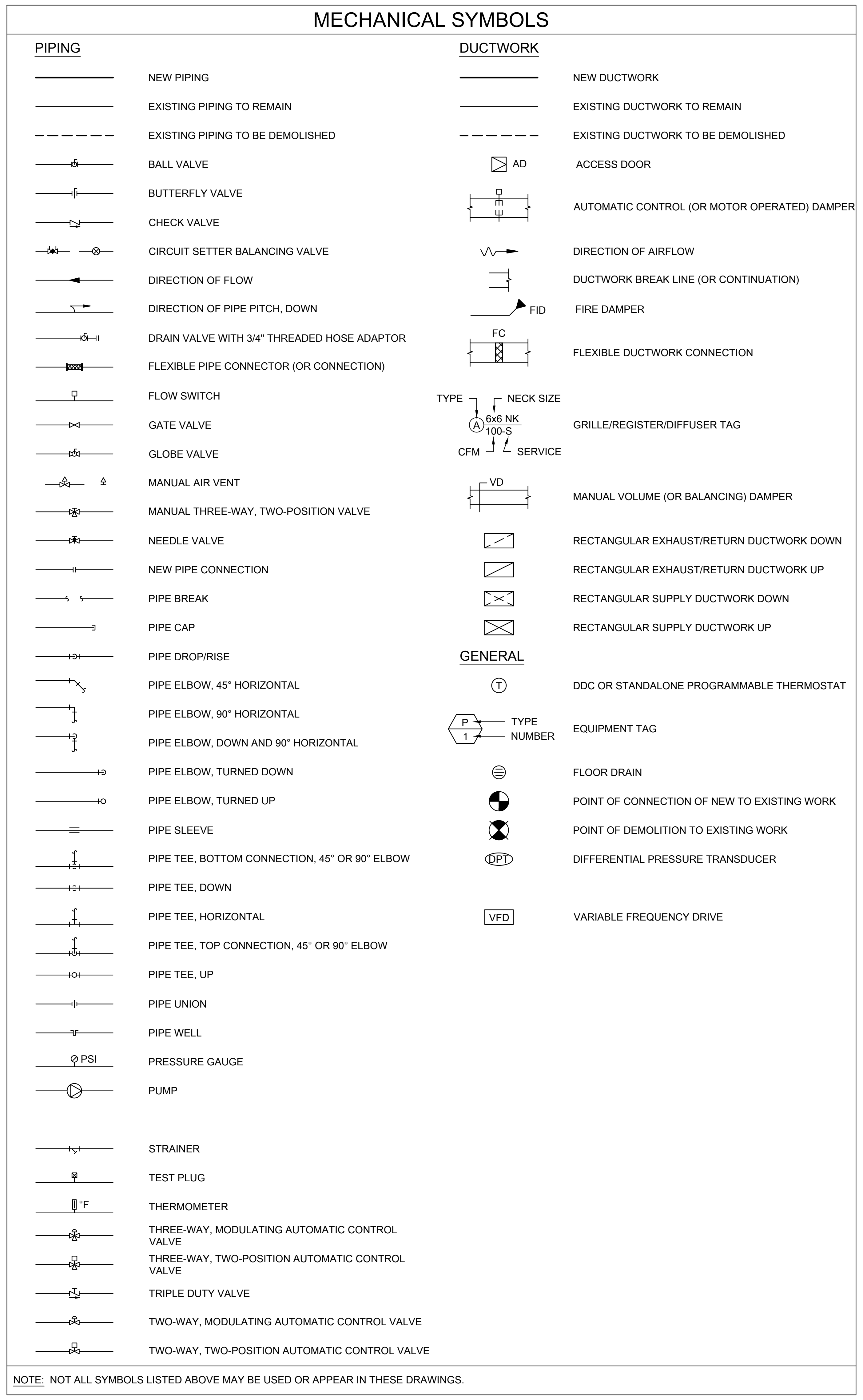
IFSA - GUARANTEED RATE FIELD - HVAC FY2023

333 W 35TH STREET
CHICAGO, ILLINOIS 60616

MECHANICAL SYMBOLS



PIPING

- NEW PIPING
- EXISTING PIPING TO REMAIN
- EXISTING PIPING TO BE DEMOLISHED
- BALL VALVE
- BUTTERFLY VALVE
- CHECK VALVE
- CIRCUIT SETTER BALANCING VALVE
- DIRECTION OF FLOW
- DIRECTION OF PIPE PITCH, DOWN
- DRAIN VALVE WITH 3/4" THREADED HOSE ADAPTOR
- FLEXIBLE PIPE CONNECTOR (OR CONNECTION)
- FLOW SWITCH
- GATE VALVE
- GLOBE VALVE
- MANUAL AIR VENT
- MANUAL THREE-WAY, TWO-POSITION VALVE
- NEEDLE VALVE
- NEW PIPE CONNECTION
- PIPE BREAK
- PIPE CAP
- PIPE DROP/RISE
- PIPE ELBOW, 45° HORIZONTAL
- PIPE ELBOW, 90° HORIZONTAL
- PIPE ELBOW, DOWN AND 90° HORIZONTAL
- PIPE ELBOW, TURNED DOWN
- PIPE ELBOW, TURNED UP
- PIPE SLEEVE
- PIPE TEE, BOTTOM CONNECTION, 45° OR 90° ELBOW
- PIPE TEE, DOWN
- PIPE TEE, HORIZONTAL
- PIPE TEE, TOP CONNECTION, 45° OR 90° ELBOW
- PIPE TEE, UP
- PIPE UNION
- PIPE WELL
- PRESSURE GAUGE
- PUMP
- STRAINER
- TEST PLUG
- THERMOMETER
- 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

DUCTWORK

- NEW DUCTWORK
- EXISTING DUCTWORK TO REMAIN
- EXISTING DUCTWORK TO BE DEMOLISHED
- ACCESS DOOR
- AUTOMATIC CONTROL (OR MOTOR OPERATED) DAMPER
- DIRECTION OF AIRFLOW
- DUCTWORK BREAK LINE (OR CONTINUATION)
- FIRE DAMPER
- FLEXIBLE DUCTWORK CONNECTION
- GRILLE/REGISTER/DIFFUSER TAG
- MANUAL VOLUME (OR BALANCING) DAMPER
- RECTANGULAR EXHAUST/RETURN DUCTWORK DOWN
- RECTANGULAR EXHAUST/RETURN DUCTWORK UP
- RECTANGULAR SUPPLY DUCTWORK DOWN
- RECTANGULAR SUPPLY DUCTWORK UP

GENERAL

- DDC OR STANDALONE PROGRAMMABLE THERMOSTAT
- EQUIPMENT TAG
- FLOOR DRAIN
- POINT OF CONNECTION OF NEW TO EXISTING WORK
- POINT OF DEMOLITION TO EXISTING WORK
- DIFFERENTIAL PRESSURE TRANSDUCER
- VARIABLE FREQUENCY DRIVE

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

CITY OF CHICAGO NOTES

A. ALL WORK SHALL BE IN ACCORDANCE WITH THE CITY OF CHICAGO BUILDING CODE REQUIREMENTS.

B. ALL EQUIPMENT FURNISHED AND INSTALLED SHALL BE IN FULL COMPLIANCE WITH THE CURRENT STANDARDS SET BY THE CITY OF CHICAGO DEPARTMENT OF INSPECTIONAL SERVICES.

C. ALL NEW DUCTWORK INSTALLED SHALL BE OF GALVANIZED METAL. ALL SHEET METAL INSTALLATION SHALL COMPLY WITH THE LATEST STANDARDS OF SMACNA AND ASHRAE.

D. ALL DUCT JOINTS, SEAMS, AND CONNECTIONS SHALL BE SEALED IN ACCORDANCE WITH THE CHICAGO ENERGY CONSERVATION CODE.

E. ALL NEW EQUIPMENT PROVIDED SHALL BE U.L. LISTED AND SHALL BEAR THE U.L. LABEL.

F. ALL OUTSIDE AIR INTAKES SHALL BE A MINIMUM DISTANCE OF 15'-0" FROM ANY EXHAUST LOUVERS, PLUMBING VENTS, OR ANY OTHER POSSIBLE CONTAMINANTS AND SHALL BE A MINIMUM DISTANCE OF 10'-0" ABOVE GRADE.

G. IF FLEXIBLE DUCTS ARE USED, DO NOT EXCEED 5'-0' IN LENGTH. ALL FLEXIBLE DUCTWORK TO BE CITY OF CHICAGO APPROVED.

H. NOISE FROM ALL MECHANICAL EQUIPMENT INSTALLED SHALL NOT EXCEED 55 DB AT THE PROPERTY LINE.

I. CLEARANCES FOR ALL VENTILATION EQUIPMENT MUST CONFORM TO MANUFACTURER'S REQUIREMENTS.

ABBREVIATIONS

AC	AIR CONDITIONER
ACD	AUTOMATIC CONTROL DAMPER
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AP	ACCESS PANEL
APD	AIR PRESSURE DROP
BAS	BUILDING AUTOMATION SYSTEM
BASC	BUILDING AUTOMATION SYSTEM CONTRACTOR
BFV	BUTTERFLY VALVE
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
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
CO	CLEANOUT
COND	CONDENSATE
CONV	CONVECTOR
COP	COEFFICIENT OF PERFORMANCE
CO2	CARBON DIOXIDE
CR	CONDENSATE RETURN
CU	CONDENSING UNIT
CV	CONTROL VALVE
CW	COLD (OR CITY) WATER
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
D	DRAIN
DB	DRY BULB
DHW	DOMESTIC HOT WATER
DHWR	DOMESTIC HOT WATER RETURN
DN	DOWN
DPT	DIFFERENTIAL PRESSURE TRANSDUCER
-E	EXHAUST
EA	EXHAUST AIR
EAD	EXHAUST AIR DAMPER
EAT	ENTERING AIR TEMPERATURE
EBH	ELECTRIC BASEBOARD HEAT
EC	ELECTRICAL CONTRACTOR
ECM	ELECTRONICALLY COMMUTATED MOTOR
EDH	ELECTRIC DUCT HEATER
EER	ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
EG	ETHYLENE GLYCOL
EHC	ELECTRIC HEATING COIL
EJ	EXPANSION JOINT
ESP	EXTERNAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE
F	FAHRENHEIT
FC	FLEXIBLE CONNECTOR (OR CONNECTION)
FD	FLOOR DRAIN
FCU	FAN COIL UNIT
FID	FIRE DAMPER
FFA	FROM FLOOR ABOVE
FFB	FROM FLOOR BELOW
FLA	FULL LOAD AMPS
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FPI	FINS PER INCH
FPM	FEET PER MINUTE
FTR	FINNED TUBE RADIATION
FV	FACE VELOCITY
G	GAS
GA	GAUGE
GPM	GALLONS PER MINUTE
HC	HEATING COIL
HP	HORSEPOWER
HZ	HERTZ
IPLV	INTEGRATED PART LOAD VALUE
LAT	LEAVING AIR TEMPERATURE
LPS	LOW PRESSURE STEAM
LWT	LEAVING WATER TEMPERATURE
MBH	THOUSAND BRITISH THERMAL UNITS PER HOUR
MC	MECHANICAL CONTRACTOR
MCA	MINIMUM CIRCUIT AMPACITY
MOCP	MAXIMUM OVER-CURRENT PROTECTION
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
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
RF	RETURN FAN
RH	REHEAT
RL	REFRIGERANT LIQUID
RPM	REVOLUTIONS PER MINUTE
-S	SUPPLY
SA	SUPPLY AIR
SCAC	SELF CONTAINED AIR CONDITIONER
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SF	SUPPLY FAN
SP	STATIC PRESSURE
SS	STAINLESS STEEL
SST	SATURATED SUCTION TEMPERATURE
ST	STORM
STR	STRAINER
SUH	SUSPENDED UNIT HEATER
T	THERMOSTAT
-T	TRANSFER
TDH	TOTAL DYNAMIC HEAD
TYP	TYPICAL
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
WPD	WATER PRESSURE DROP

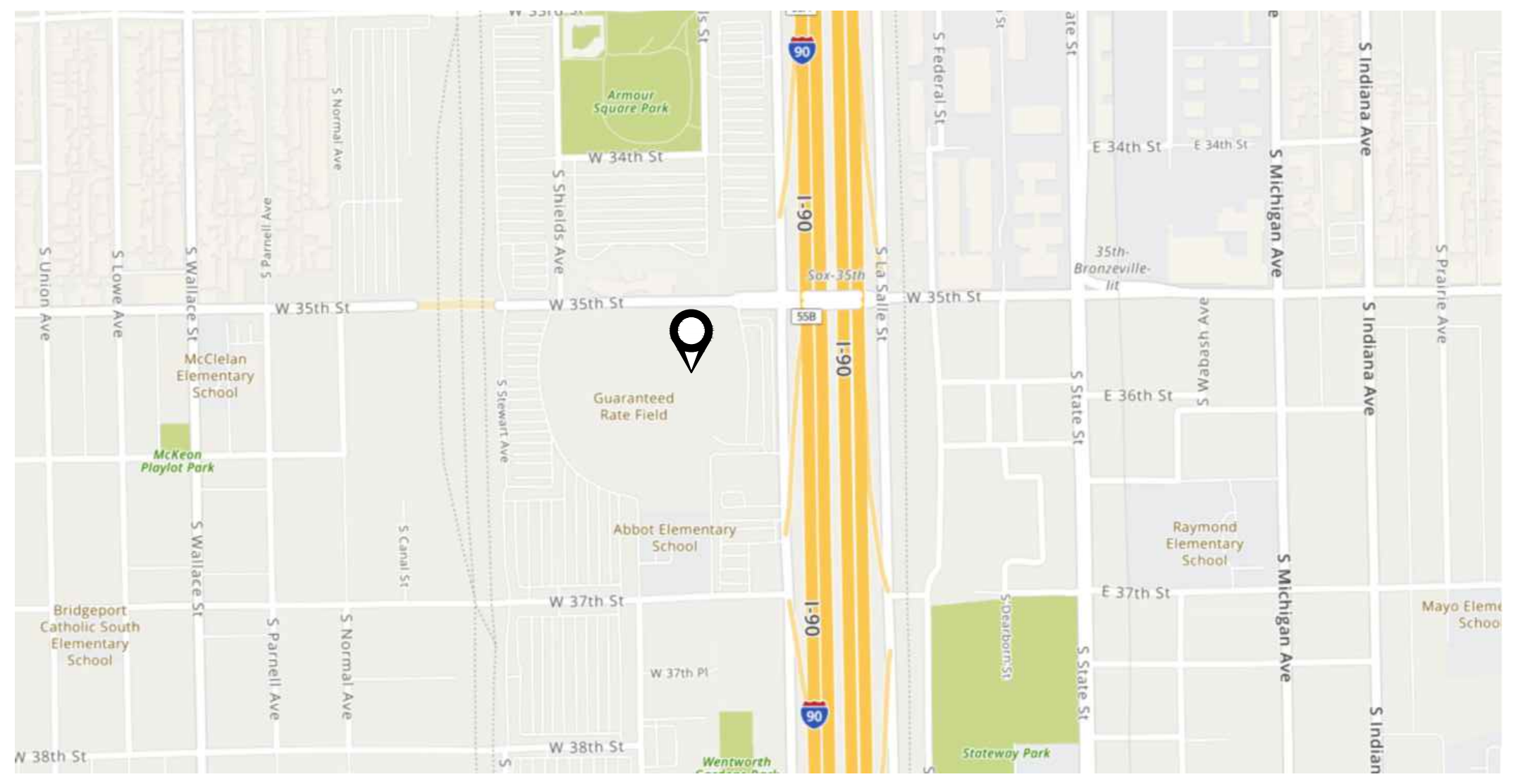
NOTE: NOT ALL ABBREVIATIONS LISTED ABOVE MAY BE USED OR APPEAR IN THESE DRAWINGS.

PROJECT SCOPE OF WORK

1. LOADING DOCK SECURITY OFFICE:
   1.1. REMOVE EXISTING ELECTRIC SUSPENDED UNIT HEATER.
   1.2. PROVIDE NEW WALL MOUNTED SELF CONTAINED COOLING/ELECTRIC HEATING EQUIPMENT.
2. PATIO AIR HANDLING UNIT MODIFICATIONS:
   2.1. REPLACE EXISTING INTERNAL CONDENSATE DRAIN PAN TO PREVENT CONDENSATE LEAKING.
3. IT ROOM COOLING:
   3.1. DEMOLISH (2) WALL MOUNTED CASSETTE COOLING UNITS, ASSOCIATED CONDENSATE PUMPS, CORRIDOR CONDENSING UNITS, AND ASSOCIATED REFRIGERANT PIPING.
   3.2. INSTALL (1) NEW WALL MOUNTED DX CASSETTE UNIT WITH INTEGRAL CONDENSATE PUMP AND ASSOCIATED CONDENSING UNIT MOUNTED SUSPENDED IN THE SERVICE CORRIDOR.
4. LEVEL 200 KITCHEN AHU REPLACEMENT:
   4.1. PRETEST AIRFLOWS AT MAJOR DUCTS DURING ALL MODES OF OPERATION.
   4.2. REPLACE AIR HANDLER AND NOTED ACCESSORIES SERVING THE KITCHEN AND SUPPORT SPACES.
5. DISHWASHER EXHAUST REPAIR & DRAIN:
   5.1. SEAL JOINTS AND REMOVE SECTION OF DISHWASHER EXHAUST DUCTWORK AND ASSOCIATED CATCH BAG FOR LEAKING DUCT.
   5.2. INSTALL NEW SECTION OF STAINLESS STEEL DUCTWORK AND PROVIDE DRAIN ROUTED TO NEARBY OPEN SITE DRAIN.
6. COMCAST ROOM
   6.1. RELOCATE EXISTING FAN COIL TO ALLOW FOR PROPER MAINTENANCE ACCESS. RE-CONNECT TO EXISTING DUCTWORK AND PIPING.
7. BARDS ROOM LOBBY:
   7.1. REPLACE EXISTING CHILLED WATER FAN COIL IN KIND.
   7.2. PROVIDE NEW PERIMETER ELECTRIC BASEBOARD.
8. ISFA OFFICES FAN COIL:
   8.1. REPLACE EXISTING CHILLED WATER FAN COIL IN KIND.

Sheet List Table

Sheet Number	Sheet Title
Mechanical	
M0.1	MECHANICAL COVER PAGE
M0.2	MECHANICAL OVERALL PLAN - SERVICE LEVEL
M0.4	MECHANICAL OVERALL PLAN - 200 LEVEL
M0.5	MECHANICAL OVERALL PLAN - 300 LEVEL
M0.6	MECHANICAL OVERALL PLAN - 400 LEVEL
MD1.1	MECHANICAL ENLARGED DEMOLITION PLANS
MD1.2	MECHANICAL ENLARGED DEMOLITION PLANS
M1.1	MECHANICAL ENLARGED NEW WORK PLANS
M1.2	MECHANICAL ENLARGED NEW WORK PLANS
M2.1	MECHANICAL DETAILS
M2.2	MECHANICAL DETAILS
M3.1	MECHANICAL SCHEDULES
M4.1	MECHANICAL SPECIFICATIONS
M4.2	MECHANICAL SPECIFICATIONS
Electrical	
E0.1	ELECTRICAL COVER PAGE
ED1.1	ELECTRICAL ENLARGED DEMOLITION PLANS
ED1.2	ELECTRICAL ENLARGED DEMOLITION PLANS
E1.1	ELECTRICAL ENLARGED NEW WORK PLANS
E1.2	ELECTRICAL ENLARGED NEW WORK PLANS
E2.1	ELECTRICAL SPECIFICATIONS



1 LOCATION MAP
SCALE: NO SCALE

ENERGY CODE COMPLIANCE STATEMENT

I certify that I am a Registered Energy Professional (REP). I also certify that to the best of my professional knowledge and belief that the plans for

Address: 333 W. 35TH ST, CHICAGO, IL 60616

Fully comply with the requirements of Chapter 18-13. Energy Conservation of the Municipal Code of Chicago as effective April 22, 2009

Signed: ____________________ Date: 09/09/2022
(Arch. S.E. or P.E.)

Illinois License Number: 062-056281

CHICAGO BUILDING CODE COMPLIANCE STATEMENT

I hereby certify that these plans were prepared under my direct supervision and to the best of my professional knowledge they conform to the Chicago Building Code.

Signed: ____________________ Date: 09/09/2022
(Arch. S.E. or P.E.)

HEATING CERTIFICATION STATEMENT

I hereby certify that the heating system will heat all rooms regularly occupied by humans to an inside temperature of 68° when the outside temperature is minus 10°F (As required by the Sections 34 (13-196-410) and 4 (5-4-270) of the 2010 Chicago Building Code and by Paragraph 1204.1 of Chapter 18-12 (Interior Environment) of the proposed Building Planning and Life Safety portion of the Code).

Signed: ____________________
(Owner, Contractor, or Owner's Licensed Engineer Representative)

ELARA
30 N. Wolf Rd., Second Floor
Hillside, IL 60162
(708) 236-0300
(708) 236-0330 FAX

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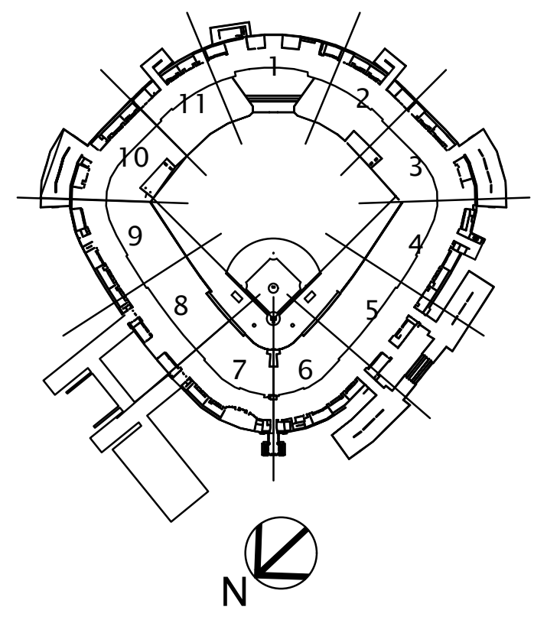
ILLINOIS SPORTS FACILITIES AUTHORITY

KEY PLAN



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	09.09.2022	ISSUED FOR BID

PROJECT:

GUARANTEED RATE FIELD - HVAC FY2023

333 WEST 35TH STREET
CHICAGO, IL 60616

DRAWING TITLE:

MECHANICAL COVER PAGE

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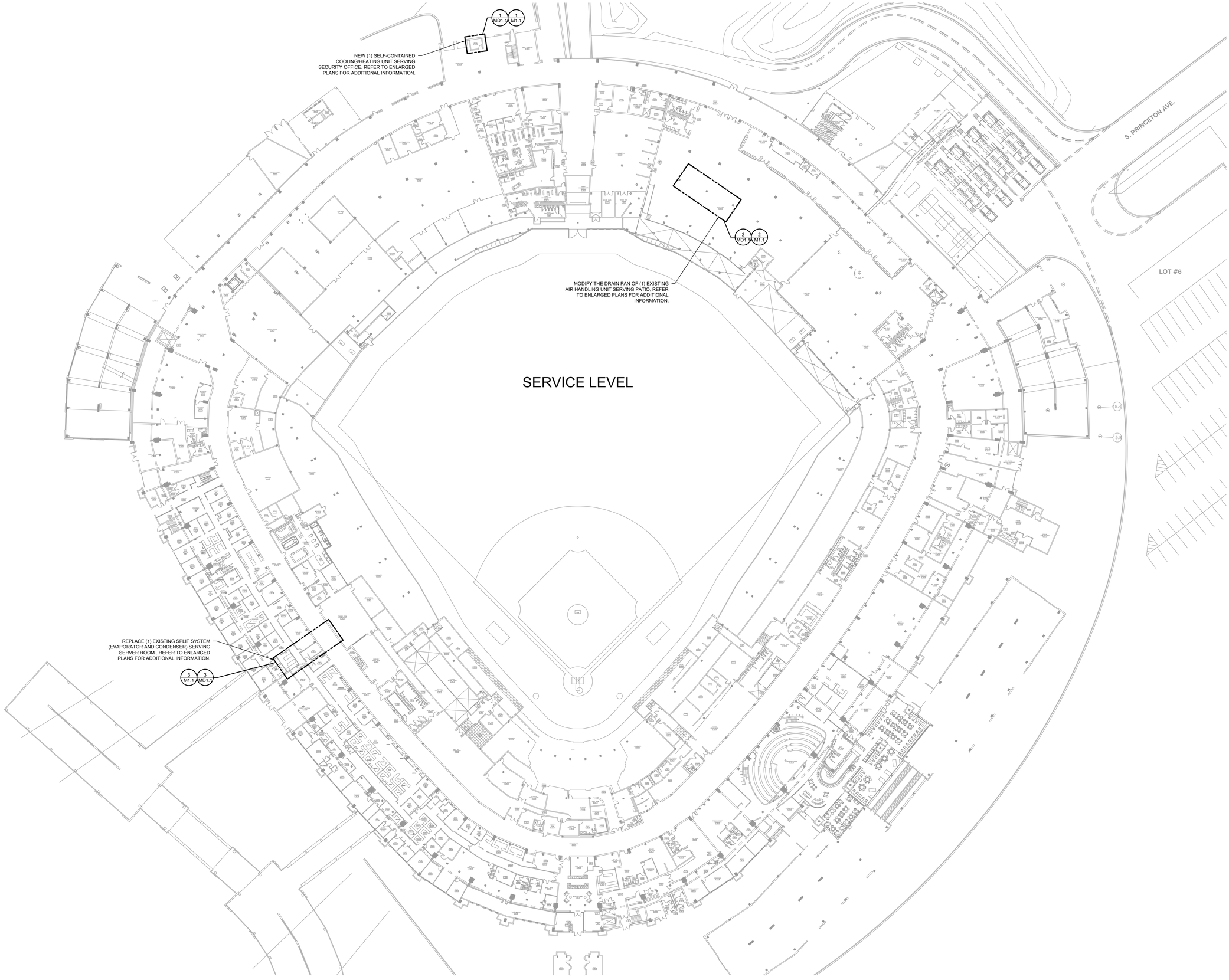
DRAWN BY:	CC
CHECKED BY:	MS
PROJECT NO:	22286
SCALE:	N.T.S.

SHEET NO.

M0.1



1 MECHANICAL OVERALL PLAN - SERVICE LEVEL

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

32' 0 16' 32' 64'

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

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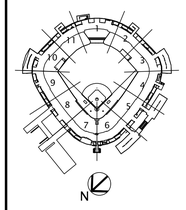

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DRAWING TITLE:

MECHANICAL OVERALL PLAN - SERVICE LEVEL

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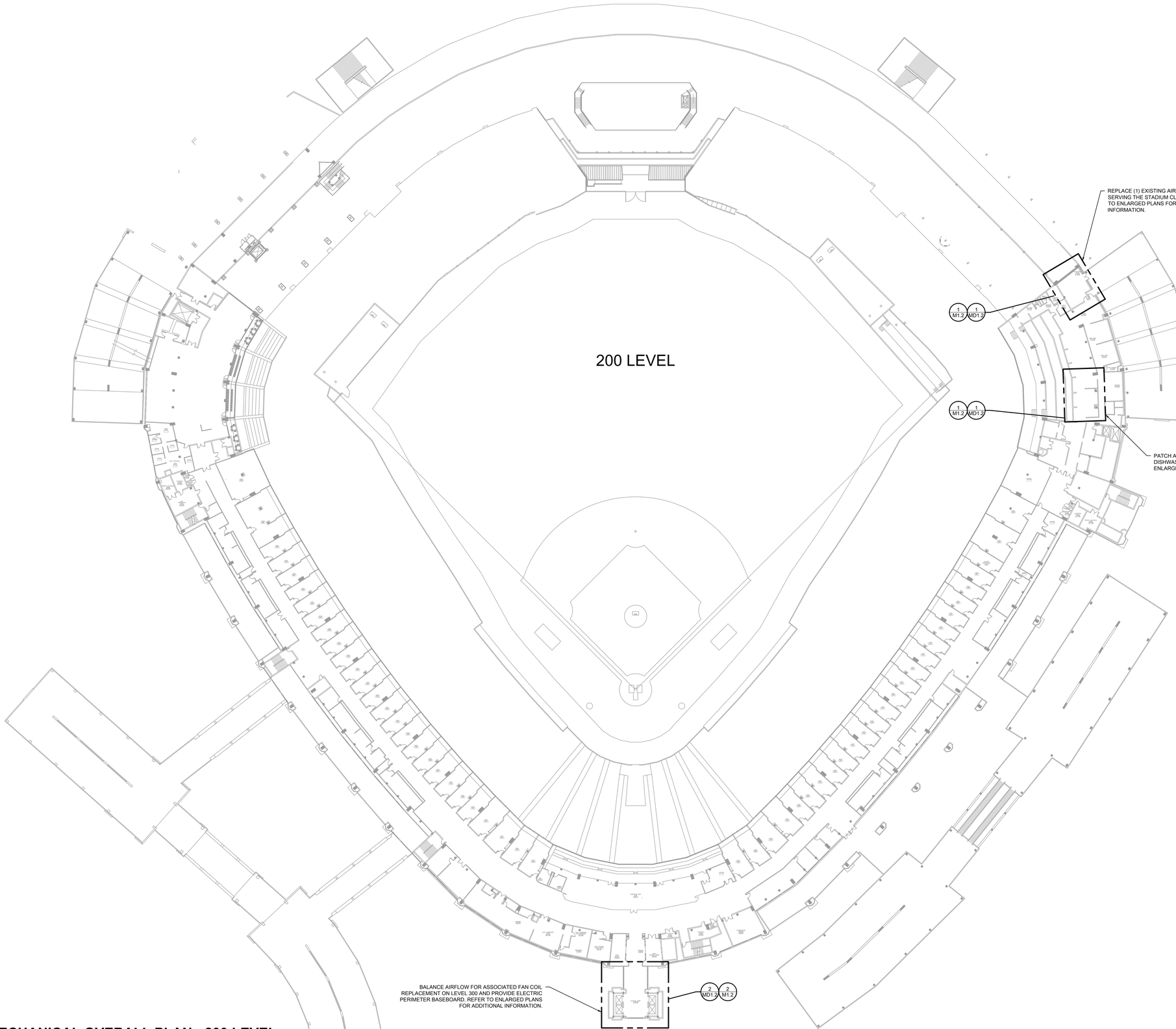
PROJECT NO:	22286
SCALE:	1/32" = 1'-0"

SHEET NO.

M0.2



1 MECHANICAL OVERALL PLAN - 200 LEVEL

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

32' 0 16' 32' 64'

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

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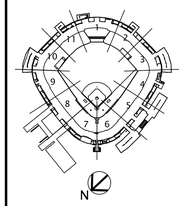

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DRAWING TITLE:

MECHANICAL OVERALL PLAN - 200 LEVEL

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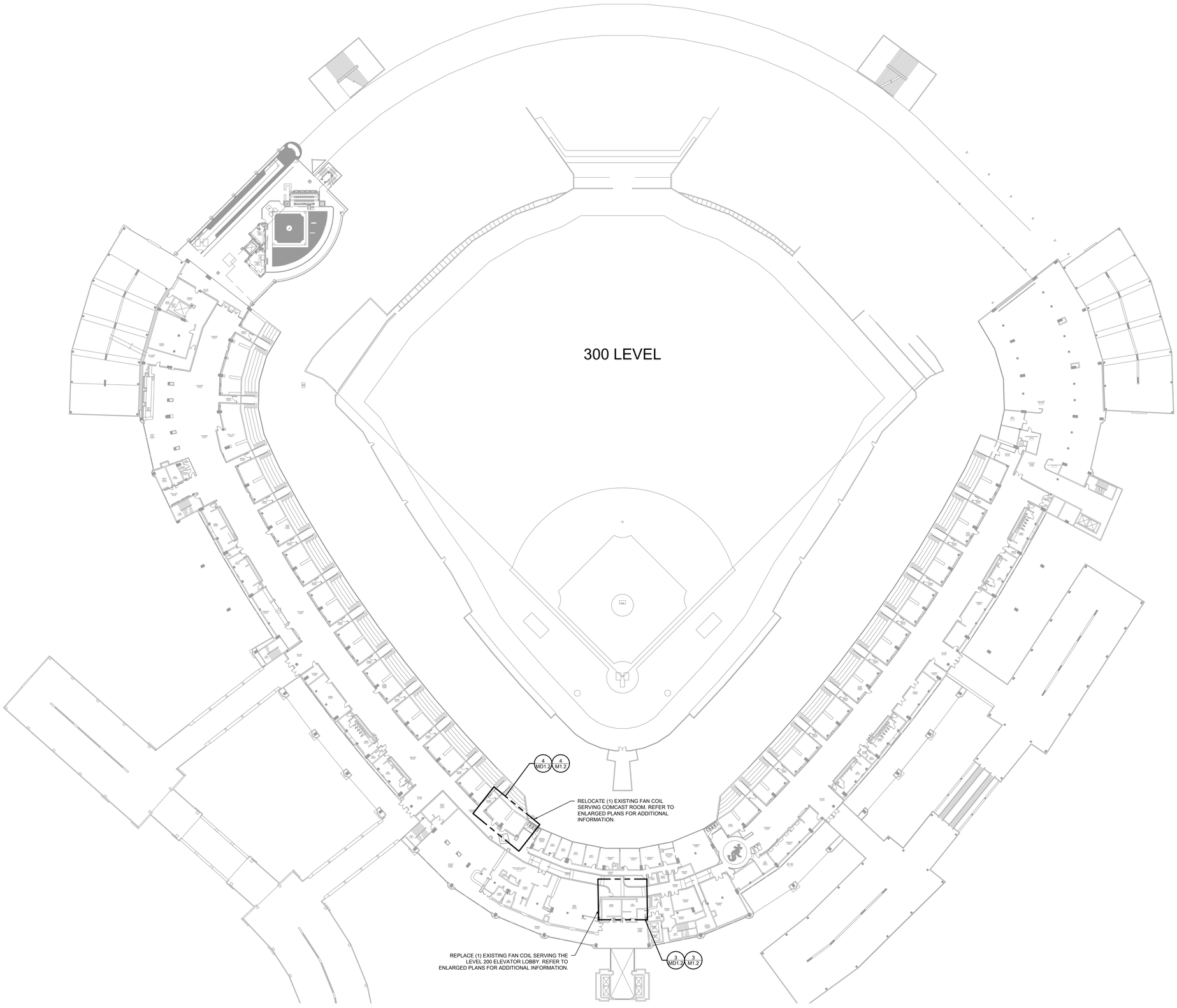
PROJECT NO:	22286
SCALE:	1/32" = 1'-0"

SHEET NO.

M0.4



1 MECHANICAL OVERALL PLAN - 300 LEVEL

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

32' 0 16' 32' 64'

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

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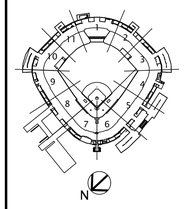

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MECHANICAL OVERALL PLAN - 300 LEVEL

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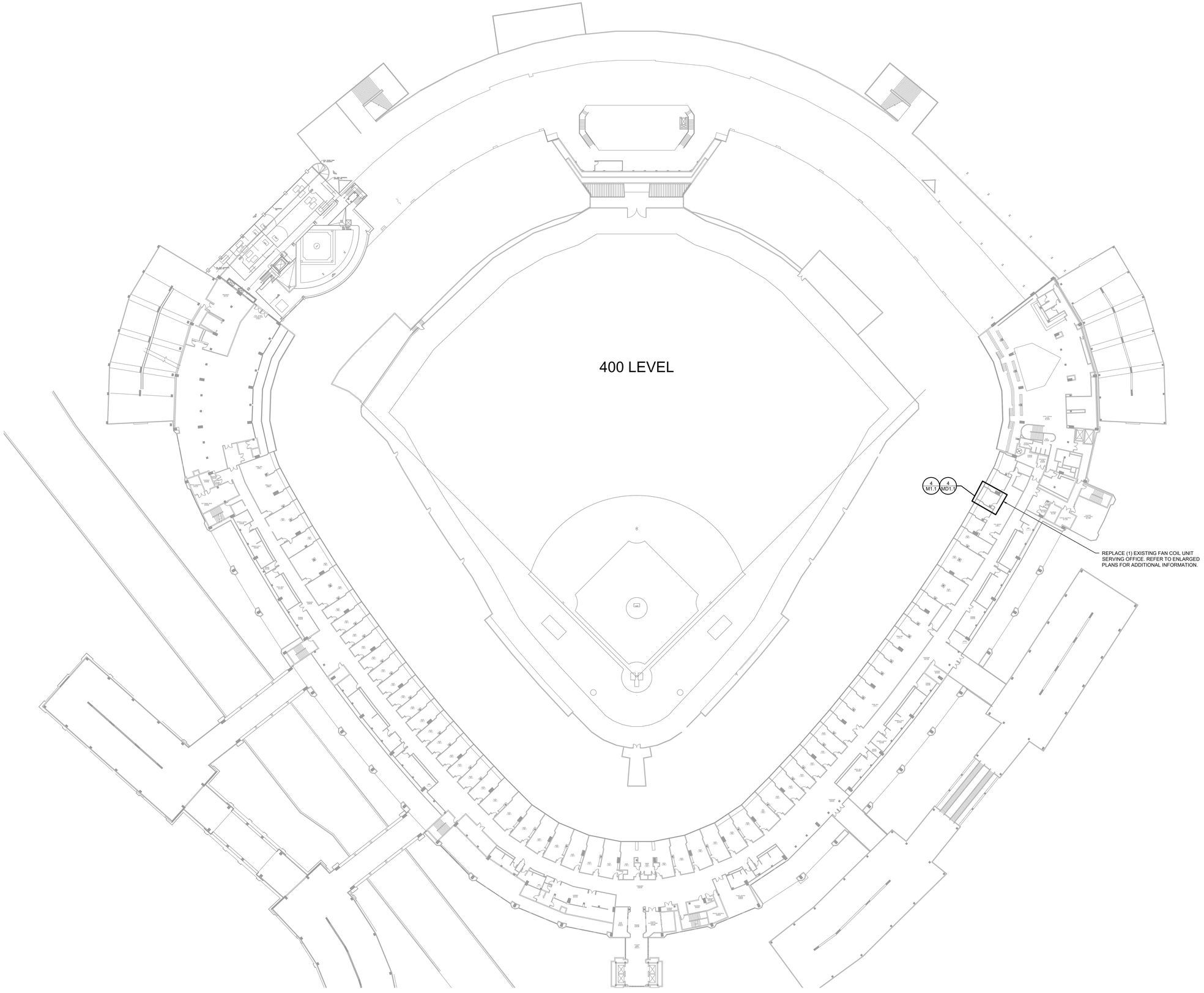
SHEET NO.

M0.5



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

32' 0 16' 32' 64'
SCALE: 1/32" = 1'-0"

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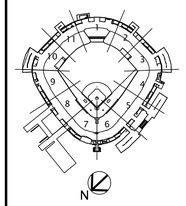

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DRAWING TITLE:
MECHANICAL OVERALL PLAN - 400 LEVEL

DESIGNED BY:	CC
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PROJECT NO:	22286
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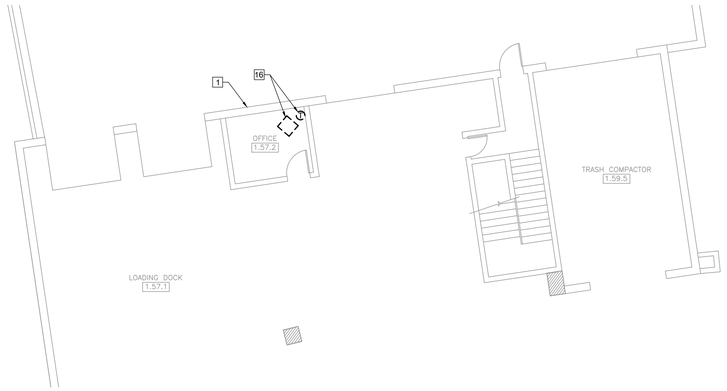

1 MECHANICAL PARTIAL DEMOLITION PLAN - SERVICE LEVEL (SECTION 08)

SCALE: 1/8" = 1'-0"

2 MECHANICAL PARTIAL DEMOLITION PLAN - SERVICE LEVEL (SECTION 02)

SCALE: 1/8" = 1'-0"

4 MECHANICAL PARTIAL DEMOLITION PLAN - 400 LEVEL (SECTION 014

SCALE: 1/8" = 1'-0"

3 MECHANICAL PARTIAL DEMOLITION PLAN - SERVICE LEVEL (SECTION 08)

SCALE: 1/8" = 1'-0"

8' 0 4' 8' 16'

SCALE: 1/8" = 1'-0"

KEYED MECHANICAL DEMOLITION NOTES

1. PREPARE EXISTING EXTERIOR WALL FOR INSTALLATION OF SELF-CONTAINED COOLING/HEATING UNIT. REFER TO NEW WORK PLANS.
2. EXISTING AHU IS LEAKING CONDENSATE. REMOVE EXISTING FILTER RACK, INTERNAL DRAIN PAN, AND CONDENSATE CONNECTION. REFER TO NEW WORK PLAN FOR REMAINDER OF SCOPE.
3. EXISTING DX CASSETTE UNIT, CONDENSING UNIT, THERMOSTAT AND ASSOCIATED REFRIGERANT PIPING TO REMAIN WITHOUT MODIFICATION.
4. DISCONNECT AND REMOVE EXISTING DX CASSETTE UNIT AND ASSOCIATED EXTERNAL CONDENSATE PUMP. DISCONNECT AND REMOVE CONDENSATE DRAIN PIPING UP TO POINT OF CONNECTION TO SHARED DRAIN LINE AND CAP. REMOVE ASSOCIATED SUPPORTS. RECOVER ALL REFRIGERANT AS REQUIRED.
5. DISCONNECT AND REMOVE EXISTING CONDENSING UNIT AND ASSOCIATED SUPPORTS. RECOVER ALL REFRIGERANT AS REQUIRED.
6. DISCONNECT AND REMOVE EXISTING REFRIGERANT PIPING AND ASSOCIATED SUPPORTS.
7. DISCONNECT AND REMOVE EXISTING THERMOSTAT. PROVIDE NEW THERMOSTAT IN SAME LOCATION, REFER TO NEW WORK DRAWINGS.
8. EXISTING ABANDONED GRILLE AND DUCTWORK TO BE DISCONNECTED AND REMOVED. CAP ASSOCIATED ABANDONED DUCT ABOVE CEILING. PROVIDE NEW CEILING TILE WHERE GRILLE WAS REMOVED TO MATCH ADJACENT TILES, PROVIDED WITH BATT INSULATION ABOVE CEILING.
9. EXISTING THERMOSTAT TO REMAIN. PRESERVE CONTROL WIRING FOR CONNECTION TO NEW FAN COIL UNIT.
10. EXISTING DUCTWORK/GRILLE TO REMAIN. CLEAN THOROUGHLY.
11. EXISTING ELECTRIC DUCT HEATER TO REMAIN. MAINTAIN ALL HEATER INTERLOCKS.
12. DISCONNECT AND REPLACE EXISTING FAN COIL UNIT, INCLUDING ASSOCIATED DUCTWORK UP TO LOCATION SHOWN.
13. DISCONNECT AND REPLACE EXISTING CHILLED WATER PIPING AND CONDENSATE DRAIN PIPING BACK TO MAIN IN CORRIDOR (VERIFY IN FIELD EXACT POINT OF DISCONNECTION). REFER TO NEW WORK PLANS.
14. EXISTING IONIZATION DEVICE TO REMOVED FOR CONSTRUCTION AND PRESERVED FOR RE-INSTALLATION.
15. EXISTING FAN COIL SYSTEM TO REMAIN WITHOUT MODIFICATION, INCLUDING ASSOCIATED DUCTWORK, PIPING, ELECTRIC HEATER, CONDENSATE DRAINAGE, THERMOSTAT, ETC.
16. EXISTING SUSPENDED ELECTRIC UNIT HEATER TO BE DISCONNECTED AND REMOVED, INCLUDING ASSOCIATED HANGERS AND THERMOSTAT. PROVIDE COVER PLATE WHERE THERMOSTAT WAS REMOVED.

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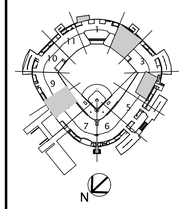

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PROJECT:

GUARANTEED RATE FIELD - HVAC FY2023

333 WEST 35TH STREET
CHICAGO, IL 60616

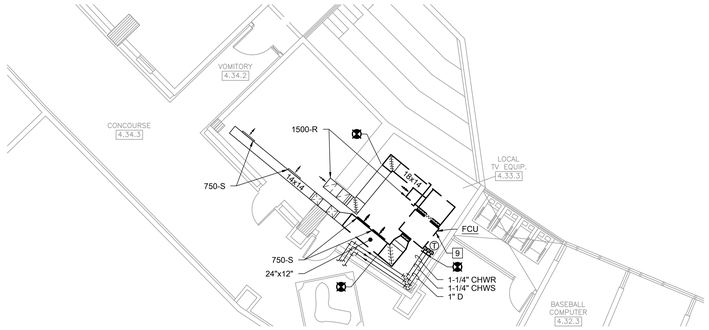
DRAWING TITLE:

MECHANICAL ENLARGED DEMOLITION PLANS

DESIGNED BY:	CC
DRAWN BY:	CC
CHECKED BY:	MS
PROJECT NO:	22286
SCALE:	1/8"=1'-0"

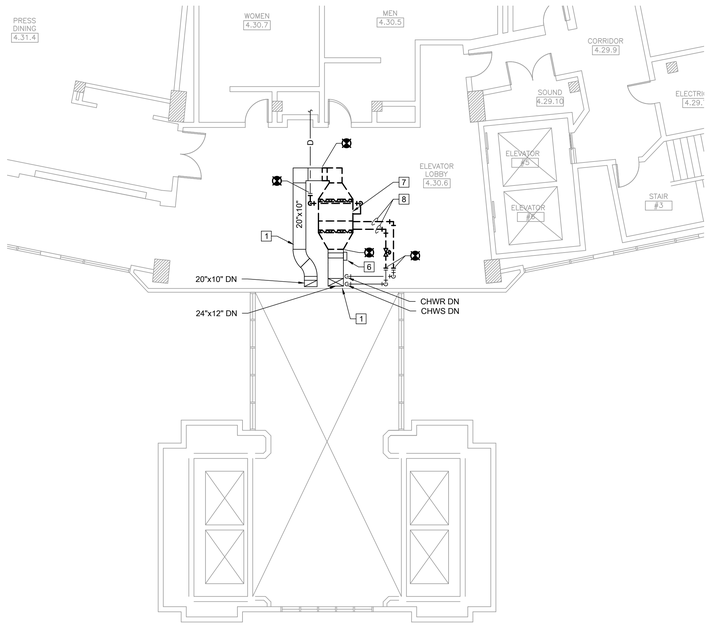
SHEET NO.

MD1.1



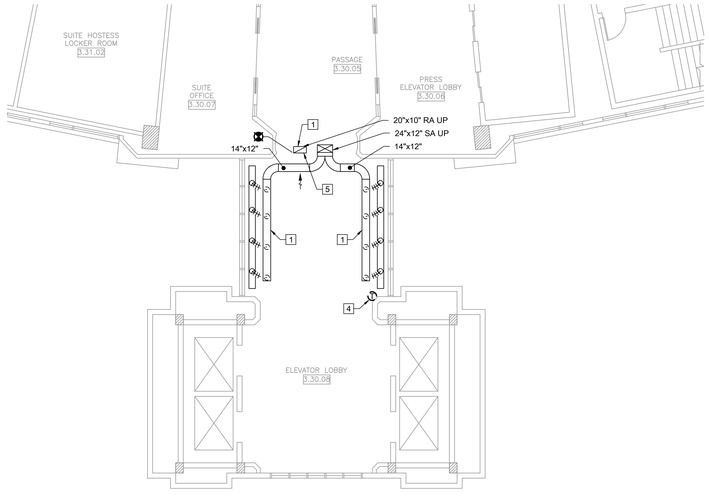
4 MECHANICAL PARTIAL DEMOLITION PLAN - 300 LEVEL (SECTION 07)

SCALE: 1/8" = 1'-0"



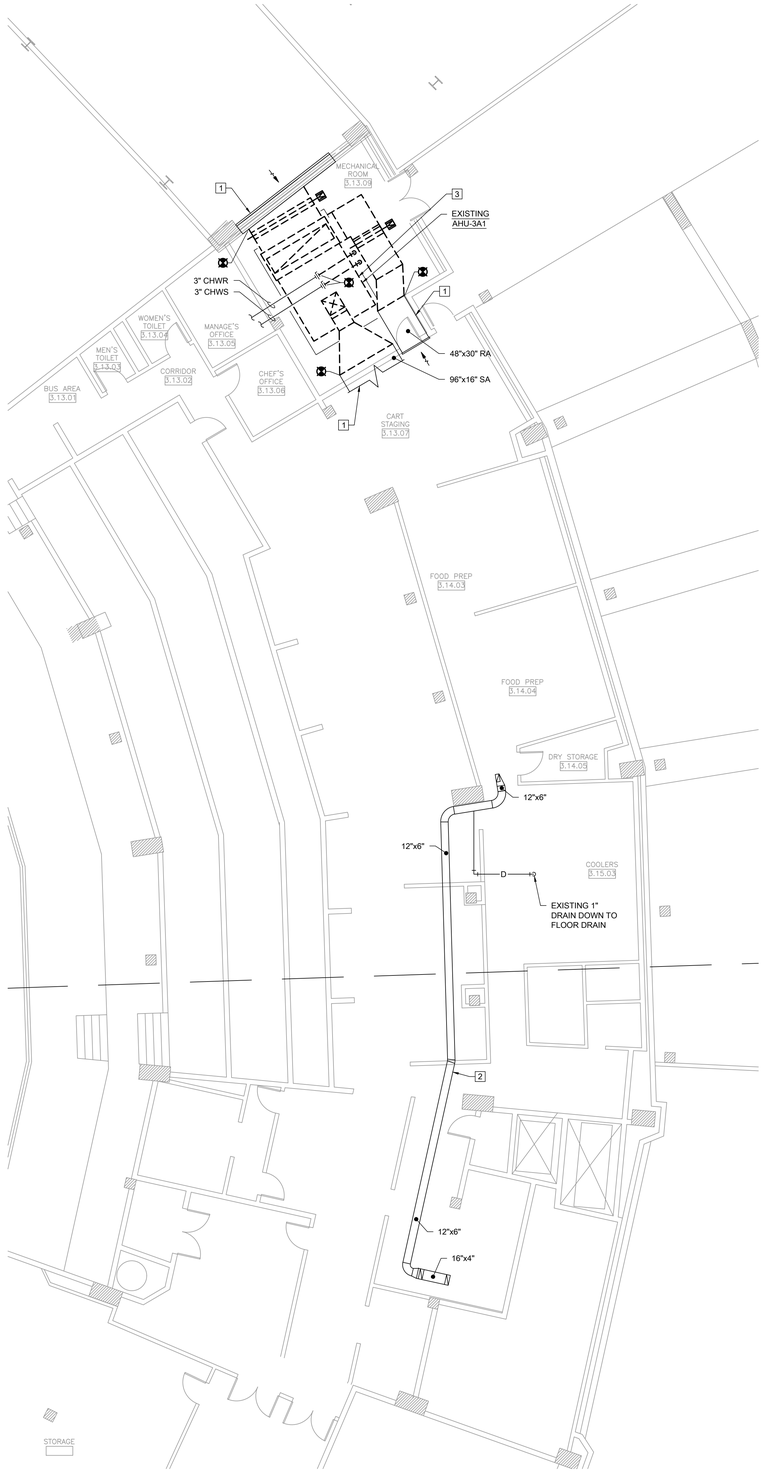
3 MECHANICAL PARTIAL DEMOLITION PLAN - 300 LEVEL (SECTION 06)

SCALE: 1/8" = 1'-0"



2 MECHANICAL PARTIAL DEMOLITION PLAN - 200 LEVEL (SECTION 06)

SCALE: 1/8" = 1'-0"



1 MECHANICAL PARTIAL DEMOLITION PLAN - 200 LEVEL (SECTION 03)

SCALE: 1/8" = 1'-0"

8' 0 4' 8' 16'

SCALE: 1/8" = 1'-0"

KEYED MECHANICAL DEMOLITION NOTES

1. EXISTING DUCTWORK TO REMAIN. CLEAN THOROUGHLY.
2. REFER TO NEW WORK PLANS FOR DISHWASHER EXHAUST REPAIR SCOPE.
3. EXISTING INDOOR AIR HANDLER TO BE DISCONNECTED AND REPLACED. ASSOCIATED CONCRETE PAD TO REMAIN AND BE RE-USED. DISCONNECT AND REMOVE DUCTWORK AND CHILLED WATER PIPING UP TO LOCATION SHOWN. REMOVE CONDENSATE DRAIN PIPING COMPLETELY (NOT SHOWN). EXISTING MOTORIZED DAMPERS TO BE REPLACED.
4. DISCONNECT AND REMOVE EXISTING THERMOSTAT. PROVIDE NEW THERMOSTAT IN SAME LOCATION, REFER TO NEW WORK DRAWINGS
5. DISCONNECT AND REMOVE EXISTING RETURN GRILLE (VERIFY LOCATION IN FIELD). PATCH AS REQUIRED.
6. EXISTING ELECTRIC DUCT HEATER TO REMAIN. MAINTAIN ALL HEATER INTERLOCKS.
7. DISCONNECT AND REPLACE EXISTING FAN COIL UNIT, INCLUDING ASSOCIATED DUCTWORK UP TO LOCATION SHOWN.
8. DISCONNECT AND REPLACE EXISTING CHILLED WATER PIPING AND CONDENSATE DRAIN PIPING BACK TO LOCATION SHOWN (VERIFY IN FIELD EXACT POINT OF DISCONNECTION). REFER TO NEW WORK PLANS.
9. EXISTING FAN COIL ORIENTATION DOES NOT ALLOW FOR ACCESS TO MOTOR. FAN COIL TO BE DISCONNECTED AND RELOCATED PER NEW WORK DRAWINGS. DISCONNECT EXISTING PIPING AND DUCTWORK CONNECTIONS AS REQUIRED TO ACCOMMODATE FAN COIL RELOCATION.

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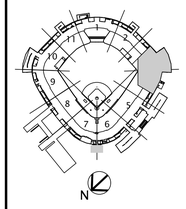

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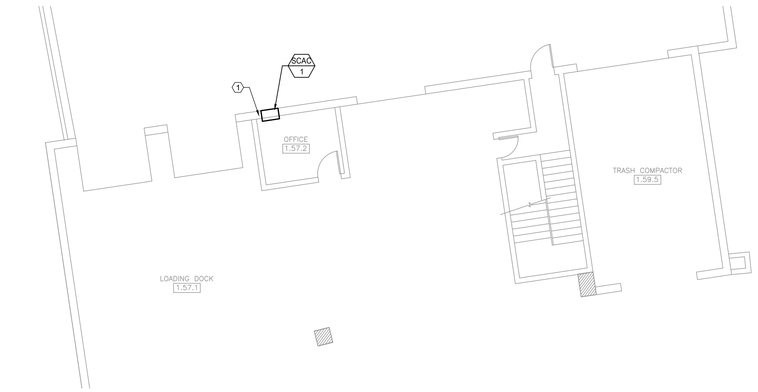
MD1.2



1 MECHANICAL PARTIAL NEW WORK PLAN - SERVICE LEVEL (SECTION 08)

SCALE: 1/8" = 1'-0"

2 MECHANICAL PARTIAL NEW WORK PLAN - SERVICE LEVEL (SECTION 02)

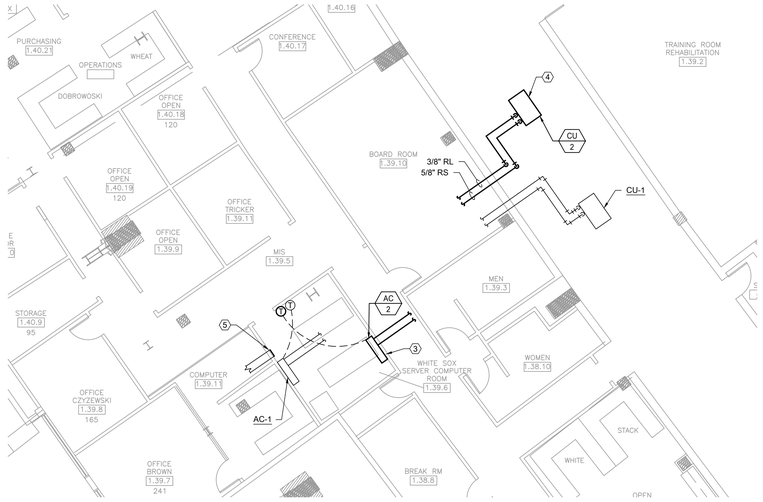
SCALE: 1/8" = 1'-0"

4 MECHANICAL PARTIAL NEW WORK PLAN - 400 LEVEL (SECTION 014

SCALE: 1/8" = 1'-0"

8' 0 4' 8' 16'

SCALE: 1/8" = 1'-0"



3 MECHANICAL PARTIAL NEW WORK PLAN - SERVICE LEVEL (SECTION 08)

SCALE: 1/8" = 1'-0"

KEYED MECHANICAL NEW WORK NOTES

1. NEW SELF-CONTAINED ELECTRIC HEAT / DX COOLING WALL AC UNIT MOUNTED AT APPROXIMATELY 5'-0" A.F.F. PROVIDE REQUIRED WALL SLEEVE AND CHASSIS, VERIFY REQUIREMENTS IN FIELD. INSTALL PER MANUFACTURER REQUIREMENTS.
2. EXISTING AHU, PROVIDE AND INSTALL NEW GALVANIZED DRAIN PAN WITH DRAIN COUPLING FROM THE DX COIL TO THE BACK OF THE AIR HANDLING UNIT. INSTALL NEW FILTER RACK ON THE BACK OF THE AIR HANDLING UNIT. INSTALL NEW CONDENSATE DRAIN PIPING FROM NEW DRAIN COUPLING AND TIE INTO EXISTING DRAIN PIPING. INSULATE DRAIN PIPING TO MATCH EXISTING.
3. INSTALL NEW WALL MOUNTED CASSETTE (AC-2) UNIT JUST BELOW CEILING PER MANUFACTURER REQUIREMENTS. ROUTE DISCHARGE FROM INTEGRAL CONDENSATE PUMP TO EXISTING CONDENSATE DRAIN LINE ABOVE CEILING WITH NEW TEE. ROUTE INSULATED REFRIGERANT LINES UP TO ABOVE CEILING AND OUT TO CORRIDOR FOR FINAL CONNECTION TO NEW CONDENSING UNIT (CU-2). INSTALL NEW THERMOSTAT IN LOCATION SHOWN, COORDINATED WITH EXISTING AVAILABLE WALL SPACE.
4. LOCATE NEW CONDENSING UNIT ON NEW STRUCTURAL PLATFORM ELEVATED ABOVE THE SERVICE CORRIDOR TO MATCH REMOVED. SUPPORT PLATFORM FROM EXISTING STRUCTURE ABOVE.
5. CAP EXISTING DUCT ABOVE CEILING.
6. INSTALL NEW FAN COIL UNIT ABOVE CEILING IN SAME LOCATION AS REMOVED. PROVIDE NEW HANGERS AS NECESSARY. VERIFY COIL HAND IN FIELD. RE-CONNECT CONTROL WIRING FROM EXISTING THERMOSTAT AND HEATER INTERLOCKS. PROVIDE NEW SUPPLY AND RETURN DUCTWORK AS REQUIRED TO RE-CONNECT EXISTING DUCTWORK. REFER TO DETAILS FOR ADDITIONAL INFORMATION.
7. EXISTING DUCTWORK/GRILLE TO REMAIN. RE-BALANCE ALL DIFFUSERS TO MEET NEW AIRFLOW AMOUNTS. CLEAN DUCTWORK THOROUGHLY.
8. NEW INSULATED CHILLED WATER AND CONDENSATE PIPING BACK TO MAIN. PROVIDE NEW CONTROL VALVE AND ISOLATION VALVES WHERE SHOWN.
9. RE-CONNECT EXISTING IONIZATION DEVICE FOR PROPER OPERATION.

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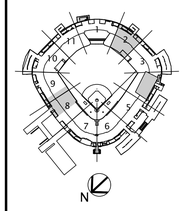

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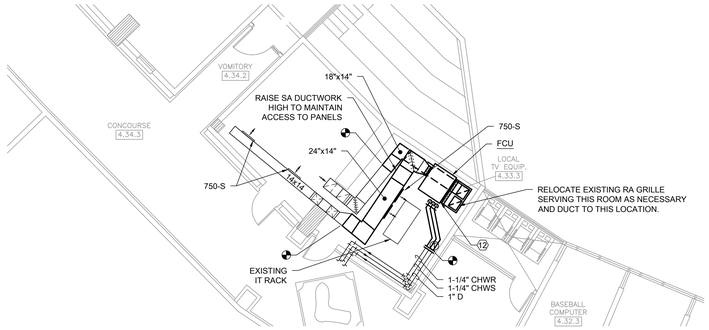
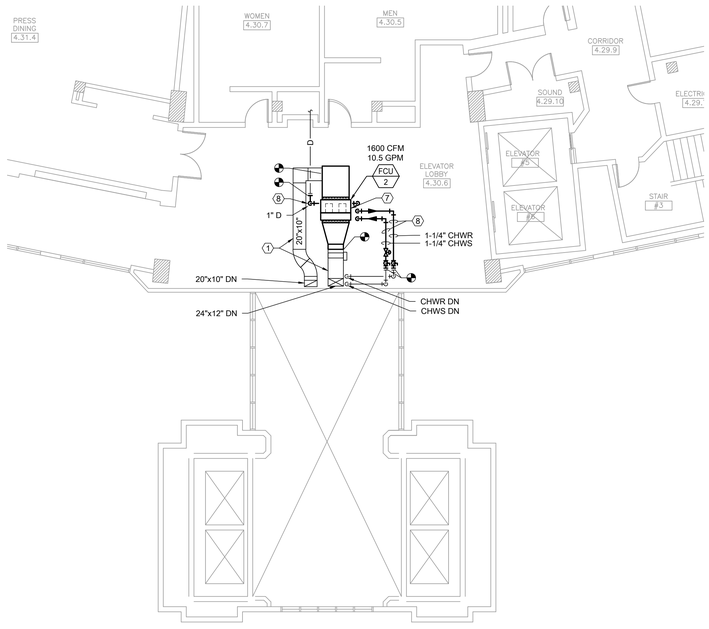


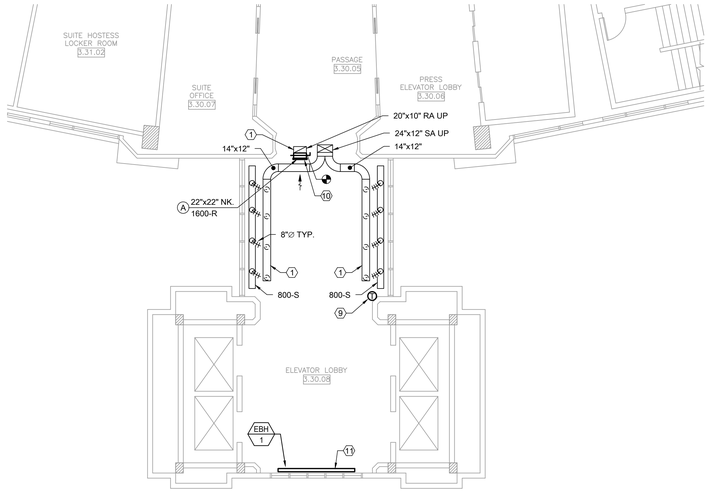
4 MECHANICAL PARTIAL NEW WORK PLAN - 300 LEVEL (SECTION 07)

SCALE: 1/8" = 1'-0"



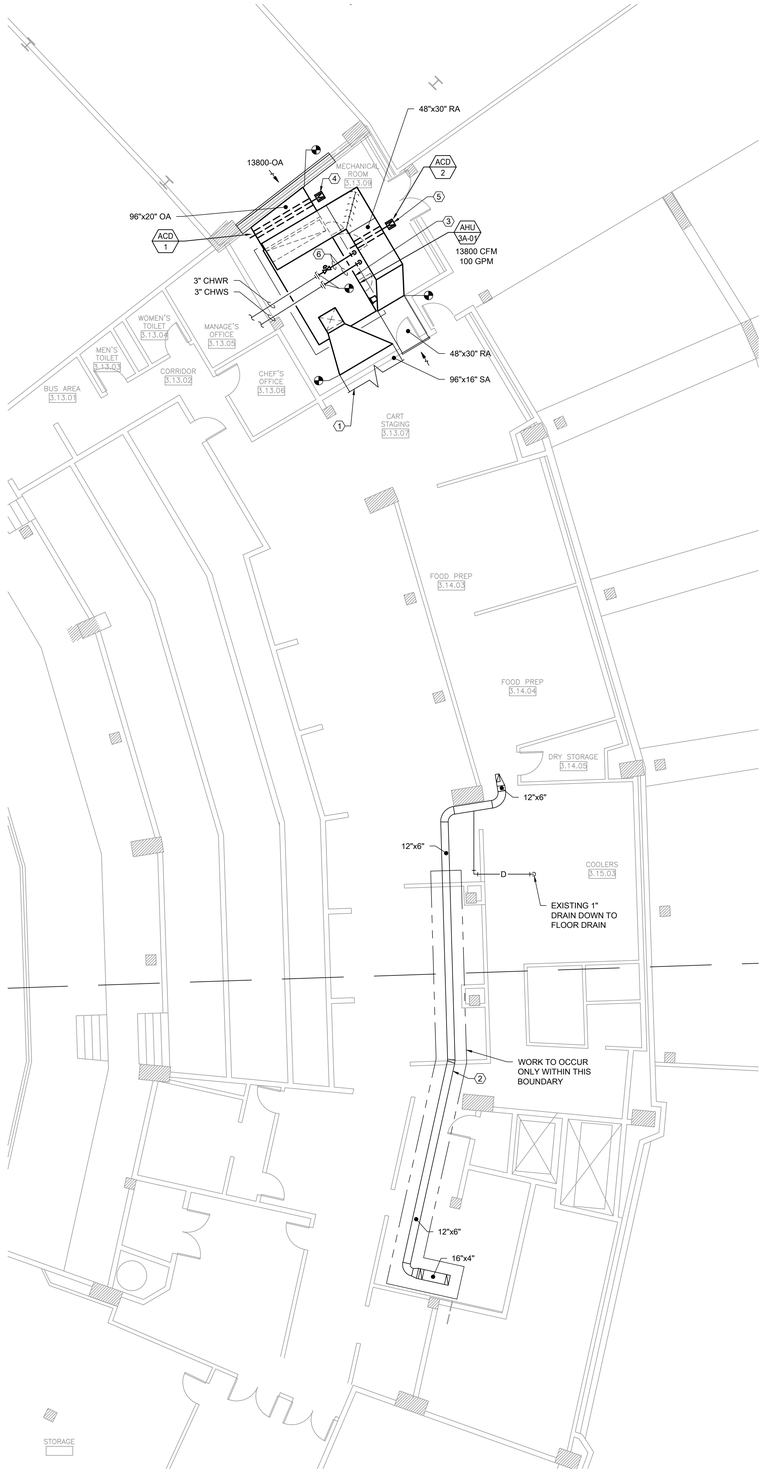
3 MECHANICAL PARTIAL NEW WORK PLAN - 300 LEVEL (SECTION 06)

SCALE: 1/8" = 1'-0"



2 MECHANICAL PARTIAL NEW WORK PLAN - 200 LEVEL (SECTION 06)

SCALE: 1/8" = 1'-0"



1 MECHANICAL PARTIAL NEW WORK PLAN - 200 LEVEL (SECTION 03)

SCALE: 1/8" = 1'-0"

8' 0 4' 8' 16'

SCALE: 1/8" = 1'-0"

KEYED MECHANICAL NEW WORK NOTES

1. EXISTING DUCTWORK TO REMAIN. CLEAN THOROUGHLY. BALANCE TO AIRFLOW INDICATED.
2. EXISTING KITCHEN DISHWASHER EXHAUST DUCTWORK IS CURRENTLY LEAKING CONDENSATE. CONTRACTOR TO PROVIDE NEW SEALANT AT ALL JOINTS WITHIN IDENTIFIED AREA, VERIFY LOCATIONS IN FIELD. AT DUCT LOW POINT, PROVIDE NEW SECTION OF STAINLESS STEEL DUCTWORK AND PROVIDE DRAIN ROUTED TO NEAREST OPEN SITE DRAIN, VERIFY LOCATIONS IN FIELD.
3. INSTALL NEW AIR HANDLING UNIT (AHU-3A-01) IN LOCATION OF PREVIOUSLY DEMOLISHED UNIT. RE-USE EXISTING CONCRETE HOUSEKEEPING PAD. RE-CONNECT EXISTING SUPPLY DUCTWORK, INSULATE PER SPECIFICATIONS. ROUTE 1-1/2" CONDENSATE DRAIN PIPING TO NEAREST FLOOR DRAIN. ELECTRIC COIL IS FIELD INSTALLED BY MC.
4. PROVIDE NEW DUCTWORK TO CONNECT EXISTING OUTSIDE AIR LOUVER TO NEW AHU. PROVIDE NEW MOTORIZED DAMPER. INSULATE PER SPECIFICATIONS. PROVIDE ACCESS DOOR AT DAMPER.
5. PROVIDE NEW DUCTWORK TO CONNECT EXISTING RETURN DUCTWORK TO NEW AHU. PROVIDE NEW MOTORIZED DAMPER. INSULATE PER SPECIFICATIONS. PROVIDE ACCESS DOOR AT DAMPER.
6. CONNECT NEW AHU CHILLED WATER COIL TO EXISTING 3" CHILLED WATER PIPING WITH NEW 3" PIPING. PROVIDE NEW CONTROL VALVE, LOCATE EXISTING IN FIELD. REFER TO DETAILS FOR ADDITIONAL INFORMATION.
7. INSTALL NEW FAN COIL UNIT ABOVE CEILING IN SAME LOCATION AS REMOVED. PROVIDE NEW HANGERS AS NECESSARY. VERIFY COIL HAND IN FIELD. RE-CONNECT HEATER INTERLOCKS. PROVIDE NEW SUPPLY AND RETURN DUCTWORK AS REQUIRED TO RE-CONNECT EXISTING DUCTWORK. REFER TO DETAILS FOR ADDITIONAL INFORMATION.
8. NEW INSULATED CHILLED WATER AND CONDENSATE PIPING BACK TO MAIN. PROVIDE NEW CONTROL VALVE AND ISOLATION VALVES WHERE SHOWN.
9. REMOVE EXISTING THERMOSTAT AND CAP EXISTING TUBING WITHIN WALL IF PNEUMATIC SYSTEM. PROVIDE NEW USER ADJUSTABLE SIEMENS THERMOSTAT. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
10. PROVIDE NEW OPENING AS REQUIRED FOR NEW FILTER RETURN GRILLE. CONNECT INTO EXISTING RETURN RISER UP TO FAN COIL (FCU-2). PROVIDE BALANCING DAMPER.
11. NEW PEDESTAL MOUNT ELECTRIC BASEBOARD. VERIFY LENGTH PRIOR TO ORDERING.
12. RELOCATE EXISTING FAN COIL UNIT TO ALLOW FOR MOTOR ACCESS. PROVIDE NEW HANGERS AS REQUIRED, MOUNT AS HIGH AS POSSIBLE BELOW CEILING. PROVIDE NEW DUCTWORK CONNECTIONS TO EXISTING AS REQUIRED. EXTEND PIPING AS NECESSARY. EXISTING THERMOSTAT TO REMAIN AND BE RE-USED IN SAME LOCATION. DO NOT ROUTE ANY DUCTWORK OR PIPING OVER EXISTING IT RACK.

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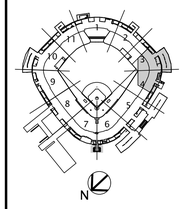

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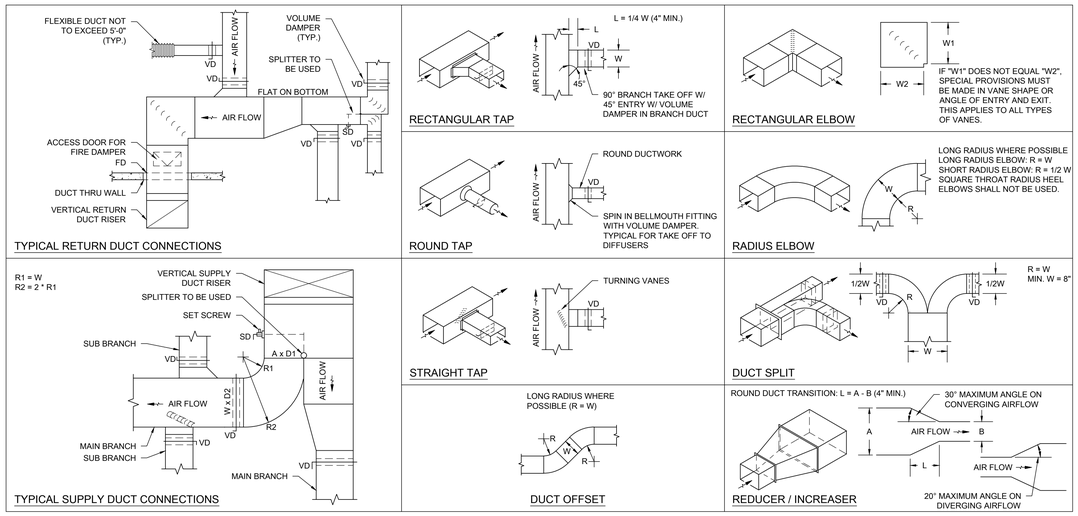
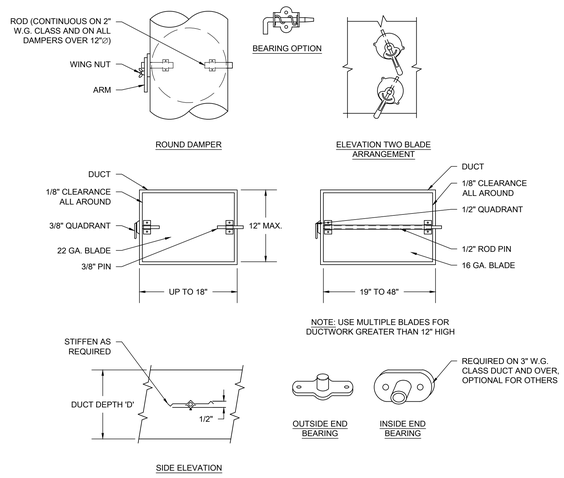
SHEET NO.

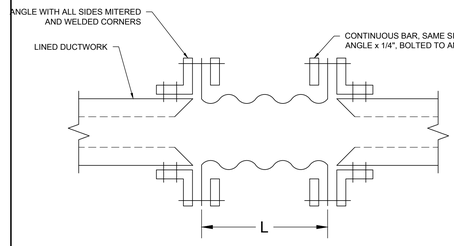
M1.2



1 TYPICAL DUCT CONSTRUCTION DETAILS
SCALE: NO SCALE



2 SINGLE BLADE VOLUME DAMPER DETAIL
SCALE: NO SCALE

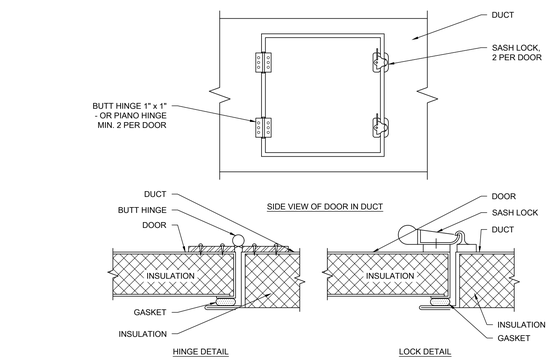


INSTALLATION REQUIREMENTS		
S.P. OF FAN	MIN. SLACK	MIN. "L"
UP TO 2"	1-1/4"	4"
2-1/8" TO 4"	2"	6"

NOTE:

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 5'-0" LONG.

3 FLEXIBLE CONNECTION DETAIL
SCALE: NO SCALE

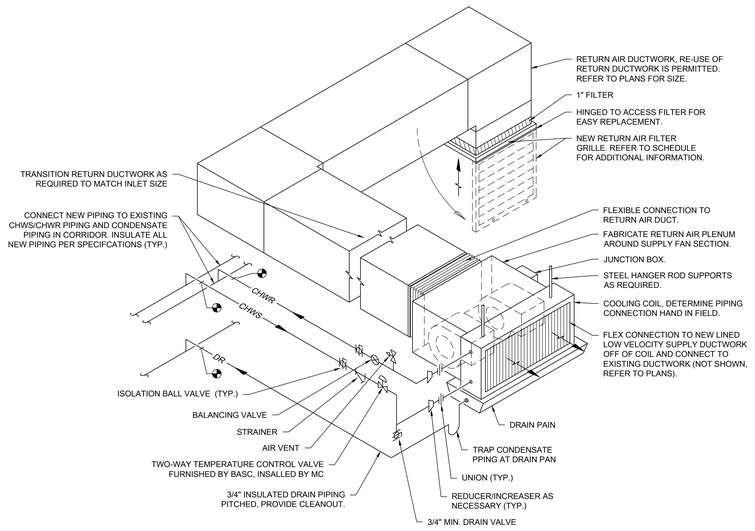


STATIC IN DUCT	DOOR SIZE	NO. OF HINGES	NO. OF LOCKS	METAL GAUGE		
				FRAME	DOOR	BACK
2" W.G. STATIC AND LESS	12" x 12" 18" x 18" 24" x 24"	2 2 3	2-S 2-S 2-S	24 22 22	26 24 22	26 26 26
3" W.G. STATIC	12" x 12" 18" x 18" 24" x 24"	2 2 3	2-S 2-S, 1-T, 1-B 2-S, 1-T, 1-B	24 22 22	26 24 22	26 26 26
S = SIDE OPPOSITE HINGES, T = TOP , B = BOTTOM						

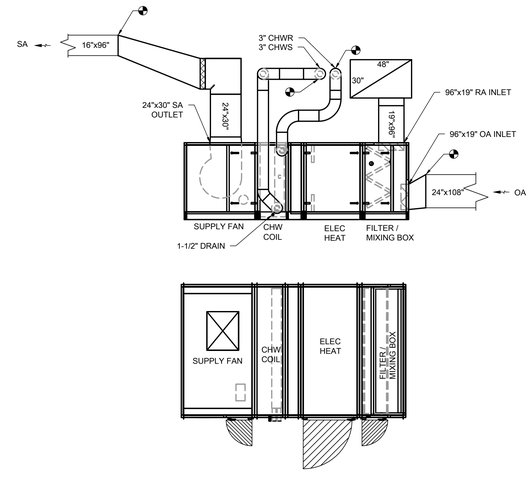
NOTES:

1. PROVIDE CAM LOCKS IN LIEU OF HINGES IN AREAS WHERE OBSTRUCTIONS WILL NOT PERMIT FULL SWING OPENING OF DOOR.
2. DOOR TO BE SQUARE IN SHAPE, 2" SMALLER THAN DUCT DIMENSION WITH A MINIMUM SIZE OF 8" x 8" AND A MAXIMUM SIZE OF 24" x 24".
3. TYPICAL LOCATIONS FOR ACCESS DOORS: FIRE DAMPERS, AUTO DAMPERS, REHEAT COILS, SMOKE DAMPERS, & DEVICES MOUNTED INSIDE DUCT.

4 TYPICAL DUCT ACCESS DOOR DETAIL
SCALE: NO SCALE



5 TYPICAL FAN COIL DETAIL
SCALE: NO SCALE



NOTES:

1. ELECTRIC HEATING SECTION SHALL BE PROVIDED BY A SEPARATE VENDOR AS BASIS OF DESIGN UNIT CANNOT FACTORY INSTALL THE HEAT CAPACITY REQUIRED TO MATCH EXISTING.
2. EQUIPMENT INGRESS PROVIDED THROUGH STANDARD 6'-0" x 7'-0" DOUBLE DOOR TO WALKING RAMP. REFER TO OVERALL 200 LEVEL PLAN AND ENLARGED PLAN FOR LOCATION.
3. ACCESS SHALL BE FROM THE RIGHT SIDE.
4. PIPE CONNECTIONS AT COIL TO ALLOW FOR COIL REMOVAL/SERVICE WITH MINIMAL MODIFICATION AND/OR DISASSEMBLY.
5. IECC 2018 COMPLIANT MOTORIZED CONTROL DAMPERS SHALL BE FACTORY INSTALLED.

6 AHU 3A-01 DETAIL
SCALE: NO SCALE

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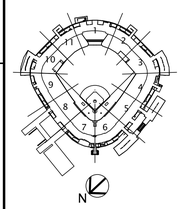

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SCALE:	N.T.S.

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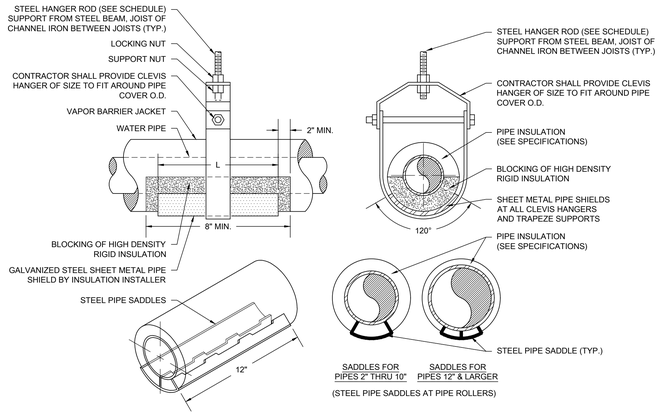
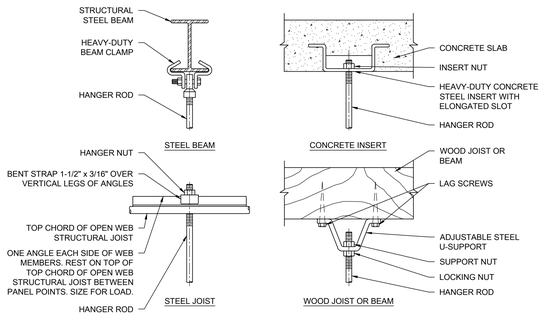
M2.1



PIPE SIZE	LENGTH "L"	GA. MIN.
3/4" TO 2"	12"	18
2-1/2" TO 4"	12"	16
5" TO 6"	18"	16

NOTE: INSTALL 360° INSULATION PROTECTION SHIELDS AT ALL PIPING SECURED WITH U-BOLTS AND U-CLAMPS. PROVIDE HIGH DENSITY INSULATION SUPPORTS AT ALL CLEVIS HANGERS, SUPPORTS, AND TRAPEZE HANGERS. PROVIDE STEEL PIPE INSULATION SADDLES ON ALL PIPES SUPPORTED BY ROLLERS.

1 PIPE COVERING PROTECTION SHIELDS AND PIPE SADDLES
SCALE: NO SCALE



PIPE HANGERS AND SUPPORTS

SUPPORT HORIZONTAL STEEL AND COPPER PIPING AS FOLLOWS:

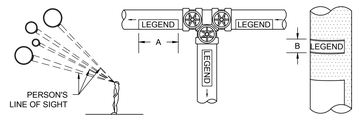
NOMINAL PIPE SIZE	DISTANCE BETWEEN SUPPORTS	HANGER ROD DIAMETERS
1/2"	6'-0"	3/8"
3/4" TO 1-1/2"	6'-0"	1/2"
2" TO 2-1/2"	10'-0"	1/2"
3" TO 4"	10'-0"	5/8"
6" TO 12"	14'-0"	7/8"

- PLACE HANGER WITHIN 1 FOOT OF EACH HORIZONTAL ELBOW. SUPPORT HORIZONTAL SOIL WASTE AND STORM PIPE NEAR EACH HUB WITH 5 FEET MAXIMUM SPACING BETWEEN HANGERS.
- WHERE SEVERAL PIPES CAN BE INSTALLED IN PARALLEL AND AT SAME ELEVATION, PROVIDE MULTIPLE OR TRAPEZE HANGERS.

VERTICAL PIPING:

1. SUPPORT VERTICAL WATER PIPING AT EVERY FLOOR SUPPORT VERTICAL SOIL PIPE AT EACH FLOOR AT HUB.
2. SUPPORT VERTICAL SOIL PIPE AT EACH FLOOR AT HUB.
3. WHERE PRACTICAL, SUPPORT RISER PIPING INDEPENDENTLY OF CONNECTED HORIZONTAL PIPING.

2 PIPING HANGER DETAILS
SCALE: NO SCALE



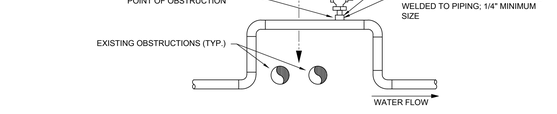
NOTES:

1. STENCIL TYPE MARKERS WILL NOT BE PERMITTED. ONLY FACTORY MANUFACTURED MARKERS AS FOLLOWS WILL BE ACCEPTABLE:
   - PIPES 3/4" THRU 5-7/8" DIAMETER: USE "SNAP-AROUND" TYPE.
   - PIPES 6" DIAMETER AND LARGER: USE "STRAP-AROUND" TYPE.
2. IDENTIFICATION MARKERS SHALL BE PLACED ON ALL EXPOSED COVERED AND UNCOVERED 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.

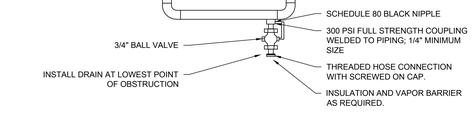
SIZE OF LEGEND LETTERS		
OUTSIDE DIAMETER OF PIPE OF COVERING	LENGTH OF COLOR FIELD "A"	SIZE OF LETTERS "B"
3/4" TO 1-1/4"	8"	1/2"
1-1/2" TO 2"	8"	3/4"
2-1/2" TO 6"	12"	1-1/4"

PLAN TAG	SERVICE	IDENTIFICATION MARKER
CHWR	CHILLED WATER RETURN	WHITE LETTERING ON GREEN BACKGROUND
CHWS	CHILLED WATER SUPPLY	WHITE LETTERING ON GREEN BACKGROUND
COND / DR	CONDENSATE (DRAIN)	WHITE LETTERING ON GREEN BACKGROUND

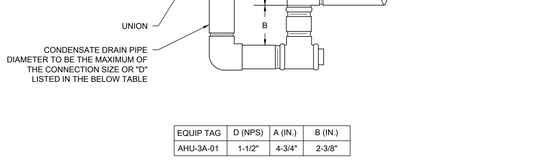
3 TYPICAL PIPE IDENTIFICATION MARKERS DETAIL
SCALE: NO SCALE



4 HIGH POINT MANUAL VENT DETAIL
SCALE: NO SCALE

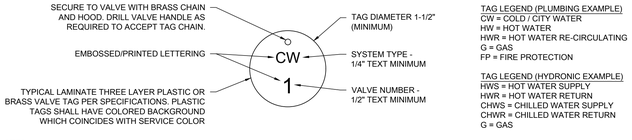


5 LOW POINT MANUAL DRAIN DETAIL
SCALE: NO SCALE



EQUIP TAG	D (NPS)	A (IN.)	B (IN.)
AHU-3A-01	1-1/2"	4-3/4"	2-3/8"

6 PVC / GLASS FIBER ELBOW INSULATION SYSTEM DETAILS
SCALE: NO SCALE



TAG LEGEND (PLUMBING EXAMPLE)
CW = COLD / CITY WATER
HW = HOT WATER
HWR = HOT WATER RE-CIRCULATING
G = GAS
FP = FIRE PROTECTION

TAG LEGEND (HYDRONIC EXAMPLE)
HWS = HOT WATER SUPPLY
HWR = HOT WATER RETURN
CHWS = CHILLED WATER SUPPLY
CHWR = CHILLED WATER RETURN
G = GAS

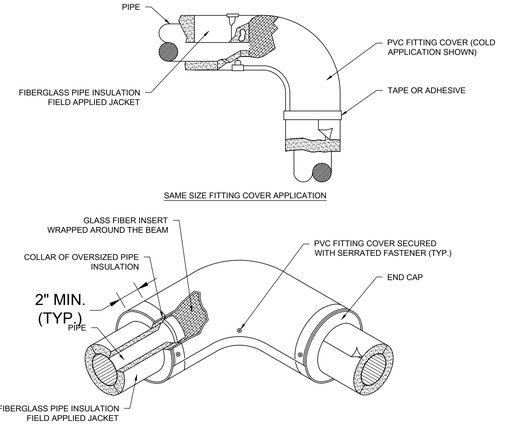
NOTES:

1. ABBREVIATIONS SHALL BE INDICATED FOR EACH DESIGN SYSTEM AS THEY APPEAR ON THE DESIGN DRAWINGS.
2. VALVE TAGS SHALL BE INDICATED IN "VALVE CHARTS" AND ON "PROJECT RECORD" DRAWINGS AND SHALL CORRELATE WITH TAG I.D.'S.
3. ALL MAJOR SYSTEMS ON-OFF, CONTROL, AND BALANCING VALVES SHOULD HAVE AN ASTERIK"*".
4. PROVIDE 8.5" x 11" VALVE TAG SHEETS IN A 3-RING BINDER FOR REPRODUCTION AND/OR FUTURE EDITING.
5. REFERENCE ALL "VALVE TAGS" TO "VALVE TAG CHARTS", "AS BUILT DRAWINGS", AND "O & M MANUAL DATA" (INDEX VALVES PER CHART). EXAMPLE VALVE TAG CHART BELOW:

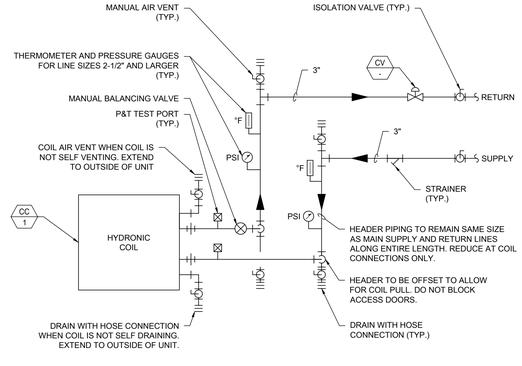
VALVE TAG CHART FOR: XXXXXXX MOD: XXX AREA: XXX WING: XXX FLOOR: XXX

VALVE TAG #	LOCATION (ALSO SEE AS-BUILT DRAWINGS)	FUNCTION (WHAT IT DOES & WHAT/WHERE IT SERVICES)	TYPE	SIZE	MANUFACTURER	MODEL NUMBER
CW-1	RM. XXX - ABOVE CEILING	ON/OFF - FIXTURES IN RM. XXX & XXX...	BV	1"	BELL AND GOSSETT	XX-XXX-XX
CW-2	CORR. XXX - ABOVE DOOR @ RM. XXX	BALANCE - 2ND FLOOR, EAST SIDE, NORTH WING	BFV	1-1/2"	ALLEN BRADLEY	XX-XXX-XX
CW-3	BOILER RM. XXX - NE CORNER	ON/OFF - MAIN - BLDGS X, Y, & Z	GV	8"	BELL AND GOSSETT	XX-XXX-XX
CW-4	RM. XXX - BEHIND N. ACCESS PANEL	ON/OFF - EXTERIOR FIELD HOUSE - IRRIGATION	BV	3"	M & M	XX-XXX-XX
CW-5	RM. XXX - ABOVE CEILING	ON/OFF - MIXING VALVE - EYEWASH	BV	1"	GTM & S	XX-XXX-XX

7 VALVE TAG AND VALVE CHART SAMPLE DETAIL
SCALE: NO SCALE



8 PVC / GLASS FIBER ELBOW INSULATION SYSTEM DETAILS
SCALE: NO SCALE

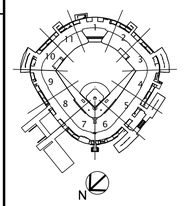


9 PIPING AT HYDRONIC COIL (2-WAY CV)
SCALE: NO SCALE

ELARA
30 N. Wolf Rd., Second Floor
Hillside, IL 60162
(708) 236-0300
(708) 236-0330 FAX

ISFA
ILLINOIS SPORTS FACILITIES AUTHORITY

KEY PLAN



ISSUE/REVISION:

REV.	DATE	DESCRIPTION
	09.09.2022	ISSUED FOR BID

PROJECT:

GUARANTEED RATE FIELD - HVAC FY2023

333 WEST 35TH STREET
CHICAGO, IL 60616

DRAWING TITLE:

MECHANICAL DETAILS

DESIGNED BY:	CC
DRAWN BY:	CC
CHECKED BY:	MS
PROJECT NO:	22286
SCALE:	N.T.S.

SHEET NO.

M2.2

AIR HANDLING UNITS (AHU)

EQUIP. TAG		GENERAL									SUPPLY FAN								FINAL FILTER			ELECTRICAL			NOTES
ABB.	NO.	LOCATION	SERVICE	MFR	MODEL	OPERATING WEIGHT (LBS)	LENGTH (IN)	WIDTH (IN)	HEIGHT (IN)	COILS	TOTAL AIR FLOW (CFM)	ESP (IN. WC)	TSP (IN. WC)	TYPE	QTY.	FAN RPM	MOTOR RPM	MOTOR HP (EACH)	MOTOR BHP (EACH)	TYPE	MERV	APD (IN. WC)	VOLTS	HZ	PHASE	
AHU	3A-01	MECH RM 3-13-9	STADIUM CLUB KITCHEN	CARRIER	39MN SIZE 30W	5374	173	118	60	CC-1 EHC-1	13800	2.5	3.81	FC	1	972	1800	20	15	4" ANGLE	13	0.2	460	60	3	SEE BELOW

NOTES:
1. PROVIDE WITH BLANK SECTION IN LIEU OF FACTORY INSTALLED HEAT. BASIS OF DESIGN UNIT REQUIRES A SEPARATE HEATING COIL SECTION PROVIDED BY ANOTHER SUPPLIER. REFER TO DETAILS AND ELECTRIC HEATING COIL SCHEDULE.
2. 2" FOAM INJECTED DOUBLE WALL CONSTRUCTION. R-13 MINIMUM WITH THERMALLY BROKEN PANELS.
3. PANEL DEFLECTION SHALL NOT EXCEED L/240 AT 125% OF DESIGN STATIC PRESSURE, MAXIMUM 5 INCHES OF POSITIVE OR 6 INCHES OF NEGATIVE STATIC PRESSURE. DEFLECTION SHALL BE MEASURED AT THE PANEL MIDPOINT.
4. CASING LEAKAGE RATE SHALL NOT EXCEED 0.50 CFM PER SQUARE FOOT OF CASING SURFACE AREA AT ADESIGN STATIC PRESSURE UP TO A MAXIMUM OF 5 INCHES POSITIVE PRESSURE SECTIONS AND -6 INCHES IN NEGATIVE PRESSURE SECTIONS.
5. MULTI-SLOPED STAINLESS STEEL DRAIN PANS UNDER ANY COIL WITH EXPECTED SUPPLY WATER TEMPERATURE BELOW 70°F. COILS STACKED VERTICALLY SHALL BE PROVIDED WITH INTERMEDIATE DRAIN PANS.
6. UNITS SHALL BE MOUNTED ON EXISTING 4" HOUSEKEEPING PADS.
7. FACTORY MOUNTED VFD WITH INTEGRAL FUSED DISCONNECT.
8. BACNET INTERFACE.
9. REFER TO HYDRONIC COIL SCHEDULE FOR FURTHER INFORMATION.
10. MANUFACTURER CERTIFIED START-UP.
11. SINGLE POINT POWER CONNECTION.
12. PROVIDE (1) EXTRA SET OF FILTERS FOR OWNER'S STOCK.
13. ADDITIONAL ACCEPTABLE MANUFACTURERS: AAON, DAIKIN, TRANE, YORK.

CHILLED WATER COOLING COILS (CC)

EQUIP. TAG		GENERAL											PERFORMANCE										NOTES
ABB.	NO.	LOCATION	SERVICE	MFR	MODEL	NUMBER OF COILS	CFM	FLUID TYPE	ROWS	FPI	FIN TYPE	FIN THICKNESS (IN.)	EAT DB/WB (°F)	LAT DB/WB (°F)	EWT (°F)	LWT (°F)	TOTAL CAP. (MBH)	SENS. CAP. (MBH)	FACE VELOCITY (FPM)	APD (IN. WC)	GPM	FLUID VELOCITY (FPS)	WPD (FT)	
CC	1	AHU-3A-01	COOLING COIL	CARRIER	28MC	1	13800	30% PG	6	14	SINE WAVE	0.0042	80	67	44	54	472	356	455	0.73	100	3	7.1	ALL

NOTES:
1. REFER TO EQUIPMENT SCHEDULE REFERENCED UNDER "LOCATION" FOR FURTHER INFORMATION.
2. MULTI-SLOPED STAINLESS STEEL DRAIN PANS UNDER ANY COIL WITH EXPECTED SUPPLY WATER TEMPERATURE BELOW 70°F. COILS STACKED VERTICALLY SHALL BE PROVIDED WITH INTERMEDIATE DRAIN PANS.

ELECTRIC HEATING COIL (EHC)

EQUIP. TAG		GENERAL							PERFORMANCE						ELECTRICAL			NOTES
ABB.	NO.	LOCATION	MFR	UNIT SIZE (W x H x D)	CFM	MIN AIRFLOW (CFM)	FACE AREA (SQ.FT.)	# OF STAGES	KW	EAT (°F)	LAT (°F)	TOTAL CAP. (MBH)	FACE VELOCITY (FPM)	APD (IN. WC)	VOLTS	HZ	PHASE	
EHC	1	AHU-3A-1	THERMOLEC	98 X 48 X 5	13800	PER MFR.	32.7	4	210	60	108	716.1	300	0.1"	480	60	3	SEE BELOW

NOTES:
1. COIL IS FIELD INSTALLED BY MECHANICAL CONTRACTOR.
2. ELECTRICAL CONTRACTOR TO FURNISH AND INSTALL FUSED DISCONNECT SWITCH FOR EHC-1.
3. MAGNETIC CONTACTOR FULL BREAK.
4. AUTOMATIC CUT-OUT.
5. MANUAL CUT-OUT
6. TRANSF. C/W FUSIBLE LINK
7. LINEAR MANUAL CUT-OUT
8. PDS FIXED, C/W PITOT TUBE
9. S.C.R. BY THERMOLEC.
10. HYBRID SEQ. STEP CONTROLLER D46
11. INPUT 0-10V
12. HRC LOAD FUSES
13. SLIP-IN DUCT HEATER

DX AIR CONDITIONING UNIT (AC)

EQUIP. TAG		GENERAL							DIMENSIONS (INCHES)			PERFORMANCE						ELECTRICAL			NOTES
ABB.	NO.	SERVICE	LOCATION	MFR	MODEL	TYPE	REFRIGERANT TYPE	OPERATING WEIGHT (LBS.)	L	W	H	FAN (LOW / MED / HIGH SPEEDS) CFM	FAN (LOW / MED / HIGH SPEEDS) SOUND PRESSURE dB(A)	COOLING MODE EAT, DB/WB (°F)	COOLING MODE TOTAL CAPACITY (BTU/HR)	HEATING MODE EAT, DB (°F)	HEATING MODE CAPACITY (MBH)	VOLTS	HZ	PHASE	
AC	2	IT ROOM	WHITE SOX SERVER COMPUTER ROOM 1.39.6	CARRIER	40MAHBQ36XA3	WALL-MOUNTED DUCTLESS CASSETTE	R-410A	44	10.83	44.88	14.57	382 / 506 / 639 / 843	39 / 41 / 46 / 52	75	36000	70	36000	208/230	60	1	SEE BELOW

NOTES:
1. WALL MOUNTED SEIMENS THERMOSTAT.
2. PROVIDE WITH ACCESSORY CONDENSATE PUMP.
3. SCHEDULED MANUFACTURER AND MODEL SHALL BE BASE BID.

AIR COOLED CONDENSING UNITS (CU)

EQUIP. TAG		GENERAL								COMPRESSOR(S)				FAN(S)		PERFORMANCE						ELECTRICAL					NOTES
ABB.	NO.	SERVICE	LOCATION	MFR	MODEL	OPERATING WEIGHT (LBS)	LENGTH (IN)	WIDTH (IN)	HEIGHT (IN)	CKT	QTY	TONS	TYPE	CHARGE (LBS.)	TYPE	QTY	TOTAL CAPACITY (MBH)	EER	SEER	REFRIG. TYPE	SUCTION LINE SIZE (IN)	LIQUID LINE SIZE (IN)	HOT GAS LINE SIZE (IN)	MCA	MOCP	VOLTS	HZ	PHASE	
CU	1	AC-1	SERVICE LEVEL CORRIDOR	CARRIER	38MARBQ36AA3	150.3	16.16	37.25	31.89	A	1	3	ROTARY	7.5	PROPELLER	1	36	8.5	17.5	R410A	5/8	3/8	N/A	28	35	208	60	1	SEE BELOW

NOTES:
1. MANUFACTURER PROVIDED 1 YEAR WARRANTY ON ENTIRE UNIT AND 5 YEAR PARTS ONLY COMPRESSOR WARRANTY.
2. MANUFACTURER CERTIFIED START-UP
3. ECM CONDENSER FANS WITH HEAD PRESSURE CONTROL.
4. SINGLE POINT POWER.
5. NON-FUSED DISCONNECT.
6. UL LISTED.
7. ADDITIONAL ACCEPTABLE MANUFACTURERS: AAON, YORK, DAIKIN, LENNOX, LIEBERT, LG, MITSUBISHI, TRANE.

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	42DCA	HORIZONTAL DUCTED	178	47	29.5	16.4	1600	0.3	46.8	30.9	75 / 67	61.1 / 59.9	9.9	MERV 13	115	60	1	SEE BELOW
FCU	2	BARDS LOBBY	BARDS LOBBY	CARRIER	42DCA	HORIZONTAL DUCTED	178	47	29.5	16.4	1600	0.3	50.6	32.4	75 / 67	60.4 / 59.3	10.9	MERV 13	277	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% PROPYLENE 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.

SELF CONTAINED AIR CONDITIONER (SCAC)

EQUIP. TAG		GENERAL						SUPPLY FAN		ELECTRIC HEATER			DX COOLING				ELECTRICAL				NOTES
ABB.	NO.	LOCATION	MFR	MODEL	OPERATING WEIGHT (LBS)	DIMENSIONS (IN) (LxWxH)	EER	TOTAL AIR FLOW (CFM)	ESP (IN. WG)	HEATING BTU	HEATING WATTS	HEATING AMPS	TEMP RISE (°F)	COIL	REFRIG. TYPE	EAT DB/WB (°F)	LAT DB/WB (°F)	TOTAL CAPACITY (BTU)	MOCP	VOLTS	HZ	PHASE	
SCAC	1	LOADING DOCK OFFICE	FRIEDRICH	WET10A33A	104	27 X 16.75 X 16.75	10.7	260	0	11000	3550	16	40.0	DX	R410A	75 / 65.3	60 / 52.3	10000	20	277	60	1	SEE BELOW

NOTES:
1. PROVIDE WITH PERMANENT / WASHABLE FILTER.
2. CONTRACTOR TO VERIFY ALL LINTEL AND WALL SLEEVE / CHASSIS REQUIREMENTS. PROVIDE AS REQUIRED.
3. PROVIDE DISCONNECT SWITCH.

ELECTRIC BASEBOARD HEATER (EBH)

EQUIP. TAG		GENERAL								PERFORMANCE		ELECTRICAL			NOTES
ABB.	NO.	LOCATION	MFR	MODEL	MOUNTING TYPE	WEIGHT (LBS.)	LENGTH (FT.)	DEPTH (IN.)	HEIGHT (IN.)	WATTS	CAPACITY (BTU/HR)	VOLTS	HZ	PHASE	
EBH	1	BARDS LOBBY	VULCAN	SBT-10250-PD	PEDESTAL FLOOR MOUNT		10	5	7	2500	8532	277	60		SEE BELOW

NOTES:
1. UNITS TO OPERATE IN UNISON AS ADDITIONAL PHASE OF HEAT FOR ASSOCIATED FAN COIL UNIT.
2. LOCAL DISCONNECT SWITCH PROVIDED BY MANUFACTURER.
3. COLOR SHALL BE FLAT BLACK.
4. ACCEPTABLE ALTERNATE MANUFACTURERS: BERKO, MARKEL, OUELLET, QMARK.

GRILLES, REGISTERS, AND DIFFUSERS

EQUIP. TAG	MFR	MODEL	TYPE	MATERIAL	SIZE	MAX. NC	NOTES
A	PRICE	530FF	RETURN AIR FILTER GRILLE	STEEL	24x24	30	SEE BELOW

NOTES:
1. CONTRACTOR SHALL VERIFY BORDER TYPE INCLUDING FRAME, FLANGE, AND SECURING METHOD IN EACH APPLICATION; REFER TO PLANS.
2. COLOR AND FINISH SHALL BE WHITE.
3. PROVIDE OPPOSED BLADE DAMPER.
4. PROVIDE (1) ADDITIONAL FILTER FOR OWNERS STOCK.
5. ADDITIONAL ACCEPTABLE MANUFACTURERS INCLUDE TITUS, NAILOR, KRUEGER.

AUTOMATIC CONTROL DAMPERS (ACD)

EQUIP. TAG		GENERAL							NOTES
ABB.	NO.	SERVICE	LOCATION	MFR	MODEL	MAXIMUM AIRFLOW (CFM)	WIDTH (IN)	HEIGHT (IN)	
ACD	1	AHU-3A-01 OUTSIDE AIR	MECHANICAL ROOM 3.13.09	RUSKIN	TED50	13800	96	20	SEE BELOW
ACD	2	AHU-3A-01 RETURN AIR	MECHANICAL ROOM 3.13.09	RUSKIN	CD-50	13800	48	30	SEE BELOW

NOTES:
1. CONTRACTOR SHALL VERIFY SIZE PRIOR TO ORDER.
2. CONTRACTOR TO VERIFY IF ACD-1 NEEDS TO BE SPLIT INTO TWO SEPARATE DAMPERS TO ACCOMMODATE WIDTH. MODIFY AS NECESSARY.
3. DAMPER ACTUATOR SHALL BE 24V, FURNISHED AND WIRED BY BASC.
3. SCHEDULED MANUFACTUTRER AND MODEL SHALL BE BASE BID.

REFRIGERATION SCHEDULE

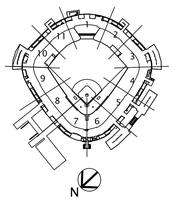
EQUIP. TAG		QTY.	LOCATION	REFRIGERANT			COMPRESSOR(S)				REMOTE	SELF-CONTAINED	AIR COOLED	WATER COOLED	NOTES
ABB.	NO.			TYPE	CKT	CHARGE (LBS)	TYPE	QTY	HP	TONS					
SCAC	1	1	LOADING DOCK SECURTIY OFFICE	R410A	1		ROTARY	1	-	1	YES	YES	YES	NO	SEE BELOW
CU	2	1	SERVICE CORRIDOR	R410A	1	7.5	ROTARY	1	-	3	YES	NO	YES	NO	SEE BELOW

NOTES:
1. EXPANSION VALVE, DEVICES, AND ALL CONNECTIONS SHALL BE LOCATED OUT OF AIR STREAM.
2. ALL REFRIGERANT PIPING SHALL BE COPPER TYPE 'K' OR 'ACR' WITH WROUGHT COPPER FITTINGS. ALL JOINTS SHALL BE JOINED BY BRAZING.
3. DISCHARGE AT LEAST 12'-0" ABOVE THE GROUND, 20'-0" FROM ANY FIRE ESCAPE, AND AT LEAST 10'-0" FROM ANY DOOR, WINDOW, INTAKE DUCT, OR EXHAUST DUCT.
4. SAFETY VALVES SHALL COMPLY WITH CHICAGO BUILDING CODE REQUIREMENTS
5. PROVIDE CITY OF CHICAGO APPROVED REFRIGERANT RELIEF VALVE.

ELARA
30 N. Wolf Rd., Second Floor
Hillside, IL 60162
(708) 236-0300
(708) 236-0330 FAX

ISFA
ILLINOIS SPORTS FACILITIES AUTHORITY

KEY PLAN



ISSUE/REVISION:

REV.	DATE	DESCRIPTION
	09.09.2022	ISSUED FOR BID

PROJECT:

GUARANTEED RATE FIELD - HVAC FY2023

333 WEST 35TH STREET
CHICAGO, IL 60616

DRAWING TITLE:

MECHANICAL SCHEDULES

DESIGNED BY:	CC
DRAWN BY:	CC
CHECKED BY:	MS
PROJECT NO:	22286
SCALE:	N.T.S.

SHEET NO.

M3.1

I. GENERAL

A. THIS CONTRACTOR SHALL REVIEW THE ENTIRE SET OF CONTRACT DOCUMENTS, INCLUDING, BUT NOT LIMITED TO, ALL ELECTRICAL AND MECHANICAL 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.

B. SHOULD THIS CONTRACTOR FIND DISCREPANCIES IN, OR OMISSIONS FROM, THE DRAWINGS, SPECIFICATIONS OR OTHER 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, THIS 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 THIS 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.

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

D. 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.

E. THIS 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.

F. 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 BASE BID UNLESS OTHERWISE NOTED.

G. THIS 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.

H. ALL PUBLIC AND PRIVATE PROPERTY DAMAGED AS A RESULT OF WORK PERFORMED UNDER THIS CONTRACT SHALL BE REPAIRED AND REPLACED BY THIS CONTRACTOR, TO THE SATISFACTION OF REGULATIONS AND AUTHORITIES HAVING JURISDICTION.

I. UPON COMPLETION OF THE WORK, THE CONTRACTOR SHALL CHECK THE ENTIRE WORK AREA, AND SHALL CLEAN CONSTRUCTION DUST AND DEBRIS OFF ALL SURFACES, EQUIPMENT AND DEVICES. THIS CONTRACTOR SHALL REMOVE SURPLUS AND DEMOLISHED MATERIALS AND RUBBISH FROM THE PROPERTY AND LEAVE THE WORK AREA IN A NEAT AND CLEAN CONDITION. CONTRACTORS SHALL BE RESPONSIBLE FOR THE REMOVAL OF ANY CARTONS, PACKING MATERIALS DEBRIS, AND SO ON, THAT HAVE BEEN BROUGHT TO THE SITE UNDER THIS CONTRACT. THIS REQUIREMENT APPLIES BOTH TO DEBRIS FROM EQUIPMENT AND WORK PROVIDED BY THIS CONTRACTOR AND TO DEBRIS ASSOCIATED WITH EQUIPMENT FURNISHED BY THE OWNER FOR INSTALLATION UNDER THIS CONTRACT.

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

K. IT SHALL BE THE MECHANICAL CONTRACTOR'S RESPONSIBILITY TO STORE HIS MATERIALS IN A MANNER THAT WILL MAINTAIN AN ORDERLY CLEAN APPEARANCE. IF STORED ON SITE IN OPEN OR UNPROTECTED AREAS, ALL EQUIPMENT AND MATERIAL SHALL BE KEPT OFF THE GROUND BY MEANS OF PALLETS OR RACKS, AND COVERED WITH TARPAULINS. EQUIPMENT OR MATERIAL, IF LEFT OUT IN THE OPEN AND DAMAGED, SHALL BE REPAINTED OR OTHERWISE REFURBISHED AT THE DISCRETION OF THE BUILDING OWNER'S REPRESENTATIVE. EQUIPMENT AND MATERIAL IS SUBJECT TO REJECTION AND REPLACEMENT IF, IN THE OPINION OF THE ENGINEER OR MANUFACTURER, THE EQUIPMENT HAS DETERIORATED OR BEEN DAMAGED TO THE EXTENT THAT ITS IMMEDIATE USE IS QUESTIONABLE, OR THAT ITS NORMAL LIFE EXPECTANCY HAS BEEN CURTAILED.

L. PROVIDE ALL HOLES, SLEEVES, CUTTING, PATCHING, AND CAULKING FOR INSTALLATION OF THIS WORK. CAULKING SHALL CONFORM TO THE FIRE RATING OF THE WALLS. SEAL ALL PENETRATIONS THROUGH BLOCK WALLS.

M. EXISTING SYSTEMS TO BE SHUT DOWN A MINIMUM AMOUNT OF TIME. SHUTDOWN TO BE COORDINATED ON THE JOB SITE.

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

O. REFER TO SHEET M0.1 FOR ADDITIONAL DEMOLITION NOTES AND GENERAL NOTES.

II. SHOP DRAWINGS, SUBMITTALS, AND AS-BUILTS

A. SHOP DRAWINGS, PRODUCT DATA, AND/OR SAMPLES SHALL BE SUBMITTED FOR ALL EQUIPMENT AS SPECIFIED OR SCHEDULED. SHOP DRAWING PLANS SHALL BE 1/4" SCALE AND SHALL INDICATE LAYOUT OF ALL EQUIPMENT, DUCTS, DIFFUSERS, BOXES, PIPING, THERMOSTATS, AND ANY OTHER RELATED MECHANICAL ITEMS. SHOP DRAWING PLANS SHALL INCLUDE ALL DUCT AND PIPE SIZES, CFM, ETC.

B. SHOULD CONDITIONS NECESSITATE ANY REARRANGEMENTS, OR IF CONDUIT OR PIPING CAN BE RUN TO BETTER ADVANTAGE, THIS CONTRACTOR SHALL PREPARE AND SUBMIT FOR APPROVAL SHOP DRAWINGS SHOWING SUCH CHANGES BEFORE PROCEEDING WITH THE WORK

C. THE CONTRACTOR SHALL, UPON BEING AWARDED THE CONTRACT, SUBMIT ELECTRONIC COPIES OF THE MANUFACTURER'S SUBMITTALS OF ALL EQUIPMENT TO BE FURNISHED UNDER THIS CONTRACT. THE CONTRACTOR SHALL PROCEED WITH THE PROCUREMENT AND INSTALLATION OF EQUIPMENT ONLY AFTER RECEIVING APPROVED SUBMITTALS RELATIVE TO EACH ITEM.

D. THE CONTRACTOR SHALL FURNISH AS-BUILT DRAWINGS TO THE ENGINEER & OWNER BEFORE FINAL PAYMENT WILL BE ISSUED. THE AS-BUILT DRAWINGS SHALL BE SUBMITTED IN REPRODUCIBLE FORM, AND AS AN ELECTRONIC FILE ON DISK (AUTOCAD 2004 OR LATER), AND AS THREE BLUELINE COPIES.

E. THIS CONTRACTOR SHALL, DURING THE COURSE OF CONSTRUCTION, COLLECT AND COMPILE A COMPLETE BROCHURE OF ALL EQUIPMENT FURNISHED AND INSTALLED ON THIS PROJECT. THIS BROCHURE SHALL INCLUDE OPERATIONAL AND MAINTENANCE INSTRUCTIONS, PARTS LISTS, SUBMITTALS AND DESCRIPTIVE LITERATURE, ALL AS FURNISHED BY THE EQUIPMENT MANUFACTURER. CONTRACTOR SHALL FURNISH OWNER WITH THREE INSTRUCTION MANUALS IN BOUND FORM CONTAINING THIS DATA FOR ALL EQUIPMENT AND APPARATUS. MANUALS SHALL BE EDITED TO BE PRODUCT SPECIFIC FOR PRODUCTS ACTUALLY INSTALLED ON THE PROJECT.

III. REGULATIONS AND CODES

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.

IV. MATERIALS AND EQUIPMENT

A. ALL EQUIPMENT INSTALLED UNDER THIS CONTRACT SHALL BE NEW, UNLESS OTHERWISE STATED HEREIN, OF BEST QUALITY NORMALLY USED FOR THE PURPOSE IN GOOD COMMERCIAL PRACTICE, AND FREE FROM DEFECTS.

B. ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION.

C. THIS CONTRACTOR IS REQUIRED TO BID AS SPECIFIED. NO MATERIAL OR EQUIPMENT SUBSTITUTIONS WILL BE CONSIDERED AFTER THE AWARD OF CONTRACT. THIS CONTRACTOR SHALL, IF HE DESIRES TO SUBSTITUTE OTHER THAN SPECIFIED MATERIAL OR EQUIPMENT, SUBMIT IN ALTERNATE PROPOSAL FORM WITH HIS BID, A LIST OF SUCH ITEMS INDICATING ITEM, MANUFACTURER, MODEL NUMBER AND THAT AMOUNT TO BE ADDED TO OR DEDUCTED FROM THE BASE BID. EACH SUCH MATERIAL OR EQUIPMENT SUBSTITUTION ITEM SHALL BE LISTED SEPARATELY IN ORDER THAT PROPER CONSIDERATION MAY BE GIVEN. IN ANY EVENT, SPECIFIED MATERIALS ONLY SHALL BE PROPOSED UNDER THE BASE BID.

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

E. THIS CONTRACTOR SHALL FURNISH AND INSTALL ALL STRUCTURAL STEEL MEMBERS, SLEEVES AND SHIMS REQUIRED TO LEVEL AND SUPPORT EQUIPMENT AND EQUIPMENT SUPPORTS.

F. ALL EQUIPMENT NOISE LEVELS SHALL NOT EXCEED 55 DB AT THE LOT LINE.

G. ALL EQUIPMENT PROVIDED UNDER THESE SPECIFICATIONS SHALL PERFORM WITH THE LEAST POSSIBLE NOISE AND VIBRATION CONSISTENT WITH ITS DUTY, QUIETNESS OF OPERATION OF ALL EQUIPMENT IS A REQUIREMENT. ANY EQUIPMENT, AS DETERMINED BY THE BUILDING OWNER'S REPRESENTATIVE OR ENGINEER TO BE PRODUCING OBJECTIONABLE NOISE OR TRANSMITTING NOISE OR VIBRATION TO THE BUILDING SHALL BE REPAIRED OR REMOVED AND REPLACED.

H. FURNISH AND INSTALL IDENTIFICATION LABELS ON ALL EQUIPMENT INSTALLED AS PART OF THIS PROJECT. IDENTIFICATION LABELS SHALL BE FASTENED TO EQUIPMENT CLEARLY VISIBLE. LABELS SHALL BE ENGRAVED WITH EQUIPMENT TAG, MANUFACTURER'S NAME, ADDRESS, MODEL NUMBER, AND RATING.

I. CODE RATINGS, LABELS, OR OTHER DATA WHICH ARE DIE-STAMPED OR OTHERWISE AFFIXED TO THE SURFACE OF THE EQUIPMENT SHALL BE IN A VISIBLE LOCATION.

J. REPLACE FILTERS ON ALL EQUIPMENT HAVING THEM AT PROJECT COMPLETION PRIOR TO TURNOVER.

V. EXISTING BUILDING MODIFICATIONS

A. THIS CONTRACTOR SHALL NOT REMOVE OR RELOCATE ANY EXISTING ITEMS OF OWNER'S EQUIPMENT, FOUND TO BE IN THE PATH OF NEW SYSTEMS TO BE INSTALLED, WITHOUT PRIOR APPROVAL BY THE OWNER, EXCEPT AS SPECIFICALLY INDICATED ON THE DRAWINGS. IF EXISTING EQUIPMENT IS FOUND TO BE IN THE WAY OF PROPOSED PIPE ROUTING, ETC., THE OWNER'S REPRESENTATIVE SHOULD BE ADVISED, AND HE SHALL MAKE THE DECISION AS TO WHETHER OR NOT THE SPECIFIC ITEM IS TO BE REMOVED AND RETAINED, REMOVED AND DISPOSED OF, OR REMOVED AND RELOCATED.

B. ALL CUTTING, DRILLING AND PATCHING REQUIRED FOR THE INSTALLATION OF SYSTEMS HEREIN DESCRIBED, SHALL BE PROVIDED BY THIS CONTRACTOR. STRUCTURAL MEMBERS SHALL NOT BE DISTURBED WITHOUT PRIOR APPROVAL OF THE ENGINEER. ALL AREAS DISTURBED BY WORK PERFORMED UNDER THIS CONTRACT SHALL BE NEATLY REPAIRED AND REFINISHED TO THE CONDITION OF ADJOINING SURFACES IN A MANNER SUITABLE TO THE ENGINEER. ROOF AND EXTERIOR WALLS TO REMAIN WEATHER TIGHT. INTERIOR WALLS TO MAINTAIN REQUIRED FIRE RATING.

VI. SCOPE AND GUARANTEE

A. THE WORK TO BE PERFORMED UNDER THIS CONTRACT SHALL INCLUDE THE INSTALLATION OF THE VENTILATING, HEATING HYDRONIC WATER, CONTROL SYSTEMS AND COMPONENTS AS INDICATED ON THE DRAWINGS AND SPECIFIED HEREIN.

B. BY SIGNING THE CONTRACT, THIS CONTRACTOR ACKNOWLEDGES THAT HE HAS VISITED THE SITE AND ACQUAINTED HIMSELF WITH THE CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED, AND HE AGREES THAT HE WILL COMPLY WITH THE REQUIREMENTS AND INTENT OF ALL PERTINENT DOCUMENTS IN THE PERFORMANCE OF THE WORK.

C. THIS CONTRACTOR SHALL GUARANTEE THAT THE COMPLETE SYSTEMS AS INSTALLED UNDER THIS CONTRACT SHALL BE FREE OF DEFECTS IN WORKMANSHIP AND MATERIALS FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF JOB ACCEPTANCE BY THE OWNER. THIS SHALL INCLUDE A GUARANTEE OF FREE CIRCULATION OF AIR AND WATER THROUGH-OUT THEIR RESPECTIVE SYSTEMS, WITHOUT LEAKS OR UNDUE NOISE. IF DEFECTS OCCUR DURING THE ONE YEAR GUARANTEE PERIOD, THIS CONTRACTOR SHALL REPAIR OR REPLACE WITH NEW EQUIPMENT, SUCH DEFECTS, AT NO EXPENSE TO THE OWNER AND TO THE SATISFACTION OF THE ENGINEER.

VII. PIPING

A. GENERAL

1. ALL NEW PIPING SHALL BE SUPPORTED BY SPRING TYPE STEEL HANGERS OR BRACKETS AT SUFFICIENT INTERVALS TO MAINTAIN A STRAIGHT LINE, BUT NOT TO EXCEED 10' SPACING ON CENTERS OF HANGERS IN ANY CASE, WITH A SEPARATE HANGER FOR EACH BRANCH. SUPPORT PIPING IN ACCORDANCE WITH MANUFACTURER'S STANDARDIZATION SOCIETY (MSS) GUIDES SP-58, 69, AND 89.
2. PIPING SUPPORT SHALL NOT BE FROM DUCTWORK, CONDUIT, OR OTHER PIPING BUT FROM THE PERMANENT BUILDING STRUCTURE OR EQUIPMENT SUPPORTS.
3. WHERE INSULATED PIPE IS SUPPORTED, PROVIDE SADDLES, BLOCKS OR OTHER METHOD APPROVED BY ENGINEER TO PROTECT INSULATION FROM BEING CRUSHED.
4. ALL PIPE SHALL BE CUT TO EXACT MEASURE. FULL LENGTHS OF PIPE SHALL BE USED. SHORT LENGTHS OF PIPING WITH COUPLINGS WILL NOT BE PERMITTED.
5. COMPLY WITH PROVISIONS OF ASME B31 SERIES "CODE FOR PRESSURE PIPING."
6. SEQUENCE, COORDINATE, AND INTEGRATE INSTALLATIONS OF MECHANICAL MATERIALS AND EQUIPMENT FOR EFFICIENT FLOW OF THE WORK. COORDINATE INSTALLATION OF LARGE EQUIPMENT WITH RELATED TRADES.
7. INSTALL PIPING AT A SLOPE DOWNWARDS TOWARDS DRAIN VALVE LOCATIONS LOCATED WITHIN BUILDING TO ALLOW FOR COMPLETE SYSTEM DRAINING IF NECESSARY.
8. INSTALL COMPONENTS HAVING PRESSURE RATING EQUAL TO OR GREATER THAN SYSTEM OPERATING PRESSURE.
9. INSTALL EXPOSED INTERIOR AND EXTERIOR PIPING AT RIGHT ANGLES OR PARALLEL TO BUILDING WALLS. DIAGONAL RUNS ARE PROHIBITED, EXCEPT WHERE INDICATED.
10. INSTALL PIPING TO ALLOW APPLICATION OF INSULATION PLUS 1-INCH CLEARANCE AROUND INSULATION.
11. SUBJECT ALL NEW PIPING TO HYDROSTATIC PRESSURE TESTS THAT IS NOT LESS THAN 50 PSIG AND 1.5 TIMES THE SYSTEM'S WORKING PRESSURE. TEST PRESSURE SHALL NOT EXCEED MAXIMUM PRESSURE FOR ANY VESSEL, PUMP, VALVE, OR OTHER COMPONENT IN SYSTEM UNDER TEST. PRESSURE TEST UNDER SUPERVISION OF BUILDING ENGINEER.

B. BLACK STEEL PIPING AND FITTINGS

1. SIZE 3" AND LARGER: PIPE SHALL BE BLACK CARBON STEEL. ANSI/ASTM A-53 GRADE B, WITH BEVELED ENDS FOR WELDING.
2. EACH LENGTH OF PIPE SHALL BE LEGIBLY IDENTIFIED AT THE MILL BY PAINT, STENCILING, OR RAISED SYMBOLS IDENTIFYING THE MANUFACTURER AND CLASS OF PIPE.
3. ALL PIPE FOR THE FOLLOWING SERVICES SHALL BE SCHEDULE 40 BLACK STEEL FOR PIPING 10 INCHES TO 3 INCHES SHALL HAVE A MINIMUM WALL THICKNESS OF 0.375 INCHES FOR PIPING 12" AND LARGER.
   a. CHILLED WATER (EXCEPT WHERE SPECIFIED COPPER)
5. ALL FITTINGS IN BLACK CARBON STEEL PIPING 3" AND LARGER SHALL BE SHORT OR LONG PATTERN WELDED FITTINGS OF THE SAME WALL THICKNESS AND OF THE SAME MATERIAL AS THE PIPE TO WHICH THEY ARE ATTACHED. THEY SHALL BE IDENTIFIED BY THE MANUFACTURER BY PERMANENTLY ATTACHED TAGS, IMPRINTS, OR OTHER APPROVED MEANS, INDICATING THE CLASS OF WALL THICKNESS AND MATERIAL.
6. LOW PRESSURE FITTINGS, FLANGES, AND UNIONS SHALL BE USED FOR THE FOLLOWING SERVICES:
   a. CHILLED WATER
7. LOW PRESSURE SCREWED FITTINGS SHALL BE BLACK CAST IRON, 125 LB. CLASS, IN ACCORDANCE WITH ANSI B 16.4 OR BLACK MALLEABLE IRON, 150 LB. CLASS IN ACCORDANCE WITH ANSI B 16.3.
8. LOW PRESSURE FLANGED FITTINGS SHALL BE CAST IRON, SHORT BODY, CLASS 125, BLACK, AND IN ACCORDANCE WITH ANSI B 16.1. GASKETS SHALL BE FULL FACE OF 1/8" MINIMUM THICKNESS AS HEREINAFTER SPECIFIED. FLANGE BOLTS SHALL BE HEXAGON HEAD MACHINE BOLTS WITH HEAVY SEMI-FINISHED HEXAGON HEAD NUTS, CADMIUM PLATED, HAVING DIMENSIONS IN ACCORDANCE WITH ANSI B 18.2.
9. WELD FITTINGS SHALL BE STEEL, STANDARD WEIGHTS, BLACK, AND IN ACCORDANCE WITH ANSI B 16.9, ANSI B 16.25, ASTM A 234, ANSI B 16.5, OR ANSI B 16.11.
10. LOW PRESSURE UNIONS SHALL BE 150 PSIG MALLEABLE IRON BRASS TO IRON SEAT GROUND JOINT UNIONS. (THE GROOVED PIPING METHOD FOR MECHANICALLY JOINING PIPE IS RECOGNIZED AS RELIABLE AND ECONOMICAL METHOD. HOWEVER IF YOU CHOOSE NOT TO ACCEPT THIS METHOD, MAKE SURE TO DELETE ITEM NUMBER 11)
11. FITTINGS FOR GROOVED END PIPE MAY BE USED IN LIEU OF WELDED OR FLANGED FITTINGS IN HOT WATER HEATING, CHILLED WATER, AND CONDENSER WATER PIPING 2-1/2" AND LARGER. FITTINGS SHALL BE COMPLETE WITH MALLEABLE IRON HOUSING, GASKET, AND BLACK STEEL BOLTS AND NUTS.
    a. PIPE GROOVING SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS CONTAINED IN THE LATEST PUBLISHED LITERATURE.
    b. BEFORE ASSEMBLY OF COUPLINGS, LIGHTLY COAT PIPE ENDS AND OUTSIDE OF GASKETS WITH WATER SOLUBLE TYPE LUBRICANT SUCH AS SILICONE SPRY, ETC. TO FACILITATE INSTALLATION.
    c. MECHANICAL GROOVED COUPLINGS, INCLUDING GASKETS USED ON DRY PIPE SYSTEMS FOR FIRE PROTECTION, SHALL BE LISTED FOR DRY-PIPE SERVICE IN "U.L. FIRE PROTECTION EQUIPMENT DIRECTORY."

C. COPPER PIPING AND FITTINGS

1. PIPE SHALL BE HARD TEMPERED, SEAMLESS COPPER TUBING, CONFORMING TO ASTM SPECIFICATION B-88. MANUFACTURER'S NAME OR TRADEMARK AND TYPE OF TUBING SHALL BE INDENTED OR OTHERWISE IDENTIFIED AT 3'-0" INTERVALS.
    a. FITTINGS IN COPPER TUBING 2-1/2" AND SMALLER SHALL BE WROUGHT SWEAT TYPE FITTINGS MANUFACTURED OF SEAMLESS TUBING FORGED BRONZE OR BRASS ROD TO MEET THE STANDARDS OF ANSI/ASME B16.22. FITTINGS SHALL HAVE TUBING STOPS
    b. ALL FITTINGS IN COPPER TUBING 3" AND LARGER MAY BE CAST RED BRONZE SOLDER TYPE FITTINGS, MEETING THE STANDARDS OF ANSI B16.18 AND ASTM B-62. FITTINGS SHALL HAVE TUBING STOPS.
    c. IN ALL CASES WHERE COPPER PIPE CONNECTIONS ARE MADE TO PIPING OR AN ITEM OF EQUIPMENT OF A DISSIMILAR METAL, PROVIDE DIELECTRIC FITTINGS AS HEREIN SPECIFIED.
2. ALL PIPE FOR THE FOLLOWING SERVICE SHALL BE TYPE "L" COPPER.
    a. CHILLED WATER SUPPLY AND RETURN
    b. CONDENSATE DRAIN LINES
3. TYPE "L" COPPER PIPE WITH WROUGHT COPPER SOLDERED FITTINGS SHALL BE USED FOR CONDENSATE DRAIN LINES.

D. REFRIGERANT PIPING

1. PIPING: COPPER TUBING TO 7/8 INCH OD: ANSI/ASTM 280, TYPE K, ANNEALED
2. FITTINGS: ASME B16.22 WROUGHT COPPER / ASME B16.26 CAST COPPER
3. JOINTS: FLARED
4. JOINTS: BRAZE, AWS A5.8 BCUP SILVER/PHOSPORUS/COPPER ALLOY WITH MELTING RANGE 1190 TO 1480 °F.
5. UNIONS, FLANGES, AND COUPLING (2 INCHES AND SMALLER)
    a. FERROUS PIING: 150 PSIG MALLEABLE IRON, THREADED
    b. COPPER PIPE: BRONZE, SOLDERED JOINTS.
6. MOISTURE AND LIQUID INDICATORS: SINGLE PORT TYPE, UL LISTED, WITH COPPER OR BRASS BODY, FLARED OR SOLDER ENDS, SIGHT GLASS, COLOR CODED PAPER MOISTURE INDICATOR WITH REMOVABLE ELEMENT CARTRIDGE AND PLASTIC CAP; FOR MAXIMUM WORKING PRESSURE OF 500 PSIG AND MAXIMUM TEMPERATURE OF 200 DEGREES F.
7. VALVES: UL LISTED, GLOBE OR ANGLE PATTERN, FORGED BRASS BODY AND BONNET, PHSOPHOR BRONZE AND STAINLESS STEEL DIAPHRAGMS, RISING STEM AND HANDWHEEL. STAINLESS STEEL SPRING, NYLON SEAT DISC, SOLDER OR FLARED ENDS, WITH POSITIVE BACKSEATING, FOR MAXIMUM WORKING PRESSURE OF 500 PSIG AND MAXIMUM TEMPERATURE OF 275 DEGREES F.
8. PACKED ANGLE VALVES: FORGED, BRASS, OR NICKEL PLATED FORGED STEEL, FORGED BRASS SEAL CAPS WITH COPPER GASKET, RISING STEM, AND SEAT WITH BACKSEATING, MOLDED STEM PACKING, SOLDER OR FLARED ENDS, FOR MAXIMUM WORKING PRESSURE OF 500 PSIG AND MAXIMUM TEMPERATURE OF 275 DEGREES F.
9. SERVICE VALVES: FORGED BRASS BODY WITH COPPER STUBS, BRASS CAPS, REMOVABLE VALVE CORE, INTEGRAL BALL CHECK VALVE, FLARED OR SOLDER ENDS, FOR MAXIMUM WORKING PRESSURE OF 500 PSIG.
10. FILTER DRIERS: REPLACEABLE CARTRIDGE ANGLE TYPE, SHELL: ARI 710, UL LISTED, BRASS, REMOVABLE CAP, FOR MAXIMUM WORKING PRESSURE OF 350 PSIG.
11. SOLENOID VALVES: AIR 760, PILOT OPERATED, COPPER OR BRASS BODY AND INTERNAL PARTS, SYNTHETIC SEAT, STAINLESS STEEL STEM AND PLUNGER ASSEMBLY, WITH FLARED SOLDER, OR THREADED ENDS, FOR MAXIMUM WORKING PRESSURE OF 500 PSIG. STEM SHALL PERMIT MANUAL OPERATION IN CASE OF COIL FAILURE.
12. COIL ASSEMBLY: UL LISTED, REPLACEABLE WITH MOLDED ELECTROMAGNETIC COIL, MOISTURE AND FUNGUS PROOF, WITH SURGE PROTECTOR AND COLOR CODED LEAD WIRES, INTEGRAL JUNCTION BOX.

    VERTICAL SUPPORTS: STEEL RISER CLAMP.

E. PIPE INSULATION

1. FURNISH AND INSTALL ALL NEW COOLING HYDRONIC WATER PIPING AND CONDENSATE DRAIN PIPING WITH FIBERGLASS MOLDED PIPE INSULATION APPLIED WITH AN ALL-SERVICE VAPOR BARRIER JACKET, STAPLED, AND THE SEAMS, JOINTS, AND STAPLES PAINTED WITH VAPOR PROOF MASTIC. ALL DAMAGED INSULATION (RESULTING FROM IMPLEMENTATION OF THIS PROJECT) ON EXISTING PIPING TO REMAIN SHALL BE REPAIRED. PROVIDE INSULATION ON EXISTING PIPING AS INDICATED IN THE MECHANICAL DOCUMENTS.
2. MINIMUM INSULATION REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE FOLLOWING SCHEDULE AND CITY OF CHICAGO CODE:
    a. CHILLED WATER PIPING: 1-1/2" THICK, 7# DENSITY FIBERGLASS PIPE INSULATED WITH VAPOR BARRIER JACKET.
    b. CONDENSATE DRAIN PIPING: 1" THICK, 7# DENSITY FIBERGLASS PIPE INSULATED WITH VAPOR BARRIER JACKET.
3. PIPE INSULATION SHALL BE APPLIED WITH ALL ADJOINING SECTIONS FIRMLY BUTTED TOGETHER AND THE LONGITUDINAL SEAM OF THE VAPOR BARRIER LAP CEMENTED WITH FOSTER NO. 85-75. END JOINTS SHALL BE SEALED WITH MINIMUM 3" WIDE FACTORY FURNISHED VAPOR BARRIER STRIPS APPLIED WITH FOSTER NO. 85-75 LAP CEMENT.
4. ALL FITTINGS, VALVES, STRAINERS, TRAPS, ETC., IN PIPING 2-1/2"AND SMALLER SHALL BE INSULATED WITH INSULATING BAGS. MATCH EXISTING FROM PREVIOUS PHASES.
5. NEW OUTDOOR CHILLED WATER PIPING INSULATION SHALL MATCH EXISTING JACKETING.

F. REFRIGERANT PIPING INSULATION

1. INSULATION SHALL BE A FLEXIBLE, CLOSED-CELL ELASTOMERIC PIPE INSULATION: AP ARMAFLEX, AC ACCOFLEX. ADHESIVE SHALL BE ARMAFLEX 520, 520 BLACK, OR 520 BLV ADHESIVE. THE INSULATION MUST CONFORM TO ASTM C534 GRADE 1 TYPE.
2. INSULATION MATERIALS SHALL HAVE A CLOSED CELL STRUCTURE TO PREVENT MOISTURE FROM WICKING WHICH MAKES IT AN EFFICIENT INSULATION.
3. INSULATION MATERIALS SHALL BE MANUFACTURED WITHOUT THE USE OF CFC'S, HFC'S, OR HCFC'S. IT IS ALSO FORMALDEHYDE FREE, LOW VOCS, FIBER FREE, DUST FREE, AND RESISTS MOLD AND MILDEW.
4. INSULATION MATERIALS SHALL HAVE A FLAME-SPREAD INDEX OF LESS THAN 25 AND A SMOKE-DEVELOPED INDEX OF LESS THAN 50 AS TESTED IN ACCORDANCE WITH ASTM E 84. IN ADDITION, THE PRODUCTS, WHEN TESTED, SHALL NOT MELT OR DRIP FLAMING PARTICLES AND THE FLAME SHALL NOT BE PROGRESSIVE.
5. INSULATION MATERIALS SHALL HAVE A MAXIMUM THERMAL CONDUCTIVITY OF 0.27 BTU-IN./H-FT²-°F AT A 75 °F MEAN TEMPERATURE AS TESTED IN ACCORDANCE WITH ASTM C 177 OR ASTM C 518.
6. INSULATION MATERIALS SHALL HAVE A MAXIMUM WATER VAPOR TRANSMISSION OF 0.08 PERM-INCHES WHEN TESTED IN ACCORDANCE WITH ASTM E 96.
7. SADDLES SHALL BE INSTALLED UNDER ALL INSULATED LINES AT UNI-STRUT CLAMPS, CLEVIS HANGERS, OR LOCATIONS WHERE INSULATION MAY BE COMPRESSED.
8. ALL INSULATION EXPOSED TO SUNLIGHT OR INSTALLED OUTDOORS SHALL BE PROTECTED WITH TWO COATS OF WB ARMAFLEX FINISH OR WEATHER RESISTANT COATING

G. VALVES

1. VALVES SHALL BE LOCATED FOR CONVENIENT ACCESS FOR OPERATION AND MAINTENANCE.
2. FOR WATER SERVICE, SHUTOFF AND/OR BY-PASS, 2" AND SMALLER, SHALL BE BALL VALVES AS FOLLOWS:
    a. 2-PIECE MILWAUKEE #BA-100 (SHUT-OFF)
    b. 3-PIECE MILWAUKEE #BA-300 (BY-PASS)
3. BUTTERFLY VALVES FOR WATER SERVICE, SHUTOFF. 2-1/2" AND LARGER, WITH A COLD WORKING PRESSURE RATING OF 150 PSIG, SHALL BE AS FOLLOWS:
    a. MILWAUKEE

E. MOTORS THAT ARE NOT INSTALLED WITHIN THE LINE OF SIGHT OF THE MOTOR STARTERS OR VFDS WITH INTEGRAL DISCONNECTS SERVING THEM SHALL HAVE A LOCAL DISCONNECTING MEANS.

F. EACH VFD DRIVE MOTOR THAT REQUIRES A LOCAL DISCONNECT SHALL BE EQUIPPED WITH AN AUXILIARY CONTACT THAT SHALL BE WIRED INTO THE STOP CIRCUIT OF THE DRIVE.

XII. SYSTEM START-UP, TESTING, ADJUSTING AND BALANCING

A. UPON COMPLETION OF THE SYSTEMS INSTALLATION, AND PRIOR TO ACCEPTANCE BY THE ENGINEER AND OWNER, THIS CONTRACTOR SHALL MAKE GENERAL OPERATING TESTS TO DEMONSTRATE THAT ALL EQUIPMENT AND SYSTEMS ARE IN PROPER WORKING ORDER, AND ARE FUNCTIONING IN CONFORMANCE WITH THE INTENT OF THE DRAWINGS AND SPECIFICATIONS.

B. BEFORE OPERATING ANY ROTATING EQUIPMENT, THE ROTATION AND LUBRICATION SHALL BE CHECKED AND THE PROPER QUANTITIES OF OIL AND GREASE SHALL BE ADDED AS REQUIRED FOR CORRECT OPERATION. EACH PART OF THE SYSTEM SHALL BE ADJUSTED TO INSURE PROPER FUNCTIONING OF ALL CONTROLS, PROPER AIR DISTRIBUTION, ELIMINATION OF DRAFTS, NOISE AND VIBRATION, AND THE ENTIRE SYSTEM SHALL BE LEFT IN FIRST-CLASS OPERATING CONDITION.

C. THIS CONTRACTOR SHALL FURNISH ALL EQUIPMENT AND PERSONNEL REQUIRED FOR THE COMPLETE AND COMPREHENSIVE TESTING, ADJUSTING, AND BALANCING OF THE SYSTEMS INSTALLED UNDER THIS CONTRACT AND TO THE EXTENT REQUIRED BY THE SEQUENCE OF OPERATION. THE OWNER AND ENGINEER SHALL BE NOTIFIED WHEN THE TESTS ARE TO TAKE PLACE, IN ORDER THAT HE OR HIS AUTHORIZED REPRESENTATIVE MAY BE IN ATTENDANCE IF DEEMED NECESSARY.

D. THIS CONTRACTOR TO RETURN EXISTING HEATING/COOLING SYSTEM TO EXISTING OPERATING CONDITION INCLUDING BUT NOT LIMITED TO THE REFILL AND PURGE OF ALL AIR AS PART OF HEATING/COOLING SYSTEM START-UP.

E. A CERTIFIED TEST AND BALANCE CONTRACTOR (TABC) SHALL BE RESPONSIBLE FOR BALANCING ALL NEW PIPING SYSTEMS TO THE EXTENT REQUIRED BY THESE DRAWINGS AND THE SEQUENCE OF OPERATION AND AS RELATED TO THE SPECIFIED WORK. SUCH BALANCING SHALL BE PERFORMED BY A MEMBER OF THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB), WHO SHALL SUBMIT THREE (3) COPIES OF THEIR NEBB CERTIFICATE PRIOR TO BALANCING AND THE BALANCING REPORT TO THE ENGINEER FOR APPROVAL. THE SCOPE OF WORK FOR THE TABC SHALL INCLUDE ALL AIR SUPPLY MAINS AND ALL WATER SUPPLY AND RETURN MAINS, BRANCHES AND TERMINAL UNITS INSTALLED AS A PART OF THIS CONTRACT. ALL BALANCING WORK SHALL CONFORM TO NEBB STANDARDS AND SHALL BE REPORTED ON NEBB STANDARD FORMS. THE BALANCING CONTRACTOR SHALL IDENTIFY EACH AIR AND WATER DEVICE BY LOCATION, TYPE AND SIZE, AND SHALL TEST AND ADJUST EACH AIR AND WATER DEVICE TO WITHIN 10% OF DESIGN. THE SCOPE OF WORK FOR THE TABC IS DESCRIBED IN THE FOLLOWING PARAGRAPHS.

F. THE TABC CONTRACTOR SHALL BE KEPT INFORMED DURING THE CONSTRUCTION OF THE PROJECT OF ANY MAJOR CHANGES MADE TO THE HVAC SYSTEM. TABC CONTRACTOR SHALL BE PROVIDED WITH ONE (1) SET OF SHOP DRAWINGS ON ALL EQUIPMENT WHICH THEY WILL BE REQUIRED TO WORK ON WHEN BALANCING THE HVAC SYSTEM.

G. THE TABC CONTRACTOR SHALL BE REQUIRED TO WORK CLOSELY WITH THE MECHANICAL CONTRACTOR AND ENGINEER IN ORDER TO ENSURE A PROPER INSTALLATION.

H. THIS CONTRACTOR SHALL PROVIDE COMPETENT PERSONNEL, TO INSTRUCT THE OWNER OR HIS REPRESENTATIVE, IN THE PROPER OPERATION OF THE SYSTEMS INSTALLED UNDER THIS CONTRACT, FOR ONE FULL DAY DURING THE HEATING SEASON.

I. THIS CONTRACTOR SHALL COORDINATE WITH ENGINEER FOR FUNCTIONAL TESTING OF EQUIPMENT AND CONTROLS INSTALLED AS PART OF THIS PROJECT. THIS CONTRACTOR SHALL CORRECT DEFICIENCIES FOUND DURING FUNCTIONAL TESTING TO THE ACCEPTANCE OF THE ENGINEER.

J. THE FINAL TEST RESULTS SHALL BE TABULATED AND FOUR (4) CERTIFIED COPIES SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW. TWO (2) CERTIFIED COPIES SHALL BE SUBMITTED TO THE BUILDING OWNER'S REPRESENTATIVE NO LATER THAN THIRTY (30) DAYS AFTER TENANT MOVE-IN. ALL EQUIPMENT SHOWN IN BALANCING REPORT SHALL HAVE AN EQUIPMENT ID TAG WHICH SHALL CORRESPOND TO TAG SHOWN ON MECHANICAL AS-BUILT DRAWINS.G

K. AIR TESTING AND BALANCING

1. BALANCE EACH AIR SUPPLY AND EXHAUST SYSTEM TO WITH 10% OF QUANTITY SHOWN ON DRAWINGS.
2. BELTS AND SHEAVE CHANGES REQUIRED TO MEET SPECIFIED AIR VOLUMES SHALL BE DONE AT NO ADDITIONAL COST.
3. RECORD AMP DRAW FOR AC AND FAN COIL UNITS AND VERIFY UNIT CAPACITY.
4. RECORD DISCHARGE AIR TEMPERATURE AT UNIT.
5. RECORD THE "AS BALANCED" STATE OF THE SYSTEM ON REPORT FORMS FOR ALL TERMINALS AND DUCT APPARATUS.
6. VERIFY THE ACTION OF ALL FAN CONTROL DAMPERS, SHUT DOWN CONTROLS, AND AIRFLOW SAFETY CONTROLS.
7. PREPARE THE REQUIRED REPORT FORMS AND SUBMIT AS REQUIRED.
8. TEST RESULTING GLYCOL PERCENTAGE AND ADJUST AS NECESSARY.

J. HYDRONIC SYSTEM TESTING AND BALANCING

1. CHECK TO SEE THAT ALL NECESSARY ELECTRICAL WIRING, TEMPERATURE CONTROL SYSTEMS, ALL RELATED HYDRONIC PIPING CIRCUITS AND ALL RELATED DUCT SYSTEMS ARE FUNCTIONAL AND THAT ANY NECESSARY COMPENSATION FOR SEASONAL EFFECTS HAVE BEEN MADE.
2. DETERMINE THAT ALL HYDRONIC SYSTEMS HAVE BEEN CLEANED, FLUSHED, RE-FILLED AND VENTED AS REQUIRED.
3. BALANCE ALL EQUIPMENT WITH CHILLED WATER FLOW TO THE GPM QUANTITY SHOWN ON THE DRAWINGS AND SPECIFIED IN THE EQUIPMENT SCHEDULE.
4. AFTER ALL TAB WORK HAS BEEN COMPLETED AND THE SYSTEMS ARE OPERATING WITHIN PLUS OR MINUS 10% OF DESIGN FLOW, MARK OR SCORE ALL BALANCING COCKS, GAUGES, AND THERMOMETERS AT FINAL SET POINTS AND/OR RANGE OF OPERATION.
5. VERIFY THE ACTION OF ALL WATER FLOW SAFETY SHUT DOWN CONTROLS
6. PREPARE ALL REPORT FORMS AND SUBMIT REQUIRED.

XIII. AUTOMATIC TEMPERATURE CONTROL SYSTEM

A. GENERAL

1. THE CONTROLS CONTRACTOR SHALL BE THE CONTROLS ENGINEER FOR THIS PROJECT, RESPONSIBLE FOR DESIGN AND ENGINEERING OF ALL CONTROL SYSTEMS TO OPERATE AS DESCRIBED IN THE SEQUENCE OF OPERATION, TO CONFORM WITH THE GOVERNING BUILDING CODES, AND OPERATE IN A MANNER CONSISTENT WITH KNOWN GOOD CONTROLS ENGINEERING PRACTICE.
2. THE BASC / CONTROLS ENGINEER SHALL IDENTIFY ANY POTENTIAL CONDITIONS THAT COULD BE CONSTRUED TO DEVIATE FROM GOOD CONTROLS ENGINEERING PRACTICE PRIOR TO BIDDING AND INCLUDE ALL ENGINEERING AND INSTALLATION WORK REQUIRED TO MAKE ALL HVAC SYSTEMS COMPLETE AND OPERATIONAL, IN CONFORMANCE WITH GOOD CONTROLS ENGINEERING PRACTICE, PRIOR TO SUBMITTING HIS BID.
3. THE DRAWINGS AND DOCUMENTS PREPARED FOR THIS PROJECT ARE DIAGRAMMATIC AND THE SUCCESSFUL BASC MUST INCLUDE ALL EQUIPMENT, MATERIALS, LABOR, AND RELATED WORK AS REQUIRED TO COMPLETE THE PROJECT OUTLINED HEREIN. THE BASC SHALL PROVIDE A COMPLETE SUBMITTAL PACKAGE FOR ALL HARDWARE DEVICES, SEQUENCE OF OPERATION WITH PROPOSED SET POINTS, ADJUSTABILITY, CONTROL DRAWINGS, AND PROGRAMMING TEXT BLOCKS FOR REVIEW AND APPROVAL BY ELARA ENERGY SERVICES PRIOR TO PURCHASING AND INSTALLATION OF THE SAME.
4. THE BASC SHALL PROVIDE ALL CONTROL COMPONENTS, WIRING, INTERLOCKS, ELECTRICAL POWER, AND ALL OTHER DEVICES REQUIRED TO MAKE ALL HVAC EQUIPMENT INSTALLED UNDER THIS PROJECT COMPLETE AND FULLY OPERATIONAL PER THE SEQUENCE OF OPERATION AND AS REQUIRED FOR SAFE AND ACCURATE CONTROL.
5. THE BASC SHALL PROVIDE ALL CONTROL VALVES AND ACTUATORS TO THE MECHANICAL CONTRACTOR FOR INSTALLATION. THE BASC SHALL DIRECT THE MECHANICAL CONTRACTOR AS TO THE PROPER LOCATION AND ORIENTATION OF ALL DEVICES TO ACHIEVE A PROPER AND CORRECT CONTROL SEQUENCE.
6. ANY CONTROLS NO LONGER NECESSARY TO ACHIEVE THE SEQUENCES OF OPERATION ARE TO BE DEMOLISHED AND REMOVED.
7. PRIOR TO DISCONNECTING AND REMOVING ANY EXISTING CONTROLLERS, THE BASC SHALL VERIFY THAT REMOVAL WILL NOT NEGATIVELY IMPACT THE OPERATION OF EXISTING CONTROLLERS AND SYSTEMS OUTSIDE THE SCOPE OF THE PROJECT.
8. THE BASC SHALL PROVIDE THERMOSTATS FOR ALL CONTROLLED EQUIPMENT TO OPERATE AS DESCRIBED IN THE SEQUENCE OF OPERATION AND / OR PER MANUFACTURER'S REQUIREMENTS AND KNOWN STANDARDS OF GOOD CONTROL PRACTICE. INCLUDE ALL THERMOSTATS AS REQUIRED FOR EQUIPMENT TO BE COMPLETE AND FULLY OPERATIONAL, WHETHER SHOWN SPECIFICALLY ON THE PLANS OR NOT.
9. ALL TEMPERATURE SENSORS IN DUCTWORK, AIR HANDLING UNITS, AND PLENUMS SHALL BE OF AVERAGING TYPE. PROPERLY SUPPORT AVERAGING ELEMENT (MINIMUM TWENTY FOOT LENGTH) ACROSS A REPRESENTATIVE AREA TO ACHIEVE A TRUE AVERAGE READING. SUPPORT SENSORS USING HEAVY CABLE AND / OR HALF INCH CONDUIT WITH NYLON WIRE TIES.
10. THE BASC SHALL SELECT ALL PRESSURE AND TEMPERATURE SENSORS WITH AN APPROPRIATE SPAN AND RANGE FOR THE APPLICATION.
11. ALL TEMPERATURE AND PRESSURE SENSORS SHALL BE INSTALLED IN LOCATIONS SUCH THAT THEY DO NOT MAKE FALSE READINGS. BASC SHALL REVIEW THE PLANS AND IDENTIFY ANY SUCH POTENTIAL CAUSES FOR FALSE READINGS AND NOTIFY THE ENGINEER IN WRITING THAT THESE SHOULD BE RELOCATED PRIOR TO ROUGH-IN AND CONTROLS INSTALLATION. THE BASC SHALL RELOCATE ANY SENSORS INSTALLED IN IMPROPER LOCATIONS AND GIVING FALSE READINGS AND HIS OWN EXPENSE. CONDITIONS TO BE AWARE OF INCLUDE, BUT ARE NOT LIMITED TO, LOCATIONS OF THERMOSTATS BEHIND DOORS, OUTDOOR AIR SENSORS NEAR EXHAUST OPENINGS, STATIC PRESSURE SENSORS IN TURBULENT LOCATIONS, THERMOSTATS INSTALLED ADJACENT TO HEAT SOURCES SUCH AS COFFEE POTS, COMPUTERS, VENDING MACHINES, AND OTHER APPLIANCES, ETC.
12. THE BASC SHALL FURNISH AND INSTALL MANUAL RESET SAFETY DEVICES FOR ANY AND ALL CONDITIONS THAT COULD DAMAGE THE EQUIPMENT AND / OR REPRESENT A THREAT TO HUMAN SAFETY. ALL WATER COILS SHALL BE PROTECTED BY AN AVERAGING ELEMENT FREEZE-STAT WITH A NON-ADJUSTABLE 40°F SET POINT, MANUAL RESET, AND HARDWIRED INTERLOCK TO SHUT DOWN THE ASSOCIATED FAN ANY TIME THE TEMPERATURE ACROSS ANY 12" LENGTH OF THE AVERAGING ELEMENT FALLS BELOW 40°F. FREEZE-STATS SHALL BE INSTALLED DOWNSTREAM OF ALL WATER COILS.
13. ALL UNUSED HOLES IN EXISTING AND NEW CONTROL PANELS ARE TO BE CAPPED.
14. RE-USE OF EXISTING CONTROL CONDUIT, RACEWAYS, AND WIRING ACCEPTABLE IF COMPATIBLE WITH NEW SYSTEM AND IF THE CONTRACTOR INCLUDES IN THE PROJECT WARRANTY.
15. THE BASC IS RESPONSIBLE FOR ALL LOW VOLTAGE CONTROL WIRING, POWER WIRING, AND CONDUIT ASSOCIATED WITH ALL CONTROL VALVES, ACTUATORS, CONTROLLERS, ETC., BEING INSTALLED AS A PART OF THIS PROJECT.
16. THE BASC MAY RE-USE ANY EXISTING RELAYS, CURRENT SENSING RELAYS, AND CURRENT TRANSDUCERS PROVIDED THEY ARE COMPATIBLE WITH THE NEW CONTROLLERS. ALL HARD WIRED CONTROL POINTS ARE TO BE MAPPED TO THE SYSTEM GRAPHICS FOR EASY VIEWING BY BUILDING STAFF. ANY CONDUIT, WIRING, SENSORS, OR SWITCHES THAT ARE RE-USED BY THE BASC ARE TO BE TESTED PRIOR TO USE AND INCLUDED IN THE PROJECT WARRANTY.
17. WIRING IN OCCUPIED AREAS OF THE BUILDING SHALL BE CONCEALED IN WALL AND ABOVE CEILINGS. EXPOSED WIRING AND CONDUIT IS NOT ACCEPTABLE IN OCCUPIED AREAS.
18. CONTRACTOR SHALL OBTAIN POWER FOR THE NEW DDC CONTROL SYSTEM FROM THE NEAREST SOURCE.
19. THE BASC SHALL INCLUDE ADEQUATE TIME IN HIS BID FOR COMPLETE COMMISSIONING OF THE MECHANICAL SYSTEMS, ON SITE IN COORDINATION WITH THE MECHANICAL CONTRACTOR AND OTHER TRADES AS REQUIRED TO MAKE ALL EQUIPMENT COMPLETE AND FULLY OPERATIONAL.
20. REFER TO SCHEMATICS, SCHEDULES, AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.

B. SCOPE OF WORK

1. ALL WORK ASSOCIATED WITH THIS PROJECT SHALL BE INCORPORATED INTO THE EXISTING SIEMENS BUILDING AUTOMATION SYSTEM CURRENTLY IN OPERATION WITHIN GUARANTEED RATE FIELD. THE SCOPE OF WORK SHALL BE AS FOLLOWS FOR EACH COMPONENT ASSOCIATED WITH THIS PROJECT. ALL CONTROL ITEMS INDICATED BELOW SHALL BE PROVIDED IN GRAPHIC FORM ON THE BUILDING BAS SYSTEM.
2. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.
3. THE FOLLOWING SHALL BE A TYPICAL POINTS LIST FOR A FAN COIL UNIT:

AO-1:	MODULATING CHILLED WATER VALVE CONTROL
AI-1:	FAN COIL DISCHARGE AIR TEMPERATURE
DI-1:	OCCUPIED WALL SWITCH
DO-1:	FAN COMMAND ON/OFF
DO-2:	ELECTRIC HEAT COIL COMMAND ON/OFF
COMM:	THERMOSTAT

3. THE FOLLOWING SHALL BE A TYPICAL POINTS LIST FOR AN AIR HANDLING UNIT:

AO-1:	MODULATING CHILLED WATER VALVE CONTROL
AI-2:	RETURN AIR TEMPERATURE
AI-1:	DISCHARGE AIR TEMPERATURE
DO-1:	FAN COMMAND ON/OFF
COMM:	THERMOSTAT

4. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL SMOKE AND/OR HEAT DETECTORS IN AIR SUPPLY SYSTEM OVER 2000 CFM. AN ADDRESSABLE FIRE ALARM RELAY SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR . BAS CONTRACTOR SHALL PICK UP SIGNAL FROM RELAY AND PROVIDE A PROGRAM TO STOP SUPPLY FAN INTERLOCKED WITH THE SYSTEM SENSING FIRE OR SMOKE. DDC PROGRAM SHALL ALSO SHOW FIRE IN UNIT ALARM AT TIME OF SHUT DOWN.

XIV. MECHANICAL / ELECTRICAL SCOPE OF WORK (FAN COIL UNITS)

A. GENERAL NOTES FOR STORAGE AND REPLACEMENT FOR ALL FAN COIL UNITS, AIR HANDLING UNITS, FANS, AND RELATED EQUIPMENT

1. ALL CEILING OR ABOVE CEILING MOUNTED COMPONENTS REMOVED DURING DEMOLITION, INCLUDING BUT NOT LIMITED TO CEILING TILES, SUPPORT STRUCTURE, LIGHT FIXTURES, DUCT WORK, DIFFUSERS, GRILLES, FIRE ALARM DEVICES, AND SPEAKERS SHALL BE STORED FOR RE-INSTALLATION.
2. ALL FIRE PROTECTION DEVICES IN MOUNTED IN CEILING OR ABOVE CEILING, INCLUDING BUT NOT LIMITED TO, SPRINKLER HEADS, PIPING, SUPPORTS, ETC., SHALL BE REMOVED, STORED, AND RE-INSTALLED.
3. ALL DUCT WORK CONNECTIONS TO FANS AND FAN COILS THAT IS DISCONNECTED OR REMOVED TO PERMIT THE INSTALLATION OF NEW EQUIPMENT SHALL BE STORED OR REPLACED AT THE TIME OF INSTALLATION OF THE NEW UNITS.
4. ALL DUCTWORK REMOVED TO PERMIT DEMOLITION AND STORED FOR RE-INSTALLATION SHALL BE CLEANED PRIOR TO INSTALLATION OR REPLACEMENT.
5. EQUIPMENT OR COMPONENTS REMOVED DURING THE DEMOLITION PHASE AND FOUND TO BE DAMAGED OR UNSUITABLE FOR RE-INSTALLATION SHALL BE REPLACED WITH EQUIVALENT ITEMS TO MATCH THOSE REMOVED.
6. ALL EQUIPMENT OR COMPONENTS REMOVED AND STORED SHALL BE LABELED, INDICATING LOCATION, SERVICE, ROOM NUMBER, AND SYSTEM.
7. ALL MATERIALS SHALL BE STORED ON SITE AND PROTECTED FROM DAMAGE OR LOSS. SEE SPECIFICATIONS.

B. CHILLED WATER FAN COIL - GENERAL DEMOLITION

1. REMOVE CEILING TILE AND SUPPORT SYSTEM LOCATED UNDER UNIT AND DUCTWORK.
2. REMOVE LIGHTING, WIRE, AND CONDUIT LOCATED UNDER UNIT AND DUCTWORK. LIGHTING TO BE RE-USED.
3. REMOVE FIRE PROTECTION PIPING, SPRINKLER HEADS, AND SUPPORTS LOCATED UNDER UNIT AND DUCTWORK.
4. REMOVE ALL SPEAKERS, GRILLES, DIFFUSERS, OR RELATED COMPONENTS UNDER UNIT AND DUCTWORK.
5. RELOCATE MOVABLE EQUIPMENT AND MATERIALS UNDER UNIT AND DUCTWORK.

C. CHILLED WATER FAN COIL - DEMOLITION

1. REMOVE CHILLED WATER PIPING, INSULATION, VALVES, GAUGES, AND THERMOMETERS. REMOVE UNIT PIPING BACK TO MAIN OR BRANCH Y.
2. REMOVE CONDENSATE DRAIN PIPING AND INSULATION.
3. DISCONNECT ELECTRIC HEATING COIL CONDUIT AND WIRING TO PERMIT REMOVAL OF FAN COIL.
4. DISCONNECT AND REMOVE DUCTWORK AND FLEXIBLE CONNECTIONS.
5. REMOVE DUCT INSULATION REQUIRED FOR INSTALLATION OF NEW UNIT AND DUCT CONNECTIONS.
6. DISCONNECT AND REMOVE ELECTRICAL POWER WIRING FROM FCU. EXISTING WIRING, CONDUIT, AND COMPONENTS TO BE RE-USED.
7. DISCONNECT ALL TEMPERATURE CONTROL, WIRING, SENSORS, AND RELATED COMPONENTS.
8. DISCONNECT EXISTING DISCONNECT SWITCH SERVING FAN COIL UNIT. SWITCH TO BE RE-USED.
9. REMOVE FAN COIL UNIT, HANGERS, SUPPORTS, AND RELATED COMPONENTS NOT BEING RE-USED.

D. CHILLED WATER FAN COIL - GENERAL CONSTRUCTION NOTES

1. PROVIDE FIRE PROTECTION PIPING, SPRINKLER HEADS, AND SUPPORTS LOCATED UNDER UNIT AND DUCTWORK.
2. PROVIDE THE RE-INSTALLATION OF LIGHTING, WIRE, AND CONDUIT LOCATED UNDER THE UNIT AND DUCTWORK.
3. PROVIDE CEILING TILE AND SUPPORT SYSTEM LOCATED UNDER UNIT AND DUCTWORK.

E. CHILLED WATER FAN COIL - CONSTRUCTION

1. PROVIDE FAN COIL UNIT, HANGERS, SUPPORTS, AND RELATED COMPONENTS.
2. PROVIDE ALL TEMPERATURE CONTROL, WIRING, SENSORS, AND RELATED COMPONENTS.
3. PROVIDE ELECTRICAL POWER, WIRING, CONDUIT, AND COMPONENTS.
4. PROVIDE RE-CONNECTION OF ELECTRIC HEATING COIL FOR FAN COIL.
5. PROVIDE DUCTWORK CONNECTIONS FOR SUPPLY DUCTWORK AND FLEXIBLE CONNECTIONS.
6. PROVIDE DUCT INSULATION FOR ALL NEW DUCTWORK AND DUCT CONNECTIONS TO EXISTING INSULATED DUCTWORK.
7. PROVIDE CHILLED WATER PIPING,VALVES, GAUGES, THERMOMETERS, AND INSULATION FROM MAIN OR BRANCH PIPING.
8. PROVIDE CONDENSATE DRAIN PIPING, INSULATION, HANGERS, AND SUPPORTS.
9. PROVIDE LABELING OF UNIT, VFD PANELS, PIPING, AND VALVE TAGS.
10. PROVIDE TESTING AND BALANCING OF UNIT.
11. PROVIDE SECONDARY DRAIN PAIN WHERE INDICATED.
12. PROVIDE RETURN AIR FILTER GRILLE.

F. CHILLED WATER BRANCH PIPING ISOLATION VALVES AND PIPING DRAIN DOWN.

1. PROVIDE DRAIN DOWN OF CHILLED WATER SYSTEMS TO PERMIT THE INSTALLATION OF ISOLATION VALVES.
2. REMOVE PIPING INSULATION TO PERMIT THE INSTALLATION OF ISOLATION VALVES.
3. REMOVE CEILING TILES, LIGHTING, CONDUIT, FIRE PROTECTION PIPING, AND HEADS TO PERMIT THE INSTALLATION OF ISOLATION VALVES.
4. PROVIDE ISOLATION VALVES FOR SUPPLY AND RETURN PIPING AT MAIN RISER OR BRANCH TO PERMIT REPLACEMENT OF FAN COIL UNIT.
5. PROVIDE HOLDING TANK OR TRUCK FOR CHILLED WATER DRAIN DOWN AND RETENTION DURING FAN COIL REMOVAL AND REPLACEMENT. (TANK OR TRUCK CAPACITY TO BE DETERMINED BASED ON DRAIN DOWN REQUIRED).
6. PROVIDE TESTING OF CHILLED WATER FOR GLYCOL CONTENT. REFILLING OF SYSTEM AND MAKE UP OF GLYCOL AS REQUIRED TO ACHIEVE 30% CONCENTRATION.
7. PROVIDE THE RE-INSTALLATION OF CEILING, LIGHTING, FIRE PROTECTION, CONDUIT, AND PIPING.

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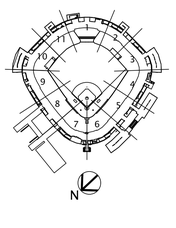
KEY PLAN



ISSUE/REVISION:

REV.	DATE	DESCRIPTION
	09.09.2022	ISSUED FOR BID

PROJECT:
GUARANTEED RATE FIELD - HVAC FY2023
333 WEST 35TH STREET
CHICAGO, IL 60616

DRAWING TITLE:
MECHANICAL SPECIFICATIONS

DESIGNED BY:	CC
DRAWN BY:	CC
CHECKED BY:	MS
PROJECT NO:	22286
SCALE:	N.T.S.

SHEET NO.
M4.2

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
ELARA	ELARA ENGINEERING
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	RESISTANCE
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
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
XFMR	TRANSFORMER
YR	YEAR

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

FIRE ALARM SYMBOLS

A	HORN ALARM
V	VISUAL ALARM
S	COMMUNICATION SPEAKER (ONE-WAY)
SV	COMMUNICATION SPEAKER (ONE-WAY) AND VISUAL COMBO ALARM
AV	HORN AND VISUAL COMBO ALARM
RA	REMOTE ANNUNCIATOR
RTS	DUCT SMOKE DETECTOR, REMOTE ALARM INDICATOR, AND KEY SWITCH TEST STATION
D	HEAT DETECTOR
SD	SMOKE DETECTOR
DD	HVAC DUCT SMOKE DETECTOR
S	MANUAL PULL STATION
WF	SPRINKLER WATER FLOW SWITCH
FAR	ADDRESSABLE FIRE ALARM RELAY
MM	MONITOR MODULE
NAC	NOTIFICATION APPLICATION CIRCUIT

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

ELECTRICAL SYMBOLS

GENERAL

- POINT OF CONNECTION OF NEW TO EXISTING WORK
- POINT OF DEMOLITION TO EXISTING WORK
- EQUIPMENT TAG (ABBREVIATION / NUMBER)
- KITCHEN EQUIPMENT TAG (D24)
- MATCH LINE (MATCH LINE / SEE SHEET NO. X#.##)
- VIEW REFERENCE (VIEW # / X#.## SHEET #)
- SECTION VIEW REFERENCE (VIEW # / X#.## SHEET #)

POWER

- EXISTING TO REMAIN
- EXISTING TO BE DEMOLISHED
- NEW
- CONDUIT BREAK LINE
- CONDUIT, TURNED UP
- CONDUIT, TURNED DOWN
- EXPOSED CONDUIT (STRAIGHT LINES)
- CONCEALED CONDUIT (CURVED LINES)
- CIRCUIT DESIGNATIONS:
  1. ARROW INDICATES HOME RUN TO PANEL
  2. SLASHES INDICATE QUANTITY OF WIRES:
     - 2.1. SHORT SLASH - PHASE AND SWITCH LEGS
     - 2.2. LONG SLASH - NEUTRAL CONDUCTORS
     - 2.3. LONG SLASH WITH DOT - "GREEN" GROUND CONDUCTOR
- FLEXIBLE CONDUIT CONNECTION
- MOTOR ("XX" DENOTES HORSEPOWER)
- JUNCTION BOX
- JUNCTION BOX WITH SWITCH
- NON-FUSED DISCONNECT SWITCH
- FUSED DISCONNECT SWITCH
- MOTOR STARTER (FVNR)
- COMBINATION STARTER WITH FUSE DISCONNECT SWITCH
- VFD
- VFD WITH INTEGRAL FUSE AND DISCONNECT SWITCH
- VFD WITH INTEGRAL CIRCUIT BREAKER
- PANELBOARD
- DISTRIBUTION PANEL, SWITCHGEAR, OR OTHER CABINET AS NOTED
- WALL RECEPTACLE - DUPLEX
- WALL RECEPTACLE - DUPLEX ABOVE COUNTER
- WALL RECEPTACLE - QUAD
- WALL RECEPTACLE - SPECIAL
- CEILING RECEPTACLE - DUPLEX

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

HVAC EQUIPMENT WIRING SCHEDULE

TAG	DESCRIPTION	LOCATION	VOLT	PHASE	LOAD				OCPD		FEED FROM	FEEDER/BRANCH WIRING					EQUIPMENT CONTROLLER							LOCAL DISCONNECT SWITCH								EQUIPMENT CONNECTION					
					HP	KW	FLA	MCA	SIZE	POLE	PANEL	SETS	NO.	SIZE	GND.	CONDUIT	P.B	F.B	I.B	SIZE	TYPE	DISC. SW	OCPD	POLE	ENCL.	SEE NOTE	P.B	F.B	I.B	SIZE	TYPE	POLE	ENCL.	SEE NOTE	P.B	F.B	I.B	RECP.	CPC	HWC	FWC	SEE NOTE
SCAC-1	SELF CONTAINED A/C UNIT	SERVICE LEVEL - OFFICE 1.57.2	208	1	-	-	16	-	20	2	RPD-2-7D	1	2	12	12	3/4"	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	E.C	-	-	6-20R	YES			-
FCU-1	FAN COIL UNIT	400 LEVEL - ISFA OFFICES 400	120	1	-	-	13.6	-	20	1	RP-5-1B	1	2	12	12	3/4"	-	-	-	-	-	-	-	-	-	-	M.C	-	-	-	-	-	6	E.C	-	-	-	YES	YES	-	-
AC-2	A/C UNIT	SERVICE LEVEL - SERVER ROOM 1.39.06	208	1	-	-	0.625	-	20	2	EXISTING PANEL	1	2	12	12	3/4"	-	-	-	-	-	-	-	-	-	-	E.C	-	-	20	TS	2	NEMA 1	3,5	E.C	-	-	-	YES	YES	-	-
CU-2	CONDENSING UNIT	SERVICE LEVEL - SERVICE CORRIDOR	208	1	-	-	22	-	35	2	RP1-4AC	1	2	8	10	3/4"	-	-	-	-	-	-	-	-	-	-	E.C	-	-	60	TS	2	NEMA 1	3	E.C	-	-	-	YES	YES	-	-
AHU 3A-01	AIR HANDLING UNIT MOTOR	200 LEVEL - MECHANICAL ROOM 3.13.09	480	3	20	-	24	-	35	3	EXISTING PANEL	1	2	8	10	3/4"	M.C	-	-	#2	VFD	-	-	-	-	-	E.C	-	-	60		3	NEMA 1	3	E.C	-	-	-	YES	YES	4	
AHU 3A-01	ELECTRIC HEATING COIL	200 LEVEL - MECHANICAL ROOM 3.13.09	480	3	-	210	252.6	-	350	3	SWBD-1-3B	EXISTING CONDUIT AND WIRES					M.C	-	-	-	-	-	-	-	-	-	E.C	-	-	400	NON-FUSE	3	NEMA 1	3	E.C	-	-	-	YES	YES	4	
EBH-1	ELECTRIC BASEBOARD HEATER	200 LEVEL - ELEVATOR LOBBY 3.30.06	277	1	-	2.5	-	-	20	1	HP-2-3B	1	2	12	12	3/4"	-	-	-	-	-	-	-	-	-	-	E.C	-	-	20	TS	1	NEMA 1	3	E.C	-	-	-	YES	YES	-	
FCU-2	FAN COIL UNIT	300 LEVEL - ELEVATOR LOBBY 4.30.6	277	1	-	-	6.8	-	20	1	EXISTING PANEL	1	2	12	12	3/4"	-	-	-	-	-	-	-	-	-	-	M.C	-	-	-	-	-	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 VEFIRY 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:	FLEXIABLE 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 USER TOGGLE/KEY SWITCH @ 48" AFF.
NOTE #6	DISCONNECT SWITCH IS INTEGRAL TO HVAC EQUIPMENT. MOUNTED ON UNIT.

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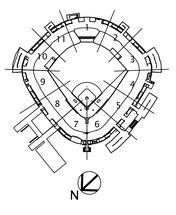
KEY PLAN



ISSUE/REVISION:

REV.	DATE	DESCRIPTION
	09.09.2022	ISSUED FOR BID

PROJECT:

GUARANTEED RATE FIELD - HVAC FY2023

333 WEST 35TH STREET
CHICAGO, IL 60616

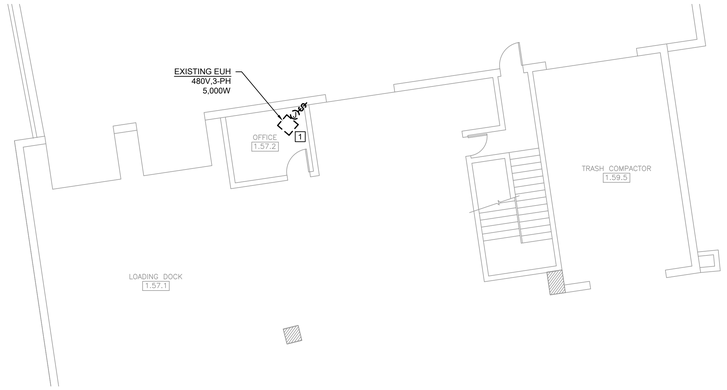
DRAWING TITLE:

ELECTRICAL COVER PAGE

DESIGNED BY:	TG
DRAWN BY:	TG
CHECKED BY:	BT
PROJECT NO:	22286
SCALE:	N.T.S.

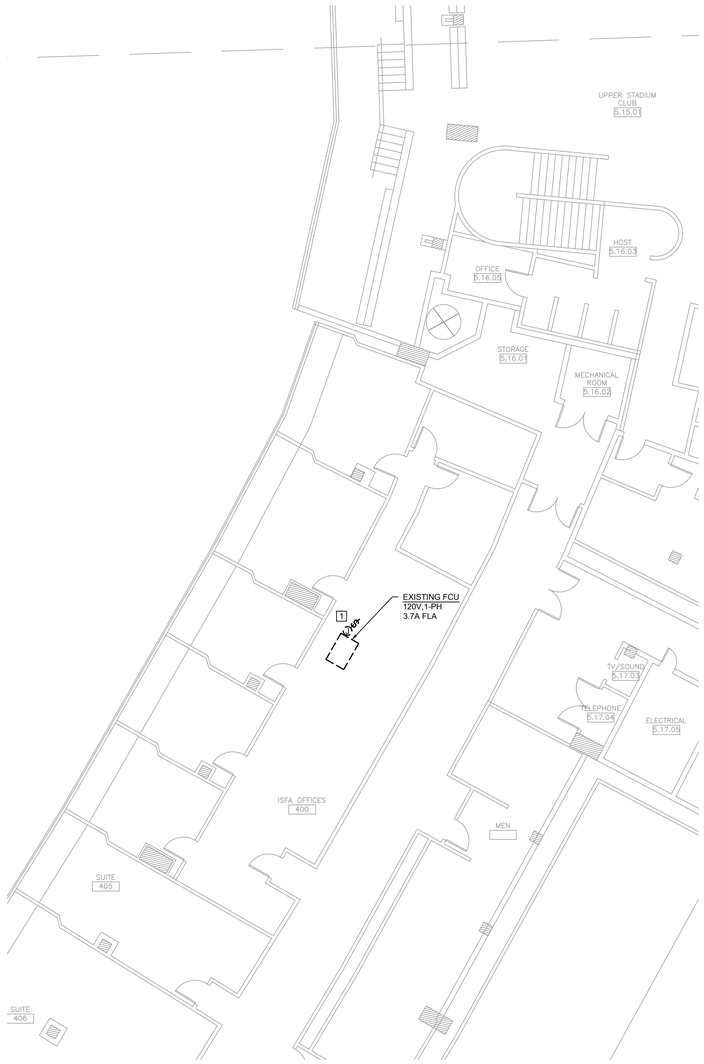
SHEET NO.

E0.1



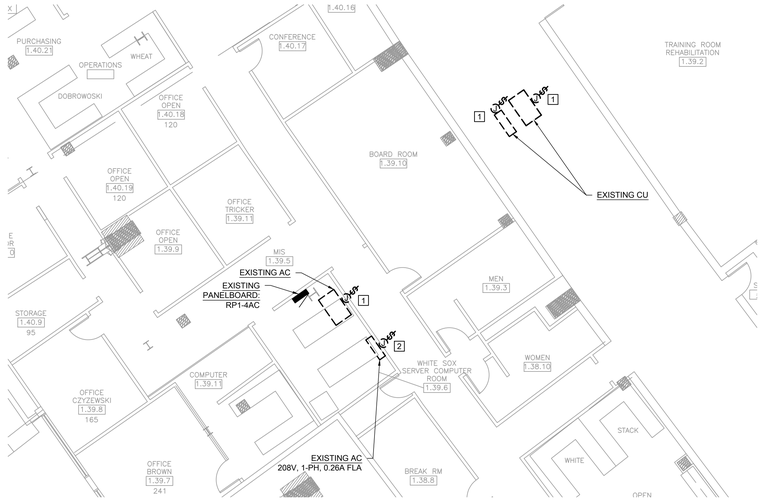
1 ELECTRICAL PARTIAL DEMOLITION PLAN - SERVICE LEVEL (SECTION 08)

SCALE: 1/8" = 1'-0"



2 ELECTRICAL PARTIAL DEMOLITION PLAN - 400 LEVEL (SECTION 014

SCALE: 1/8" = 1'-0"



3 ELECTRICAL PARTIAL DEMOLITION PLAN - SERVICE LEVEL (SECTION 08)

SCALE: 1/8" = 1'-0"

KEYED ELECTRICAL DEMOLITION NOTES

1. DISCONNECT AND REMOVE POWER CONNECTION FOR EXISTING HVAC EQUIPMENT AND ASSOCIATED DISCONNECT SWITCH AS SHOWN. DISCONNECT AND REMOVE EXISTING BRANCH CIRCUIT CONDUIT AND WIRES COMPLETELY FROM THE SOURCE.
2. DISCONNECT, REMOVE, AND SALVAGE EXISTING POWER CONNECTION FOR EXISTING HVAC EQUIPMENT. DISCONNECT AND REMOVE EXISTING DISCONNECT SWITCH FOR HVAC EQUIPMENT. EXISTING BRANCH CIRCUIT CONDUIT AND WIRES SHALL REMAIN FOR INSTALLATION OF NEW MECHANICAL EQUIPMENT. REFER TO NEW WORK DRAWINGS FOR MORE INFORMATION.

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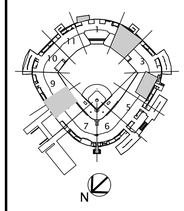
KEY PLAN



ISSUE/REVISION:

REV.	DATE	DESCRIPTION
	09.09.2022	ISSUED FOR BID

PROJECT:

GUARANTEED RATE FIELD - HVAC FY2023

333 WEST 35TH STREET
CHICAGO, IL 60616

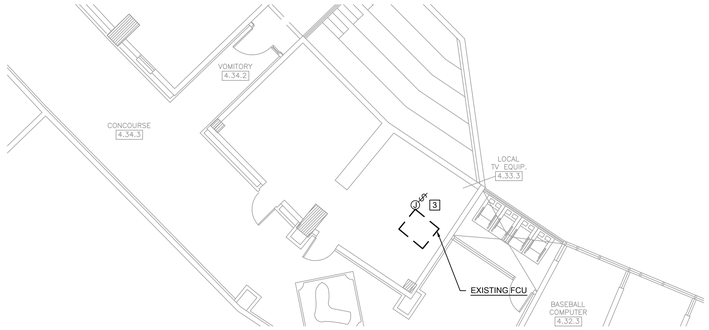
DRAWING TITLE:

ELECTRICAL ENLARGED DEMOLITION PLANS

DESIGNED BY:	TG
DRAWN BY:	TG
CHECKED BY:	BT
PROJECT NO:	22286
SCALE:	1/8"=1'-0"

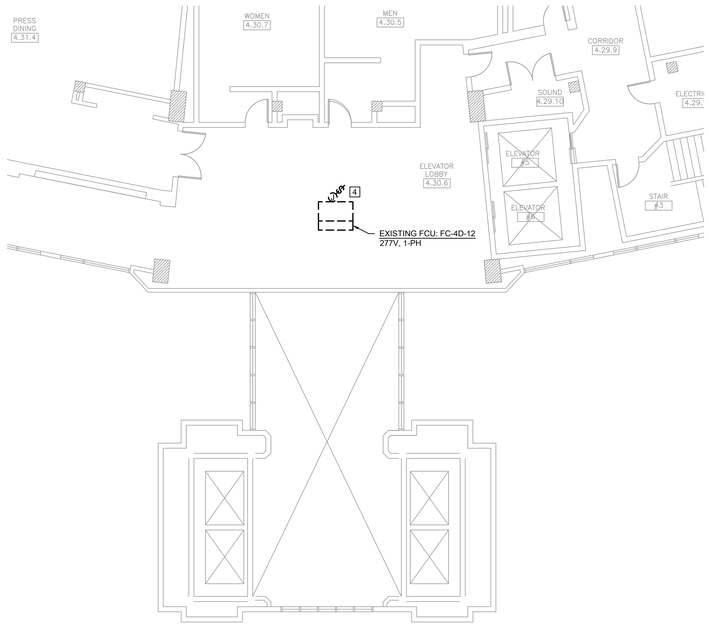
SHEET NO.

ED1.1



2 ELECTRICAL PARTIAL DEMOLITION PLAN - 300 LEVEL (SECTION 07)

SCALE: 1/8" = 1'-0"



3 ELECTRICAL PARTIAL DEMOLITION PLAN - 300 LEVEL (SECTION 06)

SCALE: 1/8" = 1'-0"

1 ELECTRICAL PARTIAL DEMOLITION PLAN - 200 LEVEL (SECTION 03)

SCALE: 1/8" = 1'-0"

8' 0 4' 8' 16'

SCALE: 1/8" = 1'-0"

KEYED ELECTRICAL DEMOLITION NOTES

1. DISCONNECT AND REMOVE EXISTING POWER CONNECTION AND ASSOCIATED DISCONNECT SWITCH FOR HVAC EQUIPMENT SHOWN. EC SHALL MAINTAIN EXISTING PRIMARY FEEDER CONDUIT AND WIRES FOR NEW ELECTRIC HEATING COIL. REFER TO NEW WORK DRAWING FOR MORE INFORMATION.
2. DISCONNECT AND REMOVE EXISTING POWER CONNECTION FOR HVAC EQUIPMENT SHOWN. DISCONNECT AND REMOVE EXISTING STARTER. DISCONNECT AND REMOVE CONDUIT AND WIRES FROM EXISTING HVAC EQUIPMENT BACK TO THE EXISTING STARTER. EXISTING PRIMARY FEEDER CONDUIT AND WIRES SHALL REMAIN FOR NEW SUPPLY FAN MOTOR. REFER TO NEW WORK DRAWING FOR MORE INFORMATION.
3. DISCONNECT, REMOVE, AND SALVAGE EXISTING POWER CONNECTION FOR EXISTING HVAC EQUIPMENT. EXISTING BRANCH CIRCUIT CONDUIT AND WIRES AND ASSOCIATED DISCONNECT SWITCH SHALL REMAIN FOR FOR EXISTING TO BE RELOCATED FAN COIL UNIT. REFER TO NEW WORK DRAWINGS FOR MORE INFORMATION.
4. DISCONNECT, REMOVE, AND SALVAGE EXISTING POWER CONNECTION FOR EXISTING HVAC EQUIPMENT. DISCONNECT AND REMOVE EXISTING DISCONNECT SWITCH FOR HVAC EQUIPMENT. EXISTING BRANCH CIRCUIT CONDUIT AND WIRES SHALL REMAIN FOR INSTALLATION OF NEW MECHANICAL EQUIPMENT. REFER TO NEW WORK DRAWINGS FOR MORE INFORMATION.

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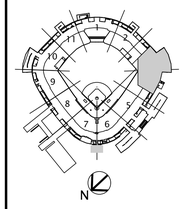
KEY PLAN



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PROJECT:

GUARANTEED RATE FIELD - HVAC FY2023

333 WEST 35TH STREET
CHICAGO, IL 60616

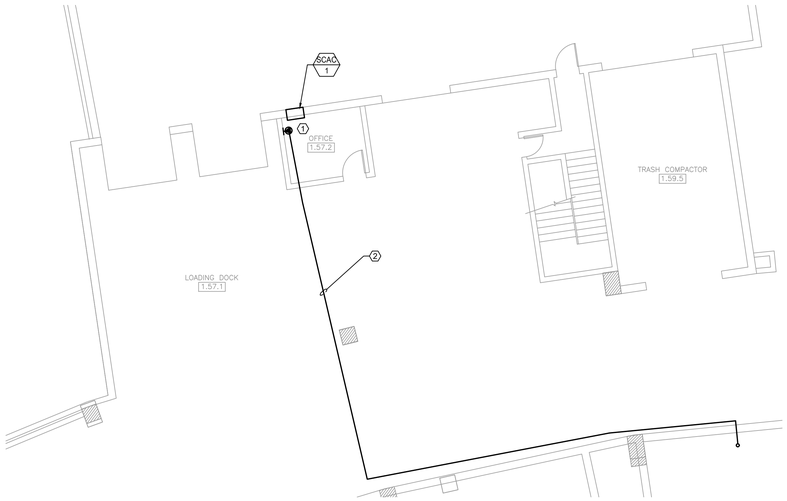
DRAWING TITLE:

ELECTRICAL ENLARGED DEMOLITION PLANS

DESIGNED BY:	TG
DRAWN BY:	TG
CHECKED BY:	BT
PROJECT NO:	22286
SCALE:	1/8"=1'-0"

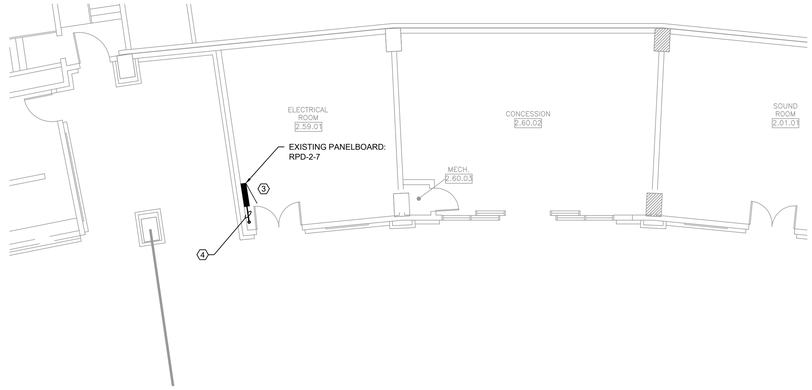
SHEET NO.

ED1.2



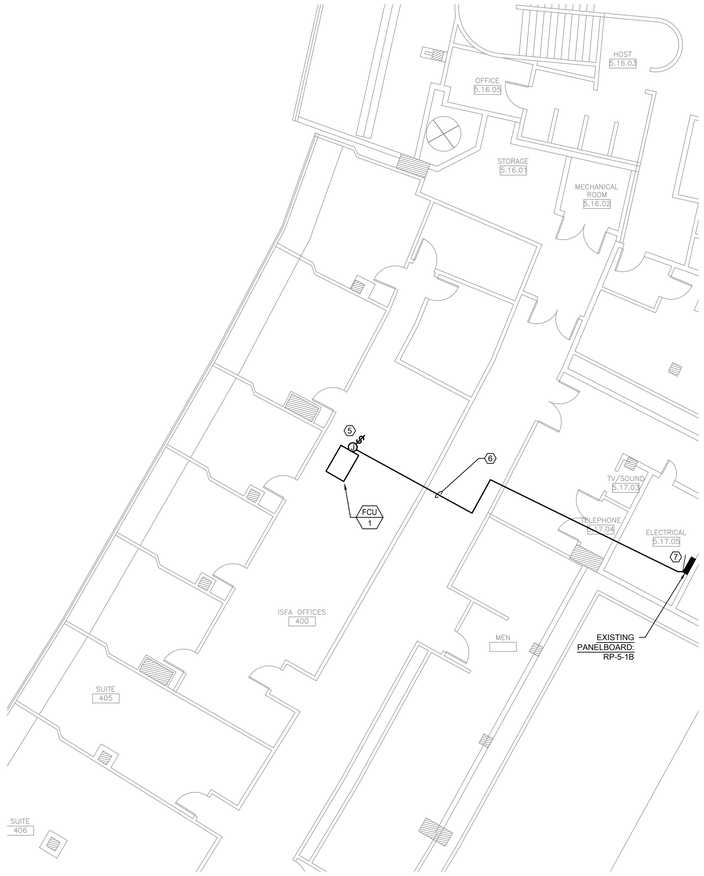
1 ELECTRICAL PARTIAL NEW WORK PLAN - SERVICE LEVEL (SECTION 08)

SCALE: 1/8" = 1'-0"



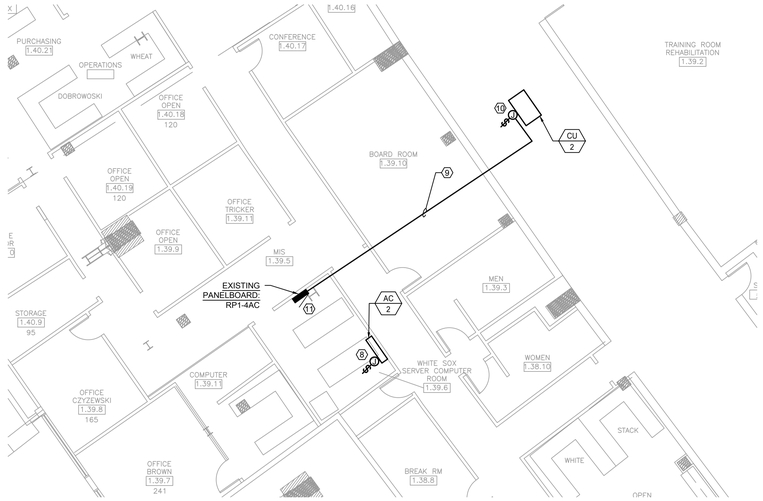
2 ELECTRICAL PARTIAL NEW WORK PLAN - 100 LEVEL (SECTION 08)

SCALE: 1/8" = 1'-0"



3 ELECTRICAL PARTIAL NEW WORK PLAN - 400 LEVEL (SECTION 014)

SCALE: 1/8" = 1'-0"



4 ELECTRICAL PARTIAL NEW WORK PLAN - SERVICE LEVEL (SECTION 08)

SCALE: 1/8" = 1'-0"

KEYED ELECTRICAL NEW WORK NOTES

1. FURNISH AND INSTALL NEW POWER CONNECTION AND ASSOCIATED NEMA 6-20P RECEPTACLE FOR NEW HVAC EQUIPMENT SHOWN. REFER TO HVAC EQUIPMENT WIRING SCHEDULE FOR MORE INFORMATION.
2. FURNISH AND INSTALL NEW CONDUIT AND WIRES FROM EXISTING PANELBOARD 'RPD-2-7D' ALONG SERVICE CORRIDOR CEILING. REFER TO HVAC EQUIPMENT WIRING SCHEDULE FOR CONDUIT AND WIRE SIZE.
3. EXISTING PANELBOARD TO REMAIN. EC SHALL DISCONNECT AND REMOVE (2) EXISTING SPARE CIRCUIT BREAKERS. EC SHALL FURNISH AND INSTALL NEW CIRCUIT BREAKER FOR HVAC EQUIPMENT IN OFFICE '1.57.2.' NEW CIRCUIT BREAKER SHALL MATCH THE EXISTING CIRCUIT BREAKER'S MAKE, MODEL, AND AIC RATING. REFER TO HVAC EQUIPMENT WIRING SCHEDULE FOR NEW CIRCUIT BREAKER SIZE.
4. EC SHALL FURNISH AND INSTALL NEW CONDUIT AND WIRES FOR NEW HVAC EQUIPMENT IN OFFICE '1.57.2' FROM PANELBOARD AS SHOWN DOWN INTO SERVICE CORRIDOR BELOW. EC SHALL PENETRATE EXISTING SLAB. SCAN FLOOR PRIOR TO CORING. REFER TO HVAC EQUIPMENT WIRING SCHEDULE FOR CONDUIT AND WIRE SIZE.
5. FURNISH AND INSTALL NEW POWER CONNECTION FOR NEW FAN COIL UNIT 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' ABOVE EXISTING ACCESSIBLE CEILING. REFER TO HVAC EQUIPMENT WIRING SCHEDULE FOR CONDUIT AND WIRE SIZE.
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 EQUIPMENT WIRING SCHEDULE FOR CIRCUIT BREAKER SIZE.
8. FURNISH AND INSTALL NEW LOCAL DISCONNECT SWITCH AND RE-CONNECT EXISTING CONDUIT AND WIRES FOR NEW HVAC EQUIPMENT LOCATION. EXTEND EXISTING CONDUIT AND WIRES AS REQUIRED. REFER TO EQUIPMENT SCHEDULES FLEXIBLE WHIP AND WIRE SIZE.
9. FURNISH AND INSTALL NEW CONDUIT AND WIRES FROM EXISTING PANELBOARD 'RP1-4AC' ABOVE EXISTING ACCESSIBLE CEILING AND INTO SERVICE CORRIDOR. REFER TO HVAC EQUIPMENT WIRING SCHEDULE FOR CONDUIT AND WIRE SIZE.
10. FURNISH AND INSTALL NEW POWER CONNECTION FOR NEW CONDENSING UNIT AND ASSOCIATED DISCONNECT SWITCH. REFER TO HVAC EQUIPMENT WIRING SCHEDULE FOR MORE INFORMATION.
11. EXISTING PANELBOARD TO REMAIN. DISCONNECT AND REMOVE (2) EXISTING SPARE 20A/1P CIRCUIT BREAKERS. FURNISH AND INSTALL NEW 2P CIRCUIT BREAKER FOR NEW HVAC EQUIPMENT SHOWN. NEW CIRCUIT BREAKER SHALL MATCH THE EXISTING CIRCUIT BREAKERS' MAKE, MODEL, AND AIC RATING. REFER TO HVAC EQUIPMENT WIRING SCHEDULE FOR CIRCUIT BREAKER SIZE.

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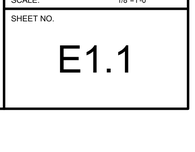


ISSUE/REVISION:

REV.	DATE	DESCRIPTION
	09.09.2022	ISSUED FOR BID

PROJECT:

GUARANTEED RATE FIELD - HVAC FY2023

333 WEST 35TH STREET
CHICAGO, IL 60616

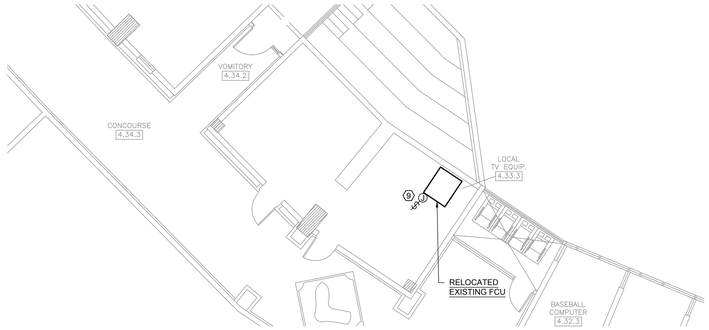
DRAWING TITLE:

ELECTRICAL ENLARGED NEW WORK PLANS

DESIGNED BY:	TG
DRAWN BY:	TG
CHECKED BY:	BT
PROJECT NO:	22286
SCALE:	1/8"=1'-0"

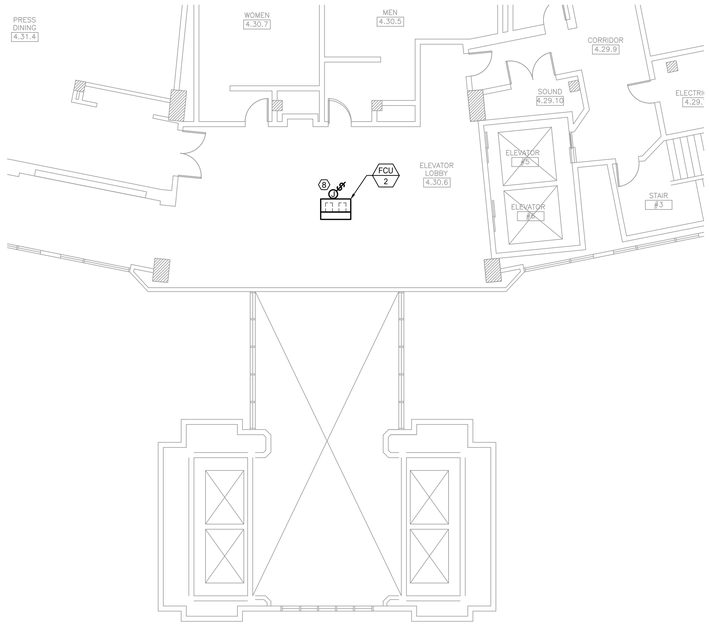
SHEET NO.

E1.1



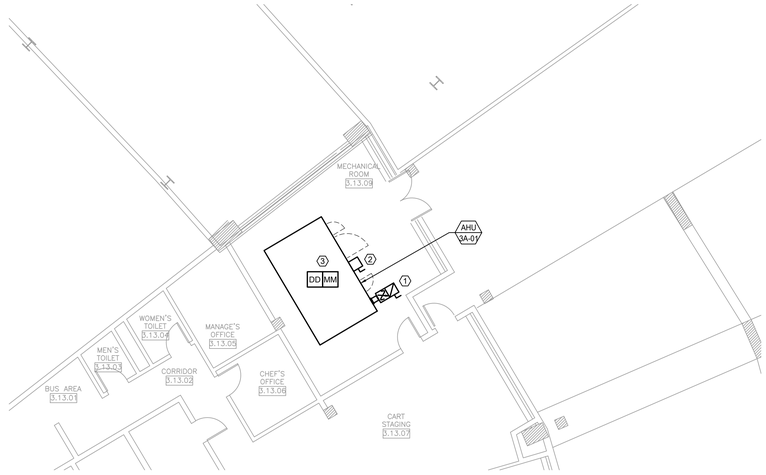
5 ELECTRICAL PARTIAL NEW WORK PLAN - 300 LEVEL (SECTION 07)

SCALE: 1/8" = 1'-0"



4 ELECTRICAL PARTIAL NEW WORK PLAN - 300 LEVEL (SECTION 06)

SCALE: 1/8" = 1'-0"

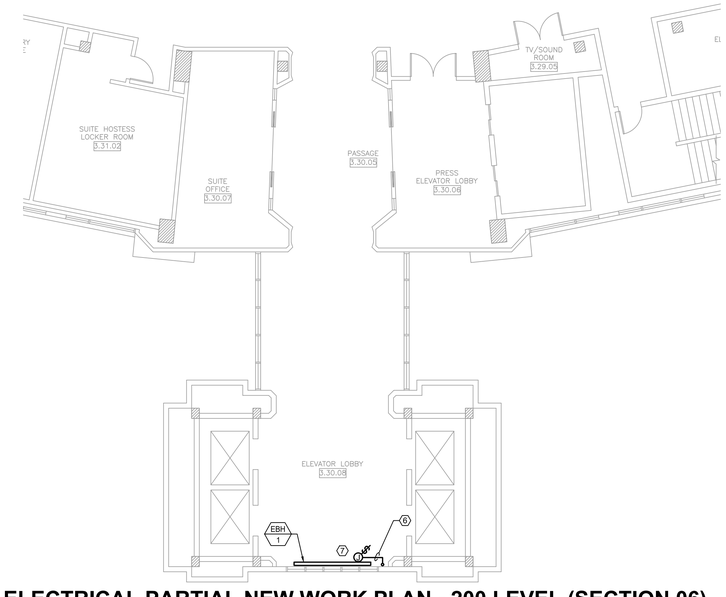


1 ELECTRICAL PARTIAL NEW WORK PLAN - 200 LEVEL (SECTION 03)

SCALE: 1/8" = 1'-0"

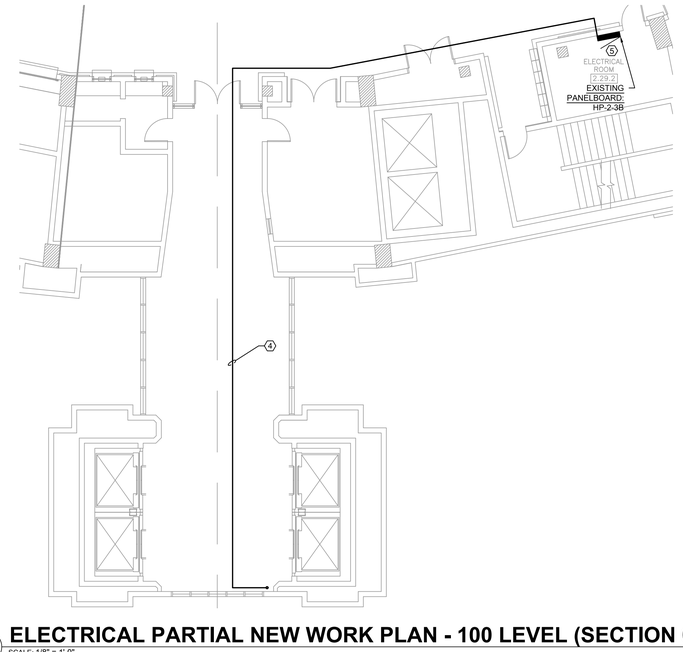
8' 0 4' 8' 16'

SCALE: 1/8" = 1'-0"



3 ELECTRICAL PARTIAL NEW WORK PLAN - 200 LEVEL (SECTION 06)

SCALE: 1/8" = 1'-0"



2 ELECTRICAL PARTIAL NEW WORK PLAN - 100 LEVEL (SECTION 06)

SCALE: 1/8" = 1'-0"

KEYED ELECTRICAL NEW WORK NOTES

1. FURNISH AND INSTALL POWER CONNECTION TO NEW AHU-3A1 SUPPLY FAN VARIABLE FREQUENCY DRIVE. VFD IS INTEGRAL TO EQUIPMENT AND MOUNTED ON SIDE. FURNISH AND INSTALL NEW CONDUIT AND WIRES FROM EXISTING FEEDER LOCATION TO NEW VFD. EXTEND EXISTING CONDUIT AND WIRES AS REQUIRED FOR NEW SUPPLY FAN MOTOR LOCATION. REFER TO HVAC EQUIPMENT WIRING SCHEDULE FOR MORE INFORMATION. EC SHALL ALSO DISCONNECT AND REMOVE EXISTING CIRCUIT BREAKER FOR AHU-3A1 SUPPLY FAN AND FURNISH AND INSTALL NEW 35A/3P CIRCUIT BREAKER WITHIN EXISTING SLOT FOR NEW SUPPLY FAN BRANCH CIRCUIT.
2. FURNISH AND INSTALL NEW NON-FUSED DISCONNECT SWITCH AND ASSOCIATED POWER CONNECTION FOR NEW ELECTRIC HEATING COIL. INSTALL NEW DISCONNECT SWITCH SUCH A WAY THAT THE EXISTING FEEDER CAN BE RE-CONNECTED TO NEW DISCONNECT SWITCH WITHOUT A SPLICE. REFER TO HVAC EQUIPMENT SCHEDULE FOR MORE INFORMATION. EC SHALL ALSO REPLACE THE EXISTING FUSES WITHIN THE MAIN SWITCHBOARD FEEDING THE ELECTRIC HEATING COIL WITH (3) NEW 350A FUSES. EC SHALL MATCH MAKE, MODEL, AND AIC RATING OF EXISTING FUSES FOR NEW FUSES.
3. FURNISH AND INSTALL NEW DUCT SMOKE DETECTORS WITH SAMPLING TUBES ON SUPPLY AND RETURN DUCTS FOR NEW AIR HANDLING UNIT. EC SHALL COORDINATE WITH MC FOR BEST LOCATION OF DUCT SMOKE DETECTORS. FURNISH AND INSTALL FIRE ALARM MONITOR MODULE FOR EACH DUCT SMOKE DETECTOR AND REMOTE TEST SWITCH MOUNTED ON THE ADJACENT WALL. FURNISH AND INSTALL FIRE ALARM CABLE IN CONDUIT TO EXISTING FIRE ALARM CONTROL PANEL OR NEAREST NAC PANEL. FIRE ALARM CONTROL PANEL IS LOCATED NEAR THE COMMAND CENTER ON GROUND LEVEL.
4. FURNISH AND INSTALL NEW CONDUIT AND WIRES FROM EXISTING PANELBOARD 'HP-2-3B' THROUGH 100 LEVEL TUNNEL AND THEN ABOVE EXISTING ACCESSIBLE CEILING UP TO ELEVATOR LOBBY ON FLOOR ABOVE. EC SHALL CORE EXISTING SLAB FOR NEW ELECTRIC BASEBOARD HEATER POWER. SCAN CEILING PRIOR TO CORING. REFER TO HVAC EQUIPMENT WIRING SCHEDULE FOR CONDUIT AND WIRE SIZE.
5. 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 EQUIPMENT WIRING SCHEDULE FOR CIRCUIT BREAKER SIZE.
6. FURNISH AND INSTALL NEW CONDUIT AND WIRES FROM EXISTING PANELBOARD 'HP-2-3B' FROM CEILING BELOW. EC SHALL SCAN FLOOR PRIOR TO CORING. REFER TO HVAC EQUIPMENT WIRING SCHEDULE FOR CONDUIT AND WIRE SIZE.
7. FURNISH AND INSTALL NEW POWER CONNECTION TO NEW HVAC EQUIPMENT SHOWN AND ASSOCIATED DISCONNECT SWITCH. REFER TO HVAC EQUIPMENT WIRING SCHEDULE FOR MORE INFORMATION.
8. EC SHALL RE-CONNECT EXISTING BRANCH CIRCUIT TO NEW HVAC EQUIPMENT. EC SHALL EXTEND EXISTING CONDUIT AND WIRES AS REQUIRED FOR NEW HVAC EQUIPMENT LOCATION. REFER TO EQUIPMENT SCHEDULES CONDUIT AND WIRE SIZE.
9. EC SHALL RE-CONNECT EXISTING BRANCH CIRCUIT TO EXISTING FAN COIL UNIT. EC SHALL EXTEND EXISTING CONDUIT AND WIRES AS REQUIRED FOR NEW FAN COIL UNIT LOCATION.

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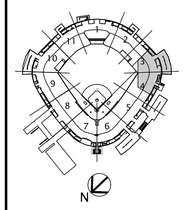
ISFA
ILLINOIS SPORTS FACILITIES AUTHORITY

KEY PLAN



ISSUE/REVISION:

REV.	DATE	DESCRIPTION
	09.09.2022	ISSUED FOR BID

PROJECT:

GUARANTEED RATE FIELD - HVAC FY2023

333 WEST 35TH STREET
CHICAGO, IL 60616

DRAWING TITLE:

ELECTRICAL ENLARGED NEW WORK PLANS

DESIGNED BY:	TG
DRAWN BY:	TG
CHECKED BY:	BT
PROJECT NO:	22286
SCALE:	1/8"=1'-0"

SHEET NO.

E1.2

I. GENERAL CONDITIONS AND REQUIREMENTS

A. 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.

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

1. ANSI - AMERICAN NATIONAL STANDARDS INSTITUTE
2. ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA (IES)
3. NATIONAL ELECTRICAL SAFETY CODE (NESC)
4. NFPA - NATIONAL FIRE PROTECTION ASSOCIATION: STANDARD FOR ELECTRICAL SAFETY IN THE WORKPLACE (NFPA 70E)
5. UNDERWRITERS LABORATORY (OR OTHER RECOGNIZED INSPECTING AGENCY)

C. 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.

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

1. ALL MATERIALS
2. EQUIPMENT, TOOLS, AND LABOR REQUIRED FOR A COMPLETE AND CODE COMPLIANT SYSTEM.
3. 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.
4. LABOR AND SPECIALTY MODELING SOFTWARE REQUIRED FOR INTERDISCIPLINARY COORDINATION AND FAMILIARIZATION WITH SITE CONDITIONS.
5. TRAINING AND GATHERING OF DOCUMENTATION FOR CLOSEOUT PROCEDURES.

E. 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.

F. 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.

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

H. 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.

I. 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.

J. 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.

K. 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.

L. 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 CLEARER 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.

M. 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.

N. 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.

O. EXISTING BUILDING CONSTRUCTION TO REMAIN IS SUBJECT TO PATCHING, REPAIRING, AND REFINISHING.

P. 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.

Q. 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.

R. 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.

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

T. 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.

U. 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.

V. 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 EXISTING CEILING PRIOR TO BID.

W. 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.

X. 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.

II. CONFLICT IN DOCUMENTS

A. 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.

III. SHUT-DOWN OF SYSTEM

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

B. SHUT-DOWN PERIODS:

1. 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;
2. KEEP SHUT-DOWN PERIOD TO MINIMUM OR USE INTERMITTENT PERIOD AS DIRECTED BY THE OWNER.
3. MAINTAIN LIFE-SAFETY SYSTEM IN FULL OPERATION IN OCCUPIED FACILITIES, OR PROVIDE NOTICE MINIMUM 15 WORKING DAYS IN ADVANCE.
4. THE SYSTEM SHUT-DOWN SHALL BE DONE DURING OFF-BUSINESS HOURS.

IV. VISIT TO SITE

A. 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.

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

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

D. 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.

V. LAWS, ORDINANCES, AND REGULATIONS

A. 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.

B. 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.

C. 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 ENGINEER UPON REQUEST.

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

VI. WORKMANSHIP

A. 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.

B. 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.

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

D. 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.

VII. 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.

VIII. COORDINATION WITH OTHER TRADES

A. 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.

B. 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.

C. 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.

D. 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.

E. 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.

F. REFER TO THE MECHANICAL SHEETS AND SPECIFICATIONS FOR EQUIPMENT LOCATIONS, LOADS, AND ADDITIONAL REQUIREMENTS.

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

H. 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.

I. 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.

IX. 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.

X. IDENTIFICATION

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.

XI. 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.

XII. CLOSEOUT PROCEDURES

A. 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 EMERGENCY SYSTEM (GENERATOR, TRANSFER SWITCH, EMERGENCY LIGHTING, BATTERIES, ETC.) TESTS RECOMMENDED BY MANUFACTURER INCLUDING VISUAL AND MECHANICAL AND ELECTRICAL INSPECTIONS. FUNCTIONALLY TEST EQUIPMENT TO ENSURE IT IS INSTALLED PER DESIGN INCLUDING EMERGENCY LIGHTING BLACKOUT TEST. PROVIDE OPERATIONAL TEST AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, CONFIRM PROPER OPERATION. PROVIDE WRITTEN REPORT OF THE RESULTS OF TESTS AND INSPECTIONS.

B. 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.

C. 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.

D. 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.

E. 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.

XIII. HANGERS AND SUPPORT SYSTEMS

A. CONTRACTOR SHALL INSTALL ALL AUXILIARY SUPPORTING STEEL AS REQUIRED FOR THE SUPPORTING OF THEIR CONDUIT, FIXTURES, DEVICES, EQUIPMENT, ETC. ALL SUPPORTING STEEL FOR ITEMS ABOVE A SUSPENDED CEILING SHALL BE FROM BUILDING STRUCTURAL MEMBERS ONLY.

B. THIS CONTRACTOR SHALL VERIFY ALL EQUIPMENT AND DEVICE MOUNTING ARRANGEMENTS, HEIGHTS, AND LOCATIONS PRIOR TO ROUGH-IN. ANY MENTION OF A SPECIFIC MOUNTING ARRANGEMENT, HEIGHT, OR LOCATION SHALL NOT RELIEVE THIS CONTRACTOR OF