MECHANICAL SYMBOLS

GENERAL

- FLOOR DRAIN
- FLOOR SINK
- ROOF DRAIN
- VFD — VARIABLE FREQUENCY DRIVE
- ECM — ELECTRONICALLY COMMUTATED MOTOR
- POINT OF CONNECTION OF NEW TO EXISTING WORK
- POINT OF DEMOLITION TO EXISTING WORK
- DEMOLITION KEYED NOTE
- NEW WORK KEYED NOTE
- EQUIPMENT TAG (ABBREVIATION / P / 1 / NUMBER)
- RISER TAG (ABBREVIATION / SR / 1 / NUMBER)
- MATCH LINE (SEE SHEET NO. X#.##)
- VIEW REFERENCE (1 / X#.## — VIEW # / SHEET #)
- SECTION VIEW REFERENCE (2 / X#.## — VIEW # / SHEET #)

DUCTWORK

- NEW DUCTWORK
- EXISTING DUCTWORK TO REMAIN
- EXISTING DUCTWORK TO BE DEMOLISHED
- DIRECTION OF AIRFLOW
- DUCTWORK CONTINUATION
- RECTANGULAR EXHAUST/RETURN DUCTWORK DOWN
- RECTANGULAR EXHAUST/RETURN DUCTWORK UP
- RECTANGULAR SUPPLY DUCTWORK DOWN
- RECTANGULAR SUPPLY DUCTWORK UP
- ROUND DUCTWORK DOWN
- ROUND DUCTWORK UP
- GRILLE/REGISTER/DIFFUSER TAG (TYPE — NECK SIZE — A — 6"x6" NK — 100-S — CFM — SERVICE)
- AUTOMATIC CONTROL (OR MOTOR OPERATED) DAMPER (M)
- FIRE DAMPER (FID)
  - FID - FIRE DAMPER
  - FSD - FIRE/SMOKE DAMPER
  - SD - SMOKE DAMPER
- MANUAL VOLUME (OR BALANCING) DAMPER (VD)
- FLEXIBLE DUCTWORK CONNECTION
- ACCESS DOOR (AD)
- SMACNA DUCT PRESSURE CLASSIFICATION (1 | 1/2 | 1)
- DUCT PRESSURE DESIGNATIONS (VAV — 2 / 1):
  1. NUMBER INDICATES SMACNA PRESSURE CLASS.
  2. THE SYMBOL CONTINUES THE ASSIGNMENT UNTIL THE DUCT TERMINATES OR ANOTHER SYMBOL APPEARS.

PIPING

- NEW PIPING
- EXISTING PIPING TO REMAIN
- EXISTING PIPING TO BE DEMOLISHED
- NEW PIPE CONNECTION
- DIRECTION OF FLOW
- DIRECTION OF PIPE PITCH, DOWN
- PIPE CONTINUATION
- ECCENTRIC PIPE REDUCER
- ORIFICE PIPE UNION
- PIPE CAP
- PIPE ELBOW, 30° HORIZONTAL
- PIPE ELBOW, 45° HORIZONTAL
- PIPE ELBOW, 90° HORIZONTAL
- PIPE ELBOW, TURNED DOWN
- PIPE ELBOW, TURNED UP
- PIPE REDUCER/INCREASER
- PIPE TEE, 45° HORIZONTAL
- PIPE TEE, 90° HORIZONTAL
- PIPE TEE, DOWN
- PIPE TEE, UP
- PIPE UNION
- THREADED HOSE CONNECTION
- ANGLE VALVE
- BALL VALVE
- BUTTERFLY VALVE
- CHECK VALVE
- GAS COCK
- GATE VALVE
- GLOBE VALVE
- MANUAL BALANCING VALVE
- MANUAL THREE-WAY, TWO-POSITION VALVE
- NEEDLE VALVE
- OS&Y GATE VALVE
- PRESSURE REDUCING/REGULATING VALVE
- PRESSURE/SAFETY RELIEF VALVE
- SOLENOID VALVE (S)
- STRAINER
- THERMOSTATIC MIXING VALVE
- THREE-WAY, MODULATING AUTOMATIC CONTROL VALVE
- THREE-WAY, TWO-POSITION AUTOMATIC CONTROL VALVE
- TRIPLE DUTY VALVE
- TWO-WAY, MODULATING AUTOMATIC CONTROL VALVE
- TWO-WAY, TWO-POSITION AUTOMATIC CONTROL VALVE
- Y-STRAINER CHECK VALVE
- AUTOMATIC AIR VENT WITH ISOLATION
- BACKFLOW PREVENTER
- FLEXIBLE PIPE CONNECTOR (OR CONNECTION)
- AQUASTAT
- METER (M)
- PIPE ALIGNMENT GUIDE
- PIPE ANCHOR
- PIPE EXPANSION JOINT (EJ)
- PIPE SLEEVE
- PIPE WELL
- PRESSURE GAUGE (PSI)
- PUMP
- STEAM TRAP (T)
- TEST PLUG
- THERMOMETER (°F)

CONTROLS

- PROBE
- SERPENTINE
- FILTER
- FILTER WITH DIFFERENTIAL PRESSURE
- PITOT
- SUPPLY/RETURN/EXHAUST FAN
- COMMUNICATION CONNECTION (COMM)
- ANALOG INPUT/OUTPUT (AI / AO)
- BINARY INPUT/OUTPUT (BI / BO)
- AIR FLOW MEASURING STATION (AFMS)
- BTU METER (BTU)
- FLOW METER (FM)
- POWER METER (KW)
- CURRENT SWITCH (CS)
- CURRENT TRANSDUCER (CT)
- CARBON MONOXIDE DETECTOR/SENSOR (CO)
- CARBON DIOXIDE DETECTOR/SENSOR (CO_2)
- FIRE ALARM RELAY (FAR)
- SMOKE DETECTOR (SD)
- HVAC DUCT SMOKE DETECTOR (DD)
- HEAT DETECTOR (D)
- FLOW SWITCH (FS)
- OCCUPANCY SENSOR (OS)
- VACANCY SENSOR (VS)
- PRESSURE PICKUP (PP)
- PRESSURE SWITCH (PS)
- FREEZE STAT (FR)
- DIFFERENTIAL PRESSURE TRANSDUCER (DPT)
- PRESSURE TRANSDUCER (PT)
- TEMPERATURE SENSOR (T)
- TEMPERATURE AND CO_2 COMBO SENSOR (T_1)
- TEMPERATURE AND RELATIVE HUMIDITY COMBO SENSOR (T_2)
- TEMPERATURE, RELATIVE HUMIDITY, AND CO_2 COMBO SENSOR (T_3)
- RELATIVE HUMIDITY SENSOR (H)
- EMERGENCY SHUTOFF

NOTE: NOT ALL SYMBOLS LISTED ABOVE MAY BE USED OR APPEAR IN THESE DRAWINGS.

MECHANICAL ABBREVIATIONS

ACD	AUTOMATIC CONTROL DAMPER
ACV	AUTOMATIC CONTROL VALVE
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AP	ACCESS PANEL
APD	AIR PRESSURE DROP
AS	AIR SEPARATOR
ASU	AIR SUPPLY UNIT
B	BOILER
BAS	BUILDING AUTOMATION SYSTEM
BASC	BUILDING AUTOMATION SYSTEM CONTRACTOR
BFV	BUTTERFLY VALVE
BFW	BOILER FEED WATER
BHP	BRAKE HORSEPOWER
BOD	BOTTOM OF DUCT
BOI	BOTTOM OF INSULATION
BOP	BOTTOM OF PIPE
BT	BUFFER TANK
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
BV	BALL VALVE
BWR	BOILER WATER RETURN
BWS	BOILER WATER SUPPLY
C	COMMON
CBV	CIRCUIT BALANCING VALVE
CC	COOLING COIL
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CK	GAS COCK
CKV	CHECK VALVE
CO	CLEANOUT
COND	CONDENSATE
COP	COEFFICIENT OF PERFORMANCE
CO2	CARBON DIOXIDE
CR	CONDENSATE RETURN
CT	COOLING TOWER
CU	CONDENSING UNIT
CV	CONTROL VALVE
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
D	DRAIN
DB	DRY BULB
DCW	COLD (OR CITY) WATER
DG	DOOR GRILLE
DHW	DOMESTIC HOT WATER
DHWR	DOMESTIC HOT WATER RECIRCULATION
DN	DOWN
DOAS	DEDICATED OUTDOOR AIR SYSTEM
DS	DUCT SLEEVE
DTR	DUAL TEMPERATURE WATER RETURN
DTS	DUAL TEMPERATURE WATER SUPPLY
-E	EXHAUST
EA	EXHAUST AIR
EAD	EXHAUST AIR DAMPER
EAT	ENTERING AIR TEMPERATURE
EBB	ELECTRIC BASEBOARD
EC	ELECTRICAL CONTRACTOR
ECM	ELECTRONICALLY COMMUTATED MOTOR
EDH	ELECTRIC DUCT HEATER
EER	ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
EG	ETHYLENE GLYCOL
EJ	EXPANSION JOINT
ERCP	ELECTRIC RADIANT CEILING PANEL
ESP	EXTERNAL STATIC PRESSURE
ECUH	ELECTRIC CABINET UNIT HEATER
ET	EXPANSION TANK
EUH	ELECTRIC UNIT HEATER
EWT	ENTERING WATER TEMPERATURE
F	FAHRENHEIT
FC	FLEXIBLE CONNECTOR (OR CONNECTION)
FD	FLOOR DRAIN
FCU	FAN COIL UNIT
FID	FIRE DAMPER
FSD	FIRE/SMOKE DAMPER
FFA	FROM FLOOR ABOVE
FFB	FROM FLOOR BELOW
FLA	FULL LOAD AMPS
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FPF	FINS PER FOOT
FPI	FINS PER INCH
FPM	FEET PER MINUTE
FS	FILL SYSTEM
FTR	FINNED TUBE RADIATION
FV	FACE VELOCITY
G	GAS
GA	GAUGE
GPM	GALLONS PER MINUTE
GTR	GEOTHERMAL RETURN
GTS	GEOTHERMAL SUPPLY
GV	GATE VALVE
HC	HEATING COIL
HG	HOT GAS
HP	HORSEPOWER
HPS	HIGH PRESSURE STEAM
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
HX	HEAT EXCHANGER
HZ	HIGH ZONE
IPLV	INTEGRATED PART LOAD VALUE
KG	KEYED GUARD
KH	KITCHEN HOOD
LAT	LEAVING AIR TEMPERATURE
LPS	LOW PRESSURE STEAM
LWT	LEAVING WATER TEMPERATURE
LZ	LOW ZONE
MAU	MAKE-UP AIR UNIT
MBH	THOUSAND BRITISH THERMAL UNITS PER HOUR
MC	MECHANICAL CONTRACTOR
MCA	MINIMUM CIRCUIT AMPACITY
MOCP	MAXIMUM OVERCURRENT PROTECTION
MOD	MOTOR OPERATED DAMPER
MU	MAKE-UP WATER
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NK	NECK
NO	NORMALLY OPEN
NPLV	NONSTANDARD PART LOAD VALUE
NPSH	NET POSITIVE SUCTION HEAD
NTS	NOT TO SCALE
OA	OUTDOOR AIR
OAD	OUTDOOR AIR DAMPER
OSD	OPEN SITE DRAIN
OS&Y	OUTSIDE STEM AND YOKE
P	PUMP
PD	PRESSURE DROP
PG	PROPYLENE GLYCOL
PHC	PREHEAT COIL
PRD	PRESSURE RELIEF DOOR
PRV	PRESSURE REDUCING (OR REGULATING) VALVE
PS	PIPE SLEEVE
PSI	POUNDS PER SQUARE INCH
-R	RETURN
RA	RETURN AIR
RAD	RETURN AIR DAMPER
RCP	RADIANT CEILING PANEL
REF	REFRIGERANT
RF	RETURN FAN
RG	REFRIGERANT GAS
RHC	REHEAT COIL
RL	REFRIGERANT LIQUID
RPM	REVOLUTIONS PER MINUTE
RS	REFRIGERANT SUCTION
RV	RELIEF VALVE
-S	SUPPLY
SA	SUPPLY AIR
SAN	SANITARY
SD	SMOKE DAMPER
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SF	SUPPLY FAN
SP	STATIC PRESSURE
SS	STAINLESS STEEL
SST	SATURATED SUCTION TEMPERATURE
ST	STORM
STM	STEAM
STR	STRAINER
SUH	SUSPENDED UNIT HEATER
T	THERMOSTAT
-T	TRANSFER
TDH	TOTAL DYNAMIC HEAD
TDV	TRIPLE DUTY VALVE
TFA	TO FLOOR ABOVE
TFB	TO FLOOR BELOW
TSP	TOTAL STATIC PRESSURE
UC	UNDERCUT DOOR
UH	UNIT HEATER
V	VENT
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER
VFD	VARIABLE FREQUENCY DRIVE
VTR	VENT THROUGH ROOF
WB	WET BULB
WC	WATER COLUMN
WG	WATER GAUGE
WL	WALL LOUVER
WMS	WIRE MESH SCREEN
WPD	WATER PRESSURE DROP
VSD	VARIABLE SPEED DRIVE

NOTE: NOT ALL ABBREVIATIONS LISTED ABOVE MAY BE USED OR APPEAR IN THESE DRAWINGS.

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ISSUE/REVISION:

REV	DATE	DESCRIPTION
	1/30/2026	ISSUED FOR BID

PROJECT:
RATE FIELD - HVAC FY2026

333 WEST 35TH STREET
CHICAGO, IL 60616

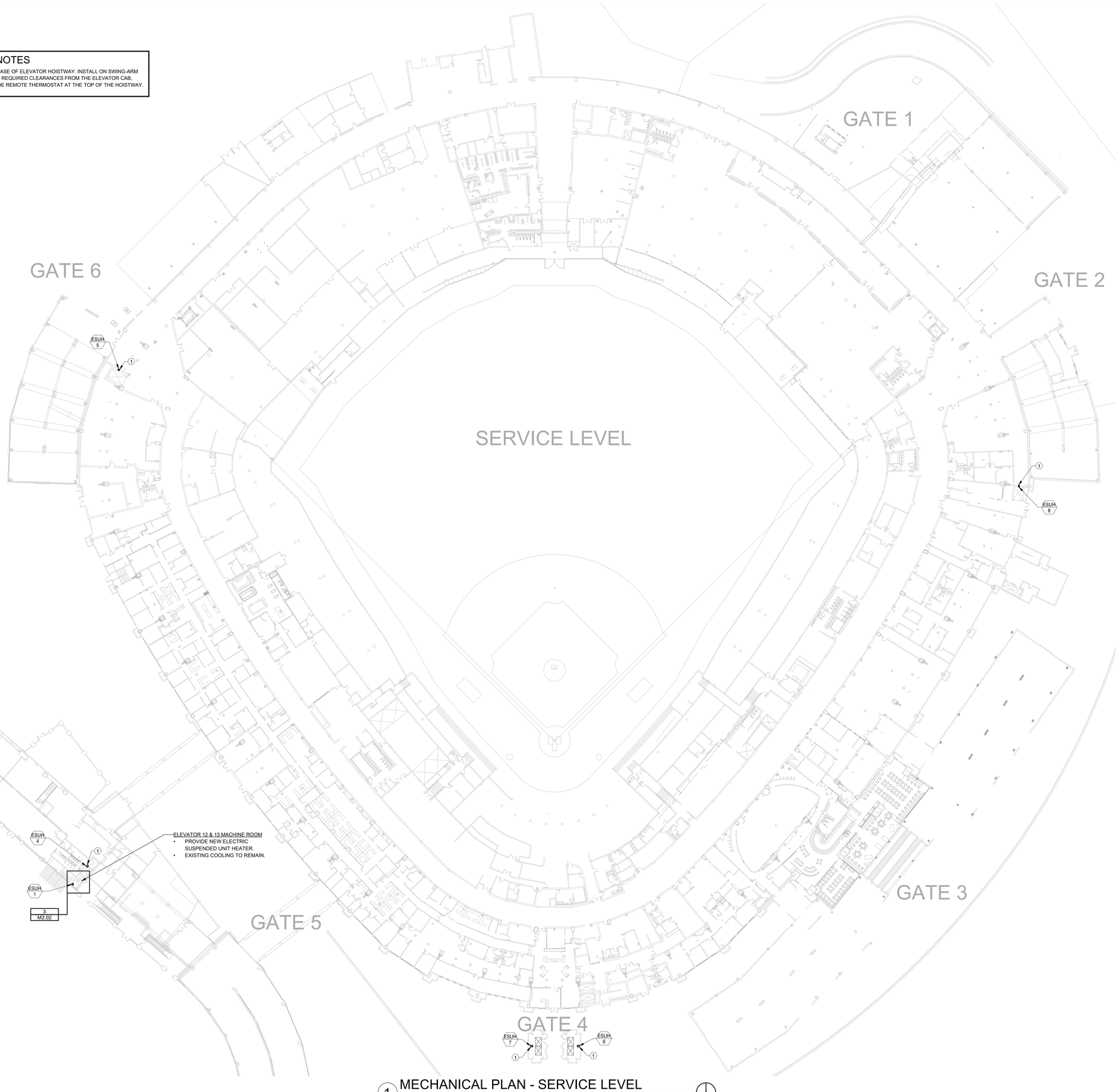
DRAWING TITLE:
MECHANICAL TITLE SHEET

DESIGNED BY:	MO
CHECKED BY:	CC
PROJECT NO:	25080
SCALE:	NO SCALE

SHEET NO.
M0.01

KEYED NOTES

1 PROVIDE NEW ELECTRIC SUSPENDED UNIT HEATER AT BASE OF ELEVATOR HOISTWAY. INSTALL ON SWING-ARM SUPPORT. COORDINATE FINAL PLACEMENT TO MAINTAIN REQUIRED CLEARANCES FROM THE ELEVATOR CAB, GUIDE RAILS, AND ALL HOISTWAY COMPONENTS. PROVIDE REMOTE THERMOSTAT AT THE TOP OF THE HOISTWAY.



1 MECHANICAL PLAN - SERVICE LEVEL
SCALE: 1/32" = 1'-0"

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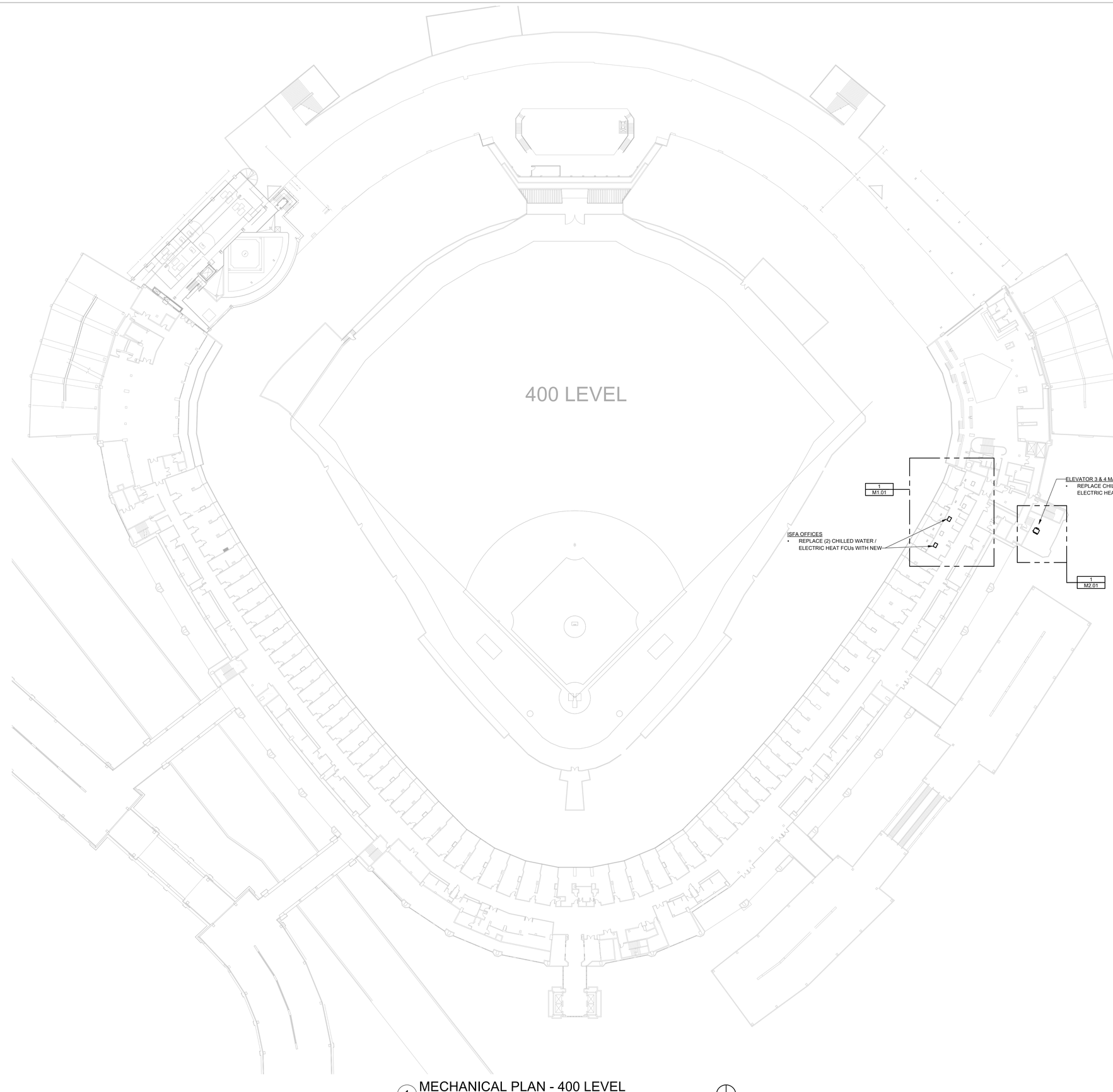
PROJECT:
RATE FIELD - HVAC FY2026

333 WEST 35TH STREET
CHICAGO, IL 60616

DRAWING TITLE:
MECHANICAL PLAN - SERVICE LEVEL

DESIGNED BY:	MO
CHECKED BY:	CC
PROJECT NO:	25080
SCALE:	1/32" = 1'-0"

SHEET NO.
M1.01



1 MECHANICAL PLAN - 400 LEVEL
SCALE: 1/32" = 1'-0"

SCALE: 1" = 30'
SCALE: 1" = 20'
SCALE: 1" = 10'
SCALE: 1/2" = 1'-0"
SCALE: 1" = 50'
SCALE: 1" = 40'
SCALE: 1/16" = 1'-0"
SCALE: 1/8" = 1'-0"
SCALE: 1/4" = 1'-0"
SCALE: 3/8" = 1'-0"
SCALE: 3/4" = 1'-0"
SCALE: 1/32" = 1'-0"
SCALE: 1" = 1'-0"
SCALE: 3/32" = 1'-0"
SCALE: 3/16" = 1'-0"
SCALE: 6" = 1'-0"
SCALE: 3" = 1'-0"
SCALE: 1 1/2" = 1'-0"

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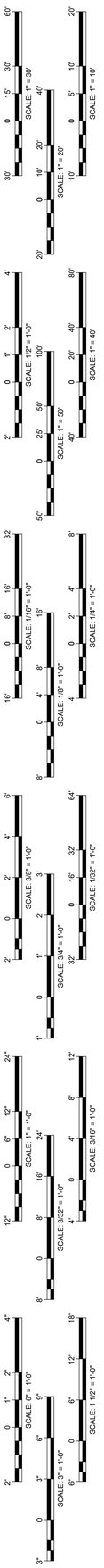
PROJECT:
RATE FIELD - HVAC FY2026

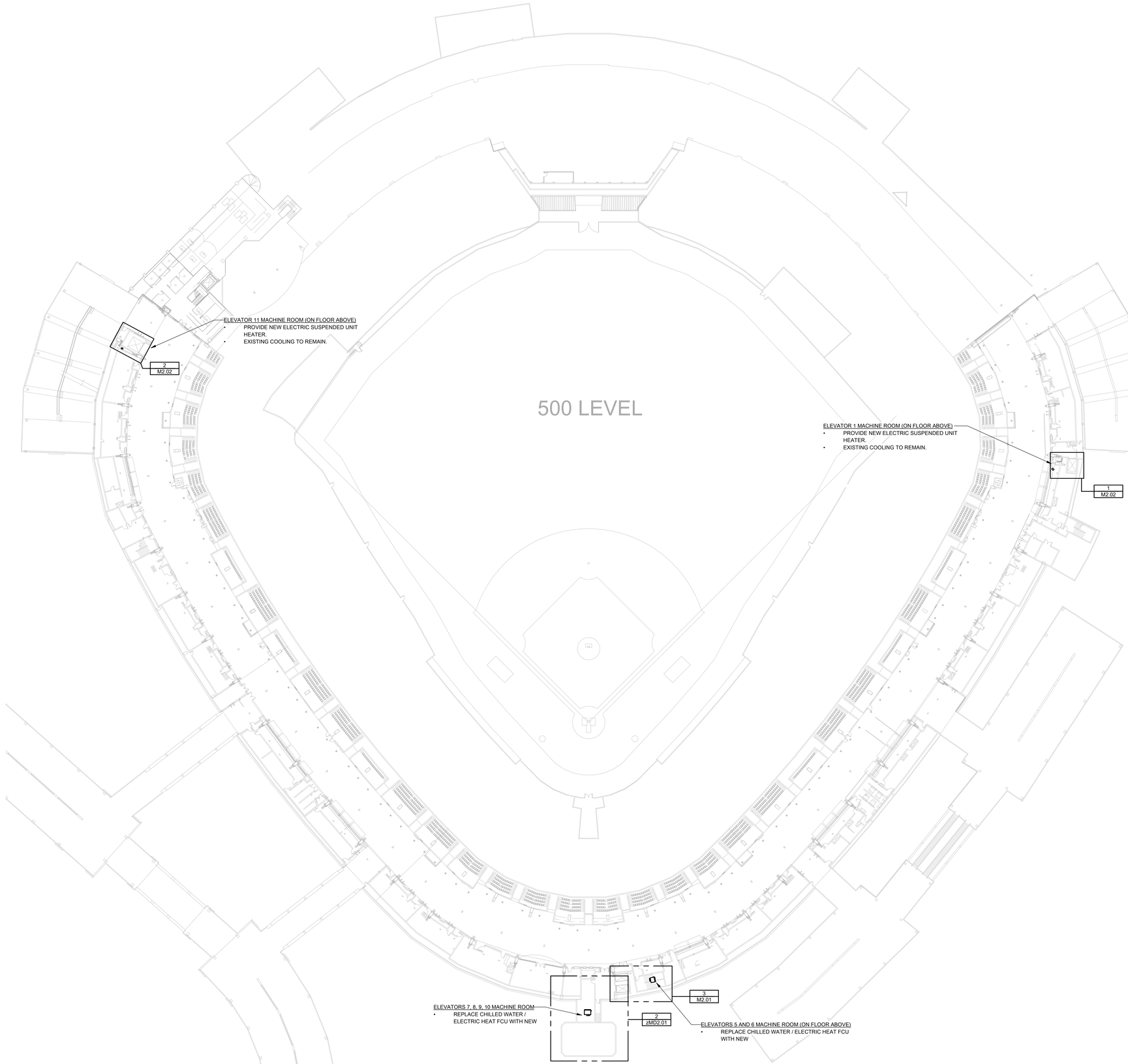
333 WEST 35TH STREET
CHICAGO, IL 60616

DRAWING TITLE:
MECHANICAL PLAN - 400 LEVEL

DESIGNED BY:	MO
CHECKED BY:	CC
PROJECT NO:	25080
SCALE:	1/32" = 1'-0"

SHEET NO.
M1.02





1 MECHANICAL PLAN - 500 LEVEL
SCALE: 1/32" = 1'-0"

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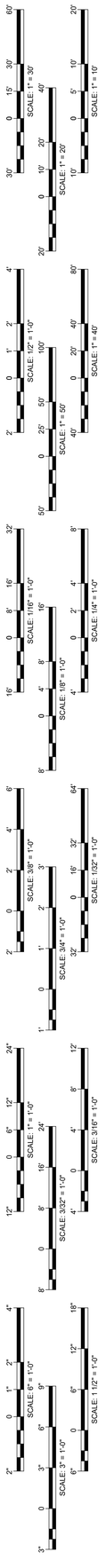
PROJECT:
RATE FIELD - HVAC FY2026

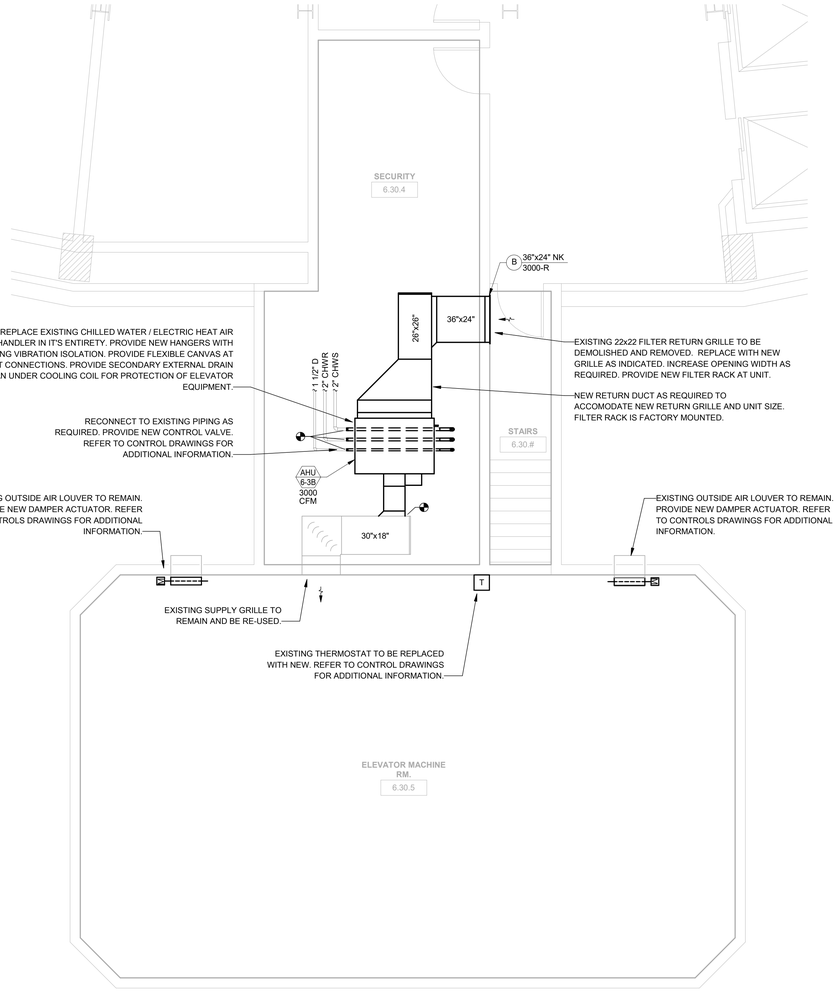
333 WEST 35TH STREET
CHICAGO, IL 60616

DRAWING TITLE:
MECHANICAL PLAN - 500 LEVEL

DESIGNED BY:	MO
CHECKED BY:	CC
PROJECT NO:	25080
SCALE:	1/32" = 1'-0"

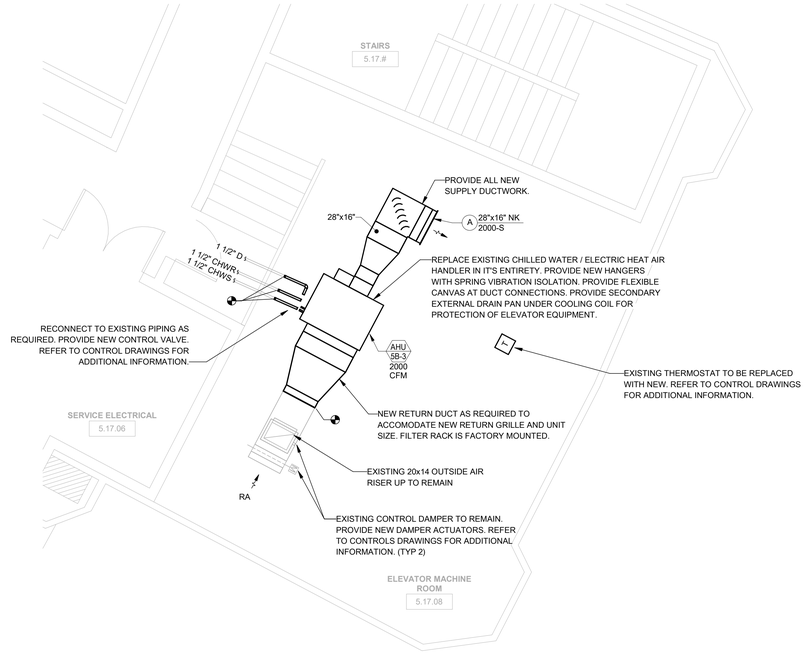
SHEET NO.
M1.03





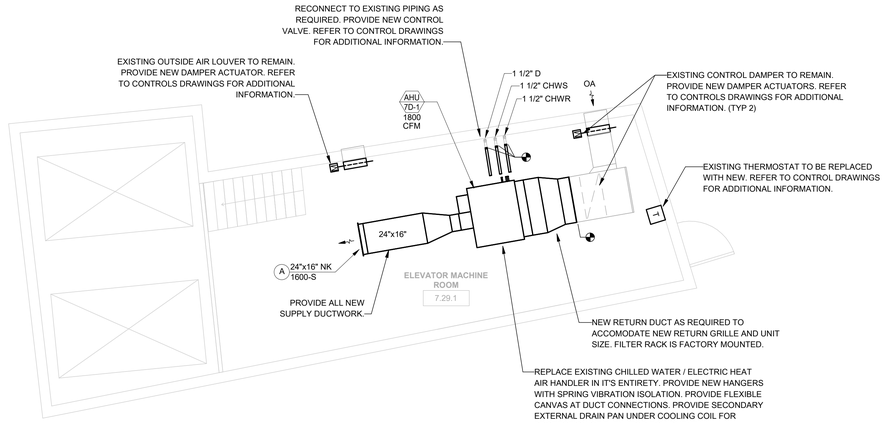
2 MECHANICAL PLAN - ELEV. 7, 8, 9, & 10 MACHINE ROOM - 500 LEVEL

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



1 MECHANICAL PLAN - ELEV. 3 & 4 MACHINE ROOM - 400 LEVEL

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



3 MECHANICAL PLAN - ELEV. 5 & 6 MACHINE ROOM - 600 LEVEL

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

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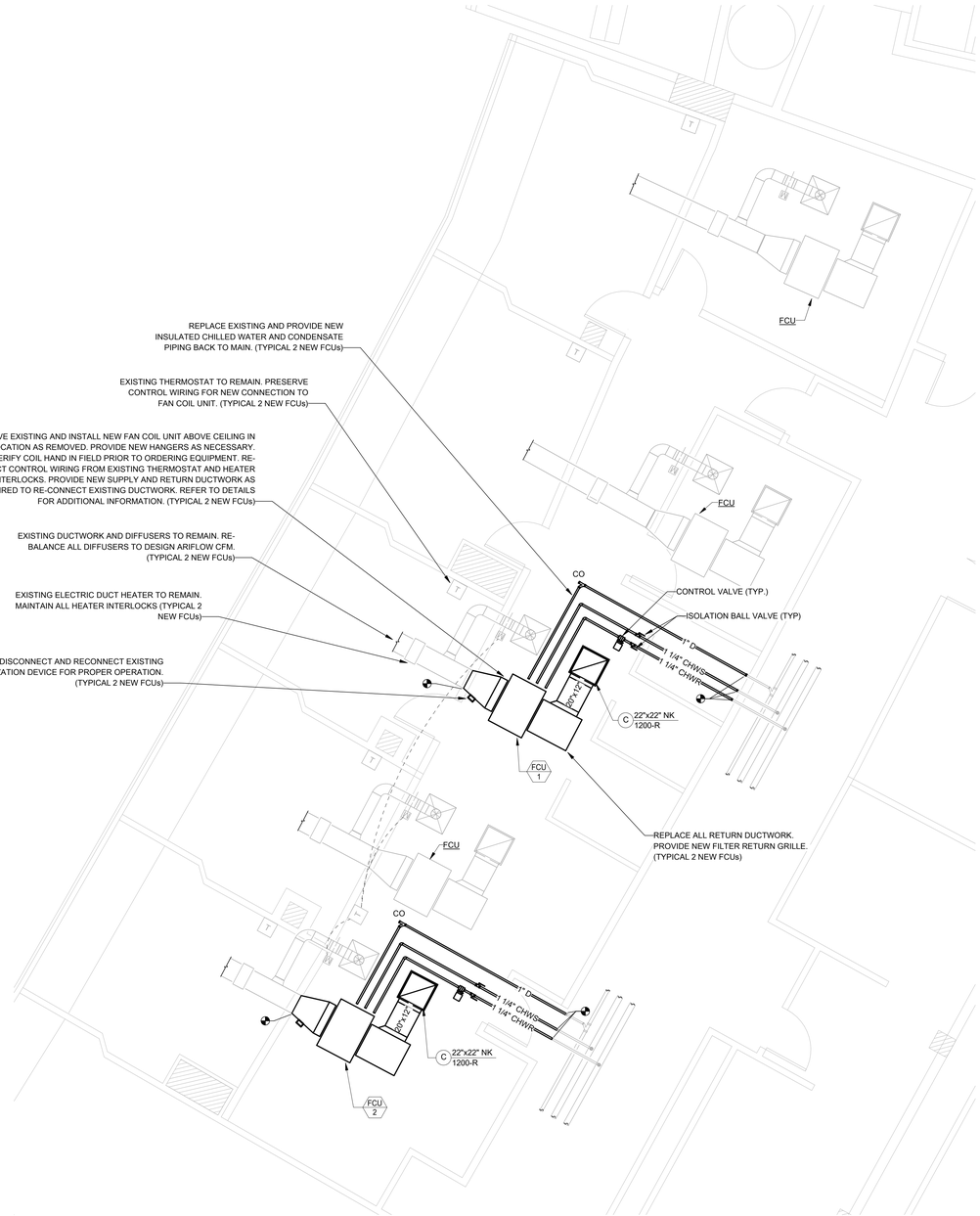
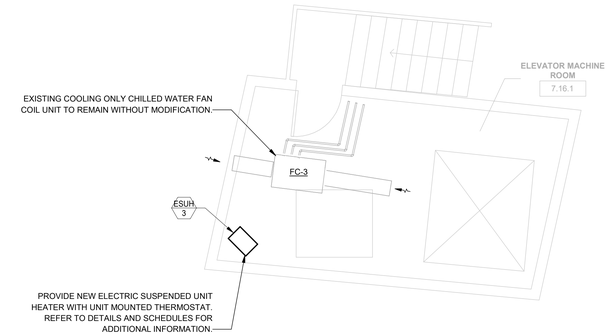
DRAWING TITLE:
MECHANICAL PLANS

DESIGNED BY:	MO
CHECKED BY:	CC
PROJECT NO:	25080
SCALE:	1/4" = 1'-0"

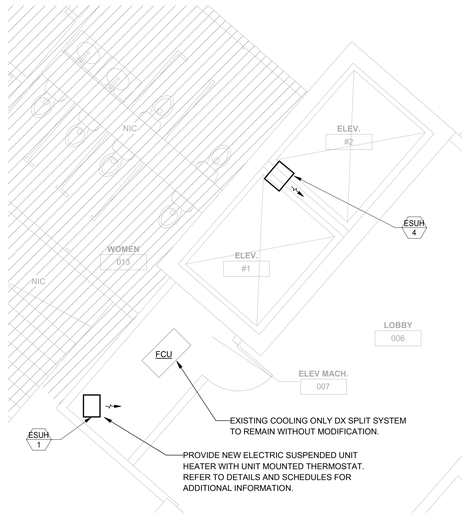
SHEET NO.
M2.01



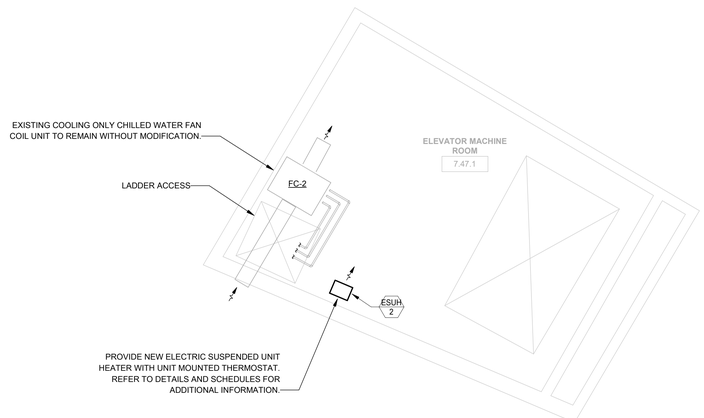
4 MECHANICAL PLAN - ISFA OFFICES - 400 LEVEL
SCALE: 1/4" = 1'-0"



1 MECHANICAL PLAN - ELEV. 1 MACHINE ROOM - 600 LEVEL
SCALE: 1/4" = 1'-0"



MECHANICAL PLAN - ELEV. 12 & 13 MACHINE ROOM - GROUND LEVEL
3 SCALE: 1/4" = 1'-0"



2 MECHANICAL PLAN - ELEV. 11 MACHINE ROOM - 600 LEVEL
SCALE: 1/4" = 1'-0"

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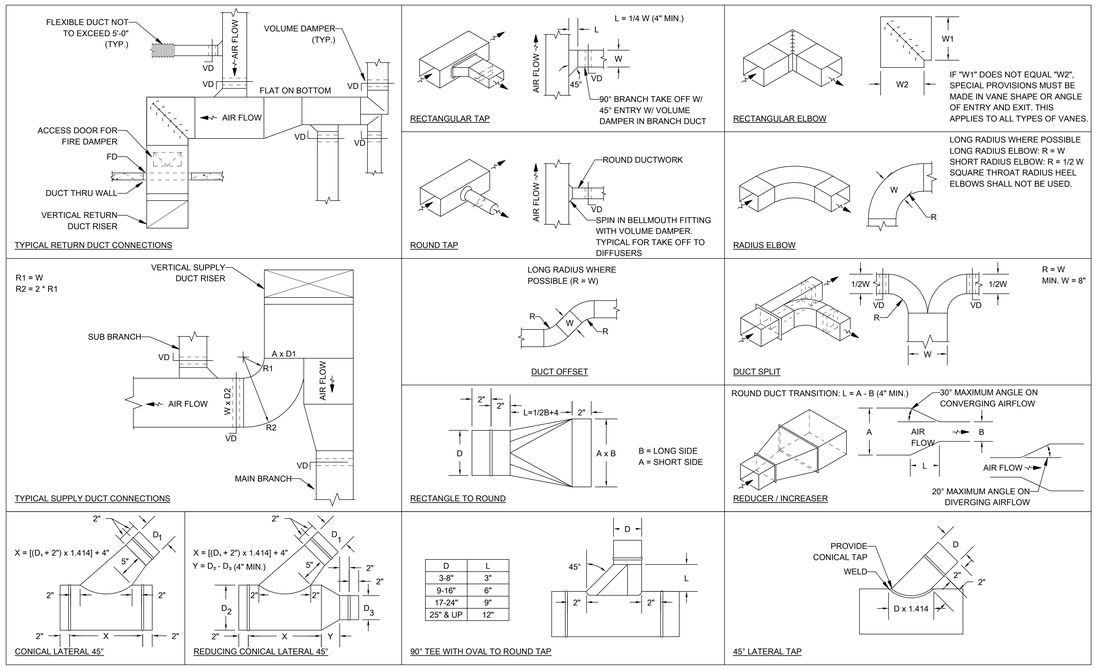
DRAWING TITLE:
MECHANICAL PLANS

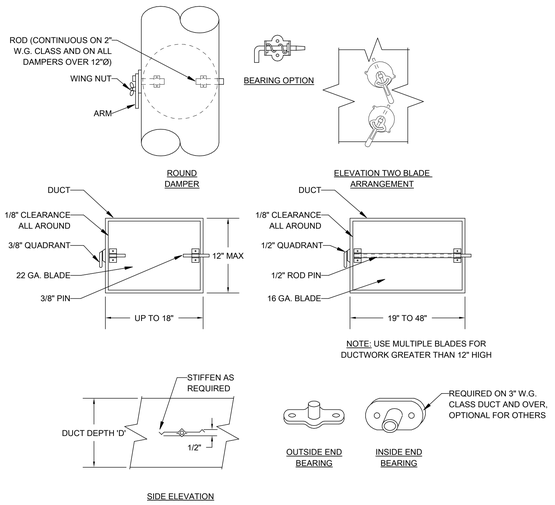
DESIGNED BY:	MO
CHECKED BY:	CC
PROJECT NO:	25080
SCALE:	1/4" = 1'-0"

SHEET NO.
M2.02



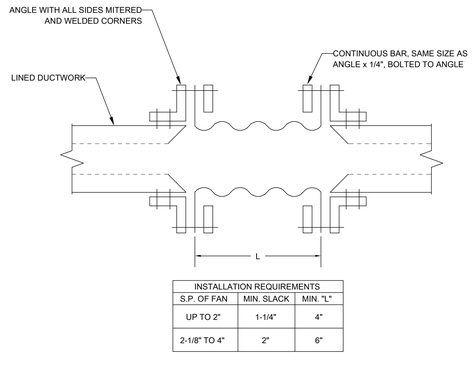
1 TYPICAL DUCT CONSTRUCTION DETAILS

SCALE: NO SCALE



2 SINGLE BLADE VOLUME DAMPER

SCALE: NO SCALE



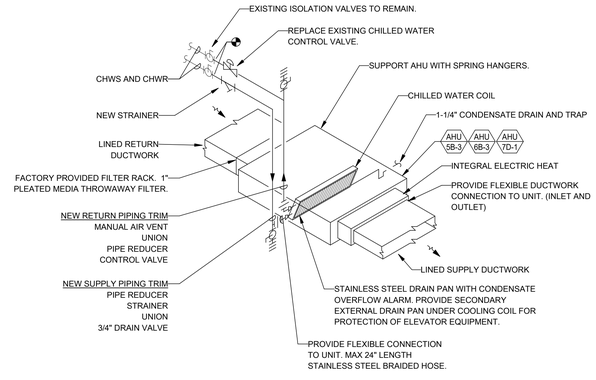
INSTALLATION REQUIREMENTS		
S.P. OF FAN	MIN. SLACK	MIN. "L"
UP TO 2"	1-1/4"	4"
2-1/8" TO 4"	2"	6"

NOTES:

1. PROVIDE FLEXIBLE CONNECTION TO ISOLATE ALL DUCTS FROM ALL FANS AND FAN ENCLOSURES TO PREVENT TRANSMISSION OF VIBRATION THROUGH DUCTWORK AND STRUCTURE. FLEXIBLE DUCTS SHALL BE LESS THAN 2'-0" LONG

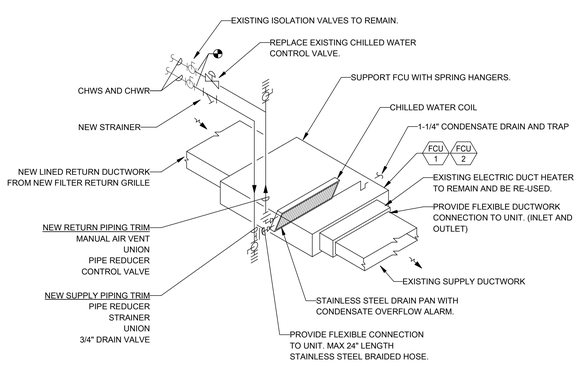
3 FLEXIBLE CONNECTION

SCALE: NO SCALE



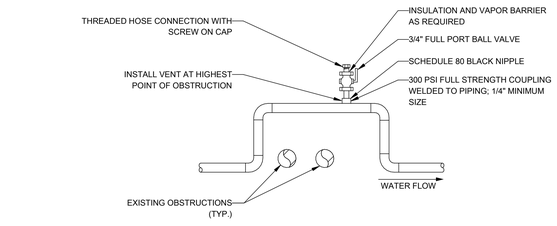
4 HORIZONTAL TWO PIPE AIR HANDLING UNIT

SCALE: NO SCALE



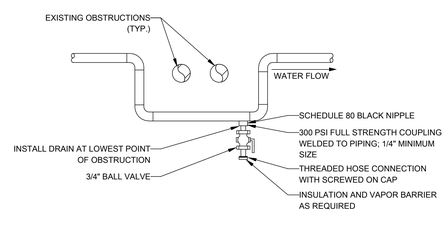
5 HORIZONTAL TWO PIPE FAN COIL UNIT

SCALE: NO SCALE



6 HIGH POINT MANUAL VENT DETAIL

SCALE: NO SCALE



7 LOW POINT MANUAL DRAIN DETAIL

SCALE: NO SCALE

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ISSUE/REVISION:

REV	DATE	DESCRIPTION
	1/30/2026	ISSUED FOR BID

PROJECT:
RATE FIELD - HVAC FY2026

333 WEST 35TH STREET
CHICAGO, IL 60616

DRAWING TITLE:
MECHANICAL DETAILS

DESIGNED BY:	MO
CHECKED BY:	CC
PROJECT NO:	25080
SCALE:	NO SCALE

SHEET NO.

M3.01

AIR HANDLING UNIT SCHEDULE (AHU)

EQUIP. TAG		GENERAL									SUPPLY FAN									COOLING DATA										HEATING DATA							ELECTRICAL DATA				
ABB.	NO.	LOCATION	MFR	MODEL	OPERATING WEIGHT (LBS)	COIL HAND	LENGTH (IN)	WIDTH (IN)	HEIGHT (IN)	MIN. OA (CFM)	TOTAL AIR FLOW (CFM)	ESP (IN. WC)	TYPE	QTY.	FAN RPM	MOTOR			TYPE	EAT DB/WB (DEG.F)	LAT DB/WB (DEG.F)	EWT (DEG.F)	LWT (DEG.F)	WATER FLOW (GPM)	WATER PD (FT. HD.)	TOTAL CAPACITY (MBH)	SENSIBLE CAPACITY (MBH)	TYPE	EAT (DEG.F)	LAT (DEG.F)	TOTAL CAPACITY (KW)	STAGES	SENSIBLE CAPACITY (MBH)	VOLTS	HZ	PHASE	NOTES
																RPM	HP (EACH)	BHP (EACH)																				
AHU	5B-3	ELEVATOR 3, 4 MACHINE ROOM	CARRIER	42DHA208RGMGDKAMKA	309	RIGHT	36	28	19-3/4	300	2000	0.75	DIRECT	1	1108	1108	1	-	ETHYLENE GLYCOL	82.3 / 68.9	54.5 / 53.6	44	54	20.9	33.2	96.1	61.40	ELECTRIC COIL	50	61.1	7	2	23.90	460	60	3	SEE BELOW
AHU	6-3B	ELEVATOR 7,8,9,10 MACHINE ROOM	CARRIER	42BHE30LG5R13408GG	350	RIGHT	40-1/4	48	32-1/4	400	3400	0.75	BELT	1	1114	1114	2	1.84	ETHYLENE GLYCOL	81.3 / 68.1.	55.4 / 54.7	44	54	31.1	22.3	142.4	97.1	ELECTRIC COIL	50	73.2	25	3	85.3	480	60	3	SEE BELOW
AHU	7D-1	ELEVATOR 5, 6 MACHINE ROOM	CARRIER	42DHA168RGMGDMAMKA	309	LEFT	37-3/4	47	21-1/2	200	1600	0.75	DIRECT	1	1341	1341	1	-	ETHYLENE GLYCOL	81.9 / 68.6	56.4 / 55.2	44	54	16.7	28.8	76.6	50.7	ELECTRIC COIL	50	67.4	9.9	2	33.8	460	60	3	SEE BELOW

NOTES:

1. MANUFACTURER PROVIDED 1 YEAR PARTS WARRANTY ON ENTIRE UNIT. MECHANICAL CONTRACTOR TO PROVIDE A 1 YEAR LABOR WARRANTY FOR THE ENTIRE UNIT.
2. FACTORY HEATER FUSING AND 40A DISCONNECT (AHU-5B-3 AND AHU-7D-1)
3. MOTOR AND ELECTRIC HEAT CONTROLS WITH FUSED DISCONNECT 41 TO 60 AMPS (AHU-6-3B)
4. VIBRATION ISOLATION AND OVERHEAD SUSPENSION BRACKETS.
5. CONDENSATE OVERFLOW SWITCH.
6. MULTI-SLOPED STAINLESS STEEL DRAIN PANS UNDER ANY COOLING COIL.
7. MANUFACTURER CERTIFIED START-UP.
8. 350 PSIG COIL TEST PRESSURE. 300 PSIG OPERATION PRESSURE.
9. STANDARD 1" THROWAWAY FILTER. PROVIDE (1) EXTRA SET OF FILTERS FOR OWNERS STOCK.
10. CHILLED WATER COILS ARE SCHDULED WITH 30% EG.
11. DOUBLE WALL 2/ 1" FIBERGLASS AND SOLID INNER LINER.
12. REAR RETURN / FRONT SUPPLY.
13. SINGLE POINT POWER CONNECTION.
14. PROVIDE WITH FILTER RACK.

HYDRONIC FAN COIL UNITS (FCU)

EQUIP. TAG		GENERAL								PERFORMANCE							ELECTRICAL				NOTES
ABB.	NO.	LOCATION	SERVICE	MFR	MODEL	TYPE	OPERATING WEIGHT (LBS)	LENGTH (IN)	WIDTH (IN)	HEIGHT (IN)	AIRFLOW (CFM)	ESP (IN. WC)	TOTAL COOLING CAPACITY (MBH)	SENSIBLE COOLING CAPACITY (MBH)	EAT DB/WB (°F)	LAT DB/WB (°F)	CHW FLOW (GPM)	FILTERS	VOLTS	HZ	PHASE	
FCU	1	ISFA OFFICE SUITE	ISFA OFFICE SUITE	CARRIER	42DCA12	HORIZONTAL DUCTED	169	46	29.5	16.5	1200	0.3	44.6	25.5	75 / 67	54.6 / 54.3	9.9	MERV 13	115	60	1	SEE BELOW
FCU	2	ISFA OFFICE SUITE	ISFA OFFICE SUITE	CARRIER	42DCA12	HORIZONTAL DUCTED	169	46	29.5	16.5	1200	0.3	44.6	25.5	75 / 67	54.6 / 54.3	9.9	MERV 13	115	60	1	SEE BELOW

NOTES:

1. CAPACITIES ARE BASED ON HIGH FAN SPEED.
2. COIL CONNECTION HAND TO BE DETERMINED BY MECHANICAL CONTRACTOR.
3. EXISTING ELECTRIC HEATING COIL SHALL REMAIN AND BE RE-USED.
4. COORDINATE CONTROLS WITH BUILDING TEMPERATURE CONTROLS CONTRACTOR FOR THERMOSTATS, CONTROL VAVLES, INTERCONNECTION OF FAN COIL AND ELECTRIC HEATING COIL.
5. INCLUDE 1" THROWAWAY FILTERS.
6. ALL UNITS TO BE SIZED FOR 30% ETHYLENE GLYCOL CONCENTRATION IN CHILLED WATER.
7. FUSED DISCONNECT.
8. NO ALTERNATE MANUFACTURER'S PERMITTED. UNIT TO BE SOLE-SOURCED TO MATCH EXISTING UNITS AND SYSTEM CURRENTLY PRESENT IN FACILITY.

ELECTRIC SUSPENDED UNIT HEATERS (ESUH)

EQUIP. TAG		GENERAL								PERFORMANCE	ELECTRICAL			NOTES
ABB.	NO.	LOCATION	MFR	MODEL	SHIPPING WEIGHT (LBS)	MOUNTING TYPE	LENGTH (IN)	WIDTH (IN)	HEIGHT (IN)	KW	AIRFLOW (CFM)	VOLTS	HZ	PHASE	
ESUH	1	ELEVATOR 12. 13 MACHINE ROOM	KING	KB4803-3	30.5	SUSPENDED	15	11	16.5	3	520	480	60	3	1,2
ESUH	2	ELEVATOR 11 MACHINE ROOM	KING	KB4805-3	30.5	SUSPENDED	15	11	16.5	5	520	480	60	3	1,2
ESUH	3	ELEVATOR 1 MACHINE ROOM	KING	KB4805-3	30.5	SUSPENDED	15	11	16.5	5	520	480	60	3	1,2
ESUH	4	ELEVATOR 12, 13 HOISTWAY	KING	KB4810-3	45	ELEVATOR HOISTWAY WALL	15	13.5	16.5	10	800	480	60	3	2,3,4
ESUH	5	ELEVATOR 11 HOISTWAY	KING	KB4805-3	30.5	ELEVATOR HOISTWAY WALL	15	11	16.5	5	520	480	60	3	2,3,4
ESUH	6	ELEVATOR 7,8 HOISTWAY	KING	KB4810-3	45	ELEVATOR HOISTWAY WALL	15	13.5	16.5	10	800	480	60	3	2,3,4
ESUH	7	ELEVATOR 9,10 HOISTWAY	KING	KB4810-3	30.5	ELEVATOR HOISTWAY WALL	15	13.5	16.5	10	800	480	60	3	2,3,4
ESUH	8	ELEVATOR 1 HOISTWAY	KING	KB4805-3	30.5	ELEVATOR HOISTWAY WALL	15	11	16.5	5	520	480	60	3	2,3,4

NOTES:

1. UNIT MOUNTED THERMOSTAT PROVIDED BY MANUFACTURER.
2. LOCAL DISCONNECT PROVIDED BY MANUFACTURER, FIELD MOUNTED BY ELECTRICAL CONTRACTOR.
3. ELEVATOR HOISTWAY APPLICATION. PROVIDE SWING ARM SUPPORT.
4. REMOTE MOUNTED THERMOSTAT. AT TOP OF HOISTWAY
5. 3 WIRE.

GRILLES, REGISTERS, AND DIFFUSER SCHEDULE

EQUIP. TAG	MFR	MODEL	TYPE	MATERIAL	SIZE	MAX. NC	NOTES
A	TITUS	300RL	SUFACE MOUNTED DOUBLE DEFLECTION	ALUMINUM	VARIES	30	SEE BELOW
B	TITUS	350RL	EXHAUST GRILLE	STEEL	VARIES	30	SEE BELOW
C	TITUS	50FF	FILTER RETURN GRILLE	ALUMINUM	22"x22" NECK	30	SEE BELOW

NOTES:

1. CONTRACTOR SHALL VERIFY BORDER TYPE INCLUDING FRAME, FLANGE, AND SECURING METHOD IN EACH APPLICATION; REFER TO...
2. COLOR WHITE.
3. SURFACE MOUNT.
4. LAY-IN FRAME.
5. PROVIDE HINGE WITH QUARTER TURN FASTENER. FURNISH WITH 2" MERV 8 FILTER.

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PROJECT:
RATE FIELD - HVAC FY2026

333 WEST 35TH STREET
CHICAGO, IL 60616

DRAWING TITLE:
MECHANICAL SCHEDULES

DESIGNED BY:	MO
CHECKED BY:	CC
PROJECT NO:	25080
SCALE:	NO SCALE

SHEET NO.
M4.01

010000. GENERAL NOTES

A. ALL WORK PERFORMED UNDER THIS CONTRACT SHALL BE IN CONFORMANCE WITH ALL GOVERNING NATIONAL, STATE, AND LOCAL CODES HAVING JURISDICTION.

B. ALL EQUIPMENT FURNISHED, AND ALL WORK PERFORMED UNDER THIS CONTRACT SHALL BE IN STRICT COMPLIANCE WITH CURRENT APPLICABLE STANDARDS AS SET FORTH BY THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA), UNDERWRITERS LABORATORIES (UL), THE AMERICAN GAS ASSOCIATION (AGA), THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME), THE AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR CONDITIONING ENGINEERS (ASHRAE), SHEET METAL AND AIR-CONDITIONING CONTRACTORS NATIONAL ASSOCIATION, INC. (SMACNA), AND OTHER NATIONAL STANDARDS WHERE APPLICABLE

C. CONTRACTOR SHALL REVIEW THE ENTIRE SET OF CONTRACT DOCUMENTS INCLUDING, BUT NOT LIMITED TO, ALL MECHANICAL AND ELECTRICAL DRAWINGS, AS WELL AS ALL SPECIFICATIONS AND INSTRUCTIONS TO BIDDERS. THIS CONTRACTOR SHALL VISIT THE SITE AND MAKE A DETAILED INSPECTION OF THE SPECIFIED WORK TO DEVELOP KNOWLEDGE OF ALL CONDITIONS PERTINENT TO THE COMPLETION OF HIS WORK. THIS CONTRACTOR SHALL FULLY COORDINATE HIS WORK WITH THE WORK PERFORMED BY OTHER TRADES AND/OR CONTRACTORS, AND SHALL MAKE SUCH FIELD ADJUSTMENTS AS ARE REQUIRED TO ACCOMMODATE FIELD CONDITIONS. ALL OF THE ABOVE SHALL BE INCLUDED IN THE SCOPE OF WORK AT NO ADDITIONAL COST TO OWNER.

D. SHOULD CONTRACTOR FIND DISCREPANCIES IN, OR OMISSIONS FROM, THE DRAWINGS, SPECIFICATIONS, OR OTHER CONTRACT DOCUMENTS, OR DISCREPANCIES BETWEEN ACTUAL FIELD CONDITIONS AND THOSE REPRESENTED IN THE DRAWINGS, OR CONFLICTS BETWEEN HIS WORK AND THAT OF OTHER TRADES, OR BE IN DOUBT AS TO THE MEANING OF ANY CONTRACT DOCUMENTS, CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER AND THE ENGINEER IN WRITING AND SHALL OBTAIN CLARIFICATION PRIOR TO SUBMITTING ANY BID. LACK OF SUCH NOTIFICATION SHALL BE CONSTRUED AS CONTRACTOR'S REPRESENTATION THAT NO DISCREPANCIES OR CONFLICTS EXIST. ADDITIONAL COMPENSATION WILL NOT BE GRANTED AFTER AWARD OF CONTRACT FOR ANY WORK REQUIRED TO COMPLY WITH THIS REQUIREMENT.

E. THE DRAWINGS INDICATE DIAGRAMMATICALLY THE INTENT, REQUIREMENTS FOR, AND LOCATION OF THE WORK INCLUDED UNDER THIS CONTRACT. ALL WORK REQUIRED TO AFFECT THE INDICATED DESIGN, INCLUDING DETAILS NOT SHOWN BUT WHOSE INCLUSION WOULD BE DEEMED A REQUIREMENT BY A KNOWLEDGEABLE TRADESMAN, BUILDING ENGINEER, OR TECHNICIAN, SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.

F. IT IS THE INTENT OF THESE DOCUMENTS THAT THE CONTRACTOR PROVIDE ALL LABOR, MATERIAL, EQUIPMENT, AND TOOLS FOR THE COMPLETE INSTALLATION OF ALL WORK SHOWN ON THE PLANS AND/OR DESCRIBED HEREIN, INCLUDING ALL DEVICES, CONTROLS, AND APPURTENANCES REQUIRED TO SET THE NEW SYSTEMS INTO OPERATION, UNLESS OTHERWISE NOTED.

G. CONTRACTOR SHALL VERIFY ALL MOUNTING, ARRANGEMENTS, HEIGHTS, AND LOCATIONS PRIOR TO ROUGH-IN. ANY MENTION OF A SPECIFIC MOUNTING ARRANGEMENT, WEIGHT, OR LOCATION SHALL NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY TO VERIFY SPECIFIC REQUIREMENTS AND BASE HIS WORK ON THEM. THE SAME CARE SHALL BE TAKEN WITH RESPECT TO INFORMATION FURNISHED BY THIS CONTRACTOR TO HIS SUBCONTRACTORS OR TO OTHER CONTRACTORS EMPLOYED BY THE OWNER ON THIS PROJECT. THIS CONTRACTOR SHALL BE FINANCIALLY RESPONSIBLE FOR ANY CHANGE ORDERS NECESSITATED BY INACCURATE OR INCORRECT INFORMATION FURNISHED TO OTHER CONTRACTORS. NO ADDITIONS TO THE CONTRACT AMOUNT WILL BE PERMITTED FOR ITEMS INSTALLED IN WRONG LOCATIONS OR IN CONFLICT WITH OTHER WORK.

H. CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING FOR AND OBTAINING ALL APPLICABLE PERMITS. THIS CONTRACTOR SHALL PAY ALL PERMIT FEES, PLAN REVIEW FEES, LICENSE FEES, AND INSPECTIONS APPLICABLE TO HIS WORK, AND SUCH COSTS SHALL BE INCLUDED IN HIS BID UNLESS OTHERWISE NOTED. THIS CONTRACTOR SHALL ALSO INCLUDE IN HIS BID ALL FEES ASSOCIATED WITH THE SERVICES OF A PERMIT EXPEDITER AS MAY BE REQUIRED TO MEET THE PROJECT SCHEDULE.

I. CONTRACTOR SHALL ESTABLISH SAFE WORKING PROCEDURES FOR THE PROTECTION OF THE WORKMEN IN ALL PHASES OF WORK AND SHALL COMPLY WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY LAWS, INCLUDING THE REQUIREMENTS OF OSHA. HE SHALL ALSO PROVIDE ALL NECESSARY SIGNS, LIGHTS, AND BARRICADES REQUIRED FOR THE SAFETY OF ALL OTHER PERSONS WHO MIGHT COME IN CONTACT WITH THE CONSTRUCTION BEING PERFORMED UNDER THIS CONTRACT.

J. ALL PUBLIC AND PRIVATE PROPERTY DAMAGED AS A RESULT OF WORK PERFORMED UNDER THIS CONTRACT SHALL BE REPAIRED AND/OR REPLACED TO MATCH EXISTING CONSTRUCTION BY THIS CONTRACTOR AND TO THE SATISFACTION OF THE OWNER AND AUTHORITIES HAVING JURISDICTION.

K. CONTRACTOR SHALL MAKE ALL ARRANGEMENTS WITH THE BUILDING OWNER'S REPRESENTATIVE REGARDING WORKSITE ACCESS, BUILDING RULES, AND REGULATIONS, INCLUDING WORKING HOURS, REFUSE DISPOSAL, DUMPSTER LOCATION, SECURITY, INTERRUPTIONS OF BUILDING UTILITIES OR FUNCTIONS, OWNERSHIP OF SALVAGED MATERIALS, PARKING, AND ANY OTHER ITEMS DEEMED TO BE OF MUTUAL INTEREST.

L. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO STORE AND PROTECT FROM DAMAGE ALL EQUIPMENT AND MATERIALS IN A MANNER THAT WILL MAINTAIN AN ORDERLY, CLEAN APPEARANCE. DAMAGED EQUIPMENT AND MATERIAL IS SUBJECT TO REJECTION BY THE OWNER'S REPRESENTATIVE. REPLACEMENT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.

M. PROVIDE ALL HOLES, SLEEVES, CUTTING, PATCHING, AND SEALING FOR INSTALLATION OF THIS WORK. SEALING SHALL CONFORM TO THE FIRE RATING OF ALL BUILDING ASSEMBLIES. ALL EXTERIOR PENETRATIONS SHALL BE MADE WEATHER TIGHT.

N. CONTRACTOR IS RESPONSIBLE FOR LOCATING, INCLUDING SCANNING WHERE NECESSARY, OBSTRUCTIONS/REINFORCEMENTS WHERE PENETRATIONS ARE TO BE MADE. ANY DAMAGE RESULTING FROM PENETRATIONS IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE REPAIRED AT NO ADDITIONAL COST TO THE OWNER.

O. CONTRACTOR SHALL NOT MODIFY OR REMOVE ANYTHING FOUND TO BE IN THE PATH OF NEW SYSTEMS TO BE INSTALLED WITHOUT PRIOR APPROVAL BY THE ENGINEER.

P. THE CONTRACTOR IS RESPONSIBLE FOR THE CONTINUOUS CLEANING OF ALL DUST AND DEBRIS RESULTING FROM THEIR WORK.

Q. CONTRACTOR TO DETERMINE REQUIRED SYSTEM SHUTDOWNS. MAXIMUM DURATION OF SYSTEM SHUTDOWN SHALL BE AT THE DISCRETION OF THE OWNER'S REPRESENTATIVE. SHUTDOWN SHALL BE COORDINATED ON THE JOB SITE WITH THE OWNER'S REPRESENTATIVE. CONTRACTOR SHALL PROVIDE A MINIMUM OF ONE (1) WEEK ADVANCE NOTICE OF SYSTEM SHUTDOWNS.

R. CONTRACTOR SHALL BE PROPERLY LICENSED, BONDED, AND INSURED AND CAPABLE OF PERFORMING QUALITY WORKMANSHIP ON THIS PROJECT.

S. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, AND SAFETY.

T. REMOVAL AND RESTORATION OF FINISHED SURFACES AS REQUIRED TO COMPLETE THIS SCOPE OF WORK IS THE RESPONSIBILITY OF THIS CONTRACTOR.

U. CONTRACTOR SHALL COORDINATE USE OF THE BUILDING ELEVATOR(S) AND DELIVERIES WITH THE OWNER.

V. MAINTAIN ALL MANUFACTURER RECOMMENDED AND CODE REQUIRED CLEARANCES.

W. CONTRACTOR SHALL PROVIDE TRAINING TO THE OPERATING STAFF FOR NEW SYSTEMS AND EQUIPMENT. REFER TO OWNER TRAINING SPECIFICATION SECTION FOR ADDITIONAL INFORMATION.

010002. OWNER TRAINING

A. THE CONTRACTOR SHALL PROVIDE DEMONSTRATION AND TRAINING TO OWNER'S PERSONNEL FOR NEW SYSTEMS AND EQUIPMENT. THE COSTS ASSOCIATED WITH THIS SHALL BE INCLUDED AS PART OF THE BASE BID UNLESS OTHERWISE NOTED.

B. ALL EQUIPMENT MANUALS, INSTALLATION OPERATION AND MAINTENANCE MANUALS, ETC. SHALL BE TURNED OVER TO THE OWNER PRIOR TO COMMENCING OWNER DEMONSTRATION AND TRAINING. REFER TO PROJECT CLOSEOUT DOCUMENT REQUIREMENTS FOR ADDITIONAL INFORMATION.

C. CONTRACTOR SHALL PROVIDE A MINIMUM OF 4 HOURS OF TRAINING OVER 1 VISITS ON SITE FOR OWNER PERSONNEL.

D. OWNER TRAINING SHALL BE CONDUCTED AFTER FUNCTIONAL TESTING IS COMPLETE AS APPROVED BY THE ENGINEER AND (WHERE APPLICABLE) COMMISSIONING AUTHORITY.

E. COORDINATE TRAINING WITH OWNER, ENGINEER & COMMISSIONING AUTHORITY.

013000. SHOP DRAWINGS, SUBMITTALS, AND AS-BUILTS

A. CONTRACTOR SHALL SUBMIT TO THE ENGINEER COORDINATED SHOP DRAWINGS. SHOP DRAWINGS SHALL BE 1/4" SCALE AND SHALL INDICATE LAYOUT OF ALL EQUIPMENT, DUCTS, PIPING, THERMOSTATS, SENSORS, GRAPHICS, CONTROLS NETWORK ARCHITECTURE, CONTROL POINTS LIST, OPERATING SEQUENCES, CONTROL DEVICES WITH SETTINGS OR ADJUSTABLE RANGES, ETC. SHOP DRAWINGS SHALL INCLUDE ALL DUCT AND PIPE SIZES, CAPACITIES, ELEVATIONS, ETC. CONTRACTOR SHALL PROCEED WITH SITE WORK ONLY AFTER RECEIVING SHOP DRAWINGS MARKED REVIEWED.

   1. SHOULD CONDITIONS NECESSITATE ANY REARRANGEMENTS, CONTRACTOR SHALL SUBMIT TO THE ENGINEER SHOP DRAWINGS SHOWING SUCH CHANGES. CONTRACTOR SHALL PROCEED WITH SITE WORK ONLY AFTER RECEIVING SHOP DRAWINGS MARKED REVIEWED.

B. CONTRACTOR SHALL SUBMIT TO THE ENGINEER MANUFACTURERS' SUBMITTALS FOR ALL EQUIPMENT AND ACCESSORIES. CONTRACTOR SHALL PROCEED WITH PROCUREMENT ONLY AFTER RECEIVING SUBMITTALS MARKED REVIEWED.

C. CONTRACTOR SHALL SUBMIT THE FOLLOWING ELECTRONIC FILES TO THE ENGINEER AND OWNER AS PART OF THE CLOSEOUT PACKAGE:

   1. ALL APPROVED SUBMITTALS, INCLUDING FINAL EQUIPMENT DATA SHEETS, CONTROL SEQUENCES, AND APPROVED SHOP DRAWINGS REFLECTING THE INSTALLED SYSTEMS.
   2. OPERATION AND MAINTENANCE MANUALS (IOMs), INCLUDING INSTALLATION INSTRUCTIONS, ROUTINE AND PREVENTIVE MAINTENANCE PROCEDURES, TROUBLESHOOTING GUIDES, AND PARTS LISTS FOR ALL MAJOR EQUIPMENT.
   3. AS-BUILT DRAWINGS, INCLUDING RECORD LOCATIONS OF CONTROL COMPONENTS, INCLUDING CONTROL UNITS, THERMOSTATS, AND SENSORS. REVISE SHOP DRAWINGS TO REFLECT ACTUAL INSTALLATION AND OPERATING SEQUENCES.
   4. FINAL ENGINEERING DRAWINGS FOR ALL DISCIPLINES.
   5. COMMISSIONING AND FUNCTIONAL TESTING REPORTS (AS APPLICABLE). DOCUMENT SYSTEM START UP, TESTING, ADJUSTING, AND BALANCING RESULTS.
   6. PUNCH LIST DOCUMENTATION AND COMPLETED SIGN OFFS, INCLUDING SIGNED CONFIRMATION THAT ALL PUNCH LIST ITEMS HAVE BEEN ADDRESSED AND RESOLVED.
   7. WARRANTY DOCUMENTATION, INCLUDING MANUFACTURER, PRIME CONTRACTOR AND SUB-CONTRACTOR WARRANTIES, CLEARLY IDENTIFYING COVERAGE PERIODS, TERMS, AND START DATES.
   8. TRAINING DOCUMENTATION, INCLUDING TRAINING AGENDAS, PRESENTATION MATERIALS, AND SIGN-IN SHEETS VERIFYING OWNER PERSONNEL PARTICIPATION.
   9. PERMIT CLOSEOUT AND INSPECTION CERTIFICATES.
   10. COST SUMMARY AND FINAL PAY APPLICATIONS.
   11. VENDOR AND SUBCONTRACTOR CONTACT INFORMATION, INCLUDING NAMES, PHONE NUMBERS, EMAIL ADDRESSES, AND EMERGENCY CONTACTS.

013001. MATERIALS AND EQUIPMENT

A. ALL MATERIALS AND EQUIPMENT INSTALLED UNDER THIS CONTRACT SHALL BE NEW, UNLESS OTHERWISE STATED IN THESE CONTRACT DOCUMENTS, AND FREE FROM DEFECTS.

B. ALL MATERIALS AND EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS' RECOMMENDATIONS.

C. CONTRACTOR IS REQUIRED TO REVIEW ALL DRAWINGS. MATERIALS AND EQUIPMENT SHOWN ON THE SCHEDULES AND DETAILS SHALL BE INCLUDED IN BASE BID. NO MATERIAL OR EQUIPMENT SUBSTITUTIONS WILL BE CONSIDERED AFTER THE AWARD OF CONTRACT. IF CONTRACTOR DESIRES TO SUBSTITUTE MATERIAL OR EQUIPMENT, CONTRACTOR MUST SUBMIT AS ALTERNATE WITH HIS BASE BID A LIST OF SUCH ITEMS INDICATING ITEM, MANUFACTURER, MODEL NUMBER, AND AMOUNT TO BE ADDED TO OR DEDUCTED FROM THE BASE BID. EACH SUCH MATERIAL OR EQUIPMENT SUBSTITUTION ITEM SHALL BE LISTED SEPARATELY.

D. CONTRACTOR SHALL BE RESPONSIBLE FOR SCHEDULING THE PURCHASE, DELIVERY, RECEIVING, UNLOADING, UNCRATING, STORING, SETTING IN PLACE, AND PROTECTING OF ALL NEW EQUIPMENT FURNISHED BY THE CONTRACTOR OR PROVIDED TO THE CONTRACTOR BY THE OWNER, AND SHALL SECURE SUCH EQUIPMENT FROM DAMAGE UNTIL TIME OF FINAL ACCEPTANCE BY THE OWNER.

E. CONTRACTOR SHALL FURNISH AND INSTALL ALL STRUCTURE, SLEEVES, SHIMS, ETC. REQUIRED TO LEVEL AND SUPPORT EQUIPMENT AND MATERIALS. INSTALL NONMETALLIC NON-SHRINK GROUT FOR LEVELING EQUIPMENT BASES.

F. CONTRACTOR SHALL VERIFY ALL PHYSICAL, ELECTRICAL, INGRESS, ETC. REQUIREMENTS FOR ALL EQUIPMENT PRIOR TO ORDERING.

G. CONTRACTOR SHALL SUBMIT TO OWNER THE PROPOSED LABELS/IDENTIFICATION PRODUCT FOR EACH PIECE OF EQUIPMENT PRIOR TO ORDERING. EQUIPMENT LABELS/IDENTIFICATION SHALL CONFORM TO THE FOLLOWING:

   1. MATERIAL AND THICKNESS: MULTILAYER, MULTICOLOR, PLASTIC LABELS FOR MECHANICAL ENGRAVING, 1/8 INCH THICK, AND HAVING PREDRILLED HOLES FOR ATTACHMENT HARDWARE.
   2. LETTER COLOR: WHITE.
   3. BACKGROUND COLOR: BLUE.
   4. MAXIMUM TEMPERATURE: ABLE TO WITHSTAND TEMPERATURES UP TO 160 DEG F.
   5. MINIMUM LABEL SIZE: LENGTH AND WIDTH VARY FOR REQUIRED LABEL CONTENT, BUT NOT LESS THAN 2-1/2 BY 3/4 INCH.
   6. MINIMUM LETTER SIZE: 1/4 INCH FOR NAME OF UNITS IF VIEWING DISTANCE IS LESS THAN 24 INCHES, 1/2 INCH FOR VIEWING DISTANCES UP TO 72 INCHES, AND PROPORTIONATELY LARGER LETTERING FOR GREATER VIEWING DISTANCES. INCLUDE SECONDARY LETTERING TWO-THIRDS TO THREE-FOURTHS THE SIZE OF PRINCIPAL LETTERING.
   7. FASTENERS: STAINLESS-STEEL RIVETS OR SELF-TAPPING SCREWS.
   8. ADHESIVE: CONTACT-TYPE PERMANENT ADHESIVE, COMPATIBLE WITH LABEL AND WITH SUBSTRATE.

H. EQUIPMENT DATA, LABELS, AND OTHER IDENTIFICATION SHALL NOT BE OBSTRUCTED.

I. CONTRACTOR SHALL PROVIDE FILTERS, STRAINER SCREENS, ETC. FOR ALL NEW EQUIPMENT DURING CONSTRUCTION. REPLACE FILTERS, STRAINERS SCREENS, ETC. WITH FINAL FILTERS, STRAINER SCREENS, ETC. AT COMPLETION OF PROJECT AND PRIOR TO TEST AND BALANCE.

017400. WARRANTY

A. SEE BID DOCUMENTS.

020000. GENERAL DEMOLITION NOTES

A. ALL WORK SHALL BE PERFORMED IN A CLEAN AND WORKMANLIKE MANNER. CARE SHALL BE EXERCISED TO MINIMIZE ANY INCONVENIENCE OR DISTURBANCE TO OTHER AREAS OF THE BUILDING, WHICH ARE TO REMAIN IN OPERATION.

B. ALL DEMOLITION AS CALLED FOR ON THE DEMOLITION DRAWINGS SHALL BE UNDER THIS CONTRACTOR'S WORK.

C. CONTRACTOR SHALL VISIT THE BUILDING, BEFORE SUBMITTING HIS BID, TO VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS WHICH MAY AFFECT HIS WORK. NOT ALL EXISTING DUCTWORK, PIPING, EQUIPMENT, ETC. MAY BE INDICATED ON DOCUMENTS.

D. THE INTENT OF THE DEMOLITION IS TO REMOVE THE ITEMS IN THEIR ENTIRETY. THIS INCLUDES ALL ASSOCIATED SUPPORT BASES, ANCHORAGE, HANGERS, CONTROLS INCLUDING WIRING AND CONDUIT EXPOSED IN MECHANICAL ROOMS, PIPING, DUCTWORK, WIRING, ETC. CAP EXISTING SYSTEMS TO REMAIN AT MAINS OR OTHER ACTIVE BRANCH LINES. MINIMIZE DEAD END LENGTHS. LABEL ABANDONED CONTROLS CONDUIT AND WIRE.

E. BEFORE STARTING ANY DEMOLITION WORK ON EQUIPMENT WHICH HAS AN ELECTRICAL CONNECTION, THE ELECTRICAL CONTRACTOR SHALL DISCONNECT THE POWER AND REMOVE CONDUIT, WIRING, DISCONNECT SWITCHES, AND STARTERS UNDER THIS CONTRACT.

F. CONTRACTOR SHALL BE RESPONSIBLE FOR CONTINUOUS CLEANUP THROUGHOUT THE COURSE OF THE DEMOLITION WORK.

G. ALL EQUIPMENT, MATERIAL, ETC. THAT IS DEMOLISHED SHALL BE REMOVED FROM THE BUILDING SITE BY THIS CONTRACTOR IN A PROPER AND LEGAL MANNER. NO ITEM WHICH IS DEMOLISHED MAY BE REUSED UNLESS SPECIFICALLY NOTED.

H. ANY CONTROLS HARDWARE OR PROGRAMMING NO LONGER NECESSARY TO ACCOMPLISH THE SEQUENCE OF OPERATIONS SHALL BE DECOMMISSIONED.

I. ALL DEMOLITION WORK OF THE EXISTING CONTROLS FOR EQUIPMENT SHOWN ON THE DRAWINGS TO BE DEMOLISHED SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR. THIS CONTRACTOR SHALL MODIFY THE EXISTING CONTROLS AS REQUIRED TO ENSURE OPERATION OF EXISTING EQUIPMENT TO REMAIN. ALL EXISTING CONTROLS SHOWN TO BE DEMOLISHED SHALL BE REMOVED AND TURNED OVER TO THE OWNER.

230593. TESTING AND BALANCING

A. UPON SUBSTANTIAL COMPLETION OF SYSTEMS INSTALLATION, AND PRIOR TO ACCEPTANCE BY THE ENGINEER AND OWNER, THIS CONTRACTOR SHALL SUBCONTRACT A TAB CONTRACTOR WHO'S TECHNICIANS ARE NEBB OR AABC CERTIFIED. TAB SUBCONTRACTOR SHALL NOT BE AFFILIATED WITH THE CONTRACTOR.

B. TEST PROCEDURES SHALL BE PER LATEST EDITIONS OF NEBB, AABC, OR TESTING, ADJUSTING, AND BALANCING CHAPTER OF ASHRAE APPLICATIONS HANDBOOK.

C. PRIOR TO ALL TAB PROCEDURES PROCEEDING, SYSTEMS INSTALLATION, STARTUP, AND OPERATION SHALL BE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND PER THE MINIMUM REQUIREMENTS OF NEBB, AABC, OR ASHRAE. IF DEFICIENCIES ARE FOUND WHICH PREVENT PROPER TAB PROCEDURES AND REPEATABLE RESULTS, THIS CONTRACTOR SHALL BE RESPONSIBLE FOR ALL RESULTING COSTS.

D. THE OWNER, ENGINEER, AND COMMISSIONING AUTHORITY SHALL BE NOTIFIED WHEN TAB SCOPE WILL BEGIN ON SITE, AUTHORIZED REPRESENTATIVE OF THE OWNER MAY BE IN ATTENDANCE IF DEEMED NECESSARY.

E. THIS CONTRACTOR TO ASSIST THE TAB CONTRACTOR AS REQUIRED TO ENSURE REPEATABLE RESULTS. THIS CONTRACTOR SHALL PROVIDE THE TAB CONTRACTOR WITH ALL REQUIRED DOCUMENTATION TO SUPPORT TAB SCOPE.

F. TAB CONTRACTOR SCOPE SHALL INCLUDE ALL NEW SYSTEMS AND EQUIPMENT INCLUDING AIR FLOW STATIONS AND BTU METERS.

G. TAB CONTRACTOR SCOPE SHALL INCLUDE EXISTING SYSTEMS AS IDENTIFIED IN THE DOCUMENTS OR AS REQUIRED FOR A FULLY FUNCTIONAL AND FULLY BALANCED SYSTEM.

H. TAB CONTRACTOR SHALL PROVIDE A SUBMITTAL PRIOR TO PERFORMING ANY WORK FOR REVIEW BY THE ENGINEER INCLUDING THE FOLLOWING:

   1. TAB PERSONNEL QUALIFICATION AND CERTIFICATION REPORTS.
   2. TEST PROCEDURES SPECIFIC TO THIS PROJECT.
   3. TEST FORMS SPECIFIC TO THIS PROJECT INCLUDING FAN CURVES.

I. TAB CONTRACTOR SHALL PROVIDE REPORT IN ACCORDANCE WITH UTILIZED STANDARD ALONG WITH AN EXECUTIVE SUMMARY STATING THE EXTENT OF SYSTEM COMPLIANCE, SYSTEM DEFICIENCIES, AND RECOMMENDED CHANGES. THIS REPORT SHALL BE SUBMITTED WITHIN THIRTY (30) DAYS OF COMPLETION OF THIS SCOPE OF WORK.

J. TAB CONTRACTOR SHALL COORDINATE WITH THE BASC AS REQUIRED TO PERFORM SCOPE OF WORK, DETERMINE CONTROL SETPOINTS, ETC. FOR PROPER OPERATION OF THE SYSTEM.

K. ALL BALANCING PROCEDURES SHALL BE PERFORMED TO MINIMIZE ENERGY USAGE.

230900. CONTROLS

A. GENERAL

   1. BASC SHALL FURNISH AND INSTALL ALL COMPONENTS REQUIRED FOR A COMPLETE AND FUNCTIONAL DDC SYSTEM TO CONTROL DEVICES, EQUIPMENT AND SYSTEMS.
   2. NEW CONTROLS SHALL BE INTEGRATED WITH AN EXTENSION OF THE OWNER'S EXISTING BUILDING AUTOMATION SYSTEM UTILIZING THE OWNER'S NETWORK. THE BUILDING HAS AN EXISTING SIEMENS FRONT END WHICH SHALL REMAIN IN USE.
   3. EXISTING CONTROL SYSTEMS SHALL REMAIN IN OPERATION UNTIL ALL CONTROLLED EQUIPMENT HAS BEEN CUTOVER TO THE NEW CONTROL SYSTEM.
   4. ALL WORK SHALL BE INSTALLED, WIRED, CIRCUIT TESTED, AND CALIBRATED BY FACTORY CERTIFIED TECHNICIANS QUALIFIED FOR THIS WORK. SUPERVISION, CALIBRATION, AND CHECKOUT OF THE SYSTEM SHALL BE BY THE EMPLOYEES OF THE BASC AND SERVICES SHALL NOT BE SUBCONTRACTED. BASC SHALL HAVE AN IN-PLACE SUPPORT FACILITY WITHIN REASONABLE PROXIMITY OF THE JOB SITE WITH FACTORY CERTIFIED TECHNICIANS, CERTIFIED ENGINEERS, SPARE PARTS INVENTORY, AND ALL NECESSARY TEST AND DIAGNOSTIC EQUIPMENT FOR THE INSTALLED SYSTEM. BASC SHALL HAVE EMERGENCY SERVICE AVAILABLE 24 HOURS A DAY AND INITIAL RESPONSE TIME OF LESS THAN 1 HOUR.
   5. BASC SHALL PROVIDE ALL LABOR NECESSARY TO INSTALL, INITIALIZE, START UP, AND TROUBLESHOOT ALL BACNET WEB SERVER WORKSTATION SOFTWARE AND THEIR FUNCTIONS INCLUDING ANY OPERATING SYSTEM SOFTWARE, HARDWARE, AND THIRD-PARTY SOFTWARE INSTALLATION AND INTEGRATION REQUIRED FOR A SUCCESSFUL PROJECT.
   6. ALL CORRECTIVE SOFTWARE MODIFICATIONS SHALL BE UPDATED ON ALL USER DOCUMENTATION AND ON USER AND MANUFACTURER ARCHIVED SOFTWARE DISKS.
   7. PROVIDE AN ADEQUATE NUMBER OF CONTROL UNITS AND ADEQUATE LICENSING TO ACHIEVE MONITORING AND CONTROL OF ALL DATA POINTS TO SATISFY THE SEQUENCE OF OPERATION.
   8. INSTALL SOFTWARE IN CONTROL UNITS AND OPERATOR WORKSTATION.
   9. THE BASC SHALL PROVIDE A STARTUP TECHNICIAN TO VERIFY ALL INPUTS AND OUTPUTS FOR PROPER READINGS AND COMMANDS WITHOUT THE PROGRAM RUNNING, TEST THE DDC PROGRAM FOR PROPER OPERATION, ETC.
   10. BASC SHALL COORDINATE, FURNISH AND INSTALL GUARDS AND TAMPER PROOF ENCLOSURES ON THERMOSTATS AS REQUIRED BY OWNER OR AS INDICATED IN THE DOCUMENTS.
   11. FURNISH AND INSTALL MECHANICAL ROOM SYSTEM NETWORK AND CONTROL WIRING IN CONDUIT. CONTROL CONDUIT SHALL BE PAINTED OR DYED BLUE. NON MECHANICAL ROOM LOW VOLTAGE CONTROL WIRING CAN BE RUN IN BRIDLE RINGS ABOVE ACCESSIBLE CEILINGS. THE BASC SHALL INSTALL ANY 120 VOLT AND 24 VOLT WIRING AND CONDUIT REQUIRED FOR ALL TEMPERATURE CONTROL DEVICES AND CONTROL PANELS FROM THE DESIGNATED DISTRIBUTION PANEL.

B. GRAPHICS

   1. PROVIDE ROBUST GRAPHIC SCREENS THAT ARE THREE DIMENSIONAL, USE DYNAMIC SYMBOLS FOR ALL OPERABLE COMPONENTS AND MULTIPLE COLORS FOR EQUIPMENT AND SYSTEMS. GRAPHIC SCREENS MUST BE CUSTOMIZED FOR THIS PROJECT WITH HYPERLINKS TO OTHER ASSOCIATED GRAPHICS. GRAPHICS SHALL RESIDE ON THE CLIENT WEB SERVER FOR ALL SYSTEMS SHOWING CURRENT VALUE OF ALL INPUTS, OUTPUTS, SET POINTS, ALARM POINTS, SCHEDULE LINKS, ETC TO FACILITATE TESTING, MONITORING AND MAINTENANCE.

C. GENERAL REQUIREMENTS FOR STAND ALONE CONTROL SYSTEMS

   1. CONTROL OF THE EQUIPMENT OR SYSTEMS SHALL OPERATE BASED ON ITS STAND ALONE LOCAL CONTROLLER INDEPENDENT OF THE (BAS) UNLESS OTHERWISE NOTED.
   2. CONTRACTOR IS RESPONSIBLE FOR ALL REQUIRED CONDUIT, CONTROL WIRING, DAISY CHAIN NETWORK WIRING, CABLING, DEVICES, INTERLOCKS, SAFETIES, PROGRAMMING, ETC TO OPERATE THE EQUIPMENT OR SYSTEMS.

D. BACNET ADVANCED OPERATOR WORKSTATION DISPLAY (EXISTING)

   1. UTILIZE THE OWNER'S EXISTING NETWORKED PC FOR SYSTEM OPERATION.
   2. AT A MINIMUM THE FOLLOWING CONTROL POINTS SHALL BE CONFIGURED FOR LONG TERM STORAGE ON THE FRONT END PC: SPACE CONDITIONS, SETPOINTS, EQUIPMENT AND SYSTEM TEMPERATURES, VALVE AND DAMPER POSITIONS, CONTROL LOOP STATUS, EQUIPMENT STATUS AND SPEED, OA CONDITIONS, AIRFLOWS, ETC.

E. TRAINING SHALL INCLUDE:

   1. BASIC THEORY ON THE INSTALLED SYSTEMS AND WALK THRU OF THE GRAPHICS. THE GRAPHICAL REVIEW SHALL COVER EACH MAJOR SYSTEM AND SHALL COVER A SAMPLING OF EACH UNIQUE TERMINAL EQUIPMENT CONFIGURATION.
   2. REVIEWING AND ACKNOWLEDGING ALARMS.
   3. LOCATIONS OF AND HOW TO RESET EQUIPMENT SAFETIES.
   4. REVIEWING TREND LOGS.
   5. ADJUSTING EQUIPMENT SCHEDULES; DEMONSTRATE PERMANENT CHANGES TO WEEKLY SCHEDULES AND ALSO SPECIAL EVENT AND HOLIDAY SCHEDULING.
   6. ADJUSTING SETPOINTS AND SETPOINT RESETS. THE OWNER SHALL BE ABLE TO ADJUST THE OPERATION WITHOUT MANUAL OVERRIDES.
   7. ANSWERING OWNER'S STAFF QUESTIONS.
   8. ADJUSTMENT OF SOFTWARE, GRAPHICS, POINT NAMES OR SEQUENCE OF OPERATIONS AS REQUESTED BY THE OWNER DURING TRAINING. PRIOR TO ENACTING ANY CHANGES, APPROVAL SHALL BE OBTAINED FROM THE ENGINEER.

230901. IN HOUSE FUNCTIONAL TESTING

A. GENERAL

   1. ELARA WILL BE WITNESSING FUNCTIONAL TESTING FOR THIS PROJECT.
   2. CONTRACTOR IS RESPONSIBLE FOR FURNISHING ALL LABOR AND MATERIALS REQUIRED TO PERFORM FUNCTIONAL TESTING ON THIS PROJECT.

B. PRIME CONTRACTOR DOCUMENTATION:

   1. THE FOLLOWING SHALL BE COMPLETED BY THE PRIME CONTRACTOR AND REPORTS SHALL BE SUBMITTED TO OWNER AND ENGINEER PRIOR TO THE START OF FUNCTIONAL TESTING. OWNER AND ENGINEER RESERVE THE RIGHT TO DELAY FUNCTIONAL TESTING DUE TO THE INCOMPLETENESS OF ANY OF THE FOLLOWING ITEMS:
      a. TAB REPORT.
      b. PRESSURE TESTING.
      c. LEAKAGE TESTING.
      d. MEGGER TESTING.
      e. THERMAL SCANS OF ELECTRICAL EQUIPMENT.
      f. STARTUP REPORTS.
      g. DRAFT OF O&M'S.
      h. CONTROL PANELS AND WIRING ARE LABELED.
      i. POINT TO POINT CHECKOUT COMPLETED WITH LIST OF OUTSTANDING DEFICIENCIES.
      j. REMOTE ALARMING HAS BEEN CONFIGURED; PROVIDE PROOF ALARMS ARE FUNCTIONAL.
      k. TRENDING HAS BEEN FULLY CONFIGURED; PROVIDE PROOF ALL TRENDING IS IN PLACE INCLUDING ALL HARD-WIRED POINTS AND KEY SETPOINTS.
      l. EQUIPMENT IS OPERATING IN FULL AUTOMATIC OPERATION PER THE SEQUENCES OF OPERATION; CONTRACTOR SHALL PROVIDE WRITTEN CONFIRMATION TO THE OWNER, ENGINEER, AND COMMISSIONING AUTHORITY. PROVIDE WRITTEN EXPLANATION FOR DEVIATIONS FROM THE DESIGNED SEQUENCES OF OPERATION.
      m. ADD BUTTON TO MAIN SYSTEM GRAPHIC TO TRIGGER A BAS REPORT LISTING ALL CONTROL POINTS IN MANUAL OVERRIDE. RUN THIS REPORT AND SUBMIT TO ENGINEER FOR REVIEW.

C. FUNCTIONAL TESTING ACTIVITIES:

   1. FUNCTIONAL PERFORMANCE TESTING SHALL DEMONSTRATE THE INSTALLATION AND OPERATION OF COMPONENTS, SYSTEMS, AND SYSTEM-TO-SYSTEM INTERFACING RELATIONSHIPS IN ACCORDANCE WITH PLANS AND SPECIFICATIONS SUCH AS OPERATION, FUNCTION, AND MAINTENANCE SERVICEABILITY. TESTING SHALL INCLUDE:
      a. ALL MODES AS DESCRIBED IN THE SEQUENCE OF OPERATION
      b. FULL-LOAD AND PART-LOAD CONDITIONS
      c. SEASONAL CONDITIONS
      d. REDUNDANT OR AUTOMATIC BACKUP MODES
      e. PERFORMANCE OF ALARMS
      f. MODE OF OPERATION UPON A LOSS OF POWER AND RESTORATION OF POWER
   2. CONTRACTOR TO INCLUDE TIME AS REQUIRED TO MODIFY THE SEQUENCE OF OPERATIONS AS DETERMINED DURING FUNCTIONAL TESTING TO OPTIMIZE ENERGY AND/OR OPERATION OF SYSTEMS.

232113. PIPING

A. GENERAL

   1. COMPLY WITH PROVISIONS OF ASME B31.
   2. SYSTEM COMPONENTS WHICH REQUIRE OBSERVATION, OPERATION, OR MAINTENANCE, SUCH AS VALVES, CONTROLS, STRAINERS, CLEANOUTS, UNIONS, ETC., SHALL BE READILY ACCESSIBLE. THEY SHALL NOT BE CONCEALED IN CHASES OR ABOVE CEILINGS WITHOUT PROVISION FOR ACCESS. VALVES WHICH ARE NOT ACCESSIBLE FROM NORMAL WORKING LEVEL SHALL BE INSTALLED WITH CHAIN WHEELS OR EXTENSIONS.
   3. INSTALL PIPING TO PERMIT COMPLETE SYSTEM DRAINING.
   4. INSTALL EQUIPMENT AND MATERIALS HAVING PRESSURE RATING EQUAL TO OR GREATER THAN MAXIMUM SYSTEM PRESSURE.
   5. INSTALL INTERIOR PIPING AT RIGHT ANGLES OR PARALLEL TO BUILDING WALLS. DIAGONAL RUNS ARE PROHIBITED, EXCEPT WHERE INDICATED OR APPROVED PRIOR TO INSTALLATION.
   6. INSTALL PIPING TO ALLOW APPLICATION OF INSULATION PLUS 1-INCH CLEARANCE AROUND INSULATION.

B. PRESSURE TESTING

   1. SUBJECT ALL NEW HYDRONIC PIPING TO HYDROSTATIC PRESSURE TESTS THAT IS NOT LESS THAN 50 PSIG AND 1.5 TIMES THE SYSTEM'S WORKING PRESSURE FOR A MINIMUM OF 4 HOURS OR AS SPECIFICALLY INDICATED. TEST PRESSURE SHALL NOT EXCEED MAXIMUM PRESSURE RATING FOR ANY VESSEL, PUMP, VALVE, OR OTHER COMPONENT IN SYSTEM UNDER TEST. SUBMIT REPORT WITHIN 48 HOURS OF TEST DATE TO ENGINEER INDICATING TEST DATE, TEST PRESSURE, AND DURATION, AS WELL AS CERTIFICATION OF SUCCESSFUL TEST.
   2. PIPING SHALL NOT BE CONCEALED, INSULATED, OR SIMILAR UNTIL PRESSURE TESTING IS COMPLETE AND REVIEWED.

C. HYDRONIC PIPING ABOVE GRADE

   1. FOR SIZES 2" AND SMALLER, ALL NEW ABOVE GRADE HYDRONIC PIPING SHALL BE SCHEDULE 40 BLACK STEEL PIPE WITH MALLEABLE IRON SCREWED FITTINGS OR TYPE L COPPER WITH 95/5 SOLDERED JOINTS.
   2. FOR SIZES 2-1/2" AND LARGER, ALL NEW ABOVE GRADE HYDRONIC PIPING SHALL BE SCHEDULE 40 STANDARD WEIGHT, A53, TYPE E, GRADE B BLACK STEEL PIPE WITH WELDED PIPE AND FITTINGS OR TYPE L COPPER WITH 95/5 SOLDERED JOINTS.
   3. MECHANICAL FITTINGS WILL NOT BE ALLOWED. MECHANICAL FITTINGS MAY BE BID AS AN ALTERNATE WHERE EXPOSED AND ACCESSIBLE IN MECHANICAL ROOMS.

D. COOLING CONDENSATE DRAIN PIPING

   1. ALL NEW COOLING CONDENSATE DRAIN PIPING SHALL BE TYPE 'M' COPPER WITH SOLDERED JOINTS.

E. HYDRONIC PIPING INSULATION

   1. FURNISH AND INSTALL ALL NEW PIPING, VALVES, FITTINGS, ETC. AND EXISTING PIPING AS INDICATED ON THE DOCUMENTS WITH FIBERGLASS MOLDED PIPE INSULATION APPLIED WITH AN ALL-SERVICE VAPOR BARRIER JACKET, STAPLED, WITH THE SEAMS, JOINTS, AND STAPLES PAINTED WITH VAPOR-PROOF MASTIC.
   2. ALL DAMAGED INSULATION (RESULTING FROM IMPLEMENTATION OF THIS PROJECT) ON EXISTING PIPING TO REMAIN SHALL BE REPLACED.
   3. MINIMUM INSULATION THICKNESS SHALL BE IN ACCORDANCE WITH THE FOLLOWING SCHEDULE AND ALL APPLICABLE CODES:
      a. CHILLED WATER PIPING: 1"
      b. CONDENSATE DRAIN PIPING: 1/2"
   4. VAPOR BARRIER JACKET SHALL HAVE FACTORY-APPLIED VAPOR RETARDER COMPOSED OF A WHITE KRAFT FACING REINFORCED WITH GLASS FIBER YARN AND BONDED TO ALUMINIZED FILM. LAP ADHESIVE SHALL BE COMPATIBLE WITH INSULATION.
   5. FURNISH AND INSTALL PVC COVERS FOR ALL VALVES AND ALL PIPE FITTINGS.

F. PIPING VALVES

   1. INSTALL ALL VALVES WITH STEMS IN EITHER AN UPRIGHT (PREFERRED) OR HORIZONTAL POSITION. CONTROL VALVES SHALL BE INSTALLED WITH ACTUATOR UPWARD UNLESS NOTED OTHERWISE OR REQUIRED FOR MAINTENANCE.
   2. ISOLATION VALVES SHALL BE ANSI/FCI 70-2-2006 CLASS VI, RATED FOR ZERO LEAKAGE.
   3. INSTALL BRANCH ISOLATION VALVES AT EACH BRANCH TAKE-OFF FROM THE MAIN. BRANCH ISOLATION VALVES ARE TO BE IN ADDITION TO EQUIPMENT ISOLATION VALVES UNLESS APPROVED BY THE ENGINEER.
   4. BALL VALVES (2 NPS AND SMALLER)
      a. 2 PIECE BRONZE BODY 600# WOG RATED, FULL PORT
      b. CHROME PLATED BRONZE BALL
      c. 2-1/4" VALVE EXTENSION
      d. TEFLON SEAT AND STUFFING BOX RING
      e. LEVER HANDLE WITH BALANCE STOPS
      f. ACCEPTABLE MANUFACTURERS:
         i. APOLLO, NIBCO, MILWAUKEE
   5. SWING CHECK VALVE (2 NPS AND SMALLER)
      a. BRONZE BODY, BRONZE TRIM, BRONZE ROTATING SWING DISC
      b. COMPOSITION DISC
      c. TREADED ENDS
      d. ACCEPTABLE MANUFACTURERS:
         i. APOLLO, NIBCO, MILWAUKEE
   6. BALANCING VALVES (UP TO AND INCLUDING 2")
      a. BRASS COPPER ALLOY OR BRONZE BODY/BRASS BALL CONSTRUCTION
      b. GLASS AND CARBON FILLED TFE SEAT RINGS
      c. ACCEPTABLE MANUFACTURERS:
         i. ARMSTRONG, B&G, TACO, T&A

G. PIPING ACCESSORIES

   1. STRAINERS (UP TO AND INCLUDING 2")
      a. SCREWED BRASS OR IRON BODY
      b. Y PATTERN WITH 1/32" STAINLESS STEEL PERFORATED SCREEN
      c. ACCEPTABLE MANUFACTURERS:
         i. KECKLEY, WATTS, APOLLO, NIBCO, MILWAUKEE
   2. AIR VENTS
      a. MANUAL TYPE: SHORT VERTICAL SECTIONS OF PIPE TO/FROM AIR CHAMBER, WITH 1/8" BRASS NEEDLE VALVE AT TOP OF CHAMBER
      b. FLOAT TYPE: BRASS OR SEMI-STEEL BODY, COPPER, STAINLESS STEEL VALVE AND VALVE SEAT; SUITABLE FOR SYSTEM OPERATING TEMPERATURE AND PRESSURE; WITH ISOLATING VALVE
      c. WASHER TYPE: BRASS WITH HYDROSCOPIC FIBER DISCS, VENT PORTS, ADJUSTABLE CAP FOR MANUAL SHUT-OFF, AND INTEGRAL SPRING LOADED BALL CHECK VALVE.
      d. ACCEPTABLE MANUFACTURERS:
         i. BELL AND GOSSETT, TACO, ARMSTRONG
   3. REDUCERS
      a. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, INSTALL ALL SUPPLY PIPING TO COILS, PUMPS, AND OTHER EQUIPMENT INCLUDING VALVES AND STRAINERS THEREIN, AT LINE SIZE IF A REDUCTION IS REQUIRED AT A PUMP, COIL, CONTROL VALVE, ETC. THE REDUCER SHALL BE INSTALLED ABUTTING THE INLET AND/OR OUTLET OF THE DEVICE.
      b. USE ECCENTRIC REDUCING FITTINGS OR ECCENTRIC REDUCING COUPLINGS WHERE REQUIRED TO PREVENT POCKETING OF LIQUID.
      c. WHERE ECCENTRIC REDUCERS ARE USED, THE STRAIGHT SIDE SHOULD BE INSTALLED ON TOP FOR PUMP SUCTION AND ON THE BOTTOM FOR ALL OTHER LINES.
   4. INSTALL AIR VENTS AT HIGH POINTS IN ALL PIPING AND AS REQUIRED FOR SYSTEM VENTING.
   5. INSTALL DRAIN VALVES AT LOW POINTS IN PIPING AND AS REQUIRED FOR SYSTEM DRAINAGE. DRAINS SHALL NOT BE LESS THAN 3/4".
   6. INSTALL UNIONS IN PIPING 2 INCHES AND SMALLER ADJACENT TO EACH VALVE AND AT FINAL CONNECTION TO EACH PIECE OF EQUIPMENT HAVING A 2-INCH OR SMALLER THREADED PIPE CONNECTION.
   7. INSTALL DI-ELECTRIC FITTINGS TO CONNECT PIPING MATERIALS OF DISSIMILAR METALS.

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ILLINOIS SPORTS FACILITIES AUTHORITY

ISSUE/REVISION:

REV	DATE	DESCRIPTION
	1/30/2026	ISSUED FOR BID

PROJECT:
RATE FIELD - HVAC FY2026

333 WEST 35TH STREET
CHICAGO, IL 60616

DRAWING TITLE:
MECHANICAL SPECIFICATIONS

DESIGNED BY: MO
CHECKED BY: CC
PROJECT NO: 25080
SCALE: NO SCALE
SHEET NO.

M5.01

H. PIPE HANGERS AND SUPPORTS

1. PROVIDE THE NECESSARY HANGERS AND ACCESSORIES FOR THE PROPER SUPPORT OF THE NEW PIPING, EQUIPMENT, ETC.
2. ALL NEW HORIZONTAL PIPING SHALL BE SUPPORTED BY STEEL CLEVIS OR TRAPEZE HANGERS OR BRACKETS AT SUFFICIENT INTERVALS TO MAINTAIN A STRAIGHT LINE, BUT NOT TO EXCEED 10 FEET SPACING ON CENTERS OF HANGERS IN ANY CASE, WITH A SEPARATE HANGER FOR EACH BRANCH. HANGERS SHALL BE LOCATED TO AVOID UNDUE STRESS ON JOINTS.
3. .
4. WHERE INSULATED PIPE IS SUPPORTED, PROVIDE SADDLES, BLOCKS OR OTHER METHOD APPROVED BY ENGINEER TO PROTECT INSULATION FROM BEING CRUSHED.
5. PIPE SUPPORT SHALL NOT BE FROM DUCTWORK, CONDUIT, OR OTHER PIPING BUT FROM THE PERMANENT BUILDING STRUCTURE.
6. HANGER RODS SHALL BE FULL-DIAMETER STEEL WITH THREADED ENDS FOR FIELD CUTTING AND THREAD EXTENDING AS REQUIRED.
7. HANGER RODS SHALL NOT BE BENT OR ALTERED IN ANY MATTER AND SHALL BE INSTALLED PLUMB AND TRUE. THE ROD SUPPORTING THE HANGER SHALL BE NO LONGER THAN 1/2" BELOW THE LOWER NUT.
8. PROVIDE ROLLER SUPPORTS TO ALLOW FOR PIPE MOVEMENT WHEREVER THE LENGTH OF PIPE AND/OR THE EXPANSION OF THE PIPE REQUIRE. FIXED PIPE SUPPORTS THAT DO NOT ALLOW FOR THE NATURAL MOVEMENT OF PIPING DUE TO EXPANSION ARE NOT ALLOWED UNLESS OTHERWISE NOTED.

I. PIPE LABELING

1. STENCIL TYPE MARKERS WILL NOT BE PERMITTED. ONLY FACTORY MANUFACTURED MARKERS AS FOLLOWS WILL BE ACCEPTABLE:
   a. FOR INDOOR USE, UTILIZE ADHESIVE PIPE MARKERS - LARGEST SIZE POSSIBLE GIVEN THE PIPE OR INSULATION OUTER DIAMETER, WITH BOTH ENDS SECURED WITH ARROW TAPE OF MATCHING SIZE AND COLOR SCHEME.
2. IDENTIFICATION MARKERS SHALL BE PLACED ON ALL EXPOSED AND CONCEALED PIPES AT 20'-0" INTERVALS, AT ALL VALVES AND BRANCHES, AND ON BOTH SIDES OF WALLS WHERE PIPES PASS THROUGH. ARROWS OF SAME COLOR AS IDENTIFICATION MARKERS SHALL ALSO BE PLACED ON PIPES POINTING AWAY FROM MARKER INDICATING DIRECTION OF FLOW.
3. COORDINATE COLOR SCHEME WITH EXISTING PIPING AND SUBMIT TO ENGINEER PRIOR TO ORDERING.
4. FURNISH AND INSTALL NEW LABELS FOR ALL PIPING REUSED UNDER A DIFFERENT SERVICE/DIRECTION AS PART OF THIS PROJECT.

232500. CHEMICAL TREATMENT

A. ALL GREASE, DIRT, OIL, AND METALLIC OXIDES SHALL BE REMOVED FROM EACH PIPING SYSTEM. EQUIPMENT SHALL BE PROVIDED TO METER THE WATER, MIX, AND INJECT THE CLEANING SOLUTION INTO THE SYSTEM. CONTRACTOR SHALL INFORM WATER TREATMENT CONTRACTOR OF ALL SYSTEM MATERIALS OF CONSTRUCTION, TO ENSURE CHEMICAL CLEANER COMPATIBILITY. A CLEANING AGENT SHALL BE CIRCULATED, WETTING ALL SURFACES AND FLUSHED FROM THE SYSTEM AT COMPLETION.

B. CHEMICAL TREATMENT SHALL CONSIST OF A NON-CHROMATE CORROSION INHIBITOR FOR THE PROTECTION OF BOTH FERROUS AND NON-FERROUS METALS. INHIBITOR SHALL BE COMPATIBLE WITH PROPYLENE AND ETHYLENE GLYCOL TYPES OF ANTIFREEZES, AND SHALL NOT BE DETRIMENTAL TO NON-METALLIC MATERIALS SUCH AS PUMP PACKING AND VALVE SEALS. THE QUANTITY OF INHIBITOR FURNISHED SHALL BE THAT NEEDED FOR THE INITIAL FILLING OF THE SYSTEM(S), PLUS 25% OF THAT AMOUNT.

C. FURNISH AND INSTALL PRE-MIXED GLYCOL SOLUTION WITH COMPATIBLE INHIBITORS FOR FREEZE PROTECTION IN THE CONCENTRATIONS INDICATED IN THE DOCUMENTS. PROVIDE AMOUNT REQUIRED FOR FINAL AND COMPLETE FILLING OF SYSTEM, PLUS ADDITIONAL FOR OWNER STOCK. ADDITIONAL STOCK AMOUNT SHALL BE 25% OF THE FINAL FILL VOLUME OR 55 GALLONS, WHICHEVER IS THE LESSER AMOUNT.

D. CONTRACTOR SHALL COORDINATE WITH CHEMICAL TREATMENT CONTRACTOR.

233100. DUCTWORK

A. GENERAL

1. IN GENERAL, THE COMPLETE SHEET METAL DUCTWORK SYSTEMS FURNISHED UNDER THIS CONTRACT, SHALL BE CONSTRUCTED AND INSTALLED IN STRICT CONFORMANCE WITH THE STANDARDS AS SET FORTH IN THE "DUCT MANUAL AND SHEET METAL CONSTRUCTION FOR VENTILATING AND AIR-CONDITIONING SYSTEMS" AS PUBLISHED BY THE SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION, INC. (SMACNA).
2. ELBOWS SHALL BE CONSTRUCTED WITH THE INSIDE RADIUS NOT LESS THEN 1/2 THE DUCT WIDTH IN THE SAME PLANE. WHERE STANDARD RADIUS ELBOWS CANNOT BE INSTALLED DUE TO SPACE CONSTRAINTS, SQUARE ELBOWS WITH DOUBLE THICKNESS TURNING VANES MAY BE INSTALLED WHERE APPROVED BY ENGINEER. CROSS-BRAKE OR BEAD SURFACES WIDER THAN 18" FOR RIGIDITY.
3. TRANSFORM DUCT SIZES GRADUALLY, NOT EXCEEDING 15 DEGREES DIVERGENCE AND 30 DEGREES CONVERGENCE.
4. DUCTWORK PENETRATIONS THROUGH RATED SEPARATIONS SHALL MAINTAIN THE FIRE AND SMOKE CONSTRUCTION OF THE WALL AND/OR FLOOR IN ACCORDANCE WITH LOCAL CODE REQUIREMENTS. FURNISH AND INSTALL FIRE AND/OR SMOKE DAMPERS WHERE REQUIRED. ALL FIRE DAMPERS SHALL BE DYNAMIC TYPE WITH BLADE OUT OF AIRSTREAM. ACCESS DOORS SHALL BE PROVIDED AT ALL FIRE AND SMOKE DAMPERS.
5. ALL DUCT SIZES SHOWN ON PLANS SHALL BE INSIDE CLEAR DIMENSIONS.
6. UPON COMPLETION OF THE INSTALLATION OF DUCTWORK CLEAN ENTIRE SYSTEM OF DEBRIS.
7. PROTECT DUCTWORK FROM THE ELEMENTS AND FOREIGN MATERIAL AND COMPLY WITH INTERMEDIATE DUCT CLEANLINESS LEVEL IN ACCORDANCE WITH SMACNA'S "DUCT CLEANLINESS FOR NEW CONSTRUCTION GUIDELINES"
8. THIS CONTRACTOR SHALL INSTALL FLEXIBLE DUCT CONNECTIONS BETWEEN EACH PIECE OF EQUIPMENT HAVING A FAN, AND ITS SUPPLY, RETURN, AND EXHAUST DUCTWORK. CONNECTIONS WHEN COMPLETED SHALL BE AIRTIGHT, AND SHALL BE INSTALLED IN AN APPROVED MANNER. FLEXIBLE CONNECTIONS SHALL BE NEOPRENE MATERIAL, TO INSURE AGAINST TRANSMISSION OF VIBRATION FROM THE FAN TO THE DUCTWORK.

B. DUCT PRESSURE CLASS AND PRESSURE TESTING

1. WHERE NOT INDICATED ON DRAWINGS, DUCTS SHALL BE CONSTRUCTED TO THE FOLLOWING PRESSURE CLASS PER SMACNA:
   a. SUPPLY AIR UPSTREAM OF TERMINAL UNITS: IN-WC PRESSURE CLASS.
   b. SUPPLY AIR DOWNSTREAM OF TERMINAL UNITS: IN-WC PRESSURE CLASS
   c. RETURN AIR: IN-WC PRESSURE CLASS
   d. GENERAL EXHAUST AIR: IN-WC PRESSURE CLASS
2. DUCTS AND PLENUMS DESIGNED TO OPERATE AT STATIC PRESSURES EQUAL TO OR GREATER THAN 3" W.C. SHALL BE LEAK TESTED IN ACCORDANCE WITH THE SMACNA HVAC AIR DUCT LEAKAGE TEST MANUAL AND SHOWN TO HAVE A RATE OF AIR LEAKAGE (CL) LESS THAN OR EQUAL TO 4.0 AS DETERMINED BY IECC. REFER TO EQUATION 4-8 IN SECTION C403.13.2.3

C. DUCTWORK MATERIAL

1. NON-COMBUSTIBLE OR CONFORMING TO REQUIREMENTS FOR CLASS 1 AIR DUCT MATERIALS OR UL 181.
2. SINGLE WALL RECTANGULAR DUCT WALL THICKNESS SHALL BE MINIMUM 22 GAUGE EXCEPT WHERE ANY WELDING OTHER THAN LONGITUDINAL SEAMS IS PERFORMED, THEN THE MINIMUM THICKNESS SHALL BE 18 GAUGE.
3. STEEL DUCTS SHALL MEET ASTM A653 / A653M, GALVANIZED COATING DESIGNATION G90, AND MILL PHOSPHATIZED FINISHES FOR SURFACES EXPOSED TO VIEW.
4. REINFORCEMENT PLATES AND SHAPES: ASTM A36 / A36M, STEEL PLATES, SHAPES, AND BARS; BLACK AND GALVANIZED.
5. TIE RODS: GALVANIZED STEEL, 1/4" MINIMUM DIAMETER FOR LENGTHS 36" OR LESS; 3/8" MINIMUM DIAMETER FOR LENGTHS LONGER THAN 36".
6. SHEET METAL MATERIALS AND SUPPORTS SHALL COMPLY WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS" FOR APPLICABLE MATERIALS, MATERIAL THICKNESSES, AND DUCT CONSTRUCTION METHODS BASED ON APPLICABLE PRESSURE CLASSES. SHEET METAL MATERIALS SHALL BE FREE OF PITTING, SEAM MARKS, ROLLER MARKS, STAINS, DISCOLORATIONS, AND OTHER IMPERFECTIONS.

D. SEALANTS AND GASKETS

1. SEAL DUCTS FOR DUCT STATIC-PRESSURE, SEAL CLASSES, AND LEAKAGE CLASS SPECIFIED IN "DUCT SCHEDULE" ARTICLE ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS". ALL JOINTS AND SEAMS SHALL BE SEALED TO SEAL CLASS A.
2. SURFACE BURNING CHARACTERISTICS FOR SEALANTS AND GASKETS SHALL BE A MAXIMUM FLAME SPREAD INDEX OF 25 AND A MAXIMUM SMOKE-DEVELOPED INDEX OF 50 WHEN TESTED ACCORDING TO UL-723; CERTIFIED BY AN NRTL.
3. WATER-BASED JOINT AND SEAM SEALANT:
   a. APPLICATION METHOD: BRUSH ON.
   b. SOLIDS CONTENT: MINIMUM 65 PERCENT.
   c. SHORE A HARDNESS: MINIMUM 20.
   d. WATER RESISTANT.
   e. MOLD AND MILDEW RESISTANT.
   f. VOC: MAXIMUM 75 G/L (LESS WATER).
   g. MAXIMUM STATIC-PRESSURE CLASS: 10-INCH WG, POSITIVE AND NEGATIVE.
   h. SERVICE: INDOOR OR OUTDOOR.
   i. SUBSTRATE: COMPATIBLE WITH GALVANIZED SHEET STEEL, STAINLESS STEEL, OR ALUMINUM SHEETS.
4. SOLVENT-BASED JOINT AND SEAM SEALANT:
   a. APPLICATION METHOD: BRUSH ON.
   b. BASE: SYNTHETIC RUBBER RESIN.
   c. SOLVENT: TOLUENE AND HEPTANE.
   d. SOLIDS CONTENT: MINIMUM 60 PERCENT.
   e. SHORE A HARDNESS: MINIMUM 60.
   f. WATER RESISTANT.
   g. MOLD AND MILDEW RESISTANT.
   h. VOC: MAXIMUM 395 G/L.
   i. MAXIMUM STATIC-PRESSURE CLASS: 10-INCH WG, POSITIVE OR NEGATIVE.
   j. SERVICE: INDOOR OR OUTDOOR.
   k. SUBSTRATE: COMPATIBLE WITH GALVANIZED SHEET STEEL, STAINLESS STEEL, OR ALUMINUM SHEETS.
   l. FOR INDOOR APPLICATIONS, SEALANT SHALL HAVE A VOC CONTENT OF 250 G/L OR LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24).
5. FLANGED JOINT SEALANT: COMPLY WITH ASTM C 920.
   a. GENERAL: SINGLE-COMPONENT, ACID-CURING, SILICONE, ELASTOMERIC.
   b. TYPE: S.
   c. GRADE: NS.
   d. CLASS: 25.
   e. USE: O.
   f. FOR INDOOR APPLICATIONS, SEALANT SHALL HAVE A VOC CONTENT OF 250 G/L OR LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24)
6. FLANGE GASKETS: BUTYL RUBBER, NEOPRENE, OR EPDM POLYMER WITH POLYISOBUTYLENE PLASTICIZER.
7. ROUND DUCT JOINT O-RING SEALS:
   a. SEAL SHALL PROVIDE MAXIMUM LEAKAGE CLASS OF 3 CFM/100 SQ. FT. AT 1-INCH WG AND SHALL BE RATED FOR 10-INCH WG STATIC-PRESSURE CLASS, POSITIVE OR NEGATIVE.

E. DUCTWORK SUPPORTS AND CONNECTIONS

1. COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS" FOR HANGERS AND SUPPORTS AND HANGER SPACING.
2. INSTALL HANGERS AND SUPPORTS WITHIN 24" OF EACH ELBOW AND WITHIN 48" OF EACH BRANCH INTERSECTION.
3. HANGERS EXPOSED TO VIEW SHALL BE THREADED ROD AND ANGLE OR CHANNEL SUPPORTS.
4. SUPPORT VERTICAL DUCTS WITH STEEL ANGLES OR CHANNEL SECURED TO THE SIDES OF THE DUCT WITH WELDS, BOLTS, SHEET METAL SCREWS, OR BLIND RIVETS; SUPPORT AT EACH FLOOR AND AT MAXIMUM INTERVALS OF 16'.
5. INSTALL UPPER ATTACHMENTS TO STRUCTURES. SELECT AND SIZE WITH PULL OUT, TENSION, AND SHEAR CAPACITIES APPROPRIATE FOR SUPPORTED LOADS AND BUILDING MATERIALS WHERE USED.
6. HANGER RODS FOR NON-CORROSIVE ENVIRONMENTS SHALL BE CADMIUM PLATED STEEL RODS AND NUTS.
7. STEEL CABLES FOR GALVANIZED STEEL DUCTS SHALL BE GALVANIZED STEEL COMPLYING WITH ASTM A603.
8. STEEL CABLE END CONNECTIONS SHALL BE CADMIUM PLATED STEEL ASSEMBLIES WITH BRACKETS, SWIVEL, AND BOLTS DESIGNED FOR DUCT HANGER SERVICE; WITH AN AUTOMATIC LOCKING AND CLAMPING DEVICE.

F. DUCTWORK INSULATION

1. ALL SUPPLY AND OUTDOOR AIR DUCTWORK INSTALLED ABOVE CEILINGS, WITHIN SHAFTS, WITHIN MECHANICAL SPACES, AND WITHIN UNCONDITIONED SPACES SHALL BE PROVIDED WITH ONE OF THE FOLLOWING SPECIFICATIONS:
   a. R-6 MINERAL FIBER BLANKET INSULATION, 2 INCHES THICK INSTALLED, 0.75 LB/CU FT DENSITY
   b. R-6 MINERAL FIBER BOARD, 2 INCHES THICK, 1.6 LB/CU FT DENSITY.
2. FOR DUCTS AND PLENUMS WITH SURFACE TEMPERATURES BELOW AMBIENT, INSTALL A CONTINUOUS UNBROKEN VAPOR BARRIER. CREATE A FACING LAP FOR LONGITUDINAL SEAMS AND END JOINTS WITH INSULATION BY REMOVING 2 INCHES FROM 1 EDGE AND 1 END OF INSULATION SEGMENT. SECURE LAPS TO ADJACENT INSULATION SECTION WITH 1/2-INCH OUTWARD-CLINCHING STAPLES, 1 INCH O.C. INSTALL VAPOR BARRIER CONSISTING OF FACTORY- OR FIELD-APPLIED JACKET, ADHESIVE, VAPOR-BARRIER MASTIC, AND SEALANT AT JOINTS, SEAMS, AND PROTRUSIONS.
   a. REPAIR PUNCTURES, TEARS, AND PENETRATIONS WITH TAPE OR MASTIC TO MAINTAIN VAPOR-BARRIER SEAL.
   b. INSTALL VAPOR STOPS FOR DUCTWORK AND PLENUMS OPERATING BELOW 50 DEG F AT 18-FOOT INTERVALS. VAPOR STOPS SHALL CONSIST OF VAPOR-BARRIER MASTIC APPLIED IN A Z-SHAPED PATTERN OVER INSULATION FACE, ALONG BUTT END OF INSULATION, AND OVER THE SURFACE. COVER INSULATION FACE AND SURFACE TO BE INSULATED A WIDTH EQUAL TO 2 TIMES THE INSULATION THICKNESS BUT NOT LESS THAN 3 INCHES.
3. APPLY ADHESIVES ACCORDING TO MANUFACTURER'S RECOMMENDED COVERAGE RATES PER UNIT AREA, FOR 100 PERCENT COVERAGE OF DUCT AND PLENUM SURFACES UNLESS OTHERWISE RECOMMENDED BY MANUFACTURER. APPLY ADHESIVE TO ENTIRE CIRCUMFERENCE OF DUCTS AND TO ALL SURFACES OF FITTINGS AND TRANSITIONS.
4. INSTALL EITHER CAPACITOR-DISCHARGE-WELD PINS AND SPEED WASHERS OR CUPPED-HEAD, CAPACITOR-DISCHARGE-WELD PINS ON SIDES AND BOTTOM OF HORIZONTAL DUCTS AND SIDES OF VERTICAL DUCTS AS FOLLOWS:
   a. ON DUCT SIDES WITH DIMENSIONS 18 INCHES AND SMALLER, PLACE PINS ALONG LONGITUDINAL CENTERLINE OF DUCT. SPACE 3 INCHES MAXIMUM FROM INSULATION END JOINTS, AND 16 INCHES O.C.
   b. ON DUCT SIDES WITH DIMENSIONS LARGER THAN 18 INCHES, SPACE PINS 16 INCHES O.C. EACH WAY, AND 3 INCHES MAXIMUM FROM INSULATION JOINTS. INSTALL ADDITIONAL PINS TO HOLD INSULATION TIGHTLY AGAINST SURFACE AT CROSS BRACING.
   c. PINS MAY BE OMITTED FROM TOP SURFACE OF HORIZONTAL, RECTANGULAR DUCTS AND PLENUMS.
   d. DO NOT OVERCOMPRESS INSULATION DURING INSTALLATION.
   e. CUT EXCESS PORTION OF PINS EXTENDING BEYOND SPEED WASHERS OR BEND PARALLEL WITH INSULATION SURFACE. COVER EXPOSED PINS AND WASHERS WITH TAPE MATCHING INSULATION FACING.
5. INSTALL INSULATION ON RECTANGULAR DUCT ELBOWS AND TRANSITIONS WITH A FULL INSULATION SECTION FOR EACH SURFACE. GROOVE AND SCORE INSULATION TO FIT AS CLOSELY AS POSSIBLE TO OUTSIDE AND INSIDE RADIUS OF ELBOWS. INSTALL INSULATION ON ROUND AND FLAT-OVAL DUCT ELBOWS WITH INDIVIDUALLY MITERED GORES CUT TO FIT THE ELBOW.
6. INSULATE DUCT STIFFENERS, HANGERS, AND FLANGES THAT PROTRUDE BEYOND INSULATION SURFACE WITH 6-INCH-WIDE STRIPS OF SAME MATERIAL USED TO INSULATE DUCT. SECURE ON ALTERNATING SIDES OF STIFFENER, HANGER, AND FLANGE WITH PINS SPACED 6 INCHES O.C.
7. IN LIEU OF EXTERIOR INSULATION, SUPPLY AND OUTDOOR AIR DUCTWORK MAY BE PROVIDED WITH INTERNAL DUCT LINER PER SPECIFICATIONS BELOW. DUCT LINER NOT PERMITTED ON OUTDOOR AIR DUCTWORK OR ANY DUCTWORK LOCATED OUTDOORS.
8. CLOSED CELL FLEXIBLE ELASTOMERIC FOAM ACOUSTICAL DUCT LINER COMPLYING WITH ASTM C1534 IS TO BE USED WITHIN 20' OF ANY FAN, VAV BOX, OR OTHER DEVICE WHICH CREATES NOISE. DUCT LINER TO BE 1" THICK FLEXIBLE ELASTOMERIC TYPE AND SHALL COMPLY WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS". DUCT LINER TO INCLUDE AN ANTI-MICROBIAL COATING AND SHALL BE FIXED WITH BOTH ADHESIVE AND MECHANICAL METHODS.
9. ALL SUPPLY, RETURN, AND OUTDOOR AIR DUCTWORK INSTALLED EXTERIOR TO THE BUILDING SHALL BE PROVIDED WITH THE FOLLOWING SPECIFICATIONS:
   a. R-12 MINERAL FIBER BOARD, 2 INCHES THICK, 2.0 LB/CU FT DENSITY.
   b. BUILD UP INSULATION TO FROM 1/4 INCH PITCH ON TOP OF DUCTWORK TO PREVENT WATER FROM POOLING.
10. ALL INSULATION AND RELATED MATERIALS SHALL HAVE A FLAME-SPREAD INDEX OF 25 OR LESS, AND A SMOKE DEVELOPED INDEX OF 50 OR LESS, AS DETERMINED BY TESTING IDENTICAL PRODUCTS PER ASTM E 84, BY A TESTING AND INSPECTING AGENCY ACCEPTABLE TO THE AUTHORITIES HAVING JURISDICTION. FACTORY LABEL PRODUCT WITH APPROPRIATE MARKINGS OF APPLICABLE TESTING AND INSPECTING AGENCY.
11. ALL DUCT WRAP SHALL BE INSTALLED WITH VAPOR BARRIER JACKET, KRAFT PAPER REINFORCED WITH GLASS FIBER YARN AND BONDED TO ALUMINIZED FILM. SECURE WITH PRESSURE SENSITIVE TAPE.

G. DUCTWORK ACCESSORIES

1. ALL SUPPLY, RETURN AND EXHAUST AIR REGISTERS, DIFFUSERS, TROFFERS, GRILLES, ETC. SHALL BE OF MODELS INDICATED, OR APPROVED EQUIVALENT UNITS.
2. AT FANS PROVIDE FLEXIBLE DUCT CONNECTIONS IMMEDIATELY ADJACENT TO EQUIPMENT. UL 181, CLASS 1 COATINGS AND ADHESIVES. MATERIAL APPROXIMATELY 3" WIDE CRIMPED INTO A METAL EDGING STRIP. FLEXIBLE FABRIC SHALL BE MINIMUM 0.024" THICK GLASS FABRIC DOUBLE COATED WITH NEOPRENE AND SHALL HAVE A +/- 10 IN-WC PRESSURE RATING. SERVICE TEMPERATURE MINUS 40 DEG F TO PLUS 200 DEG F. FOR FANS DEVELOPING STATIC PRESSURES OF 5 IN-WC OR MORE, COVER FLEXIBLE CONNECTORS WITH LEADED VINYL SHEET HELD IN PLACE WITH METAL STRAPS.

ESUH SEQUENCE OF OPERATION

1. SYSTEM DESCRIPTION
   A. ELECTRIC SUSPENDED UNIT HEATER THERMOSTAT SHALL CYCLE THE UNIT FAN TO MAINTAIN A SPACE TEMPERATURE SETPOINT OF 50°F (ADJUSTABLE). WHEN THE SPACE TEMPERATURE DROPS BELOW SETPOINT, THE FAN SHALL CYCLE ON AND THE ELECTRIC HEATING ELEMENTS SHALL BE ENERGIZED. WHEN THE THERMOSTAT IS SATISFIED, THE HEATING ELEMENTS SHALL DE-ENERGIZE, AND THE FAN SHALL REMAIN IN OPERATION TO COOL THE HEATING ELEMENTS UNTIL THEIR TEMPERATURE FALLS BELOW 100° F, AT WHICH POINT THE FAN SHALL SHUT OFF.
   B. BASC TO PROVIDE SPACE TEMPERATURE MONITORING. PROVIDE FLAT-PLATE TYPE TEMPERATURE SENSOR.
   C. PROVIDE TRENDING FOR SPACE TEMPERATURE MONITORING.
   D. UNIT HEATERS SHALL OPERATE STAND-ALONE.
2. TEMPERATURE CONTROL
   A. IN ELEVATOR HOISTWAYS, PROVIDE REMOTE TEMPERATURE SENSOR AT THE TOP OF THE HOISTWAY TO CONTROL THE ELECTRIC SUSPENDED UNIT HEATER.
   B. IN ELEVATOR MACHINE ROOMS, TEMPERATURE SENSOR SHALL BE UNIT MOUNTED BY FACTORY.
3. GRAPHICS
   A. DISPLAY ELEVATOR MACHINE ROOM AND ELEVATOR HOISTWAYS SPACE TEMPERATURES ON FRONT END GRAPHICS.
4. ALARMS
   A. CRITICAL ALARMS SHALL BE ANNUNCIATED AT THE OPERATOR WORKSTATION AND EMAILED TO THE OWNER.
   B. CRITICAL ALARMS SHALL INCLUDE THE FOLLOWING:
      a. THE SPACE TEMPERATURE IS LOWER THAN 50° F (ADJUSTABLE) FOR 15 MINUTES (ADJUSTABLE)

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ISFA
ILLINOIS SPORTS FACILITIES AUTHORITY

ISSUE/REVISION:

REV	DATE	DESCRIPTION
	1/30/2026	ISSUED FOR BID

PROJECT:
RATE FIELD - HVAC FY2026

333 WEST 35TH STREET
CHICAGO, IL 60616

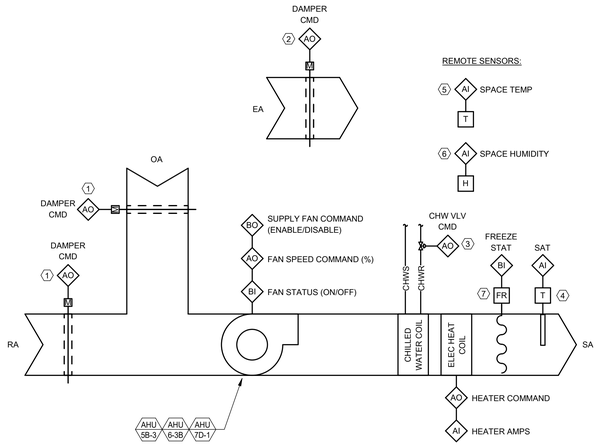
DRAWING TITLE:
MECHANICAL SPECIFICATIONS

DESIGNED BY:	MO
CHECKED BY:	CC
PROJECT NO:	25080
SCALE:	NO SCALE

SHEET NO.
M5.02

AHU BAS KEYED NOTES

1. DAMPER TO REMAIN. BASC TO FURNISH AND INSTALL REPLACEMENT ACTUATOR AND ENSURE PROPER OPERATION OF DAMPER. (AHU-5B-3 AND AHU-7D-1 ONLY)
2. DAMPER TO REMAIN. BASC TO FURNISH AND INSTALL REPLACEMENT ACTUATOR AND ENSURE PROPER OPERATION OF DAMPER. (MECHANICAL ROOMS 6.30.5 AND 7.29.1 ONLY)
3. BASC SHALL PROVIDE TWO-WAY MODULATING CONTROL VALVE FOR AHU COOLING COIL, FOR MC TO INSTALL. BASC RESPONSIBLE FOR ALL LOW VOLTAGE WIRING AND RACEWAYS. EACH CONTROL VALVE SHALL HAVE 24 VOLT ACTUATORS AND SHALL BE CONFIGURED TO FAIL CLOSED ON LOSS OF POWER AND ON LOSS OF CONTROL SIGNAL SO THAT CONTROL VALVE CLOSES IF CONDENSATE OVERFLOW SWITCH IS ACTIVATED. PROVIDE PRESSURE INDEPENDENT CONTROL VALVES (PICVS) THAT CAN BE FIELD ADJUSTED ABOVE AND BELOW THE FLOW RATES SPECIFIED IN THIS SCHEDULE. VALVE TO BE SELECTED SO THAT THE SPECIFIED FLOW RATE FALLS WITHIN THE MIDDLE OF THE CONTROL VALVE FLOW RANGE. CONTROL VALVES TO HAVE MINIMUM ANSI CLASS OF 125 AND MINIMUM 100PSI CLOSE OFF PRESSURE RATING. CONTROL VALVE SHALL INCLUDE BRASS TRIM AND STAINLESS STEEL STEM. EACH VALVE SHALL INCLUDE THE P/T TEST POINT OPTION.
4. BASC TO PROVIDE SUPPLY AIR TEMPERATURE SENSOR. TEMPERATURE SENSOR PROBE LENGTH TO BE SIZED SO THAT IT READS IN THE CENTER OF THE DUCTWORK.
5. BASC TO PROVIDE SPACE TEMPERATURE SENSORS AND ADD POINTS TO BAS FOR EACH AHU. REFER TO FLOOR PLANS FOR APPROXIMATE SENSOR LOCATIONS; COORDINATE FINAL LOCATION WITH OWNER. PROVIDE TEMPERATURE SENSOR WITH FLAT-PLATE FACE.
6. BASC TO PROVIDE HUMIDITY SENSOR. COMBINATION SENSOR IS ACCEPTABLE.
7. BASC TO FURNISH AND INSTALL FREEZESTAT.



AHU SEQUENCE OF OPERATION

1. SYSTEM DESCRIPTION
   A. APPLIES TO INDOOR AIR HANDLERS SERVING ELEVATOR MACHINE ROOMS. THE AHUs ARE EQUIPPED WITH THE FOLLOWING:
      a. OUTSIDE AIR DAMPER (WHERE INDICATED)
      b. RETURN AIR DAMPER (WHERE INDICATED)
      c. CHILLED WATER COOLING COIL WITH MODULATING VALVE
      d. ELECTRIC HEATING COIL
      e. CONSTANT VOLUME SUPPLY FAN
      f. REMOTE SPACE TEMPERATURE SENSOR AND SPACE HUMIDITY SENSOR
2. SCHEDULING:
   A. THE AHU SHALL OPERATE YEAR-ROUND AS REQUIRED TO MAINTAIN SPACE CONDITIONS.
   B. NO UNOCCUPIED MODE SHALL BE USED. NO NIGHT SETBACK SHALL APPLY.
3. UNIT START-UP:
   A. THE AHU SHALL ENABLE WHEN ANY OF THE FOLLOWING CONDITIONS ARE TRUE:
      a. SPACE TEMPERATURE IS BELOW 50°F (ADJ.)
      b. SPACE TEMPERATURE IS ABOVE 80°F (ADJ.)
      c. SPACE HUMIDITY IS ABOVE 80% RH (ADJ.)
      d. THE BAS ISSUES A GENERAL ENABLE COMMAND
   B. UPON ENABLE, CONFIRM THE FOLLOWING CONDITIONS PRIOR TO START:
      a. CHILLED WATER PUMP IS AVAILABLE (IF COOLING IS REQUIRED).
      b. DISCHARGE AIR TEMPERATURE (DAT) SENSOR IS READING VALID VALUES.
   C. AHU START SEQUENCE:
      a. SUPPLY FAN SHALL START.
      b. OUTSIDE AIR AND RETURN AIR DAMPERS SHALL DRIVE TO OCCUPIED/MINIMUM POSITIONS.
      c. HEATING AND COOLING CONTROL LOOPS SHALL BE ENABLED.
4. UNIT SHUTDOWN:
   A. UNIT SHALL SHUT DOWN ONLY IF:
      a. A SAFETY TRIP OCCURS, OR
      b. THE BAS IS MANUALLY COMMANDED OFF FOR SERVICE.
   B. UPON SHUTDOWN, DAMPERS SHALL CLOSE AND SUPPLY FAN SHALL STOP.
5. FAN CONTROL:
   A. SUPPLY FAN SHALL OPERATE CONTINUOUSLY WHEN THE AHU IS ENABLED.
6. COOLING CONTROL - CHILLED WATER COIL:
   A. THE CHILLED WATER CONTROL VALVE SHALL MODULATE TO MAINTAIN THE SPACE TEMPERATURE COOLING SETPOINT (80°F MAX. ADJ.).
   B. THE VALVE SHALL MODULATE OPEN AS THE SPACE TEMPERATURE RISES ABOVE SETPOINT AND MODULATE CLOSED AS THE SPACE TEMPERATURE FALLS BELOW SETPOINT.
7. HEATING CONTROL - ELECTRIC HEATING COIL:
   A. ELECTRIC HEATING SHALL BE ENABLED WHEN THE SPACE TEMPERATURE FALLS BELOW 50°F (ADJ.).
   B. ELECTRIC HEATING SHALL DE-ENERGIZE WHEN THE SPACE TEMPERATURE SETPOINT (50°F MINIMUM) IS SATISFIED.
   C. HIGH-TEMPERATURE SAFETY CUTOUT SHALL TRIP HEAT AND GENERATE AN ALARM.
8. VENTILATION CONTROL – OA/RA DAMPERS:
   A. OUTSIDE AIR DAMPER SHALL MAINTAIN A MINIMUM POSITION FOR VENTILATION.
   B. RETURN AIR DAMPER SHALL MODULATE IN SEQUENCE WITH OUTSIDE AIR DAMPER.
   C. DAMPERS SHALL CLOSE ONLY ON MANUAL SYSTEM SHUTDOWN OR SAFETY TRIP.
9. HUMIDITY MONITORING:
   A. BAS SHALL MONITOR SPACE RELATIVE HUMIDITY.
   B. HIGH HUMIDITY ALARM SHALL BE GENERATED WHEN SPACE HUMIDITY EXCEEDS 80% RH (ADJ.) FOR 10 MINUTES (ADJ.).
10. GRAPHICS:
    A. DISPLAY THE FOLLOWING ON THE BAS GRAPHICS:
       a. SPACE TEMPERATURE
       b. SPACE HUMIDITY
       c. DISCHARGE AIR TEMPERATURE
       d. COOLING VALVE POSITION
       e. OA/RA DAMPER POSITIONS
11. ALARMS:
    A. CRITICAL ALARMS SHALL BE ANNUNCIATED AT THE OPERATOR WORKSTATION AND EMAILED TO THE OWNER.
       a. CRITICAL ALARMS SHALL INCLUDE:
          - SPACE TEMPERATURE BELOW 50°F (ADJ.)
          - SPACE TEMPERATURE ABOVE 90°F (ADJ.)
          - SPACE HUMIDITY ABOVE 80% RH (ADJ.)
          - HIGH-TEMPERATURE TRIP ON ELECTRIC HEAT

AHU POINTS LIST

NAME	FACETS	TYPE	R/W	GRAPHIC	ALARM	TREND	DESCRIPTION
ZoneTemp	°F	AI	R	G	N	Y	
ZoneTempSp	°F	AI	R/W	G	N	Y	
ZoneTempAlmDelay	Min	AV	R/W	P	N	N	
ZoneTempAlm	ALARM/NORMAL	BV	R	G	Y	N	
ZoneHum	%RH	AI	R	G	N	Y	
FreezeStat	ALARM/NORMAL	BI	R	G	Y	N	Freeze Protection Device
SupAirTemp	°F	AI	R	G	N	Y	Probe Temperature Sensor
SupFanSts	ON/OFF	BI	R	G	N	Y	Current Switch
SupFanCmd	START/STOP	BO	R/w	G	N	Y	
SupFanSpdCmd	%	AO	R/W	G	N	Y	
OutAirDprCmd	% OPEN	AO	R/W	G	N	Y	Motorized Damper Actuator
RetAirDprCmd	% OPEN	AO	R/W	G	N	Y	Motorized Damper Actuator
ExhAirDprCmd	% OPEN	AO	R/W	G	N	Y	Motorized Damper Actuator
ChWtrVlvCmd	% OPEN	AO	R/W	G	N	Y	Control Valve
OccCmd	OCCUPIED/UNOCCUPIED	BV	R/W	G	N	Y	
UnoccAHUClgCall	N/A	BV	R	G	N	N	
SupFanRtTotal	Hr	AV	R	P	N	N	
SupFanRunFailDelay	Min	AV	R/W	P	N	N	
SupFanRunFailAlm	ALARM/NORMAL	BV	R	G	Y	N	
SupAirTempSp	°F	AV	R/W	G	N	Y	
SupAirTempSpMax	°F	AV	R/W	P	N	Y	
SupAirTempSpMin	°F	AV	R/W	P	N	Y	
ClgLockOutSp	°F	AV	R/W	G	N	Y	
ClgLockOutSpDb	°F	AV	R/W	P	N	N	
ElecHtgEnableCmd	START/STOP	AO	R/W	G	N	Y	
ElecHtgSts	AMPS	AI	R	G	N	Y	
ElecHtgLockout	N/A	AV	R/W	G	N	N	
ElecHtgSafetyAlm	ALARM/NORMAL	AV	R	G	Y	N	
OutAirDprMinPosSp	% OPEN	AV	R/W	G	N	Y	
MaxFlwOutAirDprPosSp	% OPEN	AV	R/W	P	N	N	
MaxFlwFanSpdPct	%	AV	R/W	P	N	N	
MinFlwOutAirDprPosSp	% OPEN	AV	R/W	P	N	N	
MinFlwFanSpdPct	%	AV	R/W	P	N	N	
LowSupAirTempAlmSp	°F	AV	R/W	G	N	N	
LowSupAirTempAlmDelay	Sec	AV	R/W	P	N	N	
LowSupAirTempAlm	ALARM/NORMAL	BV	R	G	Y	N	
LowSupAirTempAlmReset	RESET/NORMAL	BV	R/W	G	N	N	
OutAirFlowAlm	ALARM/NORMAL	BV	R	G	Y	N	
OutAirFlowAlmDelay	Min	AV	R/W	P	N	N	

NOTES:

For the graphic column, any points with a G should be shown on the schematic graphic. All points with a P should be shown on a separate parameter page, with a link to the schematic graphic. Provide a link on the parameter page to a PDF of the sequence of operation and equipment schematic.

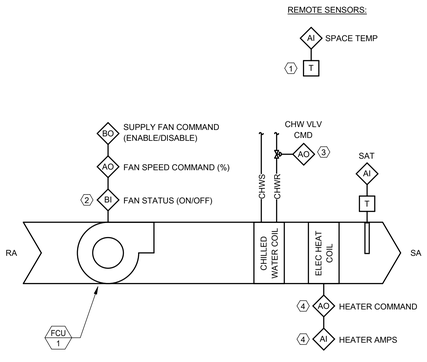
*Provide all points available through the BACnet interface to a separate equipment parameter page with a link to the schematic graphic for each piece of intergrated equipment. Up to 15 additional points shall be exposed on the schematic graphic at the request of the Engineer or Comissioning Agent. Any numeric status points shall be converted to their text value using a multistate variable.

1 AIR HANDLING UNIT - CONTROLS SCHEMATIC

SCALE: NO SCALE

FCU BAS KEYED NOTES

1. EXISTING SPACE TEMPERATURE SENSOR TO REMAIN.
2. BASC TO FURNISH AND INSTALL CURRENT SENSOR TO MONITOR FAN STATUS.
3. BASC TO FURNISH NEW CONTROL VALVE AND ACTUATOR, MC TO INSTALL NEW CONTROL VALVE. BASC RESPONSIBLE FOR FURNISHING, INSTALLING, AND WIRING THE ACTUATOR.
4. EXISTING ELECTRIC HEATING COIL AND EXISTING POINTS TO REMAIN AND BE RE-USED.



FCU SEQUENCE OF OPERATION

A. SYSTEM ENABLE/DISABLE.
   1. THE FAN COIL SHALL BE ENABLED BY AN OCCUPANCY SCHEDULE.
      a. BAS TO COORDINATE WITH OWNER FOR OCCUPANCY SCHEDULE
   2. DURING OCCUPIED MODES THE UNIT SHALL CONTROL TO A ZONE TEMPERATURE SETPOINT OF 72°F (ADJ) WITH A ±2°F (ADJ) DEADBAND.
      a. PROVIDE A 5 MIN (ADJ) DELAY WHEN SWITCHING FROM HEATING TO COOLING MODE.
      b. ALLOW THE USER TO ADJUST THE SETPOINT ±2°F (ADJ) LOCALLY AT THE THERMOSTAT.
      c. ALLOW THE USER TO MANUALLY OCCUPY THE UNIT FOR AT MOST 2 HRS (ADJ).
   3. DURING UNOCCUPIED MODES THE UNIT SHALL MAINTAIN AN UNOCCUPIED COOLING SETPOINT OF 80°F (ADJ) AND AN UNOCCUPIED HEATING SETPOINT OF 65°F (ADJ).
      a. THE UNIT SHALL STAY IN UNOCCUPIED COOLING MODE UNTIL THE SPACE TEMPERATURE IS BELOW 76°F (ADJ).
      b. THE UNIT SHALL STAY IN UNOCCUPIED HEATING MODE UNTIL THE SPACE TEMPERATURE IS ABOVE 68° F (ADJ).

B. SUPPLY FAN CONTROL.
   1. THE SUPPLY FAN SHALL RUN CONTINUOUSLY DURING OCCUPIED MODES.
   2. THE SUPPLY FAN SHALL CYCLE ON FOR UNOCCUPIED MODES.
   3. PROVIDE A TOTAL RUNTIME FOR THE SUPPLY FAN.
   4. F THE SUPPLY FAN IS COMMANDED ON AND STATUS IS NOT PROVEN IN 2 MIN (ADJ) SEND A FAN RUN FAILURE ALARM TO THE OPERATOR WORKSTATION.

C. SUPPLY FAN SPEED CONTROL.
   1. DURING NORMAL OPERATION THE FAN SHALL RUN AT A BALANCER DETERMINED SPEED.
   2. IF THE UNIT IS IN HEATING MODE AND THE HEATING PID IS AT 100% (ADJ) FOR 15 MINS (ADJ) INCREASE THE FAN SPEED TO 100% (ADJ).
   3. IF THE UNIT IS IN COOLING MODE AND THE COOLING PID IS AT 100% (ADJ) FOR 15 MINS (ADJ) INCREASE THE FAN SPEED TO 100% (ADJ).

D. TEMPERATURE CONTROL
   1. COOLING
      a. WHEN THE UNIT IS IN COOLING MODE AND THE CHILLER SYSTEM IS ENABLED, THE CHILLED WATER VALVE SHALL MODULATE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT.
      b. WHEN THE UNIT IS IN HEATING MODE, THE CHILLED WATER VALVE SHALL STAY CLOSED.
   2. HEATING
      A. THE DUCT MOUNTED ELECTRIC HEATING COIL SHALL BE ENABLED WHEN THE OUTSIDE AIR TEMPERATURE IS BELOW 30°F (ADJ.) WITH A ±5°F (ADJ.) DEADBAND.
      B. THE DUCT MOUNTED ELECTRIC HEATING COIL SHALL BE MODULATED TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT.

E. DISCHARGE AIR TEMPERATURE SETPOINT CONTROL
   1. THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL MODULATE TO MAINTAIN THE ZONE TEMPERATURE SETPOINT.
   2. WHEN THE ZONE IS SATISFIED THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE EQUAL TO THE ZONE TEMPERATURE SETPOINT.
   3. WHEN THE UNIT IS IN HEATING MODE THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL INCREASE FROM THE ZONE TEMPERATURE SETPOINT TO A MAXIMUM OF 95°F (ADJ) AS THE HEATING PID LOOP INCREASES FROM 0% (ADJ) TO 100% (ADJ).
   4. WHEN THE UNIT IS IN COOLING MODE THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL DECREASE FROM THE ZONE TEMPERATURE SETPOINT TO A MINIMUM OF 55°F (ADJ) AS THE COOLING PID LOOP INCREASES FROM 0% (ADJ) TO 100% (ADJ).

F. ALARMS
   1. CRITICAL ALARMS
      a. CRITICAL ALARMS SHALL BE ANNUNCIATED AT THE OPERATOR WORKSTATION AND EMAILED TO THE OWNER.
   2. CRITICAL ALARMS SHALL INCLUDE THE FOLLOWING:
   3. THE SPACE TEMPERATURE IS BELOW 60°F (ADJ) FOR 5 MINS (ADJ) OR ABOVE 85°F (ADJ) FOR 5 MIN (ADJ).
   4. SUPPLY FAN FAILURE

FCU POINTS LIST

NAME	FACETS	TYPE	R/W	GRAPHIC	ALARM	TREND	DESCRIPTION
ZoneTemp	°F	AI	R	G	N	Y	
ZoneTempSp	°F	AI	R/W	G	N	Y	
ZoneTempAlmDelay	Min	AV	R/W	P	N	N	
ZoneTempAlm	ALARM/NORMAL	BV	R	G	Y	N	
SupAirTemp	°F	AI	R	G	N	Y	Probe Temperature Sensor
SupFanSts	ON/OFF	BI	R	G	N	Y	Current Switch
SupFanCmd	START/STOP	BO	R/w	G	N	Y	
SupFanSpdCmd	%	AO	R/W	G	N	Y	
ChWtrVlvCmd	% OPEN	AO	R/W	G	N	Y	Control Valve
OccCmd	OCCUPIED/UNOCCUPIED	BV	R/W	G	N	Y	
UnoccAHUClgCall	N/A	BV	R	G	N	N	
SupFanRtTotal	Hr	AV	R	P	N	N	
SupFanRunFailDelay	Min	AV	R/W	P	N	N	
SupFanRunFailAlm	ALARM/NORMAL	BV	R	G	Y	N	
SupAirTempSp	°F	AV	R/W	G	N	Y	
SupAirTempSpMax	°F	AV	R/W	P	N	Y	
SupAirTempSpMin	°F	AV	R/W	P	N	Y	
ClgLockOutSp	°F	AV	R/W	G	N	Y	
ClgLockOutSpDb	°F	AV	R/W	P	N	N	
ElecHtgEnableCmd	START/STOP	AO	R/W	G	N	Y	
ElecHtgSts	AMPS	AI	R	G	N	Y	
ElecHtgLockout	N/A	AV	R/W	G	N	N	
ElecHtgSafetyAlm	ALARM/NORMAL	AV	R	G	Y	N	
MaxFlwFanSpdPct	%	AV	R/W	P	N	N	
MinFlwFanSpdPct	%	AV	R/W	P	N	N	

NOTES:

For the graphic column, any points with a G should be shown on the schematic graphic. All points with a P should be shown on a separate parameter page, with a link to the schematic graphic. Provide a link on the parameter page to a PDF of the sequence of operation and equipment schematic.

*Provide all points available through the BACnet interface to a separate equipment parameter page with a link to the schematic graphic for each piece of intergrated equipment. Up to 15 additional points shall be exposed on the schematic graphic at the request of the Engineer or Comissioning Agent. Any numeric status points shall be converted to their text value using a multistate variable.

2 FAN COIL UNIT - CONTROLS SCHEMATIC

SCALE: NO SCALE

ELARA
elaraeng.com | (708) 236-0300

ISFA
ILLINOIS SPORTS FACILITIES AUTHORITY

ISSUE/REVISION:

REV	DATE	DESCRIPTION
	1/30/2026	ISSUED FOR BID

PROJECT:
RATE FIELD - HVAC FY2026

333 WEST 35TH STREET
CHICAGO, IL 60616

DRAWING TITLE:
MECHANICAL CONTROLS

DESIGNED BY:	MO
CHECKED BY:	CC
PROJECT NO:	25080
SCALE:	NO SCALE

SHEET NO.
M6.01

PANELBOARD: EL7-1

LOCATION: ELEVATOR MACHINE...

VOLTAGE: 480-3 PHASE-3W
MAIN TYPE: MCB
BUS TYPE: TIN PLATED CU
BUS AMPS: 100 A
OCPD AMPS: -
OCPD OPT: -
INT. RATING: 18 kA
BUS OPT. -

C/B TYPE: BOLT-ON
ENCLOSURE: NEMA-1
MAX CKT. POLES: 30
MOUNTING: SURFACE
CU NEUTRAL BUS RATING: 100.00%
NEUTRAL BONDING No
CU EQ. GND. BUS: Yes
INTEGRAL SPD: No

CKT	SERVES	C/B	POLE	A	B	C	A	B	C	POLE	C/B	SERVES	CKT
1	P - AHU-7D-1	20 A	3	4074			9422			3	45 A	P - AHU-6-3B	2
3	--	--	--		4074			9422		--	--	--	4
5	--	--	--			4074			9422	--	--	--	6
7	Space	--	3	--			--			3	--	Space	8
9	--	--	--		--			--		--	--	--	10
11	--	--	--			--	--			--	--	--	12
13	Space	--	3	--			--			3	--	Space	14
15	--	--	--		--			--		--	--	--	16
17	--	--	--			--	--			--	--	--	18
19	Space	--	3	--			--			3	--	Space	20
21	--	--	--		--			--		--	--	--	22
23	--	--	--			--	--			--	--	--	24
25	Space	--	3	--			--			3	--	Space	26
27	--	--	--		--			--		--	--	--	28
29	--	--	--			--			--	--	--	--	30
	TOTAL PER PHASE (VA):			13496 VA			13496 VA						
	CONNECTED AMPS PER PHASE:			49 A			49 A						

TOTAL CONNECTED (VA): 40487 VA
TOTAL CONNECTED AMPS: 49 A
TOTAL DEMAND (VA): 40487 VA
TOTAL DEMAND AMPS: 49 A

LOAD TYPES:	CONNECTED LOAD:	DEMAND FACTOR:	DEMAND LOAD:	NOTES:
LIGHTING:				
RECEPTACLES:				
MOTORS:				
HEATING:				
COOLING:				
APPLIANCE:				
OTHERS:				

ELECTRICAL SYMBOLS LIST

GENERAL

- DEMOLITION KEYED NOTE
- NEW WORK KEYED NOTE
- EQUIPMENT TAG (ABBREVIATION, NUMBER)
- VIEW REFERENCE (VIEW #, SHEET #)

LINETYPE LEGEND

- EXISTING TO REMAIN
- EXISTING TO BE DEMOLISHED
- NEW

POWER

- CONDUIT BREAK LINE
- CONDUIT, TURNED UP
- CONDUIT, TURNED DOWN
- TRANSFER SWITCH
- MOTOR ("XX DENOTES HORSEPOWER)
- JUNCTION BOX
- JUNCTION BOX WITH SWITCH
- NON-FUSED DISCONNECT SWITCH
- FUSED DISCONNECT SWITCH
- PANELBOARD
- DISTRIBUTION PANEL, SWITCHGEAR, OR OTHER CABINET AS NOTED

SINGLE LINE

- CONDUIT BREAK LINE
- FLEXIBLE CONDUIT CONNECTION
- PANELBOARD (STATE: NEW; PANEL INFO: LP-6 277/480V MAIN)
- SWITCHBOARD OR SWITCHGEAR
- MOTOR ("XX" DENOTES HORSEPOWER)

- TRANSFORMER "STANDARD" CONFIGURATION
- TRANSFORMER "Y" CONFIGURATION
- TRANSFORMER "DELTA" CONFIGURATION
- CONTROL OR POTENTIAL TRANSFORMER
- RATIO CURRENT TRANSOFRMER
- FUSE
- NON-FUSED SWITCH
- FUSED SWITCH
- CIRCUIT BREAKER
- CIRCUIT BREAKER (DRAW OUT)
- PUSH BUTTON (MAKE)
- PUSH BUTTON (BREAK)
- NORMALLY CLOSED CONTACT
- NORMALLY OPEN CONTACT
- CUSTOMER METER
- UTILITY METER
- RELAY
- GROUND ROD
- AUTOMATIC TRANSFER SWITCH (N, E, L)
- BUS DUCT (TYPE)
- RESISTANCE
- ELECTRIC OVERLOAD
- CABLE TERMINATION
- GENERATOR
- GROUNDING ELECTRODE CONDUCTOR
- GROUND FAULT RELAY
- KEY INTERLOCK
- SHUNT TRIP
- SPLICE BOX

NOTE: NOT ALL SYMBOLS LISTED ABOVE MAY BE USED OR APPEAR IN THESE DRAWINGS.

ELECTRICAL ABBREVIATIONS

A,AMP	AMPERE
ABV	ABOVE
AC	ALTERNATING CURRENT
ACL	ACROSS THE LINE
ACT	ACOUSTICAL CEILING TILE
AD	ACCESS DOOR
ADA	AMERICANS WITH DISABILITIES ACT
ADJ	ADJUSTABLE
AFF	ABOVE FINISHED FLOOR
AFCI	ARC FAULT CIRCUIT INTERRUPTER
AF	AMP FUSE
AHJ	AUTHORITY HAVING JURISDICTION
AIC	AMPERES INTERRUPTING CAPACITY
AIEE	AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS
AL	ALUMINUM
ALM	ALARM
ALT	ALTERNATE
ANN	ANNUNCIATOR
AS	AMP SWITCH
AT	AMP TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AUTO	AUTOMATIC
AVC	ABOVE COUNTER
AWG	AMERICAN WIRE GAUGE
BAL	BALLAST
BASC	BUILDING AUTOMATION SYSTEM CONTRACTOR
BGB	BUILDING GROUND BOX
BHP	BREAK HORSEPOWER
BKR	BREAKER
C	CONDUIT
CAB	CABINET
CAT	CATALOG
CATV	CABLE TELEVISION
C.B.	CIRCUIT BREAKER
CBC	CHICAGO BUILDING CODE
CCTV	CLOSED CIRCUIT TELEVISION
CCW	COUNTERCLOCKWISE
CD	CANDELA
CECO	COMMONWEALTH EDISON COMPANY
CIC	CABLE IN CONDUIT
CKT	CIRCUIT
CL	CENTER LINE
CLG	CEILING
CLK	CLOCK
CLO	CLOSET
CLSD	CLOSED
COAX	COAXIAL
COL	COLUMN
COM	COMMON
COMED	COMED COMPANY
CONC	CONCRETE
CT	CURRENT TRANSFORMER
CU	COPPER
C.U.	COEFFICIENT OF UTILIZATION
CUH	CABINET UNIT HEATER
CW	CLOCKWISE
DB	DECIBEL
DC	DIRECT CURRENT
DEG	DEGREE
DEMO	DEMOLITION
DN	DOWN
DO	DRAW OUT
DPDT	DOUBLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
DS	DISCONNECT SWITCH
DT	DUST TIGHT
DW	DISHWASHER
DWG	DRAWING
EA	EACH
EC	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
EHD	ELECTRIC HAND DRYER
ELEC	ELECTRIC
ELEV	ELEVATOR
EM	EMERGENCY
EMT	ELECTRIC METALLIC TUBING (THIN WALL CONDUIT)
ENG	ENGINEER
EP	EXPLOSION PROOF
EPO	ELECTRIC POWER OFF
EQ	EQUIPMENT
ER#	EXISTING TO RELOCATE
EUH	ELECTRIC UNIT HEATER
EWC	ELECTRIC WATER COOLER
EWH	ELECTRIC WALL HEATER
EX	EXISTING TO REMAIN
EXT	EXTERIOR
F	FUSE
FA	FIRE ALARM
FB	FLOOR BOX
FC	FOOTCANDLE
FDC	FIRE DEPARTMENT CONNECTION
FDR	FEEDER
FF	FINISHED FLOOR
FIXT	LIGHT FIXTURE
FLA	FULL LOAD AMPS
FLUOR	FLUORESCENT
FPB	FAN POWERED BOX
FS	FUSED SWITCH
FT	FEET
FURN	FURNITURE
FVNR	FULL VOLTAGE NON-REVERSING
FVR	FULL VOLTAGE REVERSING
FWD	FORWARD
G,GRD	GROUND
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GEN	GENERATOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GHW	GALVANIZED HEAVY WALL STEEL CONDUIT
H	HOT
HD	HEAVY DUTY
HDCP	HANDICAPPED
HGB	HOGAN GROUND BOX
HID	HIGH INTENSITY DISCHARGE
HOA	HANDS-OFF-AUTO
HP	HORSEPOWER
HPS	HIGH PRESSURE SODIUM
HTR	HEATER
HV	HIGH VOLTAGE
HZ	HERTZ (CYCLES/SECOND)
I	CURRENT
IC	INTERRUPTING CAPACITY
IG	ISOLATED GROUND
IMC	INTERMEDIATE GRADE CONDUIT
IN	INCH
INC	INCANDESCENT
INFO	INFORMATION
INSUL	INSULATION
ISC	INSTANTANEOUS SHORT CIRCUIT
JB	JUNCTION BOX
KEC	KITCHEN EQUIPMENT CONTRACTOR
KO	KNOCKOUT
KS	KEYED SWITCH
KVA	KILOVOLT-AMPERE
KW	KILOWATT
KWH	KILOWATT-HOUR
L#	LINE
LCD	LIQUID CRYSTAL DISPLAY
LED	LIGHT EMITTING DIODE
LS	LOUD SPEAKER
LTG	LIGHTING
LV	LOW VOLTAGE
MAG	MAGNETIC
MAN	MANUAL
MAT	MATERIAL
MAX	MAXIMUM
MC	MECHANICAL CONTRACTOR
MCA	MINIMUM CIRCUIT AMPS
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCCB	MOLDED CASE CIRCUIT BREAKER
MCM	THOUSAND CIRCULAR MILLS
MCS	MOLDED CASE SWITCH
MECH	MECHANICAL
MFR	MANUFACTURER
MH	METAL HALIDE
MICRO	MICROWAVE
MIN	MINIMUM
MISC	MISCELLANEOUS
MOCP	MAXIMUM OVER CURRENT PROTECTION
MTD	MOUNTED
MTR	MOTOR
MTS	MANUAL TRANSFER SWITCH
MV	MERCURY VAPOR
N.NEUT	NEUTRAL
NAC	NOTIFICATION APPLIANCE CIRCUITS
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS' ASSOCIATION
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
NO	NORMALLY OPENED
NTS	NOT TO SCALE
OCP	OVER CURRENT PROTECTION
OL	OVERLOAD
OVHD	OVERHEAD
P	POLES
PA	PUBLIC ADDRESS
PB	PULL BOX
PE	PROFESSIONAL ENGINEER
PCU	PACKAGED CONTROL UNIT
PH	PHASE
PL	PROPERTY LINE
PNL	PANEL
PRI	PRIMARY
PROT.	PROTECTION OR PROTECTIVE
PT	POTENTIAL TRANSFORMER
PTD	PAINTED
PVC	POLYVINYL CHLORIDE (ELECTRIC GRADE)
PWR	POWER
QTY	QUANTITY
R	DISCONNECT AND REMOVE
RC	REMOTE CONTROL
RCP	REFLECTED CEILING PLAN
REF	REFRIGERATOR
REV	REVERSE OR REVISION
RECP	RECEPTACLE
RM	ROOM
RMC	RIGID METAL CONDUIT (GALVANIZED)
RMS	ROOT MEAN SQUARE
RT	RAIN TIGHT
RTG	RATING
RVNR	REDUCED VOLTAGE NON-REVERSING
RVR	REDUCED VOLTAGE REVERSING
S	SWITCH
SEC	SECONDARY
SC	SHORT CIRCUIT
SCH	SCHEDULE
SF	SQUARE FOOT
SP	SINGLE POLE
SPC	SINGLE POINT CONNECTION
SPDT	SINGLE POLE DOUBLE THROW
SPEC	SPECIFICATION
SPKR	SPEAKER
SPST	SINGLE POLE SINGLE THROW
SS	STAINLESS STEEL
STA	STATION
STD	STANDARD
SW	SWITCH
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
SYM	SYMMETRICAL
SYS	SYSTEM
T	TRIP
TC	TERMINAL CABINET
TEL	TELEPHONE
TEL.CL	TELEPHONE CLOSET
TEMP	TEMPORARY
TERM	TERMINAL
TL	TWIST LOCK
TRF	TRANSFORMER
TS	TIME SWITCH
TTC	TELEPHONE TERMINAL CABINET
TV	TELEVISION
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
TX	TRANSFORMER
TYP	TYPICAL
UG	UNDERGROUND
UH	UNIT HEATER
UL	UNDERWRITER'S LABORATORIES
UNG	UNGROUNDED
UNO	UNLESS NOTED OTHERWISE
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLT
VA	VOLT-AMPERE
VFD	VARIABLE FREQUENCY DRIVE
VIF	VERIFY IN FIELD
VP	VAPOR PROOF
VT	VAPOR TIGHT
W	WATT OR WIRE (DEPENDING ON CONTEXT)
W/D	WASHER DRYER
WG	WIRE GUARD
W/O	WITHOUT
WP	WEATHERPROOF
WT	WATER TIGHT
X	DEMOLISH EXISTING
XS	REMOVE AND SALVAGE
YR	YEAR

NOTE: NOT ALL ABBREVIATIONS LISTED ABOVE MAY BE USED OR APPEAR IN THESE DRAWINGS.

HVAC EQUIPMENT WIRING SCHEDULE

TAG	DESCRIPTION	VOLT	PHASE	LOAD HP	LOAD KW	LOAD FLA	LOAD MCA	OCPD SIZE	OCPD POLE	FEED FROM PANEL	FEED FROM CKT.	FEEDER/BRANCH WIRING SETS	FEEDER/BRANCH WIRING NO.	FEEDER/BRANCH WIRING SIZE	FEEDER/BRANCH WIRING GND.	FEEDER/BRANCH WIRING CONDUIT	EQUIPMENT CONTROLLER P.B	F.B	I.B	SIZE	TYPE	DISC. SW	OCPD	POLE	ENCL.	SEE NOTE	LOCAL DISCONNECT SWITCH P.B	F.B	I.B	SIZE	TYPE	POLE	ENCL.	SEE NOTE	EQUIPMENT CONNECTION P.B	F.B	I.B	RECP.	CPC	HWC	FWC	SEE NOTE
AHU-5B-3	FAN COIL UNIT	480	3	-	7	11.1	13.2	15	3	EL-3-1	-	1	3	12	12	3/4"	M.C	-	-	-	ECM	-	-	-	-	-	-	-	-	-	-	-	6	E.C	-	-	-	-	YES	YES	4
AHU-6-3B	FAN COIL UNIT	480	3	-	25	34	41.5	45	3	ELT-1	2,4,6	1	3	8	10	3/4"	M.C	-	-	-	ECM	-	-	-	-	-	-	-	-	-	-	-	6	E.C	-	-	-	-	YES	YES	4
AHU-7D-1	FAN COIL UNIT	480	3	-	9.9	14.7	17.7	20	3	ELT-1	7,9,11	1	3	12	12	3/4"	M.C	-	-	-	ECM	-	-	-	-	-	-	-	-	-	-	-	6	E.C	-	-	-	-	YES	YES	4
ESUH-1	UNIT HEATER	480	3	-	3	3.6	-	15	3	HDP1	-	1	3	12	12	3/4"	-	-	-	-	-	-	-	-	-	-	-	M.C	E.C	15	TS	3	NEMA 1	5	E.C	-	-	-	-	YES	YES	4
ESUH-2	UNIT HEATER	480	3	-	5	6	-	15	3	HP-6-5A	37,39,41	1	3	12	12	3/4"	-	-	-	-	-	-	-	-	-	-	-	M.C	E.C	15	TS	3	NEMA 1	5	E.C	-	-	-	-	YES	YES	4
ESUH-3	UNIT HEATER	480	3	-	5	6	-	15	3	HP-6-1B	37,39,41	1	3	12	12	3/4"	-	-	-	-	-	-	-	-	-	-	-	M.C	E.C	15	TS	3	NEMA 1	5	E.C	-	-	-	-	YES	YES	4
ESUH-4	UNIT HEATER	480	3	-	10	12	-	15	3	HDP1	-	1	3	12	12	3/4"	-	-	-	-	-	-	-	-	-	-	-	M.C	E.C	20	TS	3	NEMA 1	5	E.C	-	-	-	-	YES	YES	4
ESUH-5	UNIT HEATER	480	3	-	5	6	-	15	3	HP-1-5B	1,3,5	1	3	12	12	3/4"	-	-	-	-	-	-	-	-	-	-	-	M.C	E.C	15	TS	3	NEMA 1	5	E.C	-	-	-	-	YES	YES	4
ESUH-6	UNIT HEATER	480	3	-	10	12	-	15	3	HP-1-3A(1)	14,16,18	1	3	12	12	3/4"	-	-	-	-	-	-	-	-	-	-	-	M.C	E.C	20	TS	3	NEMA 1	5	E.C	-	-	-	-	YES	YES	4
ESUH-7	UNIT HEATER	480	3	-	10	12	-	15	3	HP-1-3A(1)	26,28,30	1	3	12	12	3/4"	-	-	-	-	-	-	-	-	-	-	-	M.C	E.C	20	TS	3	NEMA 1	5	E.C	-	-	-	-	YES	YES	4
ESUH-8	UNIT HEATER	480	3	-	5	6	-	15	3	HDP-1-1	-	1	3	12	12	3/4"	-	-	-	-	-	-	-	-	-	-	-	M.C	E.C	15	TS	3	NEMA 1	5	E.C	-	-	-	-	YES	YES	4
FCU-1	FAN COIL UNIT	120	1	-	-	6.6	-	15	1	RP-5-1B	-	1	2	12	12	3/4"	-	-	-	-	ECM	-	-	-	-	-	-	M.C	E.C	20	TS	1	NEMA 1	6	E.C	-	-	-	-	YES	YES	-
FCU-2	FAN COIL UNIT	120	1	-	-	6.6	-	15	1	RP-5-1B	-	1	2	12	12	3/4"	-	-	-	-	ECM	-	-	-	-	-	-	M.C	E.C	20	TS	1	NEMA 1	6	E.C	-	-	-	-	YES	YES	-

GENERAL NOTES:

1. E.C. SHALL REVIEW THE ARCHITECTURAL, MECHANICAL, PLUMBING, AND FIRE PROTECTION CONTRACT DOCUMENTS, AND SHOP DRAWINGS FOR FINAL EQUIPMENT LOCATION, ELEVATION, AND POWER REQUIREMENTS PRIOR TO INSTALLING CONDUITS.
2. E.C. SHALL REVIEW THE LOAD REQUIREMENTS WITH THE OEM PRIOR TO INSTALLING CONDUIT.
3. E.C. SHALL VERIFY IN THE FIELD THE OCPD REQUIREMENTS WITH THE OEM PRIOR TO INSTALLING CONDUIT. OCPD RATINGS ARE DERIVED FROM THE OEM'S SPECIFICATIONS.
4. E.C. SHALL VERIFY IN THE FIELD THE CONTACTOR/STARTER/VFD/PRMS/OEM CONTROLLER/DISCONNECT RATINGS WITH THE OEM PRIOR TO INSTALLING CONDUIT.
5. E.C. SHALL VERIFY IN THE FIELD THE THERMAL OVERLOAD RATINGS WITH THE OEM. PROVIDE OVERLOADS PER OEM RECOMMENDATIONS.
6. E.C. SHALL VERIFY IN THE FIELD WITH THE OEM PRIOR TO INSTALLING CONDUIT. E.C. SHALL LOCATE THE DISCONNECT SWITCH WITHIN 5FT AND WITHIN SIGHT OF THE EQUIPMENT.
7. E.C. SHALL PROVIDE CONNECTIONS TO MOTOR/LISTED EQUIPMENT. PROVIDE A Cu EQUIPMENT GROUND (EGC) FROM THE DISCONNECT SWITCH TO THE MOTOR/LISTED EQUIPMENT CONNECTION POINT/JUNCTION BOX.

PB:	PROVIDED BY (FURNISH AND INSTALL)
FB:	FURNISHED BY
IB:	INSTALLED BY
ENCL.:	NEMA ENCLOSURE
HWC:	HARD WIRE CONNECTION
FWC:	FLEXIBLE WHIP CONDUIT
CPC:	CORD AND PLUG CONNECTION
FVNR:	FULL VOLTAGE NON-REVERSING MAGNETIC STARTER
VFD:	VARIABLE FREQUENCY CONTROLLER
TS:	TOGGLE SWITCH
FUSE	FUSE DISCONNECT SWITCH
NON-FUSE	NON-FUSED DISCONNECT SWITCH

NOTE #1	E.C. SHALL PROVIDE MOUNTING/RACKING FOR STARTER TYPES (FVNR, FVR, PRMS, 2SP1W, & 2SP2W) E.C. SHALL PROVIDE THERMAL OVERLOADS FOR STARTERS PER OEM/FIELD VERIFICATION E.C. SHALL PROVIDE TWO SETS OF FORM "C" AUX CONTACTS FOR ALL STARTER TYPES E.C. SHALL PROVIDE 120Vac CONTROL COIL FOR STARTERS TYPES (FVNR, FVR, 2SP1W, & 2SP2W) E.C. SHALL PROVIDE 24Vac CONTROL COIL FOR POWER RELAYS/MANUAL STARTER "PRMS"
NOTE #2	E.C. SHALL PROVIDE MOUNTING/RACKING FOR VARIABLE FEQUENCY CONTROLLER "VFD" E.C. SHALL CALIBRATE SOLID STATE OVERLOADS PER OEM/FIELD VERIFICATION RESULTS E.C. SHALL PROVIDE FOUR SETS OF FORM "C" AUX CONTACTS WITHIN THE VFD ENCLOSURE E.C. SHALL PROVIDE OEM START-UP AND COMMISSIONING OF VFD PRIOR TO FINAL PUNCHLIST
NOTE #3	E.C. SHALL PROVIDE MOUNTING/RACKING FOR DISCONNECT SWITCHES ALL DISCONNECT SWITCHES SHALL BE WITHIN SIGHT OF THE MOTOR/EQUIPMENT AND SHALL NOT EXCEED A MAXIMUM DISTANCE OF 5 FEET FROM THE MOTOR/EQUIPMENT MAXIMUM HEIGHT AFF OF DISCONNECT SWITCH HANDLE SHALL NOT EXCEED 6'-3"
NOTE #4	E.C. SHALL VERIFY MOTOR ROTATION AND OPERATION WITH THE OEM REPRESENTATIVE PRIOR TO ENERGIZING MOTOR(S)/EQUIPMENT E.C. SHALL PROVIDE GROUNDING AND BONDING PER THE OEM SPECIFICATIONS EQUIPMENT FLEX WHIPS SHALL NOT EXCEED 72" MAXIMUM LENGTH VERIFY ALL CPC NEMA CONNECTIONS WITH THE OEM PRIOR TO INSTALLATION
NOTE #5	E.C SHALL PROVIDE TOGGLE DISCONNECT SWITCH WITHIN LINE OF SIGHT OF THE EQUIPMENT.
NOTE #6	DISCONNECT IS INTEGRAL WITH EQUIPMENT CONTROLLER

2018 ELECTRICAL CODE

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ISSUE/REVISION:

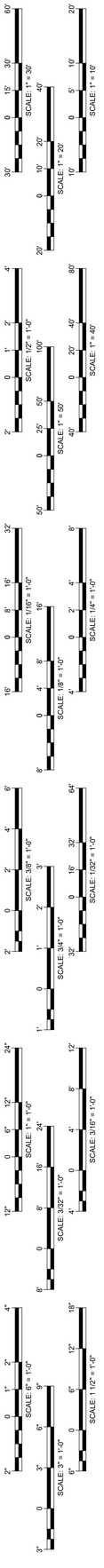
REV	DATE	DESCRIPTION
	1/30/2026	ISSUED FOR BID

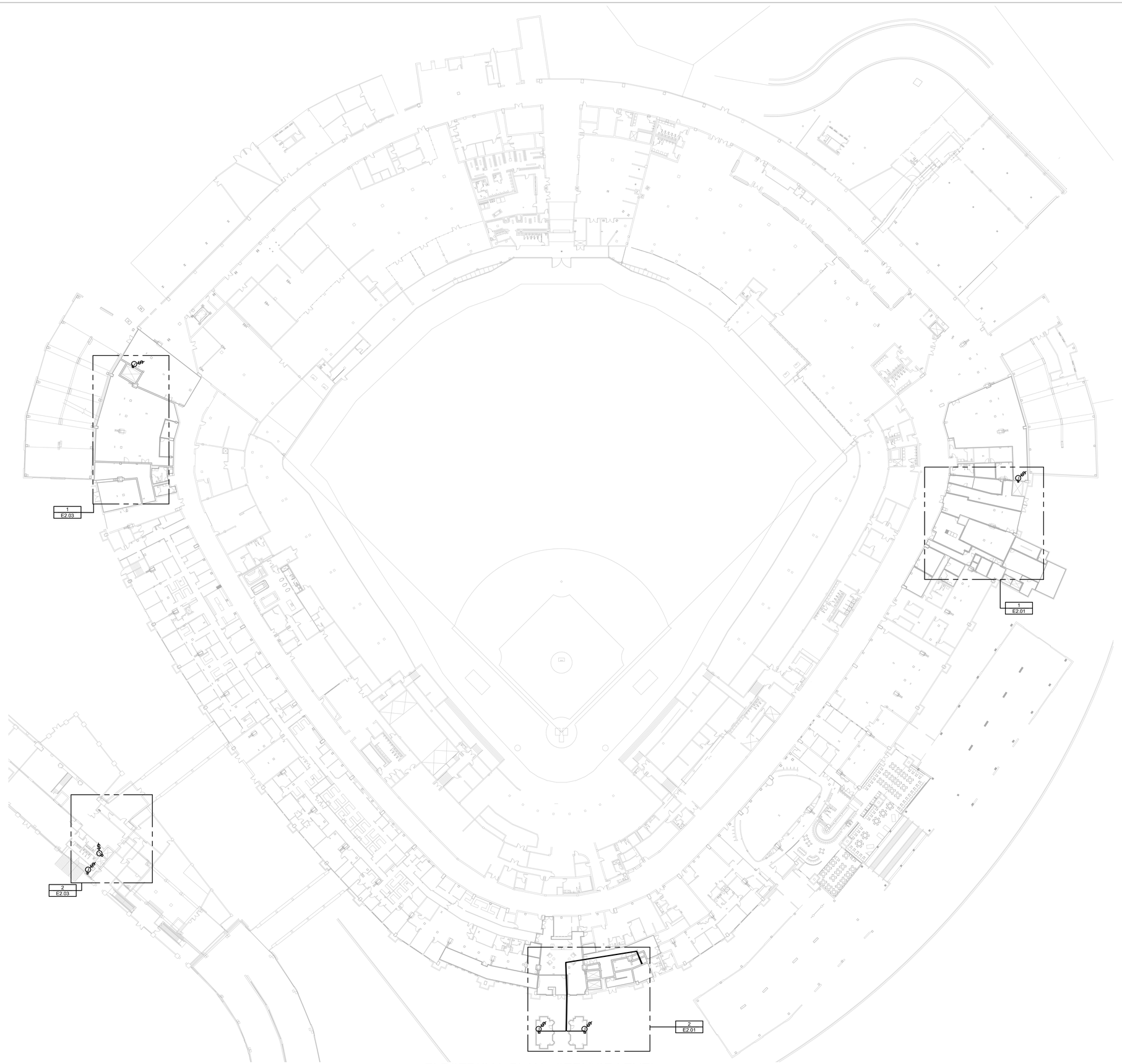
PROJECT:
RATE FIELD - HVAC FY2026

333 WEST 35TH STREET
CHICAGO, IL 60616

DRAWING TITLE:
ELECTRICAL TITLE SHEET

DESIGNED BY:	LF
CHECKED BY:	BT
PROJECT NO:	25080
SCALE:	NO SCALE
SHEET NO.	E0.01





1 ELECTRICAL PLAN - SERVICE LEVEL
SCALE: 1/32" = 1'-0"

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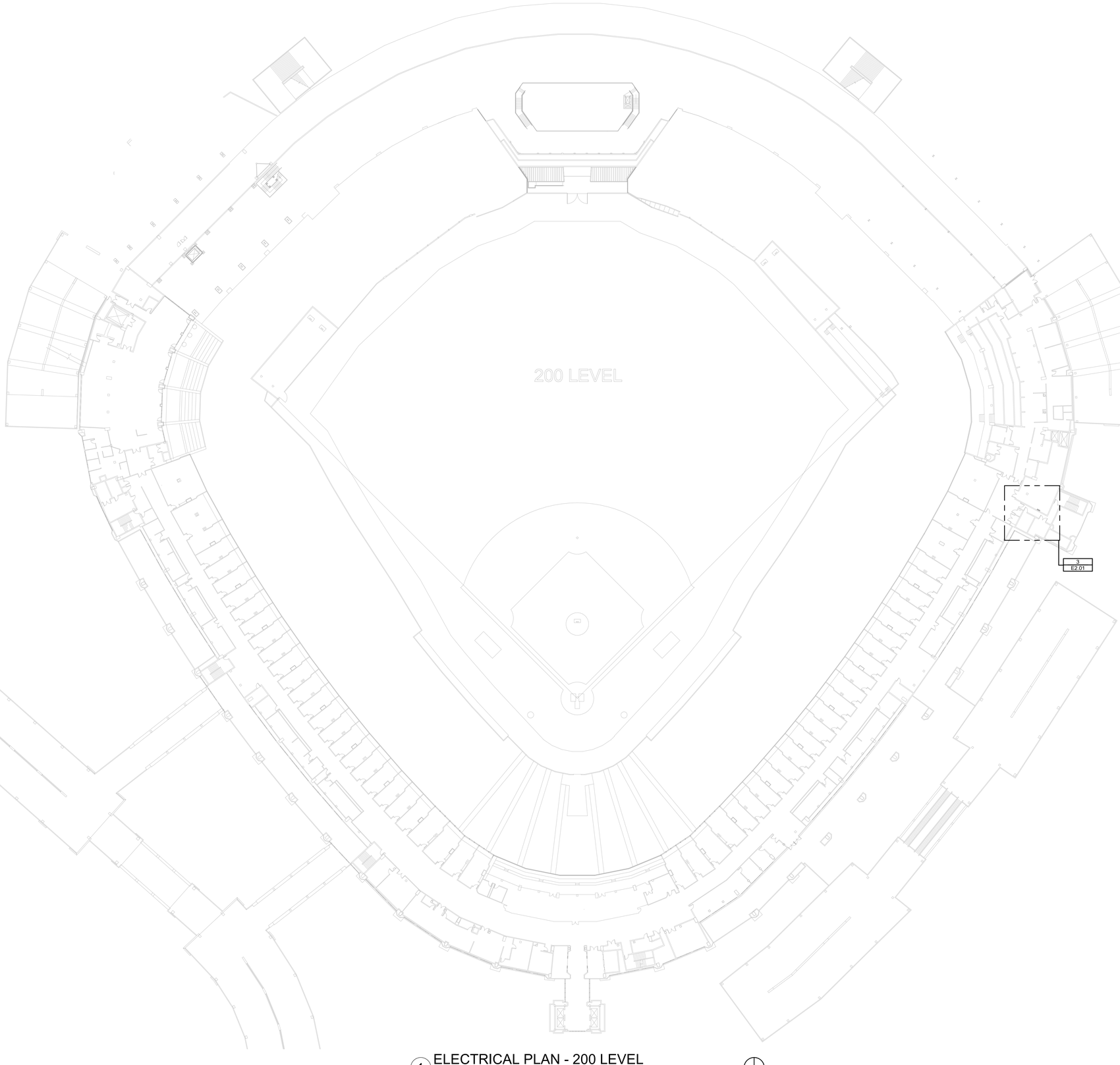
RATE FIELD - HVAC FY2026

333 WEST 35TH STREET
CHICAGO, IL 60616

DRAWING TITLE:
ELECTRICAL PLAN - SERVICE LEVEL

DESIGNED BY:	LF
CHECKED BY:	BT
PROJECT NO:	25080
SCALE:	1/32" = 1'-0"

SHEET NO.
E1.01



1 ELECTRICAL PLAN - 200 LEVEL
SCALE: 1/32" = 1'-0"

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	1/30/2026	ISSUED FOR BID

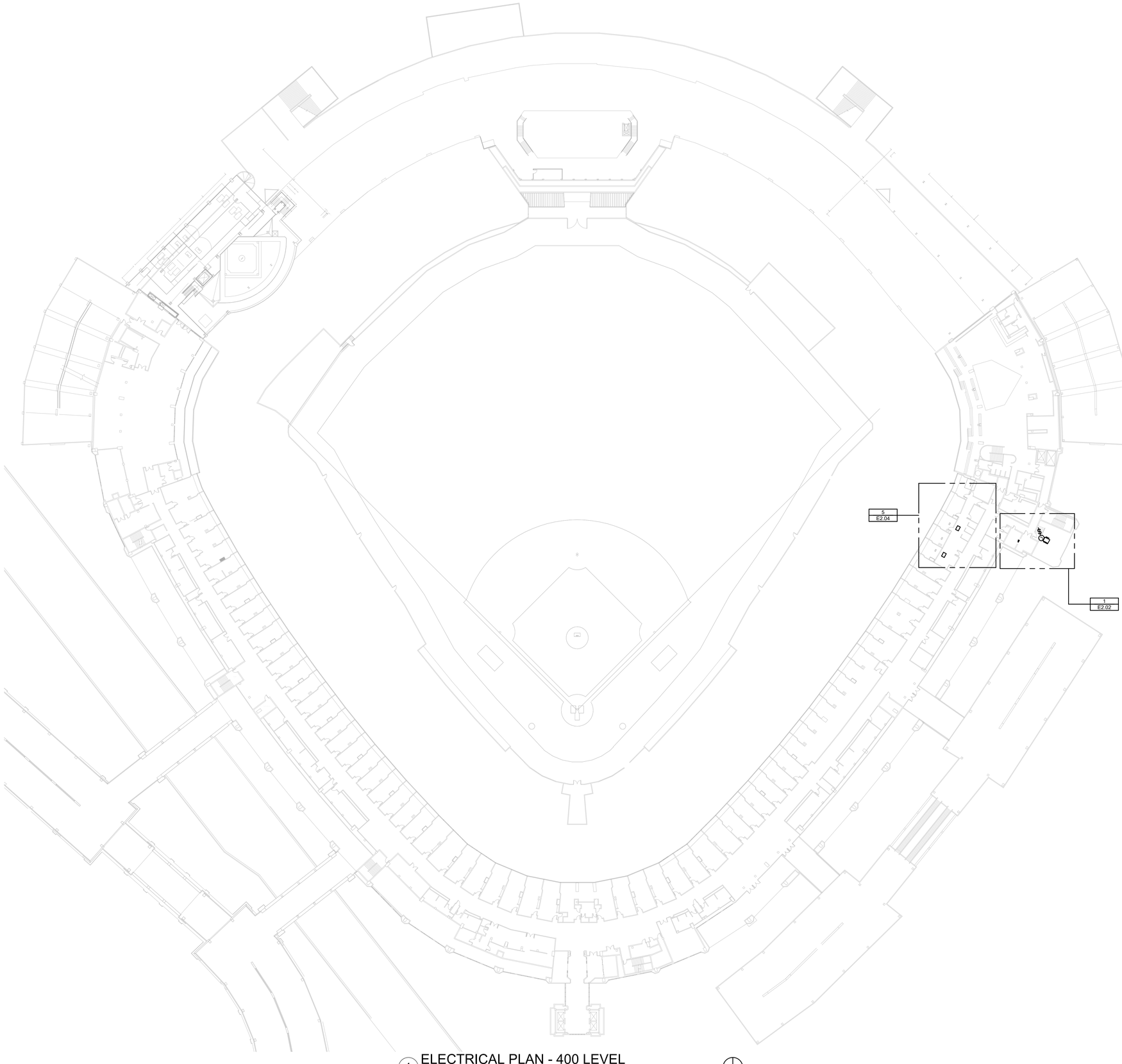
PROJECT:
RATE FIELD - HVAC FY2026

333 WEST 35TH STREET
CHICAGO, IL 60616

DRAWING TITLE:
ELECTRICAL PLAN - 200 LEVEL

DESIGNED BY:	LF
CHECKED BY:	BT
PROJECT NO:	25080
SCALE:	1/32" = 1'-0"

SHEET NO.
E1.02



1 ELECTRICAL PLAN - 400 LEVEL
SCALE: 1/32" = 1'-0"

SCALE: 1" = 30'
SCALE: 1" = 10'
SCALE: 1" = 20'
SCALE: 1/2" = 1'-0"
SCALE: 1" = 40'
SCALE: 1" = 50'
SCALE: 1/16" = 1'-0"
SCALE: 1/4" = 1'-0"
SCALE: 1/8" = 1'-0"
SCALE: 3/8" = 1'-0"
SCALE: 3/4" = 1'-0"
SCALE: 1/32" = 1'-0"
SCALE: 1" = 1'-0"
SCALE: 3/32" = 1'-0"
SCALE: 3/16" = 1'-0"
SCALE: 6" = 1'-0"
SCALE: 3" = 1'-0"
SCALE: 1 1/2" = 1'-0"

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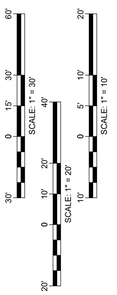
RATE FIELD - HVAC FY2026

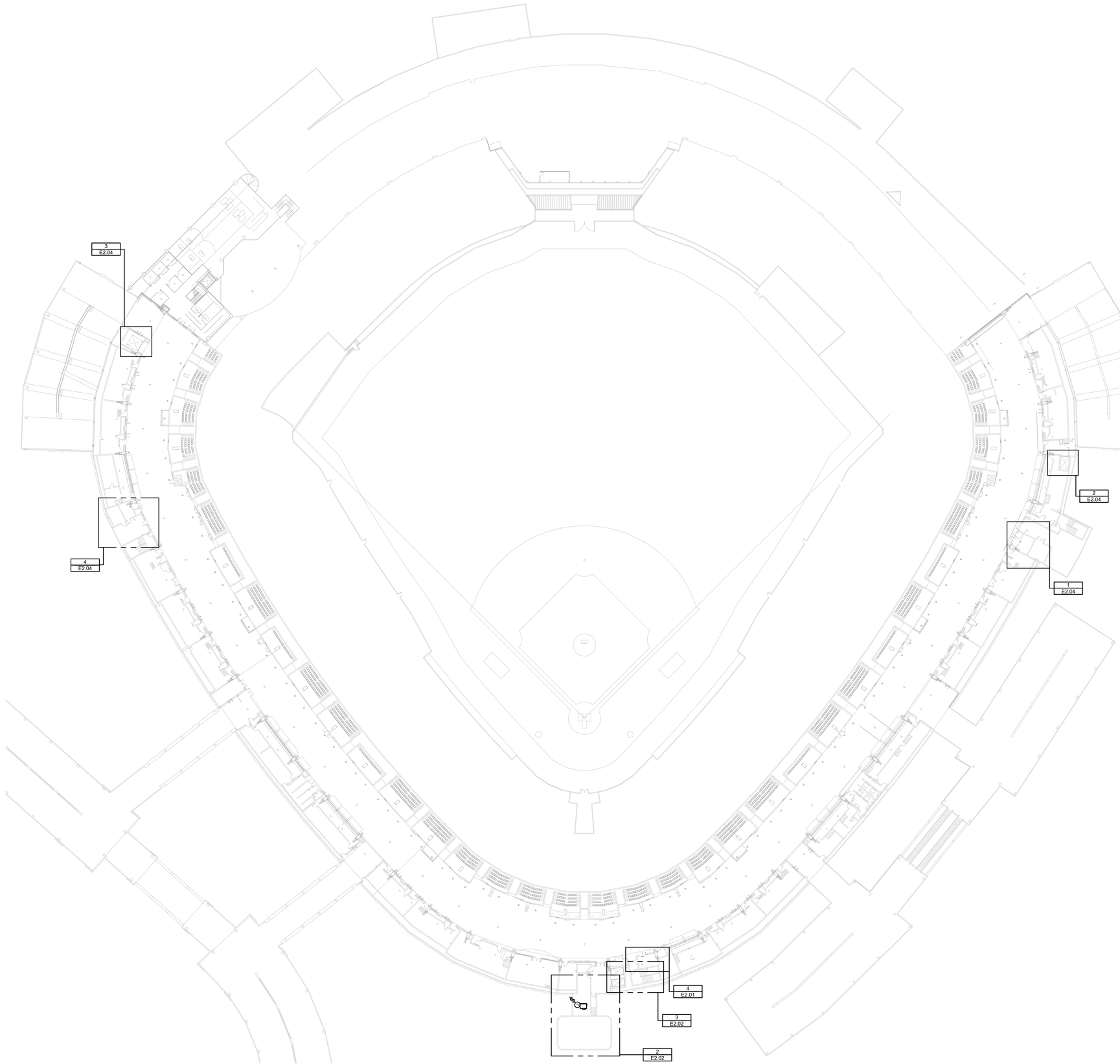
333 WEST 35TH STREET
CHICAGO, IL 60616

DRAWING TITLE:
ELECTRICAL PLAN - 400 LEVEL

DESIGNED BY:	LF
CHECKED BY:	BT
PROJECT NO:	25080
SCALE:	1/32" = 1'-0"

SHEET NO.
E1.03





1 ELECTRICAL PLAN - 500 LEVEL
SCALE: 1/32" = 1'-0"

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PROJECT:
RATE FIELD - HVAC FY2026

333 WEST 35TH STREET
CHICAGO, IL 60616

DRAWING TITLE:
ELECTRICAL PLAN - 500 LEVEL

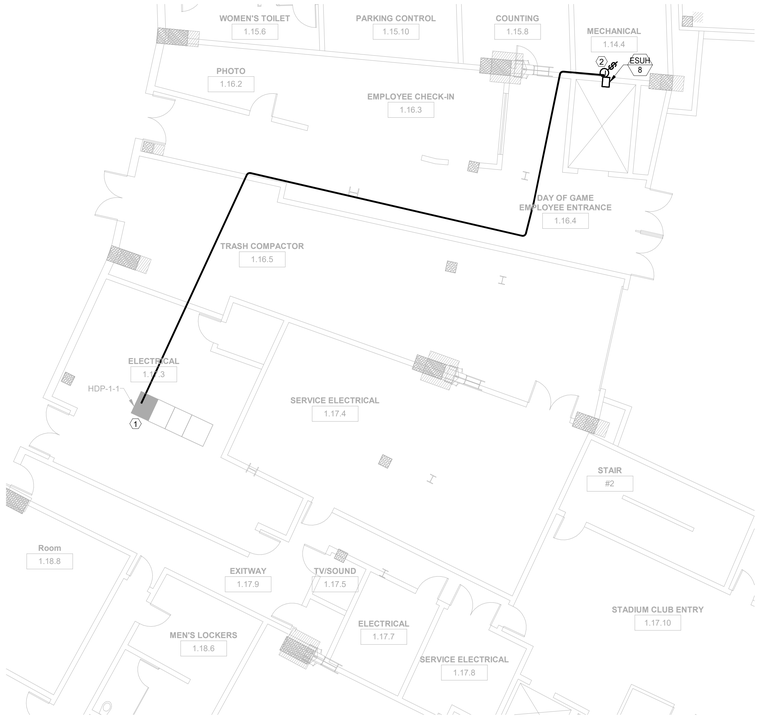
DESIGNED BY:	LF
CHECKED BY:	BT
PROJECT NO:	25080
SCALE:	1/32" = 1'-0"

SHEET NO.

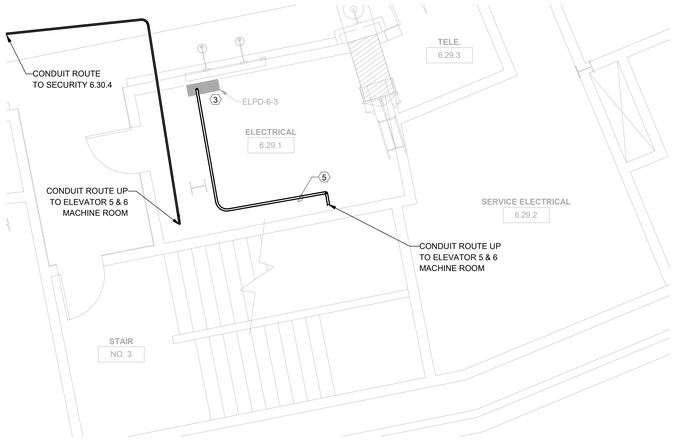
E1.04

KEYED NOTES

1. EXISTING DISTRIBUTION PANELBOARD TO REMAIN. FURNISH AND INSTALL (3) NEW 15A FUSES WITHIN THE EXISTING SPARE 30A/3P FUSE SWITCH. NEW FUSES SHALL HAVE THE SAME MAKE, MODEL, AND AIC RATING AS THE EXISTING FUSES WITHIN THE PANELBOARD. TERMINATE NEW BRANCH CIRCUIT CONDUIT AND WIRES TO EXISTING SPARE 30A/3P FUSE SWITCH.
2. MECHANICAL CONTRACTOR SHALL FURNISH AND ELECTRICAL CONTRACTOR SHALL INSTALL NEW DISCONNECT SWITCH FOR NEW UNIT HEATER. REFER TO HVAC EQUIPMENT SCHEDULE FOR SPECIFIC REQUIRMENTS AND CHARACTERISTICS OF NEW EQUIPMENT.
3. EXISTING PANELBOARD TO REMAIN. FURNISH AND INSTALL (3) NEW 100A FUSES WITHIN THE EXISTING 100A/3P SPARE FUSE SWITCH. NEW FUSES SHALL HAVE THE SAME MAKE, MODEL, AND AIC RATING AS THE EXISTING FUSES WITHIN THE PANELBOARD. TERMINATE NEW FEEDER WIRES TO EXISTING SPARE 100A/3P FUSE SWITCH FOR THE NEW PANELBOARD TO BE INSTALLED.
4. EXISTING PANELBOARD TO REMAIN. REPLACE EXISTING SPARE 20A/3P CIRCUIT BREAKERS IN SPACES #14,16,18 AND #26,28,30 WITH NEW 15A/3P CIRCUIT BREAKERS. NEW CIRCUIT BREAKER SHALL HAVE THE SAME MAKE, MODEL, AND AIC RATING AS THE EXISTING CIRCUIT BREAKERS WITHIN THE PANELBOARD. TERMINATE (2) NEW BRANCH CIRCUIT CONDUIT AND WIRES TO THE SAME LOCATION AS THE REPLACED CIRCUIT BREAKERS.
5. FURNISH AND INSTALL NEW BRANCH CIRCUIT CONDUIT AND WIRES FROM EXISTING DISTRIBUTION PANELBOARD TO NEW PANELBOARD. REFER TO ELECTRICAL SINGLE LINE DIAGRAM FOR SPECIFIC CONDUIT AND WIRE SIZES.

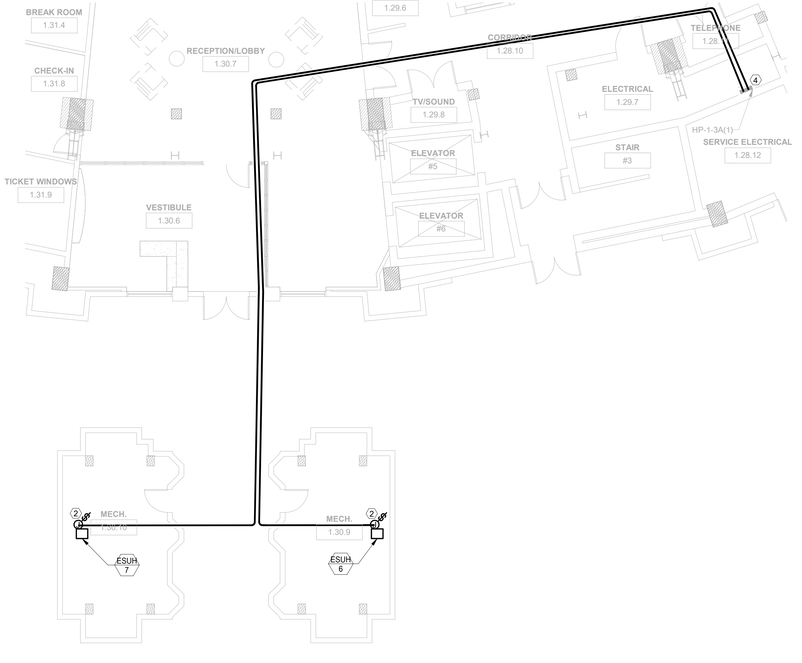


1 ELECTRICAL PLAN - ELECTRICAL ROOM 1.17.3 - GROUND LEVEL
SCALE: 1/8" = 1'-0"



4 ELECTRICAL PLAN - ELECTRICAL ROOM 6.29.1 - 500 LEVEL
SCALE: 1/4" = 1'-0"

3 ELECTRICAL PLAN - ELECTRICAL ROOM 3.17.05 - 200 LEVEL
SCALE: 1/4" = 1'-0"



2 ELECTRICAL PLAN - ELECTRICAL ROOM 1.29.07 - GROUND LEVEL
SCALE: 1/8" = 1'-0"

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PROJECT:
RATE FIELD - HVAC FY2026

333 WEST 35TH STREET
CHICAGO, IL 60616

DRAWING TITLE:
ELECTRICAL PLANS

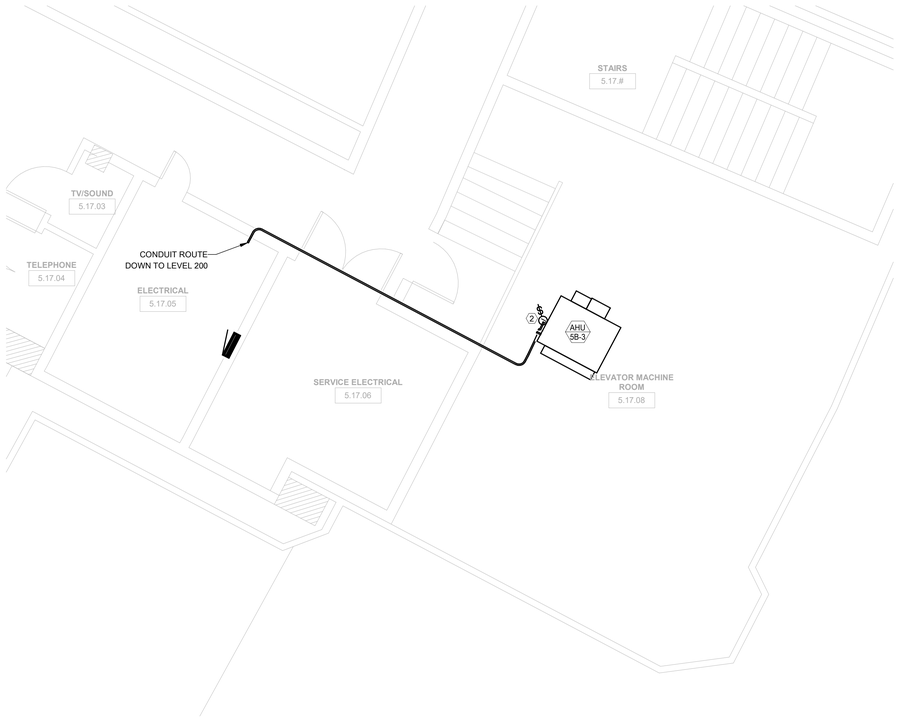
DESIGNED BY:	LF
CHECKED BY:	BT
PROJECT NO:	25080
SCALE:	As indicated

SHEET NO.
E2.01

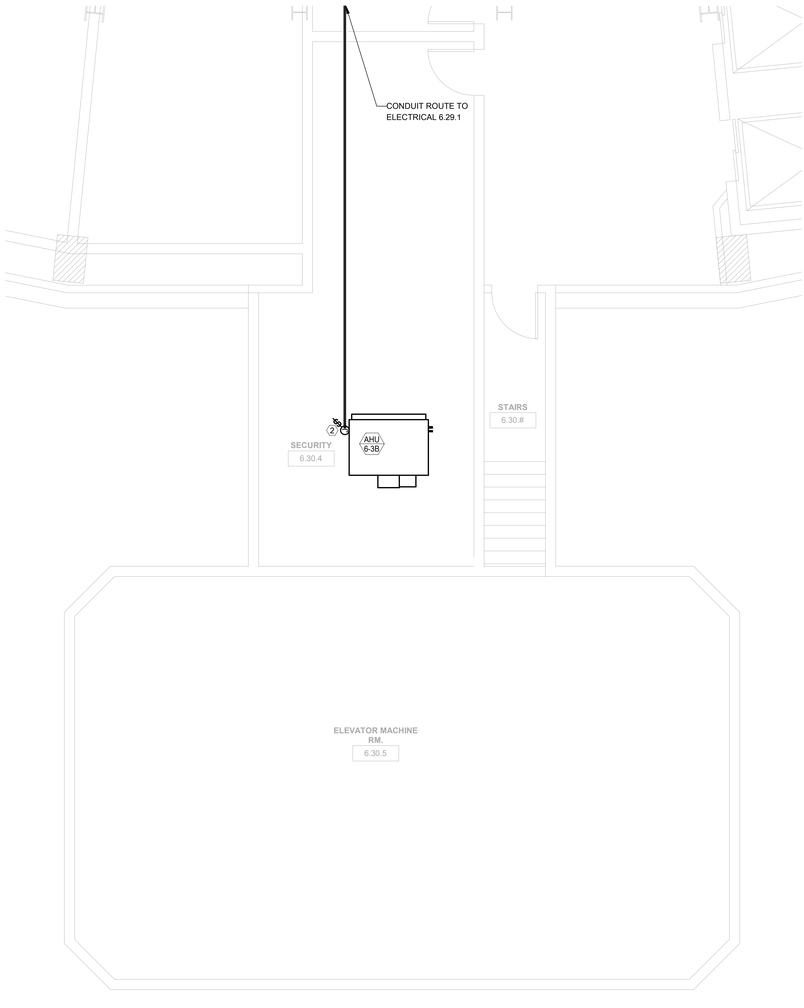
KEYED NOTES

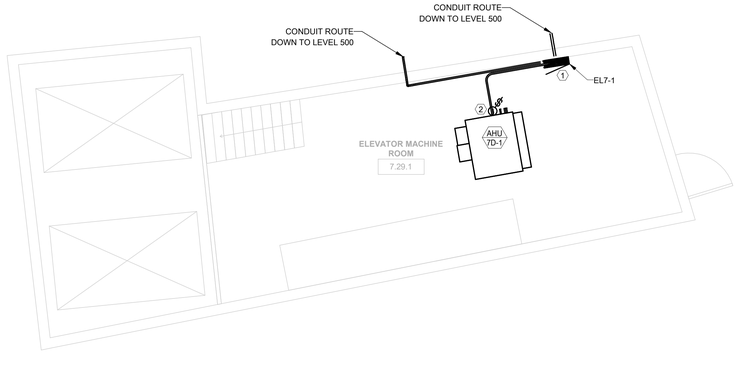
1 FURNISH AND INSTALL NEW PANELBOARD. REFER TO PANEL SCHEDULE FOR SPECIFIC REQUIREMENTS AND CHARACTERISTICS OF NEW PANELBOARD.

2 DISCONNECT SWITCH IS INTEGRAL TO EQUIPMENT BY MANUFACTURER. FURNISH AND INSTALL BRANCH CIRCUIT CONDUIT AND WIRES FROM PANELBOARD AS NOTED. REFER TO HVAC EQUIPMENT SCHEDULE FOR SPECIFIC REQUIREMENTS AND CHARACTERISTICS OF NEW EQUIPMENT.



1 ELECTRICAL PLAN - ELEV. 3 & 4 MACHINE ROOM - 400 LEVEL
SCALE: 1/4" = 1'-0"





3 ELECTRICAL PLAN - ELEV. 5 & 6 MACHINE ROOM - 600 LEVEL
SCALE: 1/4" = 1'-0"

2 ELECTRICAL PLAN - ELEV. 7, 8, 9, & 10 MACHINE ROOM - 500 LEVEL
SCALE: 1/4" = 1'-0"

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CHICAGO, IL 60616

DRAWING TITLE:
ELECTRICAL PLANS

DESIGNED BY:	LF
CHECKED BY:	BT
PROJECT NO:	25080
SCALE:	1/4" = 1'-0"

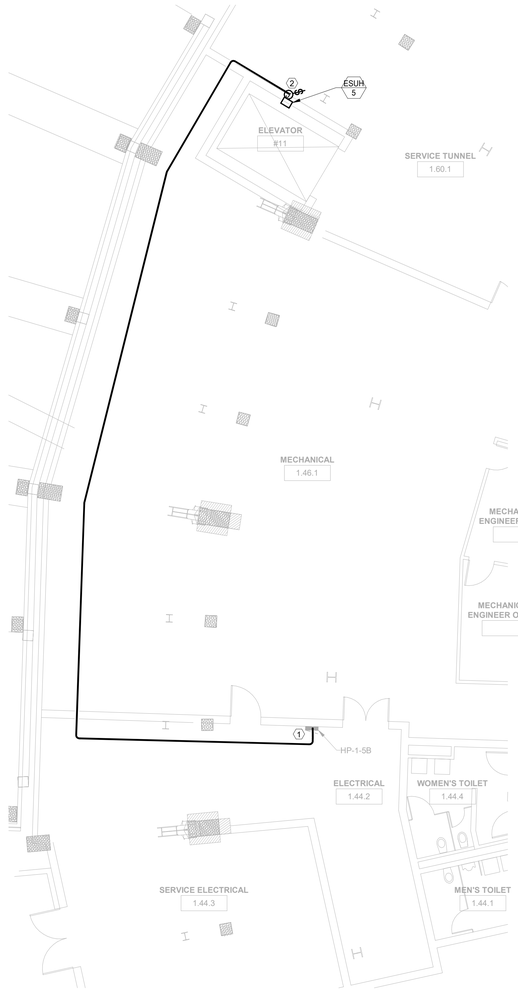
SHEET NO.
E2.02

KEYED NOTES

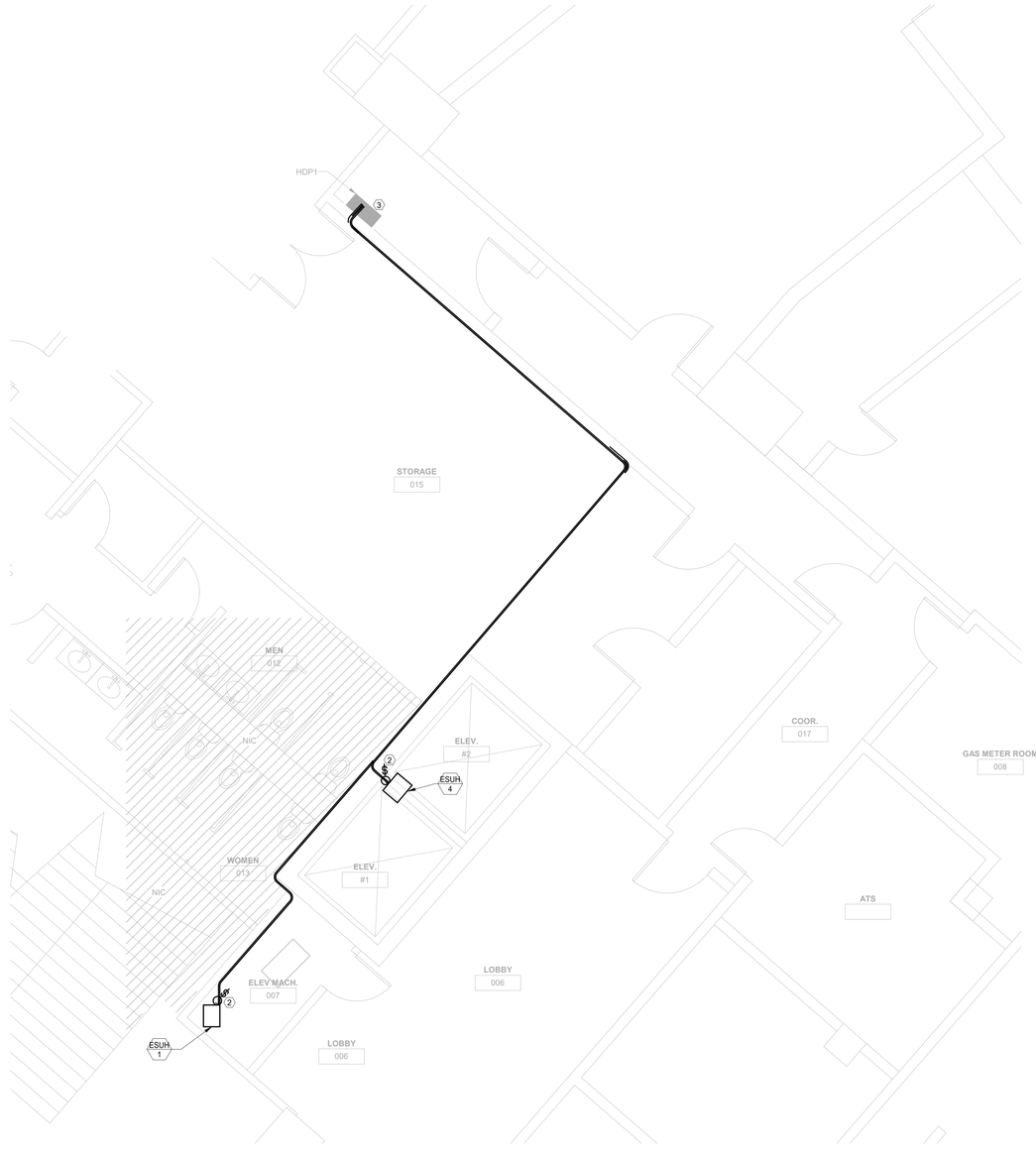
1 EXISTING PANELBOARD TO REMAIN. REPLACE EXISTING (3) SPARE 20A/1P CIRCUIT BREAKERS IN SPACES #1,3,5 WITH A NEW 15A/3P CIRCUIT BREAKER . NEW CIRCUIT BREAKER SHALL HAVE THE SAME MAKE, MODEL, AND AIC RATING AS THE EXISTING CIRCUIT BREAKERS WITHIN THE PANELBOARD. TERMINATE NEW BRANCH CIRCUIT CONDUIT AND WIRES TO SAME LOCATION AS THE REPLACED CIRCUIT BREAKER.

2 MECHANICAL CONTRACTOR SHALL FURNISH AND ELECTRICAL CONTRACTOR SHALL INSTALL NEW DISCONNECT SWITCH FOR NEW UNIT HEATER. REFER TO HVAC EQUIPMENT SCHEDULE FOR SPECIFIC REQUIRMENTS AND CHARACTERISTICS OF NEW EQUIPMENT.

3 EXISTING DISTRIBUTION PANELBOARD TO REMAIN. TERMINATE (2) NEW BRANCH CIRCUIT CONDUIT AND WIRES TO THE (2) EXISTING 15A/3P CIRCUIT BREAKERS.



1 ELECTRICAL PLAN - ELECTRICAL ROOM 1.44.02 - GROUND LEVEL
SCALE: 1/8" = 1'-0"



2 ELECTRICAL PLAN - ELEV. 12 & 13 MACHINE ROOM - GROUND LEVEL
SCALE: 1/4" = 1'-0"

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333 WEST 35TH STREET
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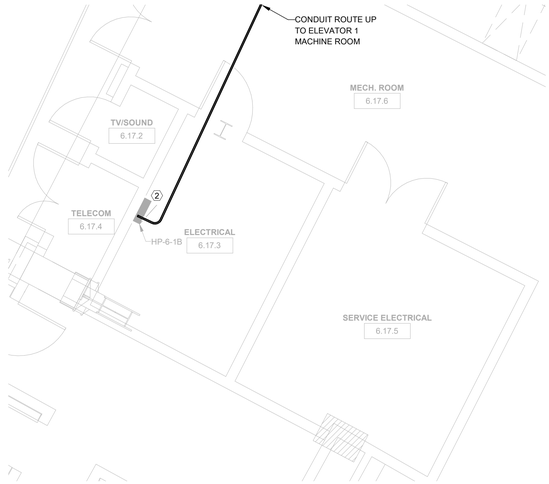
DRAWING TITLE:
ELECTRICAL PLANS

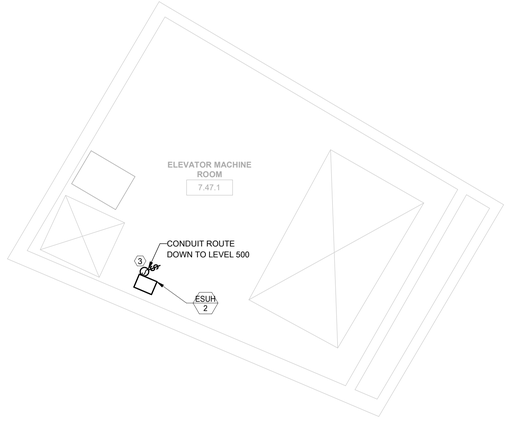
DESIGNED BY:	LF
CHECKED BY:	BT
PROJECT NO:	25080
SCALE:	As indicated

SHEET NO.
E2.03

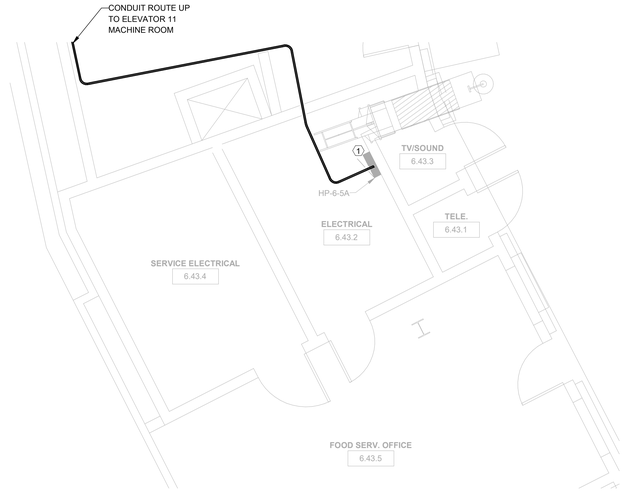
5 ELECTRICAL PLAN - ISFA OFFICES - 400 LEVEL
SCALE: 1/4" = 1'-0"



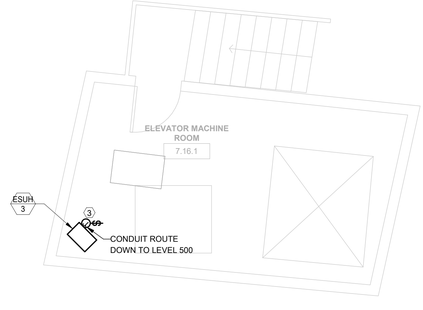
1 ELECTRICAL PLAN - ELECTRICAL ROOM 6.17.3 - 500 LEVEL
SCALE: 1/4" = 1'-0"



3 ELECTRICAL PLAN - ELEV. 11 MACHINE ROOM - 600 LEVEL
SCALE: 1/4" = 1'-0"



4 ELECTRICAL PLAN - ELECTRICAL ROOM 6.43.2 - 500 LEVEL
SCALE: 1/4" = 1'-0"



ELECTRICAL PLAN - ELEV. 1 MACHINE ROOM - 600 LEVEL
2 SCALE: 1/4" = 1'-0"

KEYED NOTES

1. EXISTING PANELBOARD TO REMAIN. REPLACE EXISTING (3) SPARE 20A/1P CIRCUIT BREAKERS IN SPACES #37,39,41 WITH A NEW 15A/3P CIRCUIT BREAKER. NEW CIRCUIT BREAKER SHALL HAVE THE SAME MAKE, MODEL, AND AIC RATING AS THE EXISTING CIRCUIT BREAKERS WITHIN THE PANELBOARD. TERMINATE NEW BRANCH CIRCUIT CONDUIT AND WIRES TO SAME LOCATION AS THE REPLACED CIRCUIT BREAKER.
2. EXISTING PANELBOARD TO REMAIN. REPLACE EXISTING SPARE 20A/3P CIRCUIT BREAKER IN SPACES #37,39,41 WITH A NEW 15A/3P CIRCUIT BREAKER. NEW CIRCUIT BREAKER SHALL HAVE THE SAME MAKE, MODEL, AND AIC RATING AS THE EXISTING CIRCUIT BREAKERS WITHIN THE PANELBOARD. TERMINATE NEW BRANCH CIRCUIT CONDUIT AND WIRES TO SAME LOCATION AS THE REPLACED CIRCUIT BREAKER.
3. MECHANICAL CONTRACTOR SHALL FURNISH AND ELECTRICAL CONTRACTOR SHALL INSTALL NEW DISCONNECT SWITCH FOR NEW UNIT HEATER. REFER TO HVAC EQUIPMENT SCHEDULE FOR SPECIFIC REQUIRMENTS AND CHARACTERISTICS OF NEW EQUIPMENT.
4. DISCONNECT AND REMOVE POWER CONNECTION FOR EXISTING HVAC EQUIPOMENT AND ASSOCIATED DISCONNECT SWITCH. DISCONNECT AND REMOVE EXISTING BRANCH CIRCUIT CONDUIT AND WIRES COMPLETELY FROM THE SOURCE.
5. FURNISH AND INSTALL NEW POWER CONNECTION FOR HVAC EQUIPMENT AND ASSOCIATED DISCONNECT SWITCH. REFER TO HVAC EQUIPMENT WIRING SCHEDULE FOR MORE INFORMATION.
6. FURNISH AND INSTALL NEW CONDUIT AND WIRES FROM EXISTING PANELBOARD "RP-5-1B". INSTALL CONDUIT ABOVE EXISTING ACCESSIBLE CEILING. REFER TO HVAC EQUIPMENT WIRING SCHEDULE FOR MORE INFORMATION.
7. EXISTING PANELBOARD TO REMAIN. FURNISH AND INSTALL NEW CIRCUIT BREAKER WITHIN EXISTING SPACE #42. NEW CIRCUIT BREAKER SHALL MATCH THE EXISTING CIRCUIT BREAKER'S MAKE, MODEL, AND AIC RATING. CONNECT NEW WIRES TO NEW CIRCUIT BREAKER. REFER TO HVAC WIRING SCHEDULE FOR CIRCUIT BREAKER SIZE.

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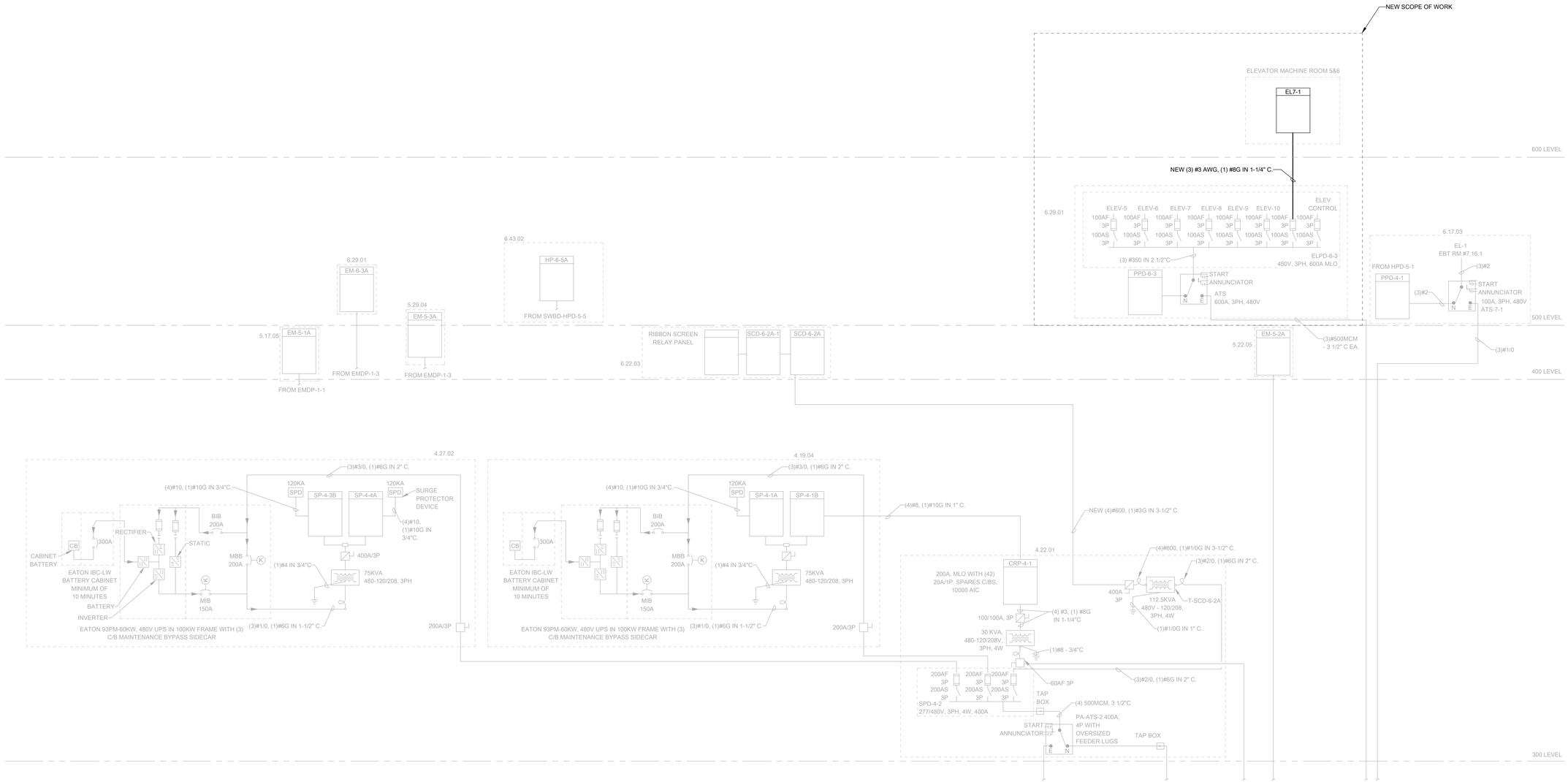
PROJECT:
RATE FIELD - HVAC FY2026

333 WEST 35TH STREET
CHICAGO, IL 60616

DRAWING TITLE:
ELECTRICAL PLANS

DESIGNED BY:	LF
CHECKED BY:	BT
PROJECT NO:	25080
SCALE:	1/4" = 1'-0"

SHEET NO.
E2.04



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REV	DATE	DESCRIPTION
	1/30/2026	ISSUED FOR BID

PROJECT:
RATE FIELD - HVAC FY2026

333 WEST 35TH STREET
CHICAGO, IL 60616

DRAWING TITLE:
ELECTRICAL SINGLE-LINE DIAGRAM - RIGHT FIELD GENERATOR 300 LEVEL - 500 LEVEL

DESIGNED BY:	LF
CHECKED BY:	BT
PROJECT NO:	25080
SCALE:	NO SCALE

SHEET NO.
E3.01

010000. GENERAL CONDITIONS AND REQUIREMENTS

A. GENERAL

1. ALL ELECTRICAL WORK INCLUDING BUT NOT LIMITED TO INSTALLATION, GROUNDING, EQUIPMENT, AND DEVICES SHALL CONFORM TO THE REQUIREMENTS OF ALL AUTHORITIES HAVING JURISDICTION AND APPLICABLE NATIONAL, STATE, CITY, AND MUNICIPAL BUILDING CODES.

2. ALL ELECTRICAL WORK SHALL CONFORM TO NATIONAL AND LOCAL STANDARDS AND GUIDELINES INCLUDING BUT NOT LIMITED TO THE LATEST VERSIONS OF THE FOLLOWING:

   a. ANSI - AMERICAN NATIONAL STANDARDS INSTITUTE
   b. ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA (IES)
   c. NATIONAL ELECTRICAL SAFETY CODE (NESC)
   d. NFPA - NATIONAL FIRE PROTECTION ASSOCIATION: STANDARD FOR ELECTRICAL SAFETY IN THE WORKPLACE (NFPA 70E)
   e. UNDERWRITERS LABORATORY (OR OTHER RECOGNIZED INSPECTING AGENCY)
   f. THE NATIONAL ELECTRICAL CODE (NEC).
   g. ENERGY CODE IECC.

3. ALL MATERIALS SHALL BE LISTED BY AN APPROVED LABORATORY AND SHALL BE NEW AND THE BEST OF THEIR RESPECTIVE KINDS AND SHALL BE INSTALLED AND APPLIED AS INTENDED AND REQUIRED BY THE MANUFACTURER.

4. ELECTRICAL WORK SHALL INCLUDE, BUT NOT BE LIMITED TO:

   a. ALL MATERIALS
   b. EQUIPMENT, TOOLS, AND LABOR REQUIRED FOR A COMPLETE AND CODE COMPLIANT SYSTEM.
   c. ANY OSHA REQUIREMENTS THAT MAY APPLY TO THE WORK UNDER THIS CONTRACT INCLUDING BUT NOT LIMITED TO SAFETY MEETINGS, STRICT LOCK/OUT/TAG/OUT PROCEDURES, AND PROPER PROTECTIVE EQUIPMENT.
   d. LABOR AND SPECIALTY MODELING SOFTWARE REQUIRED FOR INTERDISCIPLINARY COORDINATION AND FAMILIARIZATION WITH SITE CONDITIONS.
   e. TRAINING AND GATHERING OF DOCUMENTATION FOR CLOSEOUT PROCEDURES.

5. THE DRAWINGS AND SPECIFICATIONS SHALL BE UNDERSTOOD TO COVER COMPLETE SYSTEMS ACCORDING TO THEIR INTENT AND MEANING AS DESCRIBED HEREIN. THIS SPECIFICATION IS INCLUSIVE FOR EACH ITEM, REQUIRING ALL LABOR, MATERIAL AND EQUIPMENT NECESSARY TO PROPERLY INSTALL, ALTER, ADJUST AND PUT IN OPERATION THE COMPLETE ELECTRICAL SYSTEM.

6. THIS CONTRACTOR IS RESPONSIBLE FOR FURNISHING AND INSTALLING ALL ELECTRICAL COMPONENTS AND SYSTEMS AS REQUIRED FOR A FULLY FUNCTIONAL SYSTEM AND AS DESCRIBED HEREIN. ALL EQUIPMENT AND DEVICES SPECIFIED AND ADDITIONALLY REQUIRED WILL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR. IT WILL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO PURCHASE ALL EQUIPMENT AND FURNISH LABOR AND EQUIPMENT FOR A COMPLETE CODE COMPLIANT OPERATING ELECTRICAL SYSTEM.

7. THE CONTRACTOR IS RESPONSIBLE FOR THE PROPER LAYOUT AND CONSTRUCTION OF THE WORK INCLUDED IN THIS CONTRACT, INSTALLED ACCORDING TO THE APPLICABLE BUILDING CODES.

8. SPECIFIC VOLTAGE AND CURRENT REQUIREMENTS ON THE ELECTRICAL DRAWINGS SHALL NOT RELIEVE THIS CONTRACTOR OF THE RESPONSIBILITY TO VERIFY THE VOLTAGE PRIOR TO PURCHASING OR ROUGH-IN WORK. THIS CONTRACTOR SHALL REVIEW ALL DEVICES AND EQUIPMENT FURNISHED BY HIS/HER CONTRACT AND THOSE FURNISHED BY OTHER CONTRACTORS ARE IN AGREEMENT WITH THE DATA SHOWN ON THE DRAWINGS. THE E.C. SHALL PROVIDE FEEDERS, CABLE AND DEVICES THAT ARE IN ACCORDANCE WITH CODE.

9. ITEMS, ACCESSORIES, AND DEVICES REASONABLY INFERABLE AS NECESSARY FOR THE COMPLETE AND PROPER OPERATION OF ANY SYSTEM SHALL BE PROVIDED BY THE CONTRACTOR FOR SUCH SYSTEM(S), WHETHER THEY ARE SPECIFICALLY CALLED FOR BY THE DRAWINGS AND/OR SPECIFICATIONS OR NOT.

10. THE DRAWINGS MAY NOT SHOW COMPLETE OR ACCURATE DETAILS OF THE EXISTING FACILITY IN EVERY RESPECT. EXACT LOCATIONS AND RELATIONS ARE TO BE DETERMINED IN THE FIELD AND SHALL BE TO THE SATISFACTION OF THE OWNER. THIS CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL FIELD MEASUREMENTS AND EXACT EQUIPMENT LOCATIONS.

11. DRAWINGS ARE GENERALLY DIAGRAMMATIC. ROUTING OF CONDUIT AND RACEWAYS ARE SHOWN FOR CONCEPT. BUT DO NOT INTEND TO SHOW EVERY RISE, DROP, OFFSET, FITTING, NOR EVERY STRUCTURAL ELEMENT THAT MAY BE ENCOUNTERED DURING THE INSTALLATION OF THIS WORK. CONTRACTOR SHALL MAKE ANY REQUIRED CHANGES FROM THE GENERAL ROUTING SHOWN ON THESE DRAWINGS, SUCH AS OFFSETS, BENDS OR CHANGES IN ELEVATION DUE TO COORDINATION WITH THE WORK OF OTHER TRADES AND BUILDING CONSTRUCTION. ALL CHANGES SHALL BE MADE WITHOUT ADDITIONAL COST TO THE OWNER OR DELAY IN COMPLETION DATE OF THE PROJECT.

12. IT IS INTENDED THAT EQUIPMENT SHALL BE LOCATED SYMMETRICALLY WITH THE ARCHITECTURAL ELEMENTS OF THE BUILDING, NOTWITHSTANDING THE FACT THAT LOCATIONS INDICATED BY THESE DRAWINGS MAY BE DISTORTED FOR CLEARNESS OF PRESENTATION. ENGINEER HAS RIGHT TO MOVE ANY EQUIPMENT OR DEVICE BY 10 FEET WITHOUT ANY ADDITIONAL COST TO OWNER. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR APPROVAL PRIOR TO ROUGH-IN.

13. CONTRACTOR SHALL BE RESPONSIBLE AND PAY FOR ALL X-RAY IMAGING, CORING, CUTTING, PATCHING, REPAIRING AND REFINISHING OF BUILDING CONSTRUCTION REQUIRED TO ACCOMMODATE THE INSTALLATION OF THEIR WORK. ALL PATCHING, REPAIRING AND REFINISHING WORK SHALL BE PERFORMED BY THOSE REGULARLY INVOLVED IN THAT TRADE AND SHALL MATCH THE NEW CONSTRUCTION AS CLOSELY AS POSSIBLE. CARE SHALL BE TAKEN SO AS NOT TO DAMAGE ANY EXISTING BUILDING CONSTRUCTION OR ITEMS THAT ARE TO REMAIN. ANY EXISTING FINISHES THAT ARE DAMAGED DURING THE INSTALLATION OF NEW WORK SHALL BE REPAIRED, REPLACED AND PAID FOR BY THE INSTALLING CONTRACTOR, TO THE SATISFACTION OF THE ENGINEER AND OWNER.

14. THIS CONTRACTOR IS RESPONSIBLE FOR SCHEDULING DELIVERY, RECEIVING, UNLOADING, UNCRATING, STORING, SETTING IN PLACE, AND PROTECTING FROM DAMAGE, VANDALISM, THEFT OR WEATHER ALL NEW EQUIPMENT FURNISHED BY THIS CONTRACTOR FOR THE ENTIRETY OF CONSTRUCTION. THIS REQUIREMENT ALSO APPLIES TO ITEMS FURNISHED BY THE OWNER TO THE ELECTRICAL CONTRACTOR. THIS CONTRACTOR SHALL COORDINATE THE DELIVERY TO MEET THE PROJECT COMPLETION DATES AS ESTABLISHED BY THE OWNER.

15. REFER TO ARCHITECTURAL DRAWINGS FOR EXISTING BUILDING CONSTRUCTION THAT IS TO REMAIN AND, THEREFORE, SUBJECT TO PATCHING, REPAIRING, AND REFINISHING.

16. ANY ITEMS AND EQUIPMENT SCHEDULED TO BE REMOVED THAT THE OWNER WANTS TO RETAIN SHALL BE REMOVED CAREFULLY (SO AS NOT TO DAMAGE THEM) AND TURNED OVER TO THE OWNER. ALL OTHER ITEMS TO BE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND REMOVED FROM THE SITE.

17. CONTRACTOR SHALL BE RESPONSIBLE FOR THEIR OWN CLEANUP DURING CONSTRUCTION. IF CONTRACTOR FAILS TO PROVIDE SUCH CLEANUP, THE ENGINEER WILL DIRECT ANOTHER CONTRACTOR TO PERFORM THE CLEAN-UP AND THE NEGLIGENT CONTRACTOR SHALL PAY THE ASSOCIATED BACK-CHARGES AS DEEMED APPROPRIATE BY THE ENGINEER.

18. ACCESS TO WORK AREAS, INCLUDING WORK SCHEDULED THEREIN, MUST HAVE PRIOR APPROVAL OF THE OWNER. ALL WORK AREAS WILL BE KEPT CLEAN BY THIS CONTRACTOR WITH THOROUGH CLEAN UP AT END OF EACH DAY'S WORK. ALL EXISTING ELECTRIC SERVICE EQUIPMENT IS TO REMAIN OPERATIONAL DURING THE CONSTRUCTION PERIOD. ANY TEMPORARY WIRING OR REROUTING OF CIRCUITRY TO ACHIEVE THIS IS BY THE ELECTRICAL CONTRACTOR.

19. CONTRACTOR SHALL FURNISH MATERIALS AND USE INSTALLATION METHODS SUITABLE FOR THE ENVIRONMENTAL CONDITIONS OF THE AREA IN WHICH EQUIPMENT, FIXTURES AND DEVICES ARE INSTALLED.

20. CONTRACTOR SHALL PROVIDE SLEEVES IN BEAMS, FLOORS, COLUMNS AND WALLS, AS REQUIRED BY JOB SITE CONDITIONS, AND/OR AS SPECIFIED, WHEN INSTALLING THEIR WORK. ALL BEAMS AND COLUMNS WHICH ARE REQUIRED TO BE SLEEVED SHALL BE CUT AND REINFORCED AS REQUIRED BY FIELD CONDITIONS AND LOCATIONS AND SIZES SHALL BE CHECKED AND APPROVED BY ENGINEER BEFORE CONTRACTOR CUTS ANY BUILDING STRUCTURAL MEMBER.

21. CONTRACTOR SHALL REFER TO THE ARCHITECTURAL AND STRUCTURAL CONTRACT DRAWINGS (BEFORE SUBMITTING THEIR BIDS) TO FAMILIARIZE THEMSELVES WITH THE EXTENT OF THE GENERAL CONTRACTORS WORK, CEILING HEIGHTS AND CLEARANCE FOR INSTALLING THEIR WORK.

22. CONTRACTOR SHALL STORE ALL MATERIALS AND EQUIPMENT SHIPPED TO THE SITE IN A PROTECTED AREA. IF MATERIAL IS STORED OUTSIDE OF THE BUILDING, IT MUST BE STORED OFF THE GROUND A MINIMUM OF SIX INCHES (6") ON 6' x 6' PLANKS AND/OR WOOD PALLETS. ALL PIPING AND DUCTWORK WILL HAVE THE ENDS CLOSED TO KEEP OUT DIRT AND OTHER DEBRIS. NO EQUIPMENT SHALL BE STORED ON THE SITE UNLESS IT IS SITTING ON WOOD PLANKS AND COMPLETELY PROTECTED WITH WEATHERPROOF COVERS. ALL MATERIALS AND EQUIPMENT MUST BE COMPLETELY COVERED WITH WATERPROOF TARPS OR VISQUIN.

23. ELECTRICAL CONTRACTOR SHALL COORDINATE ALL NON-ACCESSIBLE SYSTEM DEVICES, PULL BOXES AND EQUIPMENT, ETC. TO ACCESSIBLE CEILING AREAS. E.C. SHALL INCLUDE ALL COMPLETE COSTS FOR RELOCATION AND VERIFY SUCH CONDITIONS WITH ARCHITECTURAL CEILING PLANS PRIOR TO FINAL BID.

24. ELECTRICAL CONTRACTOR SHALL FOLLOW NEMA NO. PB-1.1 1979 PUBLICATION, PART V PROCEDURES PRIOR TO ENERGIZATION OF ANY SWITCHGEAR. THE ELECTRICAL CONTRACTOR SHALL USE ONLY TRAINED AND AUTHORIZED PROFESSIONAL ELECTRICAL CRAFT PERSONS. THE E.C. SHALL FURNISH ANY PERSONNEL SAFETY EQUIPMENT, LADDERS, MAN-LIFTS, AND POWERED HAND TOOLS THAT MAY BE REQUIRED. ALL POWERED TOOLS SHALL BE IN GOOD CONDITION WITH ALL GROUND CONDUCTOR IN PROPER OPERATION.

25. VERIFY CODE CLEARANCES FOR ALL NEW ELECTRICAL WORK BEFORE PROCEEDING WITH CONSTRUCTION. PROVIDE ADEQUATE WORKING CLEARANCES, DEDICATED EQUIPMENT SPACE, AND LEAK PROTECTION SYSTEMS AS REQUIRED BY APPLICABLE ELECTRICAL CODES. COORDINATE USAGE OF AVAILABLE SPACE WITH ALL TRADES. IN THE EVENT OF CONFLICTS, NOTIFY THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

B. CONIFLCT IN DOCUMENTS

1. GENERALLY, THE DRAWINGS ESTABLISH THE LOCATION, QUANTITY AND RELATIONSHIP OF THE PARTS OF THE WORK, AND THE SPECIFICATIONS DEFINE THE TYPE AND QUALITY OF MATERIALS AND WORKMANSHIP. WORK SHOWN IN THE DRAWINGS AND NOT MENTIONED IN THE SPECIFICATIONS, OR REQUIRED BY THE SPECIFICATIONS AND NOT SHOWN ON THE DRAWINGS, SHALL BE PROVIDED AS IF FULLY PROVIDED FOR IN BOTH. IN THE CASE OF CONFLICTS BETWEEN THE DRAWINGS AND SPECIFICATIONS, OR WITHIN EITHER DOCUMENT, THE ENGINEER SHALL DETERMINE THE INTENT. IN SUCH CASES, IN GENERAL, THE MORE STRINGENT REQUIREMENT CONCERNING GREATER QUANTITY, QUALITY AND/OR RESULTING IN A HIGHER COST SHALL GOVERN WITHOUT FURTHER COST TO THE OWNER.

C. SHUT-DOWN OF SYSTEM

1. COORDINATE AND SEQUENCE DEMOLITION SO AS NOT TO CAUSE SHUTDOWN OF OPERATION OF SURROUNDING AREAS.

2. SHUT-DOWN PERIODS:

   a. ARRANGE TIMING OF SHUT-DOWN PERIODS OF SYSTEM, SERVICE WITH OWNER. DO NOT SHUT DOWN ANY SERVICE, WITHOUT PRIOR WRITTEN APPROVAL. PROVIDE NOTICE MINIMUM 15 WORKING DAYS IN ADVANCE.
   b. KEEP SHUT-DOWN PERIOD TO MINIMUM OR USE INTERMITTENT PERIOD AS DIRECTED BY THE OWNER.
   c. MAINTAIN LIFE-SAFETY SYSTEM IN FULL OPERATION IN OCCUPIED FACILITIES, OR PROVIDE NOTICE MINIMUM 15 WORKING DAYS IN ADVANCE.
   d. THE SYSTEM SHUT-DOWN SHALL BE DONE DURING OFF-BUSINESS HOURS.

D. VISIT TO SITE

1. THIS CONTRACTOR SHALL CAREFULLY EXAMINE THE ENTIRE SET OF CONTRACT DOCUMENTS, VISIT THE SITE, AND FULLY FAMILIARIZE HIMSELF/HERSELF AS TO ALL CONDITIONS AND MATTERS THAT CAN AFFECT THE WORK OR THE COST THEREOF. THIS CONTRACTOR IS RESPONSIBLE FOR NOTIFYING ENGINEER IN WRITING, AND PRIOR TO BID, OF DISCREPANCIES OR OMISSIONS FROM THE DRAWINGS, SPECIFICATIONS OR OTHER DOCUMENTS. OBTAIN CLARIFICATION PRIOR TO SUBMITTING ANY BID. LACK OF NOTIFICATION SHALL BE INTERPRETED TO INDICATE NO DISCREPANCIES OR CONFLICTS EXIST AND ADDITIONAL COMPENSATION WILL NOT BE GRANTED AFTER AWARD OF CONTRACT FOR ANY WORK REQUIRED TO COMPLY WITH THESE REQUIREMENTS OR INTENT.

2. SUBMISSION OF PROPOSALS SHALL BE CONSIDERED EVIDENCE THAT THE CONTRACTOR HAS VISITED AND EXAMINED THE SITE.

3. NO EXTRA PAYMENT WILL BE ALLOWED THE CONTRACTOR FOR EXTRA WORK CAUSED BY FAILURE TO VISIT, EXAMINE AND VERIFY.

4. THE ENGINEER WILL MAKE PERIODIC VISITS TO THE JOBSITE TO OBSERVE THE PROGRESS OF THE WORK AND TO OBSERVE ITS ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE ENGINEER IS NOT A GUARANTOR OF THE CONTRACTOR'S WORK, RESPONSIBLE FOR JOBSITE SAFETY, RESPONSIBLE FOR SUPERINTENDING, OR IN CHARGE OF THE ERECTION AND/OR CONSTRUCTION OF THE WORK. THE ENGINEER IS NOT RESPONSIBLE FOR SAFETY OR ADEQUACY OF ANY SHIPMENT, BUILDING, SCAFFOLDING, FORMS OR OTHER WORK AIDS USED.

E. LAWS, ORDINANCES, AND REGULATIONS

1. ALL SYSTEMS SHALL CONFORM IN FULL AND/OR PART SHALL CONFORM TO ALL PERTINENT LAWS, ORDINANCES AND REGULATIONS OF ALL BODIES HAVING JURISDICTION AT ALL GOVERNING LEVELS, NOTWITHSTANDING ANYTHING IN THESE DRAWINGS OR SPECIFICATIONS TO THE CONTRARY. IN CASE OF CONFLICT BETWEEN GOVERNING LEVELS, THE MORE STRINGENT LAWS SHALL APPLY.

2. THE CONTRACTOR SHALL PAY ALL FEES AND OBTAIN AND PAY FOR ALL PERMITS AND INSPECTIONS REQUIRED BY ANY AUTHORITY HAVING JURISDICTION IN CONNECTION WITH HIS WORK.

3. WHERE APPLICABLE, ALL NEW MATERIAL SHALL BEAR THE UNDERWRITER'S (UL) SEAL OF APPROVAL, AS WELL AS THOSE SEALS OF ALL MUNICIPALITIES HAVING JURISDICTION. CERTIFICATES TO THIS AFFECT TO BE FURNISHED TO ARCHITECT UPON REQUEST.

4. THE ELECTRICAL CONTRACTOR SHALL SECURE AND PAY FOR ALL LICENSES REQUIRED BY THE GOVERNING BODIES TO OPERATE AS AN ELECTRICAL CONTRACTOR FOR THIS PROJECT.

5. ALL LIGHT FIXTURES, RECEPTACLES, AND ELECTRICAL COMPONENTS SHALL BE DISPOSED IN CONFORMANCE WITH EPA REGULATION.

F. WORKMANSHIP

1. ALL WORK TO BE PERFORMED SHALL BE DONE BY QUALIFIED MECHANICS. ALL MECHANICS IN THE EMPLOY OF THIS CONTRACTOR ON THIS PROJECT SHALL BE SKILLED IN THE PHASES OF THE WORK TO WHICH THEY ARE USED.

2. ALL WORK MUST BE DONE IN WORKMANLIKE MANNER TO THE COMPLETE SATISFACTION OF THE ENGINEER. ALL MATERIAL SHALL BE NEW, OF THE QUALITY SPECIFIED, FREE FROM DEFECTS AND IN FIRST-CLASS CONDITION. ALL VERTICAL CONDUITS SHALL BE PLUMB.

3. THE COMPLETE SYSTEM SHALL MEET THE REQUIREMENTS OF THE LOCAL ELECTRICAL CODE AND AS MAY BE MODIFIED BY LOCAL AMENDMENTS.

4. THIS CONTRACTOR SHALL ESTABLISH SAFE WORKING PROCEDURES FOR THE PROTECTION OF THE WORKING CREW AND NON-WORKING OCCUPANTS IN ALL PHASES OF WORK, COMPLYING WITH THE APPLICABLE PROVISIONS OF ALL CITY, STATE AND FEDERAL SAFETY LAWS (OSHA). THIS SHALL INCLUDE "LOCK-OUT/TAG-OUT" AND REQUIRED GROUNDING. WORK UNDER THIS CONTRACT SHALL NOT BE DONE ON ENERGIZED CIRCUITS.

G. COORDINATION WITH OTHER TRADES

1. THE SEQUENCE FOR THE INSTALLATION OF ALL WORK SHALL BE COORDINATED BETWEEN ALL CONTRACTORS ON THE PROJECT AND IN STRICT ACCORDANCE WITH ENGINEER AND OWNERS STIPULATION AS CALLED FOR IN THE SPECIFICATION AND/OR AS DIRECTED.

2. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE LABOR AND SOFT MATERIALS REQUIRED FOR COORDINATING CONSTRUCTION INSTALLATION ELECTRONICALLY WITH OTHER TRADES USING CURRENT SOFTWARE AND MODELING SYSTEMS. THE CONTRACTOR SHALL CONFIRM MODELING REQUIREMENTS PRIOR TO BID.

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING HIS WORK WITH THAT WORK OF THE OTHER TRADES. CONTRACTOR IS COMPLETELY RESPONSIBLE IF FAILURE ON HIS PART TO COORDINATE EFFORTS RESULTS IN EXTRA WORK HAVING TO BE DONE TO COMPLETE A TASK. AS SUCH, HIS FAILURE SHALL NOT BE THE BASIS FOR ANY EXTRA CHARGE AGAINST THE OWNER.

4. CONTRACTOR SHALL CHECK DRAWINGS OF OTHER TRADES TO VERIFY THAT SPACES IN WHICH THEIR WORK WILL BE INSTALLED IS CLEAR OF OBSTRUCTIONS. WORK SHALL BE INSTALLED TO MAINTAIN MAXIMUM HEADROOM AND SPACE CONDITION AT ALL POINTS IN THE BUILDING. WHERE HEADROOM OR SPACE CONDITIONS APPEAR INADEQUATE, CONTRACTOR SHALL NOTIFY ENGINEER BEFORE PROCEEDING WITH THE INSTALLATION OF THEIR WORK. CONTRACTOR SHALL FURNISH OTHER TRADES ADVANCE INFORMATION AND/OR SHOP DRAWINGS ON LOCATIONS AND SIZES OF CONDUITS, RACEWAYS, EQUIPMENT, FRAMES, BOXES, SLEEVES AND OPENINGS, ETC. NEEDED FOR THEIR WORK TO PERMIT OTHER TRADES AFFECTED TO INSTALL THEIR WORK PROPERLY AND WITHOUT DELAY.

5. WHERE THERE IS EVIDENCE THAT WORK OF ONE TRADE WILL INTERFERE WITH WORK OF OTHER TRADES, ALL TRADES SHALL MEET ON JOB SITE TO WORK OUT SPACE CONDITIONS, AND MAKE SATISFACTORY ADJUSTMENTS TO INSTALLATION OF THE NEW WORK. CONTRACTOR SHALL VERIFY EXACT LOCATIONS OF ALL ELECTRICAL DEVICES AND EQUIPMENT PRIOR TO ROUGH-IN WITH FIELD CONDITIONS, SHOP DRAWINGS AND WORK OF OTHER TRADES. EACH CONTRACTOR SHALL BE RESPONSIBLE, AT THEIR OWN EXPENSE, FOR THE REMOVAL AND REINSTALLATION OF ANY PART OF THEIR WORK IF SAME WAS INSTALLED WITHOUT CONSULTING WITH OTHER TRADES BEFORE INSTALLING THEIR WORK.

6. REFER TO THE ARCHITECTURAL, MECHANICAL AND PLUMBING SHEETS AND SPECIFICATIONS FOR EQUIPMENT LOCATIONS, LOADS, AND ADDITIONAL REQUIREMENTS.

7. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH MECHANICAL CONTRACTOR FOR EXACT LOCATION OF HVAC EQUIPMENT TO BE WIRED PRIOR TO ROUGH-IN.

8. THE EC SHALL REVIEW AND BE FAMILIAR WITH THE MECHANICAL DRAWINGS AND SCHEDULES FOR FINAL EQUIPMENT SELECTION. THE EC SHALL VERIFY HORSEPOWER, VOLTAGE, PHASES, AMPACITY, AND SPECIAL MOUNTING BEFORE SUBMITTING HIS BID. ANY SPECIAL CONDITIONS OR CONFLICTS MUST BE INDICATED IN WRITING TO THE ENGINEER PRIOR TO OR AT THE TIME OF BID.

9. BEFORE STARTING ANY DEMOLITION ON HVAC EQUIPMENT WHICH HAS AN ELECTRICAL CONNECTION.THE MECHANICAL CONTRACTOR SHALL MEET WITH THE ELECTRICAL CONTRACTOR TO IDENTIFY ALL SUCH EQUIPMENT. THE ELECTRICAL CONTRACTOR WILL DISCONNECT THE POWER TO EACH UNIT, REMOVE CONDUIT, WIRING, DISCONNECT SWITCHES, AND STARTERS UNDER HIS CONTRACT. MECHANICAL CONTRACTOR WILL REMOVE ALL EQUIPMENT, ELECTRICAL TEMPERATURE CONTROL AND WIRING UNDER HIS CONTRACT. MECHANICAL CONTRACTOR SHALL NOT START DEMOLITION UNTIL ALL ELECTRICAL POWER HAS BEEN SAFELY DISCONNECTED FROM EQUIPMENT TO BE DEMOLISHED.

013000. SUBMITTALS

A. THE CONTRACTOR SHALL PROVIDE COMPLETE SHOP DRAWINGS INDICATING EQUIPMENT, DEVICE, AND RACEWAY LOCATIONS, INVERTS FOR OUTDOOR DEVICES, AND COMPLETE INSTALLATION DRAWINGS. THE DRAWINGS SHALL BE MAINTAINED AT THE JOB SITE AND SHALL BE UPDATED AND MAINTAINED IN AS NEAR AS POSSIBLE TO THE "AS INSTALLED" STATUS OF THE PROJECT AND SHALL BE KNOWN AS "CONTRACT RECORD DOCUMENTS". THE DRAWINGS SHALL BE REVISED IN AN AUTOCAD FORMAT AND SUBMITTED TO THE ENGINEER FOR REVIEW. THE FINAL ELECTRICAL PAYOUT SHALL NOT BE MADE TO THE EC UNTIL THE CONTRACT RECORD DOCUMENTS HAVE BEEN RECEIVED AND REVIEWED BY THE ENGINEER. THE ENGINEER WILL PROVIDE WRITTEN CONFIRMATION TO THE OWNER AND GENERAL CONTRACTOR FOR FINAL PAYOUT BASED ON THE REVIEW OF THE CONTRACT RECORD DOCUMENTS.

B. PROVIDE PRODUCT DATA FOR ALL EQUIPMENT AND DEVICES SUCH AS PANELBOARDS, DISCONNECT SWITCHES, CONDUIT & JUNCTION BOXES, WIRING, GROUNDING MATERIALS, WIRING DEVICES, EMERGENCY GENERATOR, PIPING MATERIALS, VALVES, ETC.

C. PROVIDE DIMENSIONAL DRAWINGS, MANUFACTURERS' TECHNICAL DATA, PERFORMANCE, ELECTRICAL CHARACTERISTICS, RATINGS, AND FINISHES. INCLUDE WIRING DIAGRAMS FOR POWER, SIGNAL, AND CONTROL WIRING.

D. PROVIDE OPERATION AND MAINTENANCE DATA FOR ALL EQUIPMENT AND DEVICES INCLUDING MANUFACTURER'S WRITTEN INSTRUCTIONS FOR TESTING AND ADJUSTING EQUIPMENT AND DEVICES.

E. PROVIDE SHOP DRAWINGS FOR CONDUITS LARGER THAN 1" AND ALL EXPOSED RACEWAYS.

F. CONTRACTOR SHALL SUBMIT THE FOLLOWING ELECTRONIC FILES TO THE ENGINEER AND OWNER AS PART OF THE CLOSEOUT PACKAGE:

G. ALL APPROVED SUBMITTALS, INCLUDING FINAL EQUIPMENT DATA SHEETS, CONTROL SEQUENCES, AND APPROVED SHOP DRAWINGS REFLECTING THE INSTALLED SYSTEMS.

H. OPERATION AND MAINTENANCE MANUALS (IOMs), INCLUDING INSTALLATION INSTRUCTIONS, ROUTINE AND PREVENTIVE MAINTENANCE PROCEDURES, TROUBLESHOOTING GUIDES, AND PARTS LISTS FOR ALL MAJOR EQUIPMENT.

I. AS-BUILT DRAWINGS, INCLUDING RECORD LOCATIONS OF CONTROL COMPONENTS, INCLUDING CONTROL UNITS, THERMOSTATS, AND SENSORS. REVISE SHOP DRAWINGS TO REFLECT ACTUAL INSTALLATION AND OPERATING SEQUENCES.

J. FINAL ENGINEERING DRAWINGS FOR ALL DISCIPLINES.

K. COMMISSIONING AND FUNCTIONAL TESTING REPORTS (AS APPLICABLE). DOCUMENT SYSTEM START UP, TESTING, ADJUSTING, AND BALANCING RESULTS.

L. PUNCH LIST DOCUMENTATION AND COMPLETED SIGN OFFS, INCLUDING SIGNED CONFIRMATION THAT ALL PUNCH LIST ITEMS HAVE BEEN ADDRESSED AND RESOLVED.

M. WARRANTY DOCUMENTATION, INCLUDING MANUFACTURER, PRIME CONTRACTOR, AND SUB-CONTRACTOR WARRANTIES, CLEARLY IDENTIFYING COVERAGE PERIODS, TERMS, AND START DATES.

N. TRAINING DOCUMENTATION, INCLUDING TRAINING AGENDAS, PRESENTATION MATERIALS, AND SIGN-IN SHEETS VERIFYING OWNER PERSONNEL PARTICIPATION.

O. PERMIT CLOSEOUT AND INSPECTION CERTIFICATES.

P. COST SUMMARY AND FINAL PAY APPLICATIONS.

Q. VENDOR AND SUBCONTRACTOR CONTACT INFORMATION, INCLUDING NAMES, PHONE NUMBERS, EMAIL ADDRESSES, AND EMERGENCY CONTACTS.

013001. MATERIALS AND EQUIPMENT

A. ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND SHALL CONFORM TO THE GRADE, QUALITY AND STANDARD SPECIFIED HEREIN. ALL EQUIPMENT OFFERED UNDER THESE SPECIFICATIONS SHALL BE LIMITED TO PRODUCTS REGULARLY PRODUCED AND RECOMMENDED FOR SERVICE, IN ACCORDANCE WITH ENGINEERING DATA, RATINGS OR OTHER COMPREHENSIVE LITERATURE MADE AVAILABLE TO THE PUBLIC AND IN EFFECT AT THE TIME OF OPENING OF BIDS.

B. EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS FOR TYPE AND CAPACITY OF EACH PIECE OF EQUIPMENT USED, UNLESS INDICATED OTHERWISE, THE ENGINEER MAKES NO REPRESENTATION AS TO WHETHER OR NOT ANY HAZARDOUS OR CONTAMINATED MATERIALS (INCLUDING BUT NOT LIMITED TO ASBESTOS, PCB'S, CONTAMINATED SOILS, ETC.) ARE PRESENT WITHIN THE EXISTING BUILDING OR ON THE SITE. WORK SHOWN ON THE DRAWINGS AND/OR INDICATED IN THE SPECIFICATIONS SHALL NOT BE CONSTRUED TO CALL FOR CONTACT WITH ANY OF THESE MATERIALS. IF THESE MATERIALS ARE ENCOUNTERED OR SUSPECTED THE CONTRACTOR SHALL NOT DISTURB THEM AND SHALL CONTACT THE ENGINEER IMMEDIATELY.

C. ALL INSTRUMENTS, APPARATUS AND EQUIPMENT SHALL BE TESTED AND PROVED TO BE ELECTRICALLY AND MECHANICALLY WITHOUT DEFECTS. THE ELECTRICAL SYSTEM SHALL BE TESTED FOR GROUNDS OR SHORTS. IF THE TROUBLE IS WITHIN THE CIRCUIT WIRING, ALL SHORTED OR GROUNDED WIRES SHALL BE REPLACED AND THEN RE-TESTED. ALL METERS, CABLES, EQUIPMENT OR APPARATUS NECESSARY FOR MAKING ALL TESTS SHALL BE FURNISHED AND PROVIDED BY THIS CONTRACTOR. ANY TESTING OR EQUIPMENT MUST CONFORM TO OSHA REQUIREMENTS.

017800. CLOSEOUT SUBMITTALS

A. CLOSEOUT DOCUMENT AND EQUIPMENT TURNOVER

1. PROVIDE FINAL AS-BUILT DRAWINGS IN ELECTRONIC PDF FORMAT TO OWNER AND ENGINEER SHOWING FINAL INSTALLED CONDITIONS AND BEFORE FINAL PAYMENT WILL BE ISSUED.

2. THE AS-BUILT DRAWINGS SHALL DIAGRAMMATICALLY INDICATE THE INSTALLED CONDITION, CIRCUIT NUMBERS, AND LOCATION OF THE DEVICES FOR ALL WORK. THESE DRAWINGS SHALL BE CONSIDERED CONTRACT RECORD DOCUMENTS AND SHALL ACCURATELY REFLECT THE ACTUAL INSTALLATION OF THE ELECTRICAL COMPONENTS AND CONDUITS.

3. PROVIDE ALL EQUIPMENT INSTALLATION, MAINTENANCE, AND INSTRUCTION MANUALS.

4. TURN OVER ALL KEYS, SPARE MATERIALS, STOCK ITEMS, AND OTHER EQUIPMENT PURCHASED AS PART OF THE CONTRACT AND BELONGING TO THE OWNER.

017900. DEMONSTRATION AND TRAINING

B. TESTING

1. PERFORM TESTS RECOMMENDED BY MANUFACTURER INCLUDING VISUAL, MECHANICAL, AND ELECTRICAL INSPECTIONS.

2. PERFORM INSULATION-RESISTANCE TESTS IN ACCORDANCE WITH IEEE 43.

3. FUNCTIONALLY TEST EQUIPMENT TO ENSURE IT IS INSTALLED PER DESIGN.

4. PROVIDE OPERATIONAL TEST AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, CONFIRM PROPER OPERATION.

5. PROVIDE WRITTEN REPORT OF THE RESULTS OF TESTS AND INSPECTIONS.

6. PERFORM TESTS RECOMMENDED BY MANUFACTURER INCLUDING VISUAL AND MECHANICAL AND ELECTRICAL INSPECTIONS. FUNCTIONALLY TEST EQUIPMENT TO ENSURE IT IS INSTALLED PER DESIGN. PROVIDE OPERATIONAL TEST AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, CONFIRM PROPER OPERATION. PROVIDE WRITTEN REPORT OF THE RESULTS OF TESTS AND INSPECTIONS.

C. GUARANTEE

1. THIS CONTRACTOR SHALL UNCONDITIONALLY GUARANTEE IN WRITING ALL MATERIAL, EQUIPMENT AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE BY OWNER. THE CONTRACTOR SHALL PROVIDE FREE SERVICE FOR ALL EQUIPMENT INVOLVED IN HIS CONTRACT DURING THIS GUARANTEE PERIOD.

2. THE GUARANTEE SHALL INCLUDE RESTORATION TO ITS ORIGINAL CONDITION OF ALL ADJACENT WORK THAT MUST BE DISTURBED IN FULFILLING THIS GUARANTEE.

3. ALL SUCH REPAIRS AND/OR REPLACEMENTS SHALL BE MADE WITHOUT DELAY AND AT THE CONVENIENCE OF THE DEVELOPER AND TENANT.

D. WARRANTY

1. INSTALLER AND MANUFACTURERS AGREE TO REPAIR OR REPLACE MATERIALS OR WORKMANSHIP THAT FAIL WITHIN SPECIFIED WARRANTY PERIOD. WARRANTY PERIOD SHALL BE ONE YEAR FROM DATE OF SUBSTANTIAL COMPLETION.

E. INSPECTION

1. ALL ELECTRICAL WORK IS TO BE INSPECTED AND APPROVED BY THE AUTHORIZED REPRESENTATIVE BEFORE THE SYSTEM IS ENERGIZED. DUPLICATE CERTIFICATES OF THIS APPROVAL SHALL BE DELIVERED TO THE ENGINEER

2. ALL FEES FOR THIS INSPECTION AND APPROVAL SHALL BE BORNE BY THE CONTRACTOR AND ARE TO BE INCLUDED IN HIS/HER BID. NO EXTRA COMPENSATION SHALL BE ALLOWED FOR THIS SERVICE.

078400. FIRESTOPPING

A. APPLY UL LISTED FIRE STOPPING TO PENETRATIONS OF FIRE-RATED FLOOR AND WALL ASSEMBLIES FOR ELECTRICAL INSTALLATIONS TO RESTORE ORIGINAL FIRE-RESISTANCE RATING OF ASSEMBLY.

B. PROVIDE FIRE PUTTY TO MEET FIRE RATED ENCLOSURE UL LISTING REQUIREMENTS ON ALL ELECTRICAL BOXES INSTALLED ON THE FIRE RATED WALLS AND CEILINGS.

260533.13 CONDUIT FOR ELECTRICAL SYSTEMS

A. THIS CONTRACTOR SHALL INSTALL SIZE OF CONDUIT CALLED FOR ON DRAWINGS AND SHALL NOT REDUCE SIZE OF CONDUITS TO SUIT WIRE FILL CAPACITY. MINIMUM SIZE OF CONDUIT SHALL BE 3/4" UNLESS OTHERWISE NOTED. THIS CONTRACTOR SHALL LEAVE A WIRE PULLING LINE IN ALL CONDUITS WHICH ARE NOT FILLED TO CAPACITY. THE E.C. SHALL VERIFY ALL CONDUIT SIZE PRIOR TO INSTALLATION. NOTIFY THE ENGINEER IMMEDIATELY OF ANY CONFLICT.

B. THE RACEWAY SYSTEM SHALL BE METALLIC, ELECTRICAL METALLIC TUBING "EMT" IN TRADE SIZED CONCEALED WHEREVER POSSIBLE. ALL FITTINGS SHALL BE COMPRESSION TYPE ONLY EXCEPT WHERE PVC IS ALLOWED BY CONTRACT DOCUMENTS.

C. CONDUIT USED OUTDOORS AND NOT BELOW GRADE OR EXPOSED TO WEATHER SHALL BE TYPE INTERMEDIATE METALLIC CONDUIT "IMC" OR RIGID GALVANIZED METAL CONDUIT "RMC" WITH THREADED COUPLINGS. PROVIDE MEYERS HUBS AT NON/CAST TYPE JUNCTION/PULL BOXES AND SWITCH/RECEPTACLE OUTLETS.

D. ALL CONDUITS SHALL BE RUN PARALLEL AND/OR PERPENDICULAR TO CONSTRUCTION LINES OF THE BUILDING AND IN THE CASE OF CEILING AND FLOOR RUNS, CONDUITS SHALL BE GROUPED AND SUPPORTED WITH TRAPEZE/TYPE RACKS OR STANDOFFS WITH INDIVIDUAL CONDUITS SEPARATELY ACCESSIBLE FOR REPLACEMENT AND MAINTENANCE.

E. ALL WIRING INCLUDING ALL LOW VOLTAGE CABLING BEHIND THE WALL AND ABOVE THE NON-ACCESSIBLE CEILING SHALL BE INSTALLED IN CONDUIT.

F. JUNCTION BOXES, PULL BOXES AND TERMINAL BOXES SHALL BE INSTALLED WHERE SHOWN ON THE DRAWINGS AND AT OTHER LOCATIONS AS REQUIRED TO FACILITATE THE PULLING OF CABLES.

G. PULL BOXES SHALL BE CODE SIZED AND SHALL BE CONSTRUCTED OF CODE GAUGE GALVANIZED SHEET STEEL. EACH BOX SHALL BE PROVIDED WITH A SCREW-ON REMOVABLE COVER. PROVIDE FLANGED COVERS ON FLUSH BOXES. BOXES SHALL BE SMOOTH, SQUARE AND SET PARALLEL WITH WALLS AND CEILING.

H. ALL BOXES SHALL BE PROVIDED IN LOCATIONS WHERE REASONABLE ACCESS CAN BE OBTAINED IN THE FUTURE WITHOUT REQUIRING REMOVAL OF BUILDING ELEMENTS OR FINISHES. IT SHALL BE THE SOLE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO RELOCATE BOXES TO ACCESSIBLE AREAS WHERE INACCESSIBILITY IS DETERMINED BY THE INSPECTOR OR ENGINEER.

I. REMOVE ALL UNUSED AND ABANDONED CONDUIT AND RACEWAY COMPLETELY.

J. ANY SURFACE RACEWAY USED ON A FINISHED SURFACE MUST BE METALLIC RACEWAY, WIREMOLD OR EQUAL. IF RACEWAY USED FOR POWER AND DATA, THEN MUST BE DUAL CHANNEL WITH PARTITION. SUBMIT FOR APPROVAL BY ENGINEER PRIOR TO INSTALLATION.

K. FINAL CONNECTIONS TO MOVABLE DEVICES, OR DEVICES THAT MAY TRANSMIT VIBRATION SHALL BE MADE THROUGH FLEXIBLE METALLIC CONDUIT OR LIQUID-TIGHT FLEXIBLE CONDUIT. (MOTORS, TRANSFORMERS, DUCT MOUNTED DEVICES, ETC.)

L. ENDS OF ALL METALLIC CONDUITS SHALL BE EQUIPPED WITH INSULATED GROUNDING BUSHINGS FOR DEDICATED CONDUITS SERVING GROUNDING CONDUCTORS. ALL METALLIC CONDUIT SERVING FEEDERS AND BRANCH CIRCUITS SHALL BE EQUIPPED WITH INSULATED ANTI-SHORT FITTINGS AT ENDS. ENDS OF ALL CONDUITS SHALL BE TEMPORARILY CAPPED PRIOR TO INSTALLATION AND DURING CONSTRUCTION TO EXCLUDE FOREIGN MATERIAL. UPON THE COMPLETION OF CONSTRUCTION THE OPEN END OF CONDUITS OR SLEEVES SHALL BE SEALED WATERTIGHT.

M. EACH LIGHT, RECEPTACLE OR OTHER MISCELLANEOUS DEVICE SHALL BE PROVIDED WITH A GALVANIZED OR SHERARDIZED PRESSED STEEL OUTLET BOX OF THE KNOCKOUT TYPE, OR NOT LESS THAN NO. 14 U.S. GAUGE STEEL. CONDUITS SHALL BE FASTENED WITH LOCK NUTS AND BUSHINGS. ALL UNUSED BOX KNOCKOUTS MUST BE LEFT SEALED. THERE MUST BE SUFFICIENT ROOM FOR WIRES AND BUSHINGS, AND DEEP BOXES SHALL BE INSTALLED WHERE REQUIRED. BOXES SHALL BE SECURELY AND ADEQUATELY SUPPORTED.

N. WHERE FLOOR FITTINGS REQUIRE PENETRATION OF THE FLOOR SLAB, THERE SHALL BE A STANDARD DEVICE LISTED BY UL FOR THE PURPOSE AND HAVE A UL FIRE RATING EQUAL TO THE FLOOR RATING. ALL CORE SIZES AND LOCATIONS SHALL BE SUBMITTED TO ENGINEER FOR APPROVAL AND SUBMISSION TO STRUCTURAL ENGINEER PRIOR TO CORING. THE ELECTRICAL CONTRACTOR MUST PROVIDE FLOOR X-RAY SERVICES TO DETECT AND AVOID EXISTING EMBEDDED SYSTEMS PRIOR TO CORING.

O. ALL CONDUIT RUNS SHALL BE INSTALLED ABOVE AND OVER TOP OF ALL NEW DUCTWORK, PIPING, CONDUITS, PULL BOXES, ETC. WITH PROVISION FOR ALL NECESSARY ACCESSIBLE PULL BOXES. CONDUIT MAY NOT EXCEED CODE ALLOWED NUMBER OF BENDS.

P. CONDUIT RUNS OR PULL BOXES SHALL NOT BLOCK OR PREVENT FULL ACCESS OR OPERATION OF HVAC EQUIPMENT, ACCESS DOORS, PIPING VALVES, JUNCTION BOXES, MAIN RETURN AIR DUCTS, PULL BOXES, CLEAN OUTS, ETC.

Q. FLEXIBLE METAL CONDUIT SHALL NOT BE LONGER THAN 6' 0" LONG.

260553. IDENTIFICATION FOR ELECTRICAL SYSTEMS

A. IN ADDITION TO THE REQUIREMENTS OF THE ELECTRICAL CODE AND OSHA, INSTALL AN IDENTIFICATION SIGN WHICH CLEARLY INDICATES INFORMATION REQUIRED FOR USE AND MAINTENANCE OF ITEMS SUCH AS PANELBOARDS, MOTOR CONTROLLERS (VFD, STARTERS, ETC.), SAFETY SWITCHES, CONTROL DEVICES AND OTHER SIGNIFICANT EQUIPMENT. NAMEPLATES SHALL BE LAMINATED BLACK PHENOLIC RESIN WITH A WHITE CORE WITH ENGRAVED LETTERING, A MINIMUM OF 6 MM (1/4_INCH) HIGH.

B. PROVIDE PANELBOARD AND CIRCUIT NUMBER TAG ON EACH RECEPTACLE.

260526. GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

A. EQUIPMENT GROUNDING CONDUCTORS SHALL BE UL 83 INSULATED STRANDED COPPER, UNLESS OTHERWISE INDICATED ON THE DRAWINGS. INSULATION COLOR SHALL BE CONTINUOUS GREEN FOR ALL EQUIPMENT GROUNDING CONDUCTORS. BONDING CONDUCTORS SHALL BE ASTM B8 BARE STRANDED COPPER, EXCEPT THAT SIZES NO. 10 AWG AND SMALLER SHALL BE ASTM B1 SOLID BARE COPPER WIRE. CONDUCTOR SIZES SHALL NOT BE LESS THAN WHAT IS SHOWN ON THE DRAWINGS AND NOT LESS THAN REQUIRED BY THE NEC, WHICHEVER IS GREATER. A GROUND CONDUCTOR SHALL BE INSTALLED IN EVERY RACEWAY AND BONDED TO ALL BOXES AND ENCLOSURES EXCEPT FOR THE SERVICE LATERALS. THE GROUND CONDUCTOR SHALL BE BONDED IN EVERY ENCLOSURE.

B. FURNISH AND INSTALL PIGTAILED AND BOND THE JUNCTION BOX, WHEREVER CIRCUIT CONDUCTORS ARE SPLICED IN A JUNCTION BOX.

C. MOTORS FOR EQUIPMENT WILL BE PROVIDED AND SET IN PLACE BY RESPECTIVE TRADES INSTALLING THE EQUIPMENT. THE ELECTRICAL CONTRACTOR SHALL INSTALL STARTERS AND CONTROLLERS, REMOTE CONTROL STATIONS, INCLUDING APPARATUS FOR PROPER OPERATION AND THEIR RESPECTIVE MOTORS OR EQUIPMENT. ALL STARTERS FOR ALL MOTORS SHALL HAVE PROPER HEATING ELEMENTS INSTALLED BY THE ELECTRICAL CONTRACTOR. THE ELECTRICAL CONTRACTOR SHALL:

1. PROVIDE, INSTALL AND TERMINATE ALL POWER WIRING FOR ALL MOTORS.

2. INSTALL THOSE DEVICES FURNISHED BY THE MECHANICAL CONTRACTOR.

3. PROVIDE AND INSTALL ALL CONTROL WIRING IN ACCORDANCE WITH INSTRUCTIONS/DIRECTIONS RECEIVED FROM THE MECHANICAL CONTRACTOR OR TEMPERATURE CONTROL DESIGNATE.

4. COORDINATING MOTOR THERMAL OVERLOAD REQUIREMENTS AND PROVIDING EXTERNAL THERMAL OVERLOAD PROTECTION WHERE MOTORS ARE NOT NOTED TO BE PROVIDED WITH INTEGRAL THERMAL OVERLOADS.

5. AFTER FINAL CONNECTIONS ARE COMPLETED, THE ELECTRICAL CONTRACTOR SHALL TEST MOTOR FOR PROPER ROTATION. BEFORE APPLYING CURRENT TO THE MOTOR, THE ELECTRICAL CONTRACTOR SHALL HAVE CONTRACTOR WHO SUPPLIED MOTOR CHECK THE MOTOR ALIGNMENT, OIL, ETC. THE ELECTRICAL CONTRACTOR SHALL MAKE ANY NECESSARY ADJUSTMENTS, REPLACEMENTS OR MODIFICATIONS TO THE STARTERS AND CONTROL EQUIPMENT FOR PROPER STARTING AND OVERLOAD PROTECTION.

6. ELECTRICAL CONTRACTOR SHALL MEASURE ALL OPERATING VOLTAGE AND AMPERAGE ON EACH MOTOR. VERIFY THAT THE CORRECT OVERCURRENT TRIP INFORMATION IS PROGRAMMED INTO THE VFD DRIVE UNITS. VERIFY PROPER ROTATION WITH THE MECHANICAL CONTRACTOR.

260753. ENGINEERING STUDY

A. PERFORM SHORT CIRCUIT, COORDINATION, AND ARC FLASH CALCULATION FOR ALL NEW ELECTRICAL EQUIPMENT. AFFIX ARC FLASH LABEL ON ALL NEW ELECTRICAL EQUIPMENT. THE ARC FLASH LABEL SHALL INCLUDE INCIDENT ENERGY, SHORT CIRCUIT VALUE, VOLTAGE, PPE, AND DATE.

262416. PANELBOARDS

A. PROVIDE PANELBOARDS WITH ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, MARKED FOR INTENDED LOCATION AND APPLICATION AND THAT COMPLY WITH NEMA PB 1.

B. SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PANELBOARDS BY:

1. SQUARE D
2. SIEMENS
3. GENERAL ELECTRIC
4. EATON
5. APPROVED EQUAL

C. SURFACE MOUNTED (AS SHOWN IN PLAN), DEAD-FRONT CABINETS RATED FOR ENVIRONMENTAL CONDITIONS AT INSTALLED LOCATION.

D. PANELBOARD TRIM AND FRONT COVER SHALL BE HINGED DOOR-IN-DOOR SYLE.

E. INDOOR DRY AND CLEAN LOCATIONS: NEMA 250, TYPE 1). PROVIDE GALVANIZED STEEL CABINETS TO HOUSE PANELBOARDS FLUSH AND SURFACE-MOUNTED, DEAD-FRONT CABINETS.FACTORY FINISHED WITH MANUFACTURER'S STANDARD TWO-COAT, BAKED-ON FINISH.

F. FACTORY FINISHED WITH MANUFACTURER'S STANDARD TWO-COAT, BAKED-ON FINISH.

G. PROVIDE DIRECTORY CARD WITH TRANSPARENT COVER PERMANENTLY MOUNT ON INSIDE OF DOORS.

H. PHASE, NEUTRAL, AND GROUND BUSES AND BARS SHALL BE TINNED COPPER MATERIAL AND BUS SHALL BE FULLY RATED THE ENTIRE LENGTH OF ENCLOSURE. PROVIDE FULL-SIZED NEUTRAL WITH FULL-CAPACITY BONDING STRAP FOR SERVICE ENTRANCE APPLICATIONS. MAIN AND NEUTRAL LUGS SHALL BE MECHANICAL TYPE, WITH A LUG ON THE NEUTRAL BAR FOR EACH POLE IN THE PANELBOARD AND WITH A LUG ON THE GROUND BAR FOR EACH POLE IN THE PANELBOARD.

I. PANELBOARDS SHALL BE STANDARD MANUFACTURED PRODUCTS. ALL COMPONENTS WITHIN ONE ASSEMBLY SHALL BE OF THE SAME MANUFACTURER. ALL PANELBOARDS SHALL BE DEAD FRONT TYPE. ALL PANELBOARDS SHALL BE COMPLETELY FACTORY ASSEMBLED WITH MOLDED CASE CIRCUIT BREAKERS AND ARRANGED SO THAT IT WILL BE POSSIBLE TO SUBSTITUTE A 2_POLE BREAKER FOR TWO SINGLE POLE BREAKERS, AND A 3_POLE BREAKER FOR THREE SINGLE POLE BREAKERS, WHEN TRIP IS 30 AMPS OR LESS AND FRAME SIZE IS 100 AMPERES OR LESS, WITHOUT HAVING TO DRILL AND TAP THE MAIN BUS BARS AT BUS STRAPS.CIRCUIT BREAKERS SHALL BE BOLT-ON CONNECTED TO THE PANELBOARD, MINIMUM INTERRUPTING CAPACITY SHALL BE 14,000 AIC FOR 277/480 VOLT CIRCUIT BREAKERS AND 10,000 AIC FOR 120/208 VOLT CIRCUIT BREAKERS. PLUG-IN CIRCUIT BREAKERS ARE NOT APPROVED.

J. ALL SHORT CIRCUIT WITHSTAND RATINGS SHOWN ON DRAWINGS ARE MINIMUM REQUIREMENTS.

K. PANELBOARD FAULT WITHSTAND RATING SHALL BE INCREASED BY THE ELECTRICAL CONTRACTOR AS A RESULT OF SHORT-CIRCUIT STUDY RESULTS AT NO ADDITIONAL COST TO PROJECT.

L. ALL NEW CIRCUIT BREAKERS FOR THE EXISTING PANELBOARDS SHALL BE COMPATIBLE WITH THE EXISTING EQUIPMENT. AIC RATINGS SHALL MATCH THE ORIGINAL EQUIPMENT AIC RATINGS.

M. PROVIDE A TYPEWRITTEN DIRECTORY OF ALL CIRCUITS IN THE PANELBOARD.

262726. WIRING DEVICES

A. LIST OF APPROVED MANUFACTURERS SHALL BE THE FOLLOWING OR AS OTHERWISE NOTED ON DESIGN DRAWINGS:

1. POWER DEVICES:

   a. LEVITON
   b. HUBBELL
   c. LEGRAND

B. TOGGLE SWITCHES SHALL BE SINGLE UNIT TOGGLE, BUTT CONTACT, QUIET AC TYPE, HEAVY_DUTY GENERAL-PURPOSE USE WITH AN INTEGRAL SELF GROUNDING MOUNTING STRAP, LISTED BY UNDERWRITERS LABORATORIES, INC., AND MEET THE REQUIREMENTS OF NEMA WD 1, HEAVY_DUTY AND UL 20 RATED FOR 20 AMPERES AT 120-277 VOLTS AC.

C. WALL PLATES FOR RECEPTACLES SHALL BE TYPE 302 BRUSHED STAINLESS STEEL IN PUBLIC AREAS AND GALVANIZED STEEL IN MAINTENANCE AREAS. ALL DEVICES MOUNTED EXPOSED TO WEATHER SHALL BE MOUNTED IN CAST ALUMINUM ENCLOSURES THAT ARE NEMA RATED 3R OR 4. WIRE DEVICES MANUFACTURERS LEVITON, HUBBELL OR APPROVED EQUAL.

262816.16 ENCLOSED SWITCHES

ALL FUSED (FD) AND NON-FUSED (NF) DISCONNECTS SHALL BE SQUARE D COMPANY OR APPROVED EQUAL, 3-POLE HEAVY DUTY TYPE ONLY. ALL UNITS INSTALLED OUTDOORS SHALL BE RATED WEATHERPROOF NEMA 3R. MANUFACTURERS: SCHNEIDER SQUARE D, EATON, GENERAL ELECTRIC, SIEMENS, OR APPROVED EQUAL.

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ILLINOIS SPORTS FACILITIES AUTHORITY

ISSUE/REVISION:

REV	DATE	DESCRIPTION
	1/30/2026	ISSUED FOR BID

PROJECT:
RATE FIELD - HVAC FY2026

333 WEST 35TH STREET
CHICAGO, IL 60616

DRAWING TITLE:
ELECTRICAL SPECIFICATIONS

DESIGNED BY:	LF
CHECKED BY:	BT
PROJECT NO:	25080
SCALE:	NO SCALE

SHEET NO.

E4.01