. INSTALL EACH WATER HEATER AND ALL OTHER PLUMBING EQUIPMENT WITH ADEQUATE CLEARANCES FOR ACCESS BY SERVICE PERSONNEL AND WITH PROPER ORIENTATION FOR ELEMENT REMOVAL/REPLACEMENT.
18. CONTRACTOR SHALL STERILIZE ALL DOMESTIC WATER PIPING ACCORDING TO AMERICAN WATER WORKS ASSOCIATION (AWWA) SPECIFICATIONS.
19. ALL CAST IRON PIPE, FITTINGS AND INSTALLATION SHALL COMPLY WITH THE CAST IRON SOIL PIPE INSTITUTE (CISPI) STANDARDS.
20. FLASH FLOOR DRAINS IN FLOORS WITH TOPPING OVER FINISHED AREAS WITH 40 MIL PVC MEMBRANE. 10 INCHES CLEAR ON SIDES WITH MINIMUM 36 X 36 INCH SHEET SIZE. FASTEN WATERPROOFING MEMBRANE FLASHING TO DRAIN CLAMPING DEVICE.
21. NO PLUMBING PIPING SHALL BE ROUTED OVER MAJOR MECHANICAL EQUIPMENT, MDF/IDF/DATA CLOSETS, ELECTRICAL ROOMS, OR ANY SUCH EQUIPMENT.
22. COORDINATE ALL WORK WITH THE WORK OF OTHER TRADES TO AVOID CONFLICTS AND ALSO TO MINIMIZE INTERRUPTION OF SERVICES FOR RENOVATIONS.
23. THE PROPER INSTALLATION OF NEW FIXTURES AND THE PROPER CONTINUED OPERATION OF EXISTING BUILDING FIXTURES TO REMAIN (FOR RENOVATIONS) SHALL GOVERN THE EXTENT AND NATURE OF WORK.
24. FOR RENOVATIONS THE CONTRACTOR SHALL MAKE ARRANGEMENTS IN ADVANCE WITH THE OWNER PRIOR TO ANY NECESSARY SHUT DOWN OF THE DOMESTIC WATER OR ANY OTHER SERVICE. ANY SUCH SHUT DOWN SHALL BE AT A TIME AND FOR A DURATION SATISFACTORY TO THE OWNER, WHO SHALL MAKE THE FINAL DETERMINATION AS TO ITS ACCEPTABILITY.
25. RENOVATIONS SITE INSPECTIONS: CONTRACTOR SHALL VISIT THE SITE OF WORK PRIOR TO SUBMITTING A BID AND THOROUGHLY FAMILIARIZE HIMSELF WITH THE EXISTING CONDITIONS AND EXACT NATURE OF WORK. SUBMISSION OF A BID ACKNOWLEDGES FULL RESPONSIBILITY FOR FURNISHING A COMPLETE AND FUNCTIONAL SYSTEM. NO CHANGES IN THE CONTRACT WILL BE MADE TO ACCOMMODATE OR ALLOW EXTRA FUNDS FOR ANY OMISSION WHICH RESULTS FROM FAILURE TO MAKE SUCH A THOROUGH EXAMINATION. NOTE THAT FOR GRAPHICAL CLARITY, ALL EXISTING PIPING TO REMAIN OR BE ABANDONED IN PLACE MAY NOT BE SHOWN ON THE FLOOR PLANS.



WHEN THE INSTALLATION IS SUBSTANTIALLY COMPLETE, THE CONTRACTOR SHALL PROVIDE A "FACTORY CHECKOUT" FROM THE MANUFACTURER. THE PURPOSE OF THIS CHECKOUT IS TO VERIFY THAT THE INSTALLATION IS IN CONFORMANCE WITH THE MANUFACTURER'S RECOMMENDED INSTALLATION INSTRUCTIONS. ANY REQUIRED CHANGES SHALL BE MADE BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.

NOT TO SCALE

1 GAS DOUBLE CONDENSING WATER HEATER



NOTES
1. MOUNT PUMP SECURELY IN AN ACCESSEBLE LOCATION AT 48" A.F.F.
2. ENSURE THERMOMETER IS POSITIONED FOR CLEAR VISIBILITY AND READABILITY FROM A STANDING POSITION AT FLOOR LEVEL.
3. INSULATION IS NOT SHOWN FOR CLARITY BUT SHALL BE PROVIDED AS SPECIFIED.
4. CONTROL BOX SHALL BE ROTATED IN THE FIELD AS NECESSARY PER MANUFACTURER RECOMMENDATIONS TO ENSURE ADEQUATE COOLING. ADDITIONALLY, THE TEMPERATURE OF THE AMBIENT AIR MUST NOT EXCEED 104 DEGREES F.
5. THE PUMP CAN BE INSTALLED IN A HORIZONTAL (AS SHOWN) OR VERTICAL PIPE BUT THE PUMP SHALL ALWAYS BE INSTALLED WITH A HORIZONTAL MOTOR SHAFT. ROTATE PUMP "HEAD" COMPONENT IN THE FIELD AS NECESSARY PER THE MANUFACTURER'S INSTRUCTIONS.
6. UNLESS SPECIFICALLY NOTED OTHERWISE ON THE PLANS, THE PUMP SHALL BE SET TO CONSTANT TEMPERATURE CONTROL MODE. THIS MODE SHALL KEEP RETURN PIPE TEMPERATURE CONSTANT AND ALSO LIMIT FLOW TO A MAXIMUM RATE. THE PUMP SHALL AUTOMATICALLY RAMP DOWN WHEN WATER IN THE CIRCULATION LOOP IS AT THE DESIRED TEMPERATURE. REFER TO THE PLANS FOR SYSTEM TEMPERATURE AND FLOW CRITERIA.

NOT TO SCALE

2 DOMESTIC HOT WATER CIRCULATOR PIPING INSTALLATION - VFD CONTROLLED "SMART" PUMP

PLUMBING PIPE MATERIAL SCHEDULE

PIPING SYSTEM	PIPING MATERIAL
SANITARY DRAIN AND VENTS INSIDE BUILDING BELOW GRADE	SCHEDULE 40 PVC
SANITARY DRAIN AND VENTS INSIDE BUILDING BELOW GRADE FOR KITCHEN	CAST IRON HUB AND SPIGOT
SANITARY DRAIN AND VENTS INSIDE BUILDING ABOVE GRADE	CAST IRON NO-HUB
DOMESTIC HOT & COLD WATER	COPPER, TYPE "L" HARD DRAWN
DOMESTIC HOT & COLD WATER BELOW FLOOR	COPPER, TYPE "K" SOFT ANNEALED
NATURAL GAS	CAST IRON NO-HUB

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DATE: 07/28/25

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CHECKED BY: DBR

PROJECT NUMBER 250054.000

SHEET TITLE: PLUMBING SCHEDULES, DETAILS, AND GENERAL NOTES

SHEET NUMBER: P5.01

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