GENERAL ABBREVIATIONS

A	----------
AAV	AUTOMATIC AIR VENT
AC	AIR CONDITIONER
ACCU	AIR COOLED CONDENSING UNIT
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AFS	AIR FLOW MEASURING STATION
AHU	AIR HANDLING UNIT
AL	ACOUSTIC LINING
APD	AIR PRESSURE DROP
AP	ACCESS PANEL
ATC	AUTOMATIC TEMPERATURE CONTROL
AVB	AIR VOLUME CONTROL BOX
AWT	AVERAGE WATER TEMPERATURE
B	----------
BCD	BLOWER COIL UNIT
BD	BAROMETRIC DAMPER
BDD	BACKDRAFT DAMPER
BFP	BACKFLOW PREVENTER
BHP	BRAKE HORSEPOWER
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BTU	BRITISH THERMAL UNITS
BTUH	BTU'S PER HOUR
C	----------
CAV	CONSTANT AIR VOLUME, TERMINAL BOX
CB	CHILLED BEAM
CBP	CHILLED BEAM PUMP
CC	COOLING COIL
CD	CONDENSATE DRAIN
CDR	CEILING DIFFUSER, ROUND
CFM	CUBIC FEET PER MINUTE
CH	CONVECTION HEATER
CHWP	CHILLED WATER PUMP
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
CRAH	COMPUTER ROOM AIR HANDLER
CL	CENTERLINE
CO	CLEANOUT
CP	CONDENSATE PUMP / COIL PUMP
CUH	CABINET UNIT HEATER
CVR	CONVECTOR LB/HR - POUND PER HOUR, STEAM
CW	COLD WATER
D	----------
DB	DRY BULB
DEH	DEHUMIDIFIER
DF	DESTRATIFICATION FAN
DIA	DIAMETER
DN	DOWN
DOAS	DEDICATED OUTDOOR AIR UNIT
DOAU	DEDICATED OUTDOOR AIR UNIT
DPT	DIFFERENTIAL PRESSURE TRANSMITTER
DSD	DUCT SMOKE DETECTOR
DV	DRAIN VALVE
DX	DIRECT EXPANSION AIR HANDLING UNIT
E	----------
EA	EXHAUST AIR
EAC	EXHAUST AIR CONTROLLER
EAT	ENTERING AIR TEMPERATURE
EEW	EMERGENCY EYE WASH
EF	EXHAUST FAN
EG	EXHAUST GRILLE
EH	EXHAUST HEAD
EJ	EXPANSION JOINT
EL	ELEVATION
ER	EXHAUST REGISTER
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
EWH	ELECTRIC WATER HEATER
EWT	ENTERING WATER TEMPERATURE
EXF	EXFILTRATION
EXH	EXHAUST
EXHAUST GRILLE - EXHAUST (GRILLE)	
F	----------
°F	DEGREE FAHRENHEIT
FLA	FULL LOAD AMPS
FLEX	FLEXIBILE CONNECTION
FCU	FAN COIL UNIT
F.D.	FLOOR DRAIN
FD	FIRE DAMPER WITH ACCESS DOOR
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
F&T	FLOAT & THERMOSTATIC TRAP
FPI	FINS PER INCH
FPM	FEET PER MINUTE
FS	FLOOR SINK
FSD	FIRE/SMOKE DAMPER
FT	FLASH TANK
FT WC	FEET WATER COLUMN
FZP	FREEZE PROTECTION PUMP
G	----------
GAL	GALLONS
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GR	GRILLE
H	----------
HB	HOSE BIBB
HC	HEATING COIL
HED	HOSE END DRAIN VALVE
HHWP	HEATING HOT WATER PUMP
HP	HORSEPOWER
HPS	HIGH PRESSURE STEAM
HW	HOT WATER
HWS	HOT WATER SUPPLY
HWR	HOT WATER RETURN
HX	HEAT EXCHANGER
Hz	HERTZ
I	----------
INF	INFILTRATION
L	----------
LAT	LEAVING AIR TEMPERATURE
LAV	LAVATORY
LB	LBS, POUND
LBD	LINEAR BAR DIFFUSER
LBG	LINEAR BAR GRILLE
LF	LINEAR FEET
LPS	LOW PRESSURE STEAM
LSD	LINEAR SLOT DIFFUSER
LSG	LINEAR SLOT GRILLE
LVR	LOUVER
LWT	LEAVING WATER TEMPERATURE
M	----------
MAX	MAXIMUM
MD	MODULATING CONTROL DAMPER
MERV	MAXIMUM EFFICIENCY
MFR	MANUFACTURER
MBH	THOUSAND BTU'S PER HOUR
MH	MANHOLE
MIN	MINIMUM
MOCP	MAXIMUM OVER CURRENT PROTECTION
MOD	MOTOR OPERATED DAMPER
N	----------
(N)	NEW
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
O	----------
OA	OUTSIDE AIR
OAI	OUTSIDE AIR INTAKE
OBD	OPPOSED BLADE DAMPER
P	----------
PC	PUMPED CONDENSATE
PD	PRESSURE DROP
PFD	PERFORATED FACE DIFFUSER
PFG	PERFORATED FACE GRILLE
PH	PENTHOUSE
PHC	PREHEAT COIL
PR	PIPING RISER
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH GAUGE
R	----------
RA	RETURN AIR
RD	RETURN DIFFUSER
RG	RETURN GRILLE
RFG	RECTANGULAR FILTER GRILLE
RH	RELATIVE HUMIDITY
RHC	REHEAT COIL
RPM	REVOLUTIONS PER MINUTE
RPZ	REDUCED PRESSURE ZONE
RR	RETURN REGISTER
RTU	ROOF-TOP UNIT
S	----------
SA	SUPPLY AIR
SAC	SUPPLY AIR CONTROLLER
SD	SUPPLY DIFFUSER
SMD	SMOKE DAMPER WITH ACCESS DOOR
SG	SUPPLY GRILLE
SP	STATIC PRESSURE
SR	STATIC REGISTER
SS	STAINLESS STEEL
SV	STEAM VENT
SW	SWITCH (EMERGENCY SHUTDOWN FOR HVAC SYSTEMS)
T	----------
T	ROOM THERMOSTAT
TA	TRANSFER AIR
TG	TRANSFER GRILLE
TOD	TOP OF DUCT
TOP	TOP OF PIPE
TSP	TOTAL STATIC PRESSURE
TT	THERMOSTATIC TRAP
TYP	TYPICAL
U	----------
UH	UNIT HEATER
UTR	UP THRU ROOF
V	----------
V	VENT
VAV	VARIABLE AIR VOLUME BOX
VD	VOLUME DAMPER
VEF	VEHICLE EXHAUST FAN
VI	VIBRATION ISOLATOR
W	----------
WB	WET BULB
WC	WATER CLOSET
WG	WATER GAUGE
WHA	WATER HAMMER ARRESTOR
WM	WATER METER
WPD	WATER PRESSURE DROP

PIPING NOMENCLATURE

CD	CONDENSATE DRAIN
CHGS	CHILLED WATER WITH GLYCOL, SUPPLY
CHGR	CHILLED WATER WITH GLYCOL, RETURN
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
D	DRAIN
DCW	DOMESTIC COLD WATER
HWS	HOT WATER SUPPLY
HWR	HOT WATER RETURN
LPC	LOW PRESSURE CONDENSATE
LPS	LOW PRESSURE STEAM
MPC	MEDIUM PRESSURE CONDENSATE
MPS	MEDIUM PRESSURE STEAM
PCR	PUMPED CONDENSATE RETURN
SAN	SANITARY
V	VENT, ATMOSPHERIC

DUCTWORK NOMENCLATURE

EA	EXHAUST AIR
OA	OUTDOOR AIR
RA	RETURN AIR
SA	SUPPLY AIR
TA	TRANSFER AIR

GENERAL NOTES - MECHANICAL

1. CONTRACTOR MUST COORDINATE PROJECT WITH CHILLED WATER UTILITY PROJECT OCCURRING IN PARALLEL WITH THIS PROJECT. CULLUM HALL PROJECT ALSO OCCURRING IN PARALLEL WITH THESES PROJECTS AND CONNECTED TO CHILLED WATER SITE UTILITY SYSTEM AND STEAM/CONDENSATE RETURN SITE UTILITY SYSTEM AHEAD OF LINCOLN HALL.
2. MECHANICAL DRAWINGS ARE IN PART DIAGRAMMATIC AND INTENDED TO SHOW THE SCOPE AND AND GENERAL ARRANGEMENT OF THE WORK UNDER THIS CONTRACT, FOLLOW THESE DRAWINGS IN LAYING OUT THE EQUIPMENT AND DUCTWORK. DRAWINGS ARE NOT INTENDED TO BE SCALED FOR ROUGHING IN MEASUREMENTS NOR TO SERVE AS SHOP DRAWINGS. WHERE JOB CONDITIONS REQURE MINOR CHANGES OR ADJUSTMENTS IN THE INDICATED LOCATIONS OR ARRANGEMENT OF THE WORK, SUCH CHANGES MUST BE MADE WITHOUT CHANGE IN THE CONTRACT AMOUNT.
3. THE CONTRACTOR MUST VISIT THE JOB SITE TO FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING THE WORK AND TO COORDINATE THE WORK WITH OTHER CONTRACTORS ON THE PROJECT. VERIFY DIMENSIONS PRIOR TO FABRICATION AND INSTALLATION OF DUCTWORK AND EQUIPMENT.
4. UNLESS OTHERWISE SHOWN ON DRAWINGS OR SPECIFIED HEREIN, PRODUCTS USED IN THE WORK MUST BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS AND RECOMMENDATIONS. ANY CHANGES OR MODIFICATIONS PROPOSED BY CONTRACTOR WHICH HE BELIEVES IMPROVE THE INSTALLATION MUST BE APPROVED BY THE CONTRACTING OFFICER'S REPRESENTATIVE.
5. EQUIPMENT INDICATED IN THE DRAWING, TOGETHER WITH ITS BASE AND/OR SUPPORT, DUCTWORK, WALL, FLOOR AND ROOF OPENINGS AND ELECTRICAL SERVICE ARE BASED ON THE EQUIPMENT SCHEDULE OR SPECIFICATONS. SHOULD CONTRACTOR SELECT AN EQUIVALENT ALTERNATE, EVEN IF APPROVED BY OWNERS AS EQUAL, CONTRACTOR MUST COORDINATE AND MAKE THE MODIFICATIONS IN THE WORK WITHOUT CHANGE IN CONTRACT AMOUNT.
6. FOR EXACT LOCATION OF CEILING MOUNTED DEVICES SUCH AS DIFFUSERS, REGISTERS, GRILLES, ETC. SEE ARCHITECTURAL DRAWINGS..
7. PIPING MUST BE FIELD ROUTED IN ACCORDANCE WITH APPROPRIATE ENGINEERING PRACTICES, INDUSTRY STANDARDS, AND GOVERNING CODES/REGULATIONS. ROUTE OF PIPING, INCLUDING CLEARANCE, IS THE RESPONDSIBILTY OF THE CONTRACTOR. UNIONS, BUSHINGS, AND REDUCING INSERTS, NOT SHOWN ON THE DRAWINGS BUT REQUIRED FOR INSTALLATION, MUST BE PROVIDED BY THE CONTRACTOR.
8. NOMINAL SIZE 2" AND SMALLER PIPING MUST BE FIELD ROUTED IN ACCORDANCE WITH APPROPRIATE ENGINEERING PRACTICES, INDUSTRY STANDARDS, AND GOVENING CODES/ REGULATIONS. ROUTE OF PIPE, INCLUDING CLEARANCE, IS THE RESPONDSIBILITY OF THE CONTRACTOR. UNIONS, BUSHINGS, AND REDUCING INSERTS, NOT SHOWN ON THE DRAWINGS, BUT REQUIRED FOR INSTALLATION, MUST BE PROVIDED,
9. PROVIDE LOW POINT HOSE END PIPE DRAINS TO COMPLETELY DRAIN RENOVATON WORK SYSTEMS. PROVIDE MANUAL AIR VENTS AT HIGH POINTS IN SYSTEMS (PROVIDE AUTOMATIC AIR VENTS WHERE NOTED IN DRAWINGS).
10. FOR EXACT LOCATION OF FLOOR AND ROOF OPENINGS, SEE STRUCTURAL DRAWINGS.
11. ACCESS DOORS MUST BE PROVIDED AT FIRE DAMPERS, DUCT HEATING COILS, AND OTHER DEVICES AND/OR EQUIPMENT DESCRIBED IN THE SPECIFICATIONS. ACCESS DOORS MUST BE PROVIDED UPSTREAM AND DOWNSTREAM OF ALL MITERED ELBOWS WITH TURNING VANES. ACCESS DOOR MUST BE PROVIDED WHETHER OR NOT INDICATED ON THE DRAWING.
12. DUCT SIZES SHOWN INDICATE INSIDE CLEAR DIMENSIONS.
13. COORDINATE DUCTWORK AND PIPING LOCATIONS WITH OTHER TRADES.
14. TO PRESERVE WARRANTY, ROOF WORK IS TO BE COMPLETED BY THE ROOFER HOLDING THE WARRANTY ON THE EXISTING ROOF.
15. PROVIDE VOLUME DAMPERS AT BRANCH TAKEOFFS FROM MAIN. CLEAN AND SEAL EXISTING TO REMAIN DUCTWORK. ADD ACCES DOORS.
16. PROVIDE FLEXIBLE CONNECTIONS BETWEEN DUCTWORK AND ALL EQUIPMENT CONNECTIONS.
17. PIPING, DUCTWORK AND EQUIPMENT FOREIGN TO ELECTRICAL EQUIPMENT ROOM, OR SIMILAR ROOM HOUSING ELECTRICAL EQUIPMENT (TELEPHONE/DATA, ELEVATOR MACHINE ROOM), MUST NOT PERMITTED TO BE INSTALLED IN THESE SPACES.
18. FIRE DAMPERS MUST BE CURTAIN TYPE, OUTSIDE OF THE AIR STREAM, TYPE "B" RATED FOR DYNAMIC OPERATION UNLESS NOTED ON DRAWINGS.
19. PROVIDE FIRE STOPPING AT PENETRATIONS THRU RATED PARTITIONS WITHIN SCOPE OF WORK. THIS INCLUDES PENETRATIONS THROUGH WALLS, PARTITIONS, BARRIERS, CEILINGS, ROOFS OR FLOORS - WHETHER EXISTING, CREATED THROUGH DEMOLITION OR CAUSED DURING CONSTRUCTION. PROVIDE MANUFACTURER'S STANDARD FIRE STOPPING SEALANT, WITH ACCESSORY MATERIALS, HAVING MINIMUM 1 HOUR FIRE RESISTANCE RATINGS AS ESTABLISHED BY TESTING IDENTICAL ASSEMBLIES PER ASTM E 814 AND BY UNDERWRITERS LABORATORY, INC. UL 1479 OR OTHER TESTING AND INSPECTION AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.
20. WHERE POSSIBLE, REUSE OR MODIFY EXISTING DUCT AND PIPE WALL PENETRATIONS FOR REPLACEMENT DUCT AND PIPE.

GENERAL NOTES - DEMOLITION

1. INDICATED EXISTING CONDITIONS (E.G. SIZE/LOCATION OF PIPING, DUCTWORK, EQUIPMENT, AND BUILDING ELEMENTS) ARE BASED ON INFORMATION OBTAINED FROM AVAILABLE RECORD DRAWINGS AND/OR FIELD SURVEYS. EXISTING CONDITIONS NOT RELATED TO THE WORK MAY NOT BE SHOWN. EXISTING CONDITIONS ARE PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR ONLY AND ARE NOT GUARANTEED TO BE COMPLETE OR CORRECT. PLANNING AND CHECKING HAS BEEN DONE BY THE ENGINEER TO MINIMIZE INTERFERENCES. PRIOR TO START OF EFFORT, FIELD VERIFY EXACT LOCATION AND SIZES OF ALL ELEMENTS RELATED TO THE WORK. ROUTING OF PIPING AND DUCTWORK SHOWN ON DRAWINGS IS DIAGRAMMATIC. ASCERTAIN THAT INTERFERENCES WILL NOT BE ENCOUNTERED, PREVENTING THE DISASSEMBLY OF PARTIALLY OR COMPLETELY ERECTED SYSTEMS FOR RE-ROUTING TO CLEAR OBSTRUCTIONS WHICH MAY EXIST.
2. DO NOT ASSUME THAT EXISTING VALVES WILL PROVIDE POSITIVE SHUT-OFF. CONTRACTOR MUST TEST EACH EXISTING VALVE REQUIRED FOR SYSTEM ISOLATION IN ADVANCE SO THAT PROPER PLANNING AND WORK SEQUENCING CAN BE PERFORMED. COORDINATE VALVE TESTING WITH CONTRACTING OFFICER. IMMEDIATELY NOTIFY COR OF ALL VALVES THAT FAIL TO PROVIDE POSITIVE SHUT-OFF.
3. REMOVE HANGERS, SUPPORTS, MISCELLANEOUS STRUCTURAL STEEL, CONTROLS AND INSTRUMENTATION, CONTROL WIRES AND TUBING, SPECIALTIES, VENTS AND DRAINS, ELECTRICAL POWER, AND OTHER ASSOCIATED ACCESSORIES IN THE PROCESS OF PIPE, DUCTWORK, AND EQUIPMENT DEMOLITION. SUPPORTS FOR PIPE AND DUCTWORK SHOWN TO BE DEMOLISHED THAT PENETRATE THROUGH THE INTERIOR ROOF INSULATION MUST BE CUT 3" ABOVE INSULATION AND COVERED WITH A PROTECTIVE PLASTIC CAP (BRIGHT ORANGE). EXISTING PIPING AND DUCTWORK SHOWN TO BE DEMOLISHED MUST BE DISCONNECTED AND REMOVED BACK TO SERVICE MAINS, UNLESS OTHERWISE INDICATED ON THE DRAWINGS. EXISTING PIPING AND DUCTWORK SHOWN TO REMAIN IN PLACE MUST BE CAPPED, PLUGGED, BLIND FLANGED OR OTHERWISE SEALED. NO PIPING OR DUCTWORK MUST BE LEFT OPEN ENDED UNLESS OTHERWISE INDICATED. BEFORE DISCONNECTING PIPE, VERIFY THAT PIPING HAS BEEN ISOLATED, VENTED AND DRAINED.
4. CONTROL WIRING MUST BE RMOVED BACK TO TERMINATION POINT AT SOURCE PANEL. POWER WIRING MUST BE REMOVED BACK TO BREAKER AT SOURCE POWER PANEL.
5. REMOVE FLUIDS CONTAINED WITHIN PIPING, EQUIPMENT, AND TANKS SHOWN TO BE DEMOLISHED. NO FLUIDS MUST BE ALLOWED TO DRAIN TO THE BUILDING OR CAMPUS SANITARY OR STORM SYSTEM WITHOUT WRITTEN APPROVAL FROM THE COR. CONTAIN, HAUL, AND LEGGALLY DISPOSE OF REMOVED FLUIDS OFFSITE.
6. PATCH, SEAL AND FINISH OPENINGS FROM REMOVAL OF PIPING. DUCTWORK, LOUVERS OR EQUIPMENT USING MATERIALS AND CONSTRUCTION MATCHING OR EXCEEEDING EXISTING ASSEMBLIES IN A WORKMANLIKE MANNER.
7. TAKE PRECAUTION AND USE CARE WHEN REMOVING DUCTWORK OR PIPING WITH HAZARDOUS INSULATION. COORDINATE WITH HAZARDOUS MATERILAS ABATEMENT REQUIEMENTS. REFER TO HAZMAT SURVEY REPORT CONTENTS.

NOTE: NOT ALL SYMBOLS AND ABBREVIATIONS MAY BE USED.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-18-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC LEGEND

SHEET ID

M-001

REVISED RTA SUBMISSION 03/01/2023

PIPING SYMBOLS

- AIR OR STEAM VENT
- Ø DIAMETER
- DIRECTION OF FLOW
- EXPANSION JOINT, BELLOWS
- EXPANSION JOINT, OFFSET
- EXPANSION LOOP
- FLEXIBLE CONNECTION
- M FLOW METER
- DPT DIFFERENTIAL PRESSURE TRANSMITTER
- PIPE ANCHOR
- PIPE GUIDE
- PITCH OF PIPE, DOWN
- PRESSURE GAUGE AND VALVE
- P/T PRESSURE / TEMPERATURE PLUG
- REDUCER, CONCENTRIC
- REDUCER, ECCENTRIC STRAIGHT CROWN
- REDUCER, ECCENTRIC STRAIGHT INVERT
- RISER OR ELBOW DOWN
- RISER UP AND DOWN ELBOW UP
- T STEAM TRAP, FLOAT AND THERMOSTATIC (F&T) TYPE
- STRAINER
- STRAINER W/GATE VALVE W/NIPPLE & CAP
- THERMOMETER
- THERMOMETER WELL
- T THERMOSTAT
- UNION CONNECTION
- FLANGED CONNECTION
- VALVE, AUTOMATIC FLOW CONTROL
- VALVE, BALANCING
- VALVE, CHECK
- NS VALVE, CHECK NON-SLAM
- VALVE, DRAIN W/NIPPLE & CAP
- M VALVE, MOTORIZED THREE-WAY
- M VALVE, MOTORIZED TWO-WAY
- VALVE, NEEDLE
- VALVE, PRESSURE REGULATING
- VALVE, RELIEF (SAFETY)
- VALVE, SHUT-OFF (≤2": BALL AND ≥2.5": BUTTERFLY)
- VALVE, SHUT-OFF LOCK SHIELD
- S VALVE, SOLENOID
- VALVE, THROTTLING FULL PORT BALL TYPE
- VALVE, TRIPLE DUTY
- PIPE CROSS-SECTION SHOWN WITH INSULATION

AIR DISTRIBUTION, GENERAL SYMBOLS & NOMENCLATURE

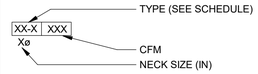
- TRANSFER DUCT, SEE DETAIL
- TRANSFER DUCT, SEE DETAIL W/RETURN/TRANSFER GRILLE
- TRANSFER DUCT, SEE DETAIL W/RETURN/TRANSFER GRILLE
- AIR CUSHION, 12" LONG MIN.
- AIR CUSHION, 12" LONG MIN.
- VOLUME DAMPER
- DAMPER (TYPE AS INDICATED; BD, BDD, MOD, FD, SD/FD, VD, ETC.)
- Ø DIAMETER
- DOOR LOUVER (FREE AREA IN SQ. FEET)
- U DOOR UNDERCUT
- D DUCT DROP (SLOPING)
- DUCT DROP (90°)
- R DUCT RISE (SLOPING)
- DUCT RISE (90°) (RISE AND DROP IN DIRECTION OF AIR FLOW)
- TRANSFER AIR
- CFM DOOR UNDERCUT AIRFLOW
- S D DUCT MOUNTED SMOKE DETECTOR
- FLEXIBLE CONNECTION
- FLEXIBLE DUCTWORK
- FLEXIBLE DUCTWORK
- HUMIDIFIER (DUCT MOUNTED)
- HUMIDIFIER (DUCT MOUNTED)
- H HUMIDISTAT
- HS HUMIDITY SENSOR
- T THERMOSTAT
- TS TEMPERATURE SENSOR
- C CARBON DIOXIDE
- DUCT TRASITION (RECTANGULAR TO RECTANGULAR)
- DUCT TRASITION (RECTANGULAR TO ROUND)
- AIRFLOW MEASURING STATION (AFS)
- AIRFLOW MEASURING STATION (AFS)
- DP DIFFERENTIAL PRESSURE TRANSMITER
- SP DUCT STATIC PRESSURE SENSOR

- 22x10 RECTANGULAR DUCT (FIRST NUMBER INDICATES PLAN DIMENSION, SECOND NUMBER INDICATES DEPTH)
- 22x10ø FLAT OVAL DUCT
- 12ø ROUND DUCT (12"ø DIAMETER)
- RADIUS ELBOW (NO TURNING VANES)
- HARD ELBOW (WITH TURNING VANES)
- DUCT TRANSITION (RECTANGULAR TO RECTANGULAR)
- DUCT TRANSITION (RECTANGULAR TO ROUND)
- RECTANGULAR SUPPLY DUCT UP
- RECTANGULAR SUPPLY DUCT DOWN
- 22x10 B / 14x10 T DUCT INDICATION FOR STACKING T= TOP; B= BOTTOM
- 22x10 T / 14x10 B DUCT INDICATION FOR STACKING T= TOP; B= BOTTOM
- VOLUME DAMPER
- FLEXIBLE CONNECTION
- DAMPER (TYPE AS INDICATED; BD, BDD, MOD, FD, SD/FD, ETC.)
- SPLITTER DAMPER
- T/H TEMP / HUMID SENSOR (DUCT MOUNTED)
- AV AUDIO VISUAL ALARM
- 8X14 / LFD-1 / 300 FLEXIBLE BRANCH DUCT CONNECTION TO DIFFUSER. CONICAL BELL MOUTH OR SQUARE/ROUND BOOT FITTING WITH VOLUME DAMPER.
- ROUND INLET CONNECTION TO LAMINAR FLOW DIFFUSER (CFM INDICATED)
- 14X10 BRANCH DUCT CONNECTION TO DIFFUSER WITH VOLUME DAMPER.
- SQUARE INLET CONNECTION TO DIFFUSER
- SUPPLY DIFFUSER
- DIFFUSER (WITH BLANK-OFF) 3-WAY
- REGISTER OR GRILLE (EXHAUST, RETURN, TRANSFER)

ALTERATION/DEMOLITION SYMBOLS

- POINT OF CONNECTION, NEW TO EXISTING
- TERMINATION OF DEMOLITION, REMOVAL
- EXISTING TO BE REMOVED
- EXISTING TO BE REMOVED

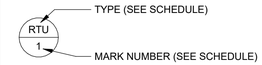
AIR TERMINAL IDENTIFICATION



BRANCH CONNECTIONS IN DOUBLE-LINE DUCTWORK

- RECTANGULAR PROPORTIONAL SPLIT
- BRANCH OFF BOTTOM 45° BOOT CONNECTION
- BRANCH OFF TOP 45° BOOT CONNECTION
- BRANCH OFF SIDE 45° BOOT CONNECTION
- BRANCH OFF SIDE CONICAL BELL MOUTH

EQUIPMENT IDENTIFICATION



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WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

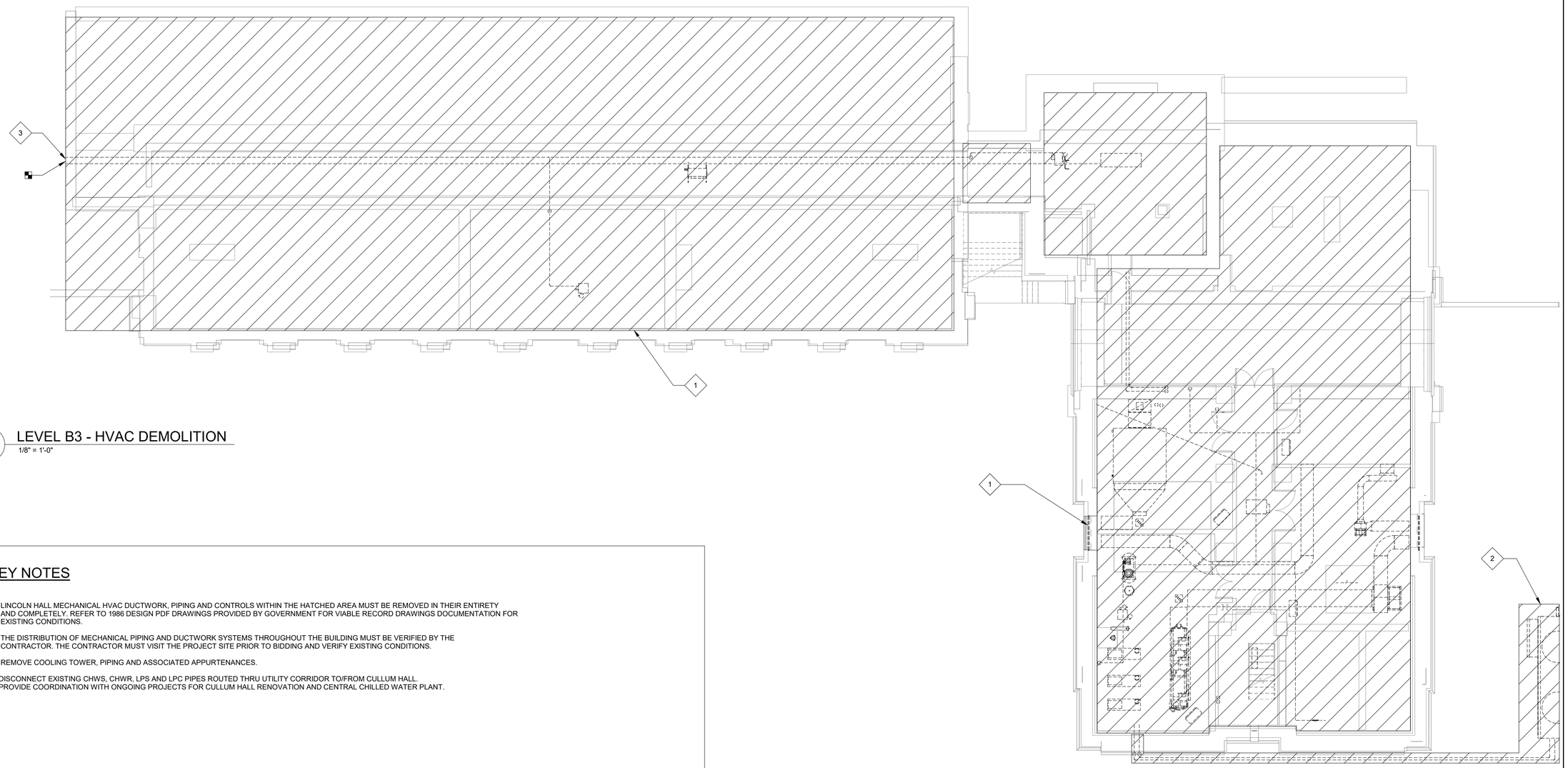
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC LEGEND

SHEET ID

M-002

REVISED RTA SUBMISSION 03/01/2023



C1 LEVEL B3 - HVAC DEMOLITION

1/8" = 1'-0"

KEY NOTES

1. LINCOLN HALL MECHANICAL HVAC DUCTWORK, PIPING AND CONTROLS WITHIN THE HATCHED AREA MUST BE REMOVED IN THEIR ENTIRETY AND COMPLETELY. REFER TO 1986 DESIGN PDF DRAWINGS PROVIDED BY GOVERNMENT FOR VIABLE RECORD DRAWINGS DOCUMENTATION FOR EXISTING CONDITIONS.

   THE DISTRIBUTION OF MECHANICAL PIPING AND DUCTWORK SYSTEMS THROUGHOUT THE BUILDING MUST BE VERIFIED BY THE CONTRACTOR. THE CONTRACTOR MUST VISIT THE PROJECT SITE PRIOR TO BIDDING AND VERIFY EXISTING CONDITIONS.

2. REMOVE COOLING TOWER, PIPING AND ASSOCIATED APPURTENANCES.

3. DISCONNECT EXISTING CHWS, CHWR, LPS AND LPC PIPES ROUTED THRU UTILITY CORRIDOR TO/FROM CULLUM HALL. PROVIDE COORDINATION WITH ONGOING PROJECTS FOR CULLUM HALL RENOVATION AND CENTRAL CHILLED WATER PLANT.

GENERAL NOTES

1. REFER TO SHEET M-001 AND M-002 FOR LEGEND AND GENERAL NOTES.
2. GOVERNMENT IS RESPONDSIBLE FOR REMOVING ANY COMPONENTS DESIRED FOR SPARE PARTS OR REUSE PRIOR TO CONSTRUCTION DEMOLITION. CONTRACTOR MUST OFFER REMOVED EQUIPMENT TO GOVENRMENT AND DELIVER TO A LOCATION AS DIRECTED BY GOVENERMENT.
3. REMOVE COOLING CHILLED WATER SYSTEM (I.E., CHILLER, PUMPS, HYDRONIC SPECIALTIES, ETC.) IN ITS ENTIRETY, INCLUDING CONNECTED DISTRIBUTION SYSTEM SUPPLY AND RETURN PIPING, VERTICAL RISERS, HANGERS, SUPPORTS, INSULATION, CONCRETE HOUSEKEEPING PADS, POWER CONNECTIONS ASSOCIATED CONTROLS AND FIELD DEVICES. DEMOLISH CHILLED WATER PIPING BACK TO CAMPUS CHILLED WATER SITE UTILITY ENTRANCE LOCATION AT LEVEL B3 UTILITY TUNNEL ENTRANCE INTO MECHANICAL ROOM XB301.
4. REMOVE CONDENSER WATER SYSTEM (I.E. COOLING TOWER, PUMPS, CHEMICAL TREATMENT SYSTEM. HYDRONIC SPECIALTIES, ETC.) IN ITS ENTIRETY, INCLUDING CONNECTED DISTRIBUTION SYSTEM SUPPLY AND RETURN PIPING, PIT ROUTED PIPING, HANGERS, SUPPORTS, INSULATION, CONCRETE HOUSEKEEPING PADS, POWER CONNECTIONS ASSOCIATED CONTROLS AND FILED DEVICES. DEMOLISH CONDENSER WATER PIPING BETWEEN COOLING TOWER LOCATED TO NORTH OF LINCOLN HALL BACK TO PIPING ENTRANCE LOCATION AT LEVEL B3 INTO MECHANICAL ROOM XB301.
5. REMOVE HEATING HOT WATER SYSTEM (I.E., STEAM-TO-HOT WATER HEAT EXCHANGER, PUMPS, HYDRONIC SPECIALTIES, ETC.) IN ITS ENTIRETY, INCLUDING CONNECTED DISTRIBUTION SYSTEM SUPPLY AND RETURN PIPING, VERTICAL RISERS, HANGERS, SUPPORTS, INSULATION, CONCRETE HOUSEKEEPING PADS, POWER CONNECTIONS ASSOCIATED CONTROLS AND FIELD DEVICES.
6. REMOVE MEDIUM AND LOW PRESSURE STEAM PIPING SYSTEMS SERVING EXISTING HHW SYSTEM HEAT EXCHANGERS FROM CAMPUS STEAM SITE UTILITY. DEMOLISH STEAM CONDENSATE RETURN UNITS, INCLUDING CONNECTED DISTRIBUTION SYSTEM STEAM PIPING, CONDENSATE RETURN PIPING, RELIEF PIPING, STEAM TRAPS, HANGERS, SUPPORTS, INSULATION, CONCRETE HOUSEKEEPING PADS, POWER CONNECTIONS ASSOCIATED CONTROLS AND FILED DEVICES. DEMOLISH STEAM AND CONDENSATE RETURN PIPING BACK TO ENTRANCE LOCATION AT LEVEL B3 UTILITY TUNNEL ENTRANCE INTO MECHANICAL ROOM XB301.
7. REMOVE CONDENSATE RETURN UNIT INCLUDING CONNECTED PIPING, VALVES, HYDRONIC SPECIALTIES, HANGERS, SUPPORTS, INSULATION, POWER CONNECTION, CONTROL AND FILED DEVICES.
8. REMOVE CHW AND HHW SYSTEM PUMPS INCLUDING CONNECTED PIPING, VALVES, HYDRONIC SPECIALTIES, HANGERS, SUPPORTS, INSULATION, POWER CONNECTION, CONTROL AND FIELD DEVICES.
9. REMOVE AIR SYSTEMS (I.E., AIR HANDLING UNITS, HEATING AND VENTILATION UNITS, EXHAUST FANS, AIR MOVING EQUIPMENT, ETC.) IN THIER ENTIRETY, INCLUDING CONNECTED DUCTWORK, HANGERS, SUPPORTS, INSULATION CONRETE HOUSEKEEPING PADS, DAMPERS, AIR FIXTURES, CHW PIPING, HHW PIPING, POWER CONNECTIONS, ASSOCIATED CONTROLS AND FIELD DEVICES.
10. REMOVE HVAC SUPPLY AND RETURN DUCT SYSTEMS INCLUDING RISERS, HANGERS, SUPPORTS, INSULATION VOLUME DAMPERS AND FIRE DAMPERS IN THEIR ENTIRETY. DEMOLISH DUCT MOUNTED CONTROLS AND FIELD DEVICES.
11. REMOVE AIR INTAKE LOUVERS; OPENING TO BE UTILIZED FOR REPLACEMENT LOUVER; SEE NEW WORK PLAN.
12. REMOVE SPLIT DX SYSTEM INDOOR AIR HANDLING UNITS. CONNECTED DUCTWORK, REFRIGERANT PIPING, CONDENSATE DRAIN PIPING, INSULATION, POWER CONNECTIONS, ASSOCIATED CONTROLS AND FIELD DEVICES. DEMOLISH OUTDOOR CONDENSING UNITS OR HEAT PUMPS SERVING INDOOR AIR HANDLING UNIT, CONNECTED REFRIGERANT PIPING, POWER CONNECTION, ASSOCIATED CONTROLS AND FILED DEVICES.
13. REMOVE HHW BASEBOARD HEATERSM UNIT HEATERS AND RADIATORS, ETC. IN THEIR ENTIRETY, INCLUDING HYDRONIC SPECIALTIES, HANGERS, SUPPORTS, INSULATION, POWER CONNECTION, CONTROLS AND FIELD DEVICES. DEMOLISH CONNECTED HHW DISTRIBUTION PIPING SYSTEM SERVING BASEBOARD HEATERS IN ITS ENTIRETY.
14. REMOVE UNIT HEATERS INCLUDING CONNECTED PIPING, VALVES, HYDRONIC SPECIALTIES, HANGERS, SUPPORTS, INSULATION, POWER CONNECTION, CONTROLS AND FILED DEVICES.
15. PATCH AND SEAL AND FINISH OPENINGS FROM REMOVAL OF PIPING, DUCTWORK, LOUVERS OR EQUIPMENT USING MATERIALS AND CONSTRUCTION MATCHING OR EXCEEDING EXISTING ASSEMBLIES IN A WORKMANLIKE MANNER. OPENINGS BEING REUTILIZED BY REPLACEMENT MECHANICAL SYSTEMS MUST BE PROTECTED DURING CONSTRUCTION.
16. REMOVE DEMOLISHED DUCTWORK, PIPING, EQUIPMENT (REFUSED BY GOVERNMENT) AND ACCESSORIES FROM SITE AND PROPERLY DISPOSE OF MATERIALS IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL CODES AND ORDINANCES.
17. REMOVE DDC CONTROL PANELS, CONTROL WIRING, TUBING, SENSORS, TRANSMITTER, FILED DEVICES, ETC, NO LONGER REQUIRED DUE TO EQUIPMENT REMOVALS.

0 4' 8' 16'

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

N

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI 'D'
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

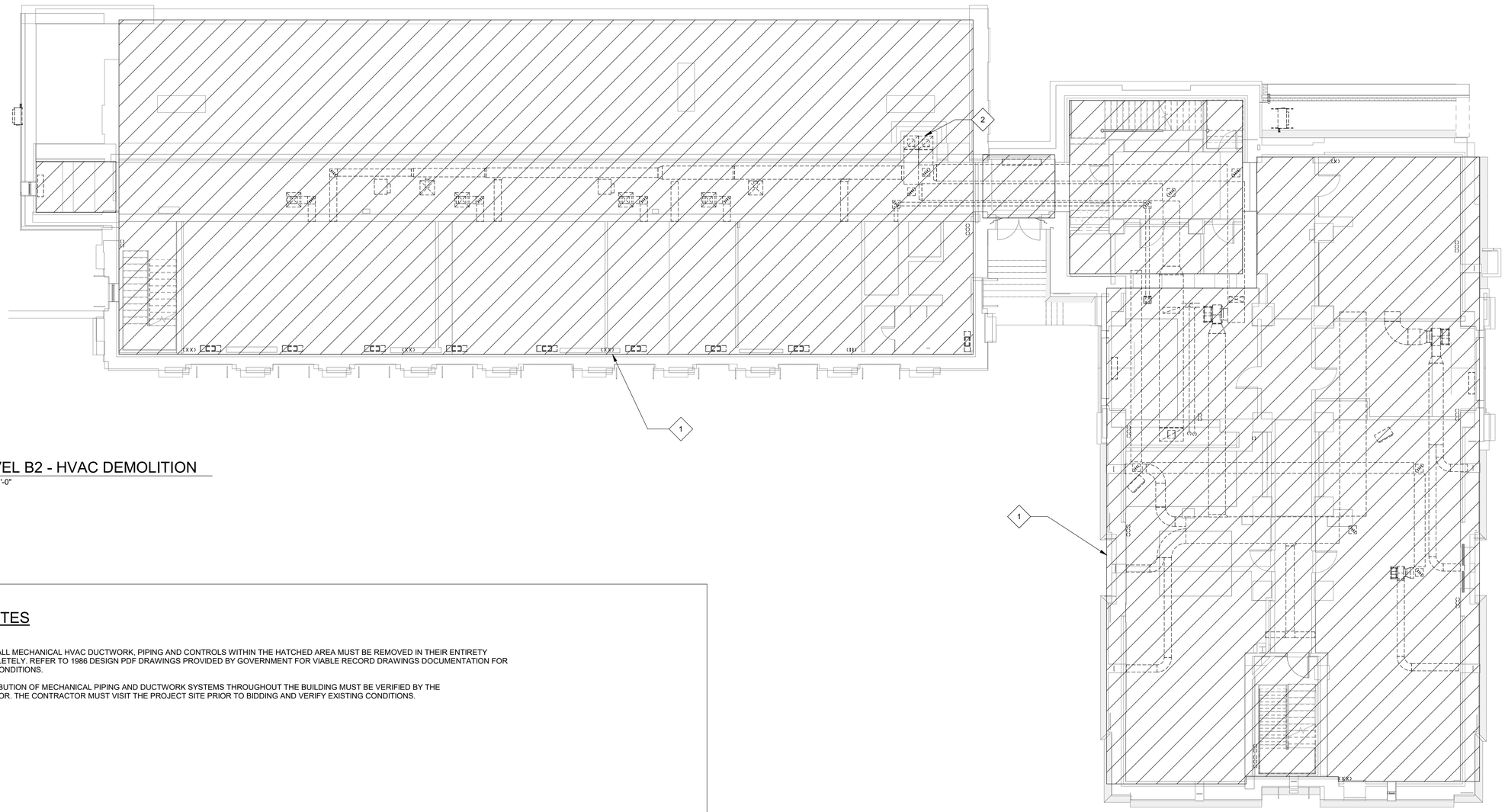
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

LEVEL B3 DEMOLITION PLAN - HVAC

SHEET ID

MD101

REVISED RTA SUBMISSION 03/01/2023



C1 LEVEL B2 - HVAC DEMOLITION
1/8" = 1'-0"

KEY NOTES

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   THE DISTRIBUTION OF MECHANICAL PIPING AND DUCTWORK SYSTEMS THROUGHOUT THE BUILDING MUST BE VERIFIED BY THE CONTRACTOR. THE CONTRACTOR MUST VISIT THE PROJECT SITE PRIOR TO BIDDING AND VERIFY EXISTING CONDITIONS.

GENERAL NOTES

1. REFER TO SHEET M-001 AND M-002 FOR LEGEND AND GENERAL NOTES.
2. GOVERNMENT IS RESPONDSIBLE FOR REMOVING ANY COMPONENTS DESIRED FOR SPARE PARTS OR REUSE PRIOR TO CONSTRUCTION DEMOLITION. CONTRACTOR MUST OFFER REMOVED EQUIPMENT TO GOVENRMENT AND DELIVER TO A LOCATION AS DIRECTED BY GOVERNMENT.
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0 4' 8' 16'
SCALE: 1/8"=1'-0"

N

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
SIZE: ANSI D
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

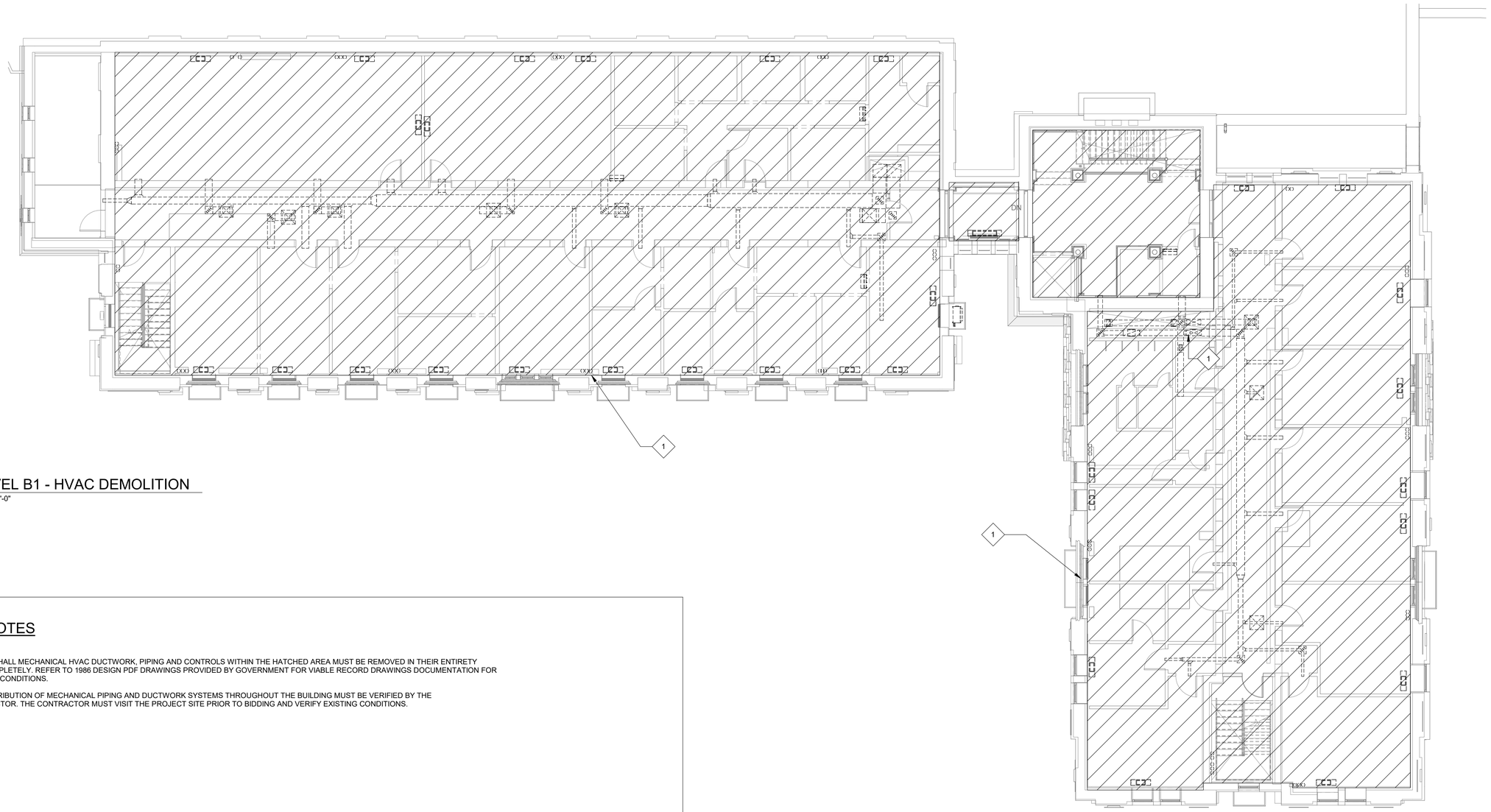
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

LEVEL B2 DEMOLITION PLAN - HVAC

SHEET ID

MD102

REVISED RTA SUBMISSION 03/01/2023



C1 LEVEL B1 - HVAC DEMOLITION

1/8" = 1'-0"

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0 4' 8' 16'

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

N

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

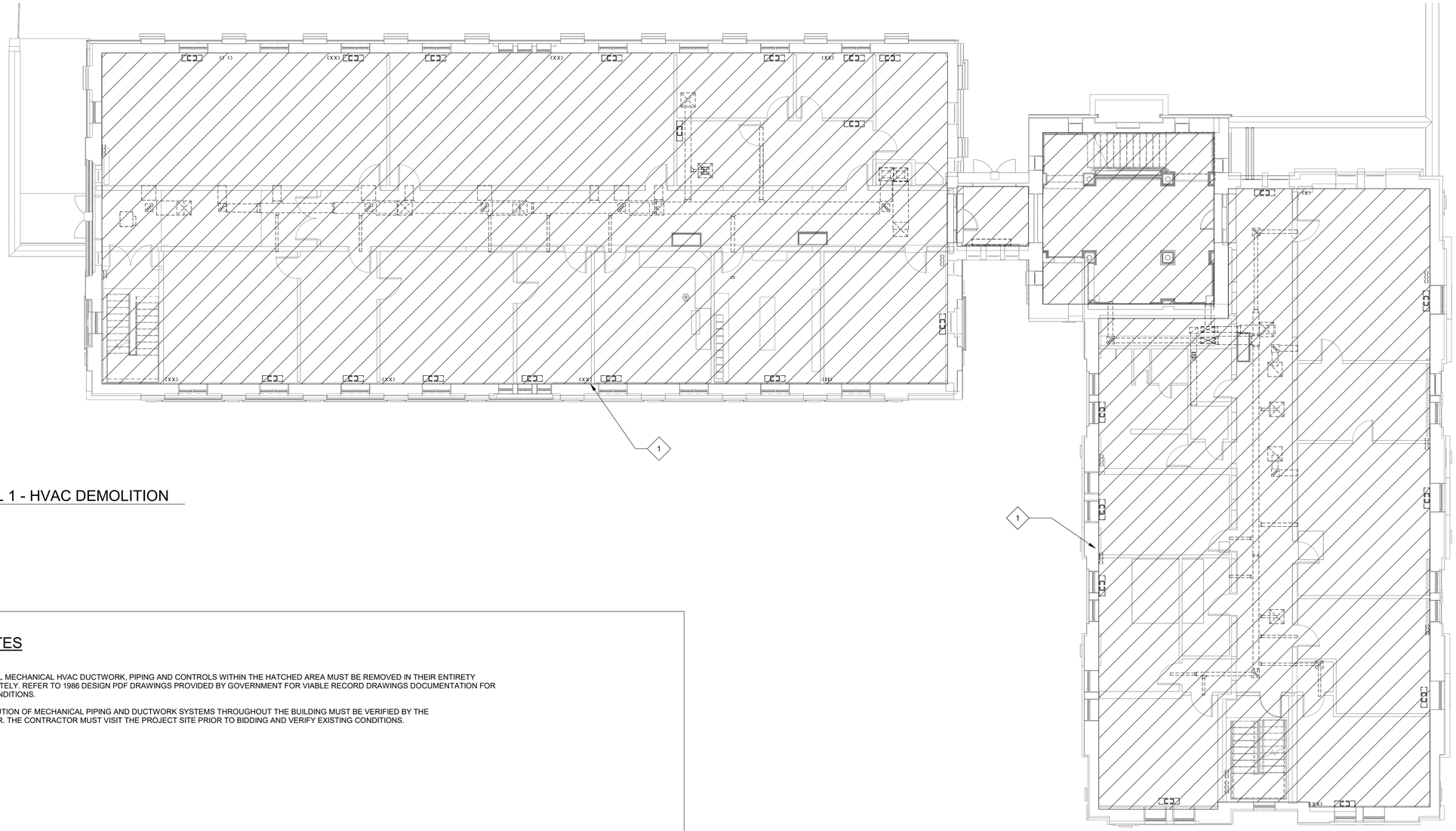
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

LEVEL B1 DEMOLITION PLAN - HVAC

SHEET ID

MD103

REVISED RTA SUBMISSION 03/01/2023



C1 LEVEL 1 - HVAC DEMOLITION

1/8" = 1'-0"

KEY NOTES

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6. REMOVE CHW AND HHW SYSTEM PUMPOS INCLUDING CONNECTED PIPING, VALVES, HYDRONIC SPECIALTIES, HANGERS, SUPPORTS, INSULATION, POWER CONNECTION, CONTROL AND FILED DEVICES.
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SCALE: 1/8"=1'-0"

N

US Army Corps of Engineers ®

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DESIGNED BY: N. SLEEM
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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

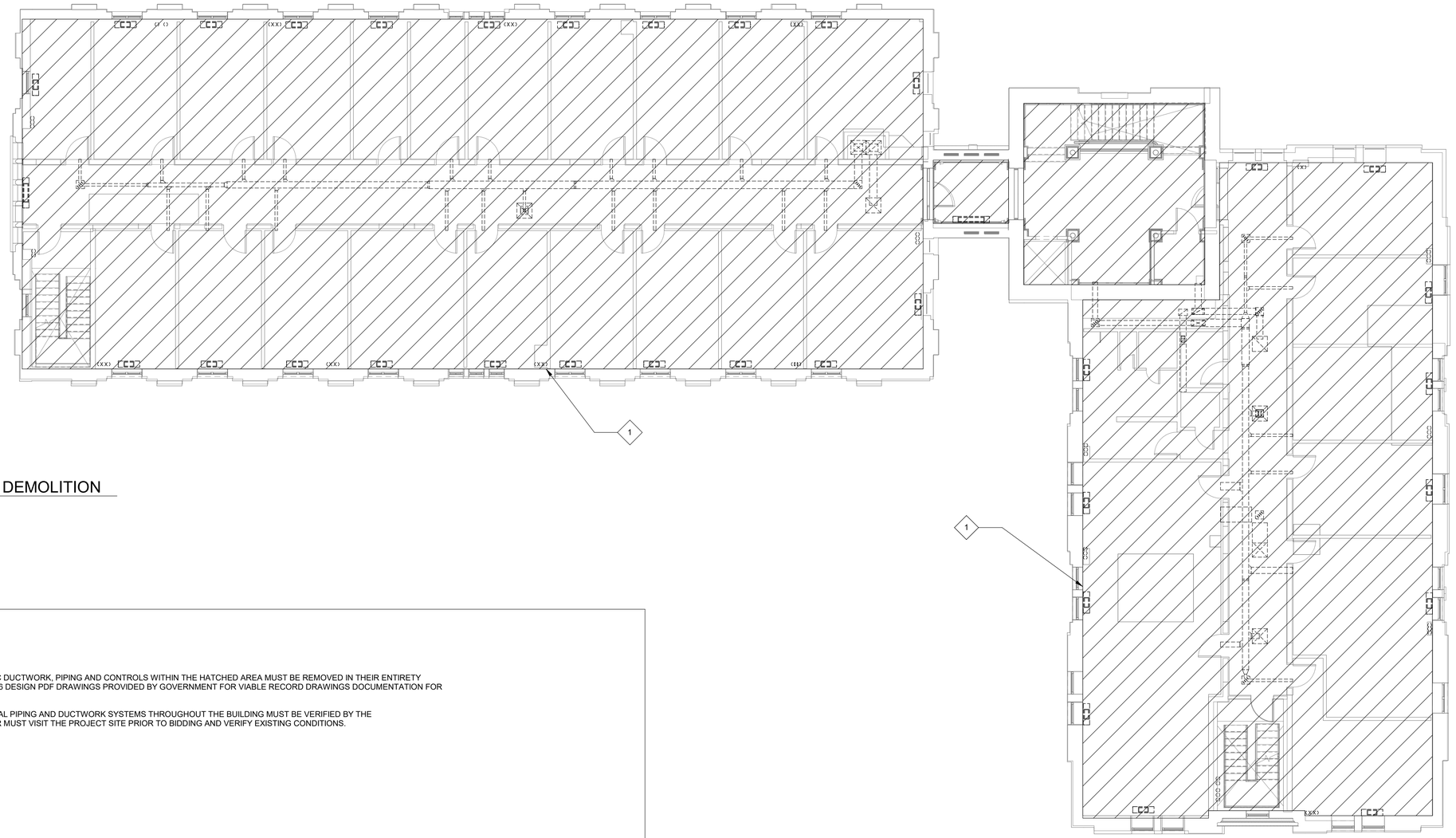
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

LEVEL 1 DEMOLITION PLAN - HVAC

SHEET ID

MD104

REVISED RTA SUBMISSION 03/01/2023



C1 LEVEL 2 - HVAC DEMOLITION

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7. REMOVE AIR SYSTEMS (I.E., AIR HANDLING UNITS, HEATING AND VENTILATION UNITS, EXHAUST FANS, AIR MOVING EQUIPMENT, ETC.) IN THIER ENTIRETY, INCLUDING CONNECTED DUCTWORK, HANGERS, SUPPORTS, INSULATION CONRETE HOUSEKEEPING PADS, DAMPERS, AIR FIXTURES, CHW PIPING, HHW PIPING, POWER CONNECTIONS, ASSOCIATED CONTROLS AND FIELD DEVICES.
8. REMOVE HVAC SUPPLY AND RETURN DUCT SYSTEMS INCLUDING RISERS, HANGERS, SUPPORTS, INSULATION VOLUME DAMPERS AND FIRE DAMPERS IN THEIR ENTIRETY. DEMOLISH DUCT MOUNTED CONTROLS AND FIELD DEVICES.
9. REMOVE AIR INTAKE LOUVERS; OPENING TO BE UTILIZED FOR REPLACEMENT LOUVER; SEE NEW WORK PLAN.
10. REMOVE SPLIT DX SYSTEM INDOOR AIR HANDLING UNITS, CONNECTED DUCTWORK, REFRIGERANT PIPING, CONDENSATE DRAIN PIPING, INSULATION, POWER CONNECTIONS, ASSOCIATED CONTROLS AND FIELD DEVICES. DEMOLISH OUTDOOR CONDENSING UNITS OR HEAT PUMPS SERVING INDOOR AIR HANDLING UNIT, CONNECTED REFRIGERANT PIPING, POWER CONNECTION, ASSOCIATED CONTROLS AND FIELD DEVICES.
11. REMOVE HHW BASEBOARD HEATERS, UNIT HEATERS, RADIATORS, ETC. IN THEIR ENTIRETY, INCLUDING HYDRONIC SPECIALTIES, HANGERS, SUPPORTS, INSULATION, POWER CONNECTION, CONTROLS AND FIELD DEVICES. DEMOLISH CONNECTED HHW DISTRIBUTION PIPING SYSTEM SERVING BASEBOARD HEATERS IN ITS ENTIRETY.
12. REMOVE UNIT HEATERS INCLUDING CONNECTED PIPING, VALVES, HYDRONIC SPECIALTIES, HANGERS, SUPPORTS, INSULATION, POWER CONNECTION, CONTROLS AND FIELD DEVICES.
13. PATCH, SEAL AND FINISH OPENINGS FROM REMOVAL OF PIPING, DUCTWORK, LOUVERS OR EQUIPMENT USING MATERAILS AND CONSTRUCTION MATCHING OR EXCEEDING EXISTING ASSEMBLIES IN A WORKMANLIKE MANNER. OPENINGS BEING REUTILIZED BY REPLACEMENT MECHANICAL SYSTEMS MUST BE PROTECTED DURING CONSTRUCTION.
14. REMOVE DEMOLISHED DUCTWORK, PIPING, EQUIPMENT (REFUSED BY GOVERNMENT) AND ACCESSORIES FROM SITE AND PROPERLY DISPOSE OF MATERIALS IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL CODES AND ORDINANCES.
15. REMOVE DDC CONTROL PANELS, CONTROL WIRING, TUBING, SENSORS, TRANSMITTER, FILED DEVICES, ETC, NO LONGER REQUIRED DUE TO EQUIPMENT REMOVALS.

0 4' 8' 16'

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

N

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

SIZE: ANSI D FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

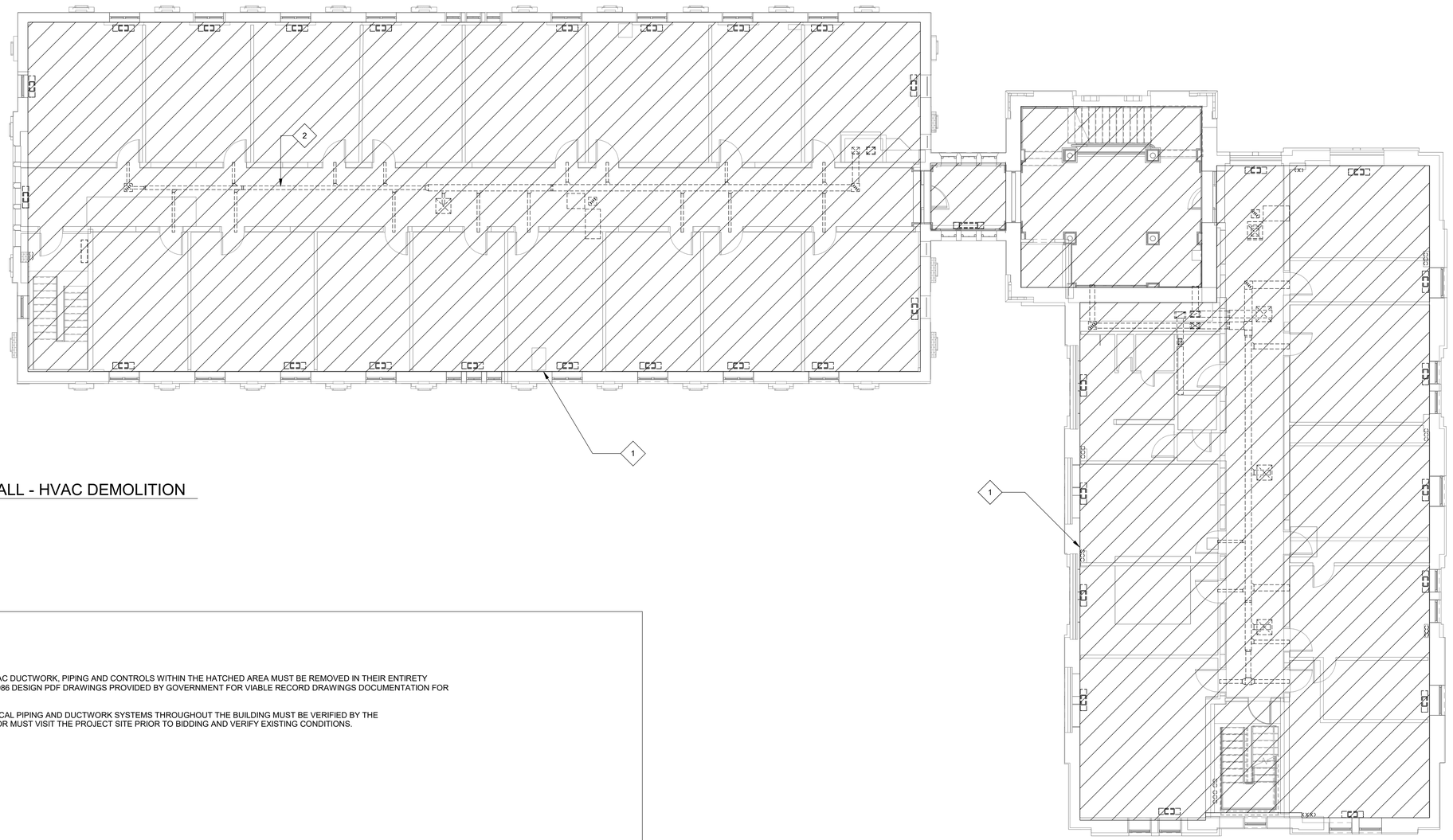
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

LEVEL 2 DEMOLITION PLAN - HVAC

SHEET ID

MD105

REVISED RTA SUBMISSION 03/01/2023



C1 LEVEL 3 - OVERALL - HVAC DEMOLITION

1/8" = 1'-0"

KEY NOTES

1. LINCOLN HALL MECHANICAL HVAC DUCTWORK, PIPING AND CONTROLS WITHIN THE HATCHED AREA MUST BE REMOVED IN THEIR ENTIRETY AND COMPLETELY. REFER TO 1986 DESIGN PDF DRAWINGS PROVIDED BY GOVERNMENT FOR VIABLE RECORD DRAWINGS DOCUMENTATION FOR EXISTING CONDITIONS.

   THE DISTRIBUTION OF MECHANICAL PIPING AND DUCTWORK SYSTEMS THROUGHOUT THE BUILDING MUST BE VERIFIED BY THE CONTRACTOR. THE CONTRACTOR MUST VISIT THE PROJECT SITE PRIOR TO BIDDING AND VERIFY EXISTING CONDITIONS.

GENERAL NOTES

1. REFER TO SHEET M-001 AND M-002 FOR LEGEND AND GENERAL NOTES.
2. GOVERNMENT IS RESPONDSIBLE FOR REMOVING ANY COMPONENTS DESIRED FOR SPARE PARTS OR REUSE PRIOR TO CONSTRUCTION DEMOLITION. CONTRACTOR MUST OFFER REMOVED EQUIPMENT TO GOVENRMENT AND DELIVER TO A LOCATION AS DIRECTED BY GOVERNMENT.
3. REMOVE COOLING CHILLED WATER SYSTEM (I.E., CHILLER, PUMPS, HYDRONIC SPECIALTIES, ETC.) IN ITS ENTIRETY, INCLUDING CONNECTED DISTRIBUTION SYSTEM SUPPLY AND RETURN PIPING, VERTICAL RISERS, HANGERS, SUPPORTS, INSULATION, CONCRETE HOUSEKEEPING PADS, POWER CONNECTIONS ASSOCIATED CONTROLS AND FIELD DEVICES. DEMOLISH CHILLED WATER PIPING BACK TO CAMPUS CHILLED WATER SITE UTILITY ENTRANCE LOCATION AT LEVEL B3 UTILITY TUNNEL ENTRANCE INTO MECHANICAL ROOM XB301.
4. REMOVE HEATING HOT WATER SYSTEM IN ITS ENTIRETY, INCLUDING DISTRIBUTION SYSTEM SUPPLY AND RETURN PIPING, HYDRONIC SPECIALTIES, VERTICAL RISERS, HANGERS, SUPPORTS, INSULATION, CONCRETE HOUSEKEEPING PADS, POWER CONNECTIONS ASSOCIATED CONTROLS AND FIELD DEVICES.
5. REMOVE CONDENSATE RETURN UNIT INCLUDING CONNECTED PIPING, VALVES, HYDRONIC SPECIALTIES, HANGERS, SUPPORTS, INSULATION, POWER CONNECTION, CONTROL AND FIELD DEVICES.
6. REMOVE CHW AND HHW SYSTEM PUMPOS INCLUDING CONNECTED PIPING, VALVES, HYDRONIC SPECIALTIES, HANGERS, SUPPORTS, INSULATION, POWER CONNECTION, CONTROL AND FILED DEVICES.
7. REMOVE AIR SYSTEMS (I.E., AIR HANDLING UNITS, HEATING AND VENTILATION UNITS, EXHAUST FANS, AIR MOVING EQUIPMENT, ETC.) IN THIER ENTIRETY, INCLUDING CONNECTED DUCTWORK, HANGERS, SUPPORTS, INSULATION CONRETE HOUSEKEEPING PADS, DAMPERS, AIR FIXTURES, CHW PIPING, HHW PIPING, POWER CONNECTIONS, ASSOCIATED CONTROLS AND FIELD DEVICES.
8. REMOVE HVAC SUPPLY AND RETURN DUCT SYSTEMS INCLUDING RISERS, HANGERS, SUPPORTS, INSULATION VOLUME DAMPERS AND FIRE DAMPERS IN THEIR ENTIRETY. DEMOLISH DUCT MOUNTED CONTROLS AND FIELD DEVICES.
9. REMOVE AIR INTAKE LOUVERS; OPENING TO BE UTILIZED FOR REPLACEMENT LOUVER; SEE NEW WORK PLAN.
10. REMOVE SPLIT DX SYSTEM INDOOR AIR HANDLING UNITS, CONNECTED DUCTWORK, REFRIGERANT PIPING, CONDENSATE DRAIN PIPING, INSULATION, POWER CONNECTIONS, ASSOCIATED CONTROLS AND FIELD DEVICES. DEMOLISH OUTDOOR CONDENSING UNITS OR HEAT PUMPS SERVING INDOOR AIR HANDLING UNIT, CONNECTED REFRIGERANT PIPING, POWER CONNECTION, ASSOCIATED CONTROLS AND FIELD DEVICES.
11. REMOVE HHW BASEBOARD HEATERS, UNIT HEATERS, RADIATORS, ETC. IN THEIR ENTIRETY, INCLUDING HYDRONIC SPECIALTIES, HANGERS, SUPPORTS, INSULATION, POWER CONNECTION, CONTROLS AND FIELD DEVICES. DEMOLISH CONNECTED HHW DISTRIBUTION PIPING SYSTEM SERVING BASEBOARD HEATERS IN ITS ENTIRETY.
12. REMOVE UNIT HEATERS INCLUDING CONNECTED PIPING, VALVES, HYDRONIC SPECIALTIES, HANGERS, SUPPORTS, INSULATION, POWER CONNECTION, CONTROLS AND FIELD DEVICES.
13. PATCH, SEAL AND FINISH OPENINGS FROM REMOVAL OF PIPING, DUCTWORK, LOUVERS OR EQUIPMENT USING MATERAILS AND CONSTRUCTION MATCHING OR EXCEEDING EXISTING ASSEMBLIES IN A WORKMANLIKE MANNER. OPENINGS BEING REUTILIZED BY REPLACEMENT MECHANICAL SYSTEMS MUST BE PROTECTED DURING CONSTRUCTION.
14. REMOVE DEMOLISHED DUCTWORK, PIPING, EQUIPMENT (REFUSED BY GOVERNMENT) AND ACCESSORIES FROM SITE AND PROPERLY DISPOSE OF MATERIALS IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL CODES AND ORDINANCES.
15. REMOVE DDC CONTROL PANELS, CONTROL WIRING, TUBING, SENSORS, TRANSMITTER, FILED DEVICES, ETC, NO LONGER REQUIRED DUE TO EQUIPMENT REMOVALS.

0 4' 8' 16'

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

N

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI D

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

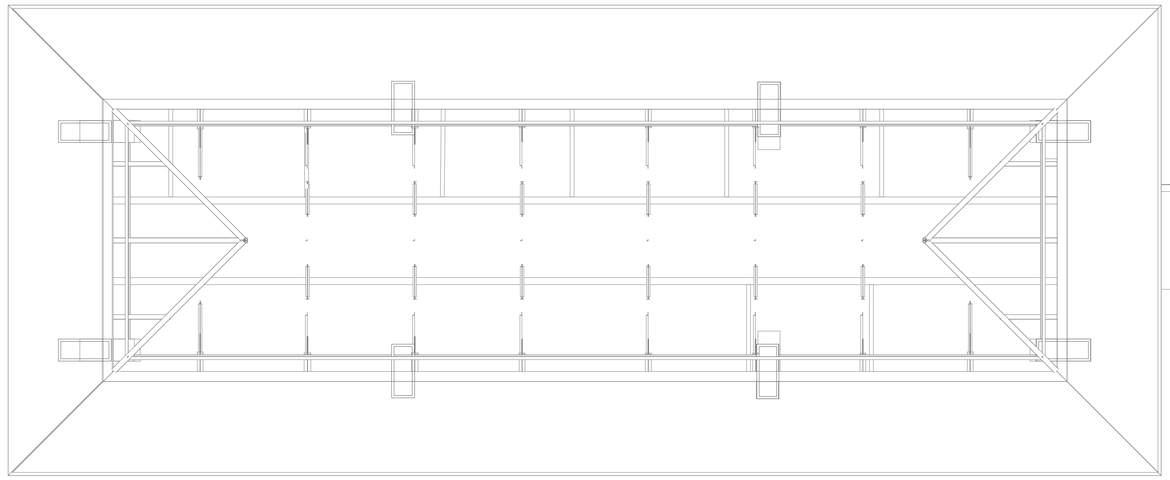
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

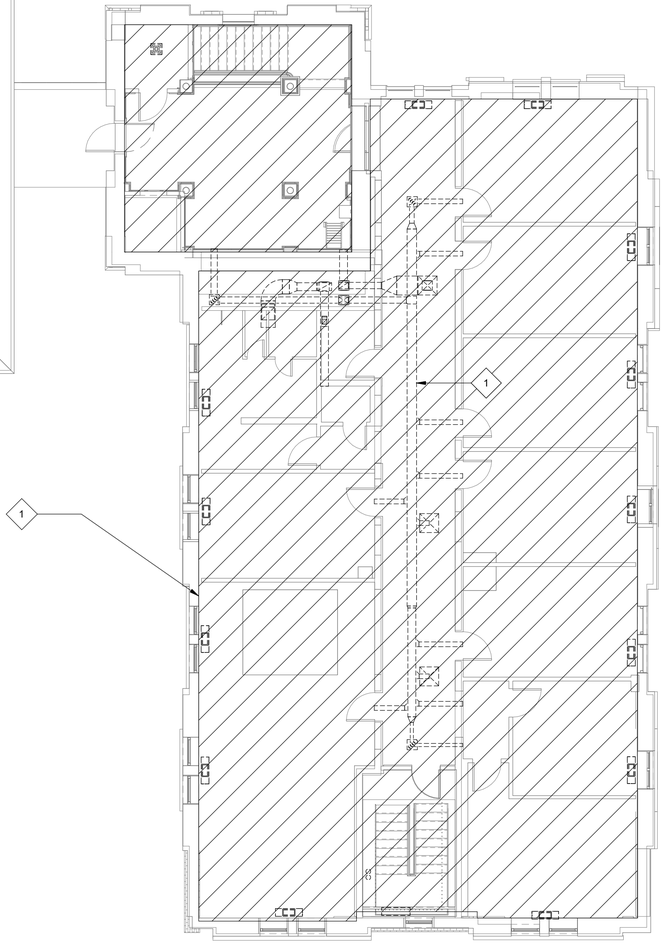
LEVEL 3 DEMOLITION PLAN - HVAC

SHEET ID

MD106

REVISED RTA SUBMISSION 03/01/2023





C1 LEVEL 4 - HVAC DEMOLITION
1/8" = 1'-0"

KEY NOTES

1. LINCOLN HALL MECHANICAL HVAC DUCTWORK, PIPING AND CONTROLS WITHIN THE HATCHED AREA MUST BE REMOVED IN THEIR ENTIRETY AND COMPLETELY. REFER TO 1986 DESIGN PDF DRAWINGS PROVIDED BY GOVERNMENT FOR VIABLE RECORD DRAWINGS DOCUMENTATION FOR EXISTING CONDITIONS.

   THE DISTRIBUTION OF MECHANICAL PIPING AND DUCTWORK SYSTEMS THROUGHOUT THE BUILDING MUST BE VERIFIED BY THE CONTRACTOR. THE CONTRACTOR MUST VISIT THE PROJECT SITE PRIOR TO BIDDING AND VERIFY EXISTING CONDITIONS.

GENERAL NOTES

1. REFER TO SHEET M-001 AND M-002 FOR LEGEND AND GENERAL NOTES.
2. GOVERNMENT IS RESPONDSIBLE FOR REMOVING ANY COMPONENTS DESIRED FOR SPARE PARTS OR REUSE PRIOR TO CONSTRUCTION DEMOLITION. CONTRACTOR MUST OFFER REMOVED EQUIPMENT TO GOVENRMENT AND DELIVER TO A LOCATION AS DIRECTED BY GOVERNMENT.
3. REMOVE COOLING CHILLED WATER SYSTEM (I.E., CHILLER, PUMPS, HYDRONIC SPECIALTIES, ETC.) IN ITS ENTIRETY, INCLUDING CONNECTED DISTRIBUTION SYSTEM SUPPLY AND RETURN PIPING, VERTICAL RISERS, HANGERS, SUPPORTS, INSULATION, CONCRETE HOUSEKEEPING PADS, POWER CONNECTIONS ASSOCIATED CONTROLS AND FIELD DEVICES. DEMOLISH CHILLED WATER PIPING BACK TO CAMPUS CHILLED WATER SITE UTILITY ENTRANCE LOCATION AT LEVEL B3 UTILITY TUNNEL ENTRANCE INTO MECHANICAL ROOM XB301.
4. REMOVE HEATING HOT WATER SYSTEM IN ITS ENTIRETY, INCLUDING DISTRIBUTION SYSTEM SUPPLY AND RETURN PIPING, HYDRONIC SPECIALTIES, VERTICAL RISERS, HANGERS, SUPPORTS, INSULATION, CONCRETE HOUSEKEEPING PADS, POWER CONNECTIONS ASSOCIATED CONTROLS AND FIELD DEVICES.
5. REMOVE CONDENSATE RETURN UNIT INCLUDING CONNECTED PIPING, VALVES, HYDRONIC SPECIALTIES, HANGERS, SUPPORTS, INSULATION, POWER CONNECTION, CONTROL AND FIELD DEVICES.
6. REMOVE CHW AND HHW SYSTEM PUMPOS INCLUDING CONNECTED PIPING, VALVES, HYDRONIC SPECIALTIES, HANGERS, SUPPORTS, INSULATION, POWER CONNECTION, CONTROL AND FILED DEVICES.
7. REMOVE AIR SYSTEMS (I.E., AIR HANDLING UNITS, HEATING AND VENTILATION UNITS, EXHAUST FANS, AIR MOVING EQUIPMENT, ETC.) IN THIER ENTIRETY, INCLUDING CONNECTED DUCTWORK, HANGERS, SUPPORTS, INSULATION CONRETE HOUSEKEEPING PADS, DAMPERS, AIR FIXTURES, CHW PIPING, HHW PIPING, POWER CONNECTIONS, ASSOCIATED CONTROLS AND FIELD DEVICES.
8. REMOVE HVAC SUPPLY AND RETURN DUCT SYSTEMS INCLUDING RISERS, HANGERS, SUPPORTS, INSULATION VOLUME DAMPERS AND FIRE DAMPERS IN THEIR ENTIRETY. DEMOLISH DUCT MOUNTED CONTROLS AND FIELD DEVICES.
9. REMOVE AIR INTAKE LOUVERS; OPENING TO BE UTILIZED FOR REPLACEMENT LOUVER; SEE NEW WORK PLAN.
10. REMOVE SPLIT DX SYSTEM INDOOR AIR HANDLING UNITS, CONNECTED DUCTWORK, REFRIGERANT PIPING, CONDENSATE DRAIN PIPING, INSULATION, POWER CONNECTIONS, ASSOCIATED CONTROLS AND FIELD DEVICES. DEMOLISH OUTDOOR CONDENSING UNITS OR HEAT PUMPS SERVING INDOOR AIR HANDLING UNIT, CONNECTED REFRIGERANT PIPING, POWER CONNECTION, ASSOCIATED CONTROLS AND FIELD DEVICES.
11. REMOVE HHW BASEBOARD HEATERS, UNIT HEATERS, RADIATORS, ETC. IN THEIR ENTIRETY, INCLUDING HYDRONIC SPECIALTIES, HANGERS, SUPPORTS, INSULATION, POWER CONNECTION, CONTROLS AND FIELD DEVICES. DEMOLISH CONNECTED HHW DISTRIBUTION PIPING SYSTEM SERVING BASEBOARD HEATERS IN ITS ENTIRETY.
12. REMOVE UNIT HEATERS INCLUDING CONNECTED PIPING, VALVES, HYDRONIC SPECIALTIES, HANGERS, SUPPORTS, INSULATION, POWER CONNECTION, CONTROLS AND FIELD DEVICES.
13. PATCH, SEAL AND FINISH OPENINGS FROM REMOVAL OF PIPING, DUCTWORK, LOUVERS OR EQUIPMENT USING MATERAILS AND CONSTRUCTION MATCHING OR EXCEEDING EXISTING ASSEMBLIES IN A WORKMANLIKE MANNER. OPENINGS BEING REUTILIZED BY REPLACEMENT MECHANICAL SYSTEMS MUST BE PROTECTED DURING CONSTRUCTION.
14. REMOVE DEMOLISHED DUCTWORK, PIPING, EQUIPMENT (REFUSED BY GOVERNMENT) AND ACCESSORIES FROM SITE AND PROPERLY DISPOSE OF MATERIALS IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL CODES AND ORDINANCES.
15. REMOVE DDC CONTROL PANELS, CONTROL WIRING, TUBING, SENSORS, TRANSMITTER, FILED DEVICES, ETC, NO LONGER REQUIRED DUE TO EQUIPMENT REMOVALS.

0 4' 8' 16'
SCALE: 1/8"=1'-0"

N

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
SIZE: ANSI D
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

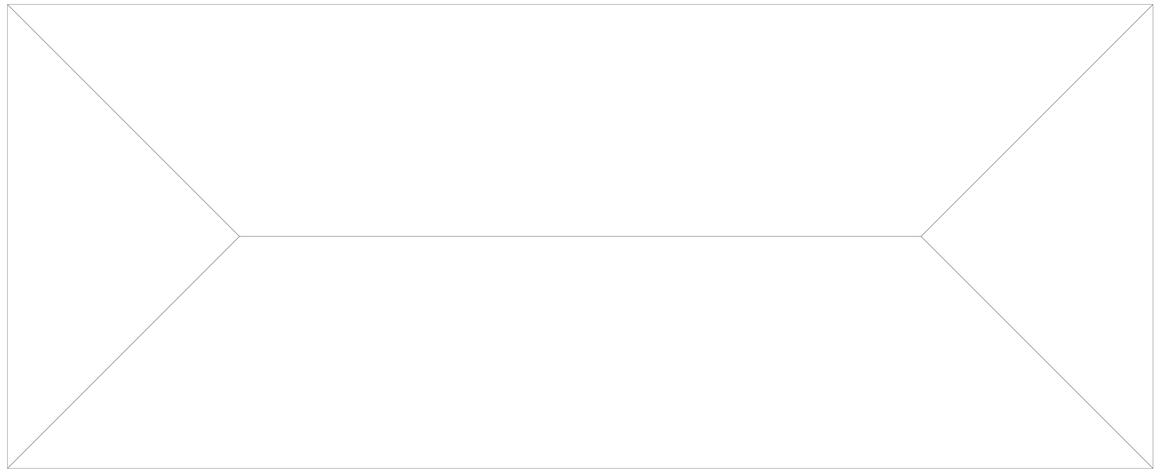
JACOBS / EWING COLE *A Joint Venture*

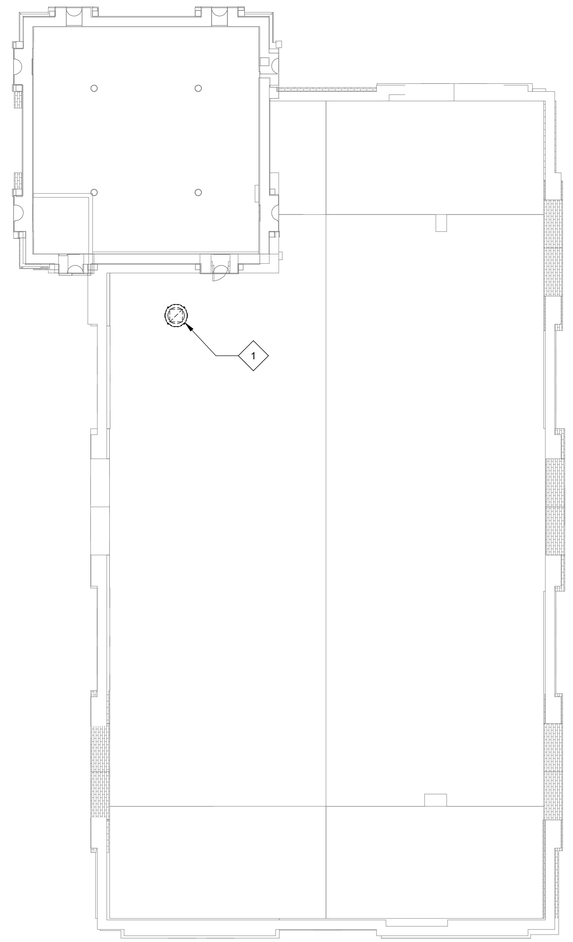
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

LEVEL 4 DEMOLITION PLAN - HVAC

SHEET ID
MD107

REVISED RTA SUBMISSION 03/01/2023





C1 LEVEL 5 - ROOF PLAN - HVAC DEMOLITION

1/8" = 1'-0"

KEY NOTES

1. REMOVE ROOFTOP MOUNTED UPBLAST EXHAUST FANS IN ITS ENTIRETY, INCLUDING CONNECTED DUCTWORK, HANGERS, SUPPORT, INSULATION, ROOF CURB, DAMPERS, POWER CONNECTIONS, ASSOCIATED CONTROLS AND FIELD DEVICES. REFER TO 1986 DESIGN PDF DRAWINGS PROVIDED BY GOVERNMENT FOR AVAIBLE RECORD DRAWINGS DOCUMENTATION FOR EXISTING CONDITIONS.

   THE DISTRIBUTION OF MECHANICAL PIPING AND DUCTWORK SYSTEMS THROUGHOUT THE BUILDING MUST BE VERIFIED BY THE CONTRACTOR. THE CONTRACTOR MUST VISIT THE PROJECT SITE PRIOR TO BIDDING AND VERIFY EXISTING CONDITIONS.

GENERAL NOTES

1. REFER TO SHEET M-001 AND M-002 FOR LEGEND AND GENERAL NOTES.
2. GOVERNMENT IS RESPONDSIBLE FOR REMOVING ANY COMPONENTS DESIRED FOR SPARE PARTS OR REUSE PRIOR TO CONSTRUCTION DEMOLITION. CONTRACTOR MUST OFFER REMOVED EQUIPMENT TO GOVENRMENT AND DELIVER TO A LOCATION AS DIRECTED BY GOVENERMENT.
3. PATCH, SEAL AND FINISH OPENINGS FROM REMOVAL OF PIPING, DUCTWORK, LOUVERS OR EQUIPMENT USING MATERIALS AND CONSTRUCTION MATCHING OR EXCEEDING EXISTING ASSEMBLIES IN A WORKMANLIKE MANNER. OPENINGS BEING REUTILIZED BY REPLACEMENT MECHANICAL SYSTEMS MUST BE PROTECTED DURING CONSTRUCTION.
4. REMOVE DEMOLISHED DUCTWORK, PIPING, EQUIPMENT (REFUSED BY GOVERNMENT) AND ACCESSORIES FROM SITE AND PROPERLY DISPOSE OF MATERIALS IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL CODES AND ORDINANCES.
5. REMOVE DDC CONTROLS PANELS, CONTROL WIRING, TUBING, SENSORS, TRANSMITTER, FIELD DEVICES, ETC. NO LONGER REQUIRED DUE TO EQUIPMENT REMOVALS.

0 4' 8' 16'

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

N

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

SIZE: ANSI D
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

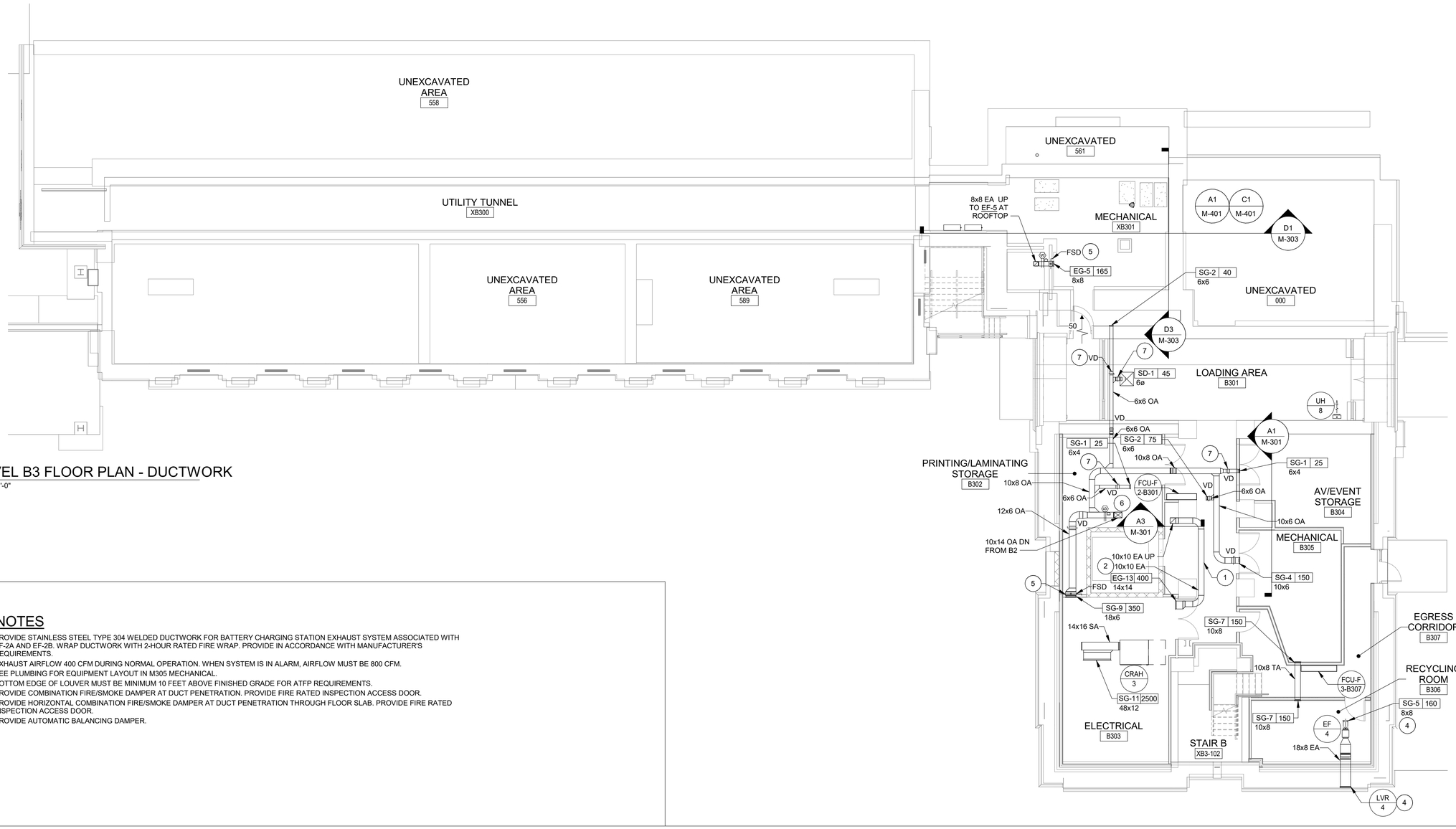
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

ROOF DEMOLITION PLAN - HVAC

SHEET ID

MD108

REVISED RTA SUBMISSION 03/01/2023



C1 LEVEL B3 FLOOR PLAN - DUCTWORK

1/8" = 1'-0"

KEYNOTES

1 PROVIDE STAINLESS STEEL TYPE 304 WELDED DUCTWORK FOR BATTERY CHARGING STATION EXHAUST SYSTEM ASSOCIATED WITH EF-2A AND EF-2B. WRAP DUCTWORK WITH 2-HOUR RATED FIRE WRAP. PROVIDE IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.

2 EXHAUST AIRFLOW 400 CFM DURING NORMAL OPERATION. WHEN SYSTEM IS IN ALARM, AIRFLOW MUST BE 800 CFM.

3 SEE PLUMBING FOR EQUIPMENT LAYOUT IN M305 MECHANICAL.

4 BOTTOM EDGE OF LOUVER MUST BE MINIMUM 10 FEET ABOVE FINISHED GRADE FOR ATFP REQUIREMENTS.

5 PROVIDE COMBINATION FIRE/SMOKE DAMPER AT DUCT PENETRATION. PROVIDE FIRE RATED INSPECTION ACCESS DOOR.

6 PROVIDE HORIZONTAL COMBINATION FIRE/SMOKE DAMPER AT DUCT PENETRATION THROUGH FLOOR SLAB. PROVIDE FIRE RATED INSPECTION ACCESS DOOR.

7 PROVIDE AUTOMATIC BALANCING DAMPER.

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. VOLUME BALANCING DAMPERS MUST BE OPPOSED BLADE TYPE UNLESS OTHERWISE NOTED. 4" ROUND DAMPERS MUST BE BUTTERFLY TYPE.
3. PROVIDE MITERED ELBOWS WITH TURNING VANES UNLESS OTHERWISE NOTED.
4. AIR TERMINALS LOCATED IN RESTROOMS AND JANITOR CLOSETS MUST BE ALUMINUM CONSTRUCTION.
5. SEE PIPING PLANS FOR LOCATIONS OF BAS ENCLOSURES, THERMOSTATS, SPACE TEMPERATURE, HUMIDITY, CO2 SENSORS, & ETC.
6. MAXIMUM FLEXIBLE DUCT LENGTH MUST BE 5 FEET.
7. MAINTAIN EQUIPMENT ACCESS CLEARANCE FOR ELECTRICAL MAINTENANCE. REPAIRS, MOTOR REPLACEMENT, ETC.
8. PROVIDE DUCTED FCUs WITH BOTTOM ACCESS FOR FILTER CHANGES AND MAINTENANCE ACCESS. COORDINATE REQUIRED LEFT HAND/RIGHT HAND SIDE FCU PIPING CONNECTIONS TO MAINTAIN ACCESS.
9. PROVIDE FIRE STOPPING AT PENETRATIONS FOR FIRE RATED WALL, FLOOR AND CEILING ASSEMBLIES.
10. ROUTE MECHANICAL DUCTWORK TIGHT TO OVERHEAD STRUCTURAL DECK TO THE GREATEST EXTENT POSSIBLE.

0 4' 8' 16'

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

N

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-18-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

SIZE: ANSI D
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

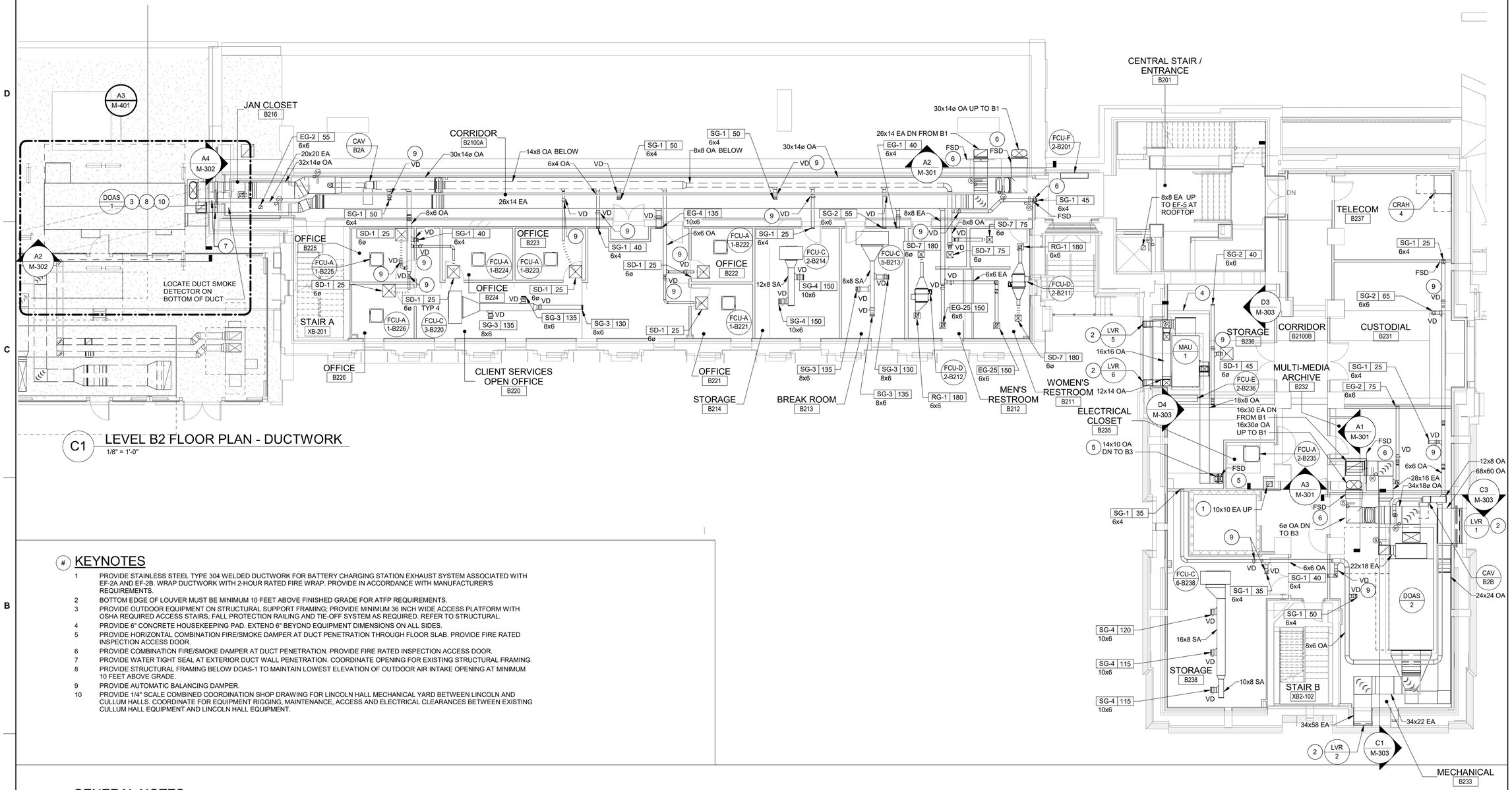
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

LEVEL B3 FLOOR PLAN - DUCTWORK

SHEET ID

MH101

REVISED RTA SUBMISSION 03/01/2023



C1 LEVEL B2 FLOOR PLAN - DUCTWORK

1/8" = 1'-0"

KEYNOTES

(#)

1 PROVIDE STAINLESS STEEL TYPE 304 WELDED DUCTWORK FOR BATTERY CHARGING STATION EXHAUST SYSTEM ASSOCIATED WITH EF-2A AND EF-2B. WRAP DUCTWORK WITH 2-HOUR RATED FIRE WRAP. PROVIDE IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.

2 BOTTOM EDGE OF LOUVER MUST BE MINIMUM 10 FEET ABOVE FINISHED GRADE FOR ATFP REQUIREMENTS.

3 PROVIDE OUTDOOR EQUIPMENT ON STRUCTURAL SUPPORT FRAMING; PROVIDE MINIMUM 36 INCH WIDE ACCESS PLATFORM WITH OSHA REQUIRED ACCESS STAIRS, FALL PROTECTION RAILING AND TIE-OFF SYSTEM AS REQUIRED. REFER TO STRUCTURAL.

4 PROVIDE 6" CONCRETE HOUSEKEEPING PAD. EXTEND 6" BEYOND EQUIPMENT DIMENSIONS ON ALL SIDES.

5 PROVIDE HORIZONTAL COMBINATION FIRE/SMOKE DAMPER AT DUCT PENETRATION THROUGH FLOOR SLAB. PROVIDE FIRE RATED INSPECTION ACCESS DOOR.

6 PROVIDE COMBINATION FIRE/SMOKE DAMPER AT DUCT PENETRATION. PROVIDE FIRE RATED INSPECTION ACCESS DOOR.

7 PROVIDE WATER TIGHT SEAL AT EXTERIOR DUCT WALL PENETRATION. COORDINATE OPENING FOR EXISTING STRUCTURAL FRAMING.

8 PROVIDE STRUCTURAL FRAMING BELOW DOAS-1 TO MAINTAIN LOWEST ELEVATION OF OUTDOOR AIR INTAKE OPENING AT MINIMUM 10 FEET ABOVE GRADE.

9 PROVIDE AUTOMATIC BALANCING DAMPER.

10 PROVIDE 1/4" SCALE COMBINED COORDINATION SHOP DRAWING FOR LINCOLN HALL MECHANICAL YARD BETWEEN LINCOLN AND CULLUM HALLS. COORDINATE FOR EQUIPMENT RIGGING, MAINTENANCE, ACCESS AND ELECTRICAL CLEARANCES BETWEEN EXISTING CULLUM HALL EQUIPMENT AND LINCOLN HALL EQUIPMENT.

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. VOLUME BALANCING DAMPERS MUST BE OPPOSED BLADE TYPE UNLESS OTHERWISE NOTED. 4" ROUND DAMPERS MUST BE BUTTERFLY TYPE.
3. PROVIDE MITERED ELBOWS WITH TURNING VANES UNLESS OTHERWISE NOTED.
4. AIR TERMINALS LOCATED IN RESTROOMS AND JANITOR CLOSETS MUST BE ALUMINUM CONSTRUCTION.
5. SEE PIPING PLANS FOR LOCATIONS OF BAS ENCLOSURES, THERMOSTATS, SPACE TEMPERATURE, HUMIDITY, CO2 SENSORS, & ETC.
6. MAXIMUM FLEXIBLE DUCT LENGTH MUST BE 5 FEET.
7. MAINTAIN EQUIPMENT ACCESS CLEARANCE FOR ELECTRICAL MAINTENANCE. REPAIRS, MOTOR REPLACEMENT, ETC.
8. PROVIDE DUCTED FCUs WITH BOTTOM ACCESS FOR FILTER CHANGES AND MAINTENANCE ACCESS. COORDINATE REQUIRED LEFT HAND/RIGHT HAND SIDE FCU PIPING CONNECTIONS TO MAINTAIN ACCESS.
9. PROVIDE FIRE STOPPING AT PENETRATIONS FOR FIRE RATED WALL, FLOOR AND CEILING ASSEMBLIES.
10. ROUTE MECHANICAL DUCTWORK TIGHT TO OVERHEAD STRUCTURAL DECK TO THE GREATEST EXTENT POSSIBLE.

0 4' 8' 16'

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

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US Army Corps of Engineers ®

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DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE A Joint Venture

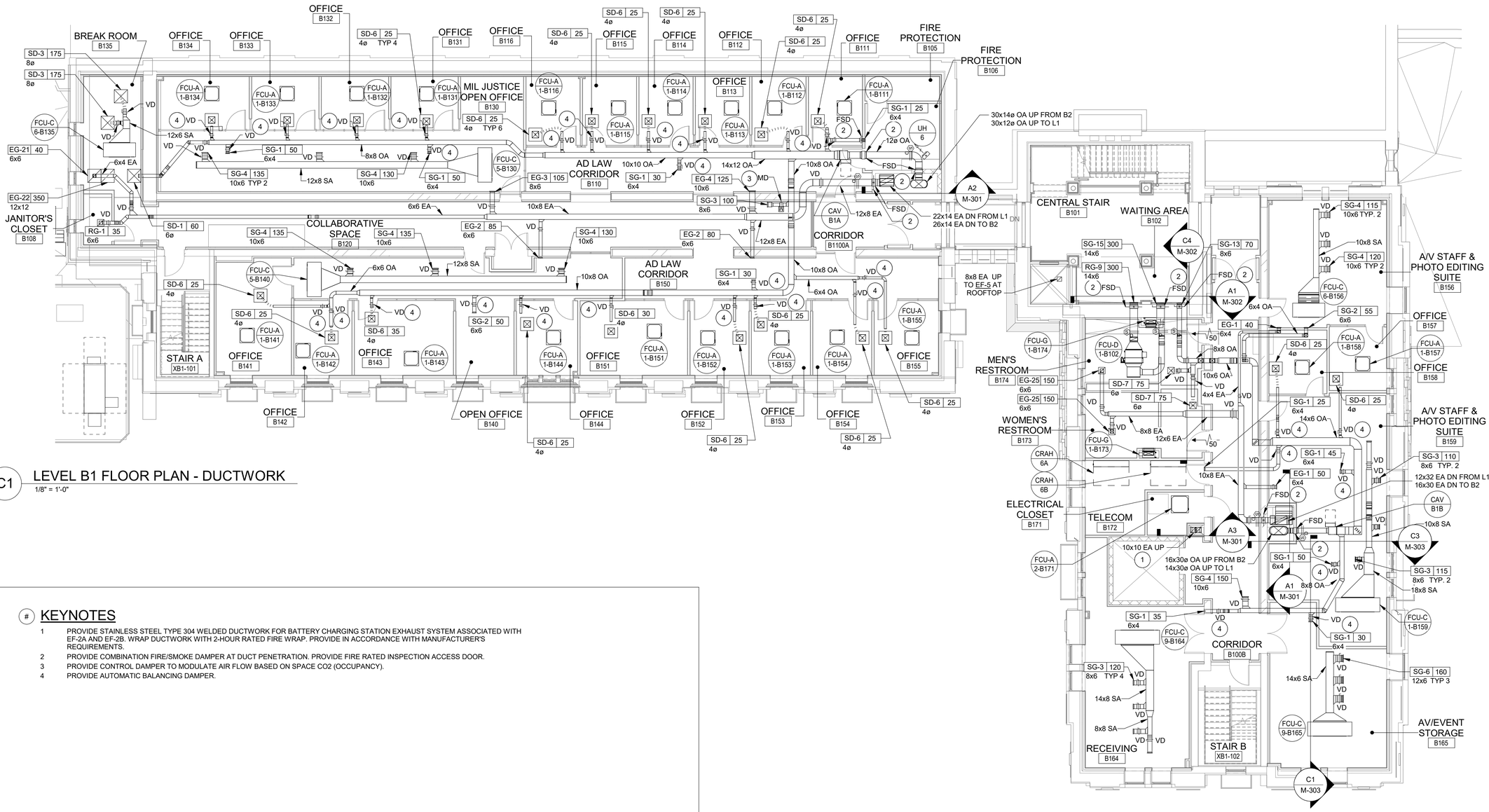
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

LEVEL B2 FLOOR PLAN - DUCTWORK

SHEET ID

MH102

REVISED RTA SUBMISSION 03/01/2023



C1 LEVEL B1 FLOOR PLAN - DUCTWORK

1/8" = 1'-0"

KEYNOTES

1. PROVIDE STAINLESS STEEL TYPE 304 WELDED DUCTWORK FOR BATTERY CHARGING STATION EXHAUST SYSTEM ASSOCIATED WITH EF-2A AND EF-2B. WRAP DUCTWORK WITH 2-HOUR RATED FIRE WRAP. PROVIDE IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.
2. PROVIDE COMBINATION FIRE/SMOKE DAMPER AT DUCT PENETRATION. PROVIDE FIRE RATED INSPECTION ACCESS DOOR.
3. PROVIDE CONTROL DAMPER TO MODULATE AIR FLOW BASED ON SPACE CO2 (OCCUPANCY).
4. PROVIDE AUTOMATIC BALANCING DAMPER.

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. VOLUME BALANCING DAMPERS MUST BE OPPOSED BLADE TYPE UNLESS OTHERWISE NOTED. 4" ROUND DAMPERS MUST BE BUTTERFLY TYPE.
3. PROVIDE MITERED ELBOWS WITH TURNING VANES UNLESS OTHERWISE NOTED.
4. AIR TERMINALS LOCATED IN RESTROOMS AND JANITOR CLOSETS MUST BE ALUMINUM CONSTRUCTION.
5. SEE PIPING PLANS FOR LOCATIONS OF BAS ENCLOSURES, THERMOSTATS, SPACE TEMPERATURE, HUMIDITY, CO2 SENSORS, & ETC.
6. MAXIMUM FLEXIBLE DUCT LENGTH MUST BE 5 FEET.
7. MAINTAIN EQUIPMENT ACCESS CLEARANCE FOR ELECTRICAL MAINTENANCE. REPAIRS, MOTOR REPLACEMENT, ETC.
8. PROVIDE DUCTED FCUs WITH BOTTOM ACCESS FOR FILTER CHANGES AND MAINTENANCE ACCESS. COORDINATE REQUIRED LEFT HAND/RIGHT HAND SIDE FCU PIPING CONNECTIONS TO MAINTAIN ACCESS.
9. PROVIDE FIRE STOPPING AT PENETRATIONS FOR FIRE RATED WALL, FLOOR AND CEILING ASSEMBLIES.
10. ROUTE MECHANICAL DUCTWORK TIGHT TO OVERHEAD STRUCTURAL DECK TO THE GREATEST EXTENT POSSIBLE.

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

N

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-18-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE, A Joint Venture

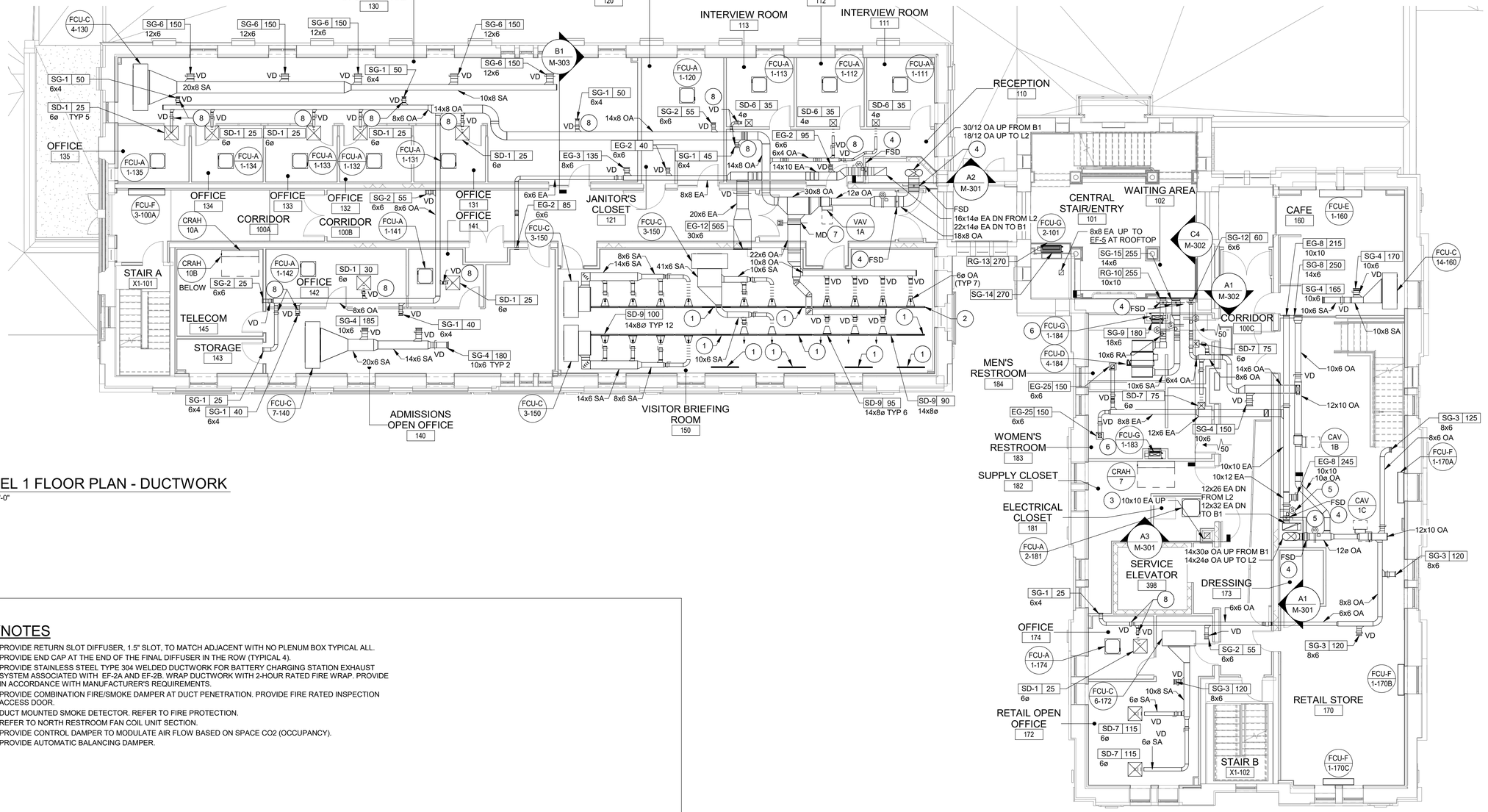
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

LEVEL B1 FLOOR PLAN - DUCTWORK

SHEET ID

MH103

REVISED RTA SUBMISSION 03/01/2023



C1 LEVEL 1 FLOOR PLAN - DUCTWORK

1/8" = 1'-0"

KEYNOTES

1. PROVIDE RETURN SLOT DIFFUSER, 1.5" SLOT, TO MATCH ADJACENT WITH NO PLENUM BOX TYPICAL ALL.
2. PROVIDE END CAP AT THE END OF THE FINAL DIFFUSER IN THE ROW (TYPICAL 4).
3. PROVIDE STAINLESS STEEL TYPE 304 WELDED DUCTWORK FOR BATTERY CHARGING STATION EXHAUST SYSTEM ASSOCIATED WITH EF-2A AND EF-2B. WRAP DUCTWORK WITH 2-HOUR RATED FIRE WRAP. PROVIDE IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.
4. PROVIDE COMBINATION FIRE/SMOKE DAMPER AT DUCT PENETRATION. PROVIDE FIRE RATED INSPECTION ACCESS DOOR.
5. DUCT MOUNTED SMOKE DETECTOR. REFER TO FIRE PROTECTION.
6. REFER TO NORTH RESTROOM FAN COIL UNIT SECTION.
7. PROVIDE CONTROL DAMPER TO MODULATE AIR FLOW BASED ON SPACE CO2 (OCCUPANCY).
8. PROVIDE AUTOMATIC BALANCING DAMPER.

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. VOLUME BALANCING DAMPERS MUST BE OPPOSED BLADE TYPE UNLESS OTHERWISE NOTED. 4" ROUND DAMPERS MUST BE BUTTERFLY TYPE.
3. PROVIDE MITERED ELBOWS WITH TURNING VANES UNLESS OTHERWISE NOTED.
4. AIR TERMINALS LOCATED IN RESTROOMS AND JANITOR CLOSETS MUST BE ALUMINUM CONSTRUCTION.
5. SEE PIPING PLANS FOR LOCATIONS OF BAS ENCLOSURES, THERMOSTATS, SPACE TEMPERATURE, HUMIDITY, CO2 SENSORS, & ETC.
6. MAXIMUM FLEXIBLE DUCT LENGTH MUST BE 5 FEET.
7. MAINTAIN EQUIPMENT ACCESS CLEARANCE FOR ELECTRICAL MAINTENANCE. REPAIRS, MOTOR REPLACEMENT, ETC.
8. PROVIDE DUCTED FCUs WITH BOTTOM ACCESS FOR FILTER CHANGES AND MAINTENANCE ACCESS. COORDINATE REQUIRED LEFT HAND/RIGHT HAND SIDE FCU PIPING CONNECTIONS TO MAINTAIN ACCESS.
9. PROVIDE FIRE STOPPING AT PENETRATIONS FOR FIRE RATED WALL, FLOOR AND CEILING ASSEMBLIES.
10. ROUTE MECHANICAL DUCTWORK TIGHT TO OVERHEAD STRUCTURAL DECK TO THE GREATEST EXTENT POSSIBLE.

0 4' 8' 16'

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

N

US Army Corps of Engineers ®

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DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:

ISSUE DATE: 01 MARCH 2023
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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE A Joint Venture

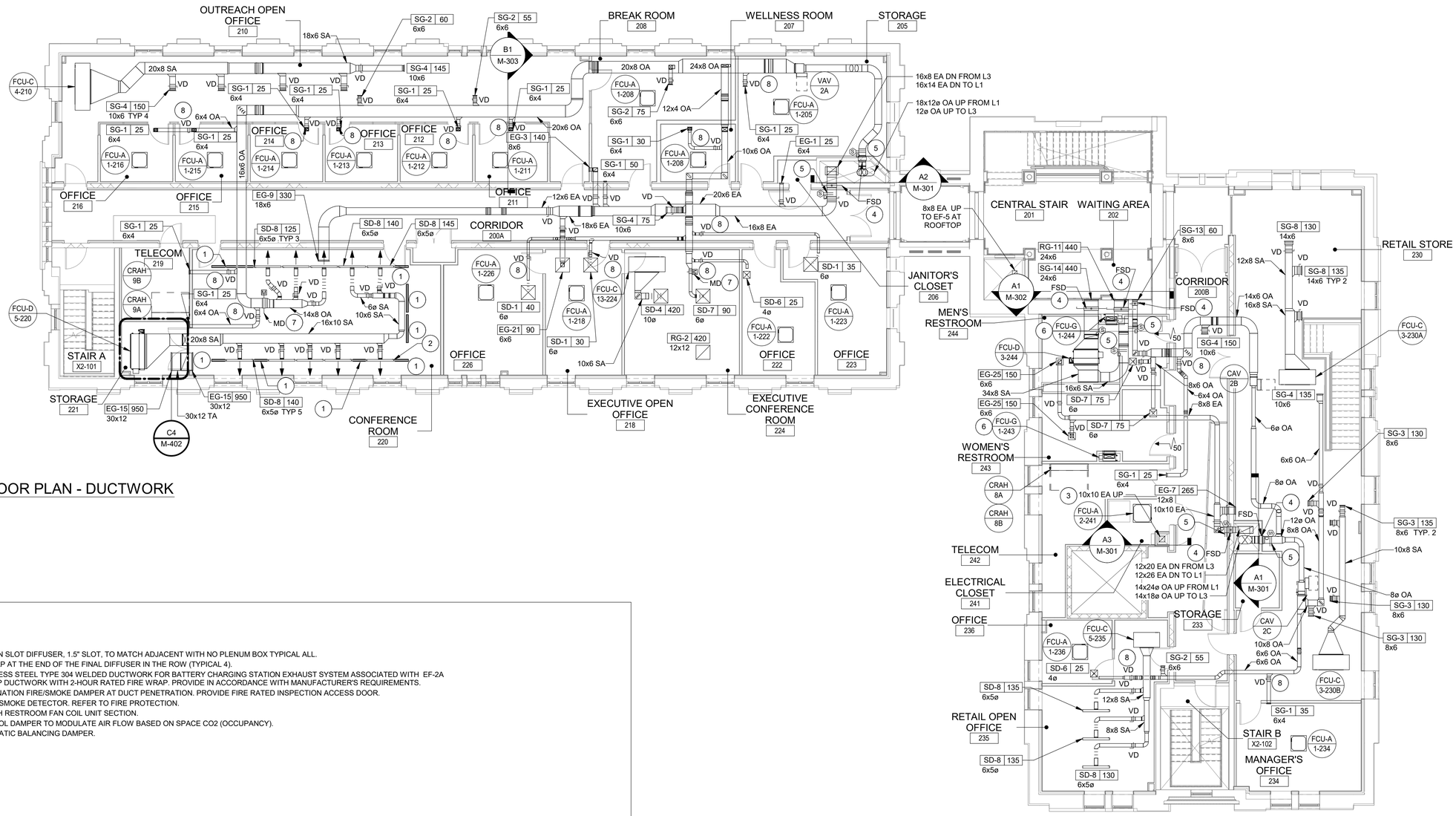
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

LEVEL 1 FLOOR PLAN - DUCTWORK

SHEET ID

MH104

REVISED RTA SUBMISSION 03/01/2023



C1 LEVEL 2 FLOOR PLAN - DUCTWORK

1/8" = 1'-0"

KEYNOTES

1. PROVIDE RETURN SLOT DIFFUSER, 1.5" SLOT, TO MATCH ADJACENT WITH NO PLENUM BOX TYPICAL ALL.
2. PROVIDE END CAP AT THE END OF THE FINAL DIFFUSER IN THE ROW (TYPICAL 4).
3. PROVIDE STAINLESS STEEL TYPE 304 WELDED DUCTWORK FOR BATTERY CHARGING STATION EXHAUST SYSTEM ASSOCIATED WITH EF-2A AND EF-2B. WRAP DUCTWORK WITH 2-HOUR RATED FIRE WRAP. PROVIDE IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.
4. PROVIDE COMBINATION FIRE/SMOKE DAMPER AT DUCT PENETRATION. PROVIDE FIRE RATED INSPECTION ACCESS DOOR.
5. DUCT MOUNTED SMOKE DETECTOR. REFER TO FIRE PROTECTION.
6. REFER TO NORTH RESTROOM FAN COIL UNIT SECTION.
7. PROVIDE CONTROL DAMPER TO MODULATE AIR FLOW BASED ON SPACE CO2 (OCCUPANCY).
8. PROVIDE AUTOMATIC BALANCING DAMPER.

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. VOLUME BALANCING DAMPERS MUST BE OPPOSED BLADE TYPE UNLESS OTHERWISE NOTED. 4" ROUND DAMPERS MUST BE BUTTERFLY TYPE.
3. PROVIDE MITERED ELBOWS WITH TURNING VANES UNLESS OTHERWISE NOTED.
4. AIR TERMINALS LOCATED IN RESTROOMS AND JANITOR CLOSETS MUST BE ALUMINUM CONSTRUCTION.
5. SEE PIPING PLANS FOR LOCATIONS OF BAS ENCLOSURES, THERMOSTATS, SPACE TEMPERATURE, HUMIDITY, CO2 SENSORS, & ETC.
6. MAXIMUM FLEXIBLE DUCT LENGTH MUST BE 5 FEET.
7. MAINTAIN EQUIPMENT ACCESS CLEARANCE FOR ELECTRICAL MAINTENANCE. REPAIRS, MOTOR REPLACEMENT, ETC.
8. PROVIDE DUCTED FCUs WITH BOTTOM ACCESS FOR FILTER CHANGES AND MAINTENANCE ACCESS. COORDINATE REQUIRED LEFT HAND/RIGHT HAND SIDE FCU PIPING CONNECTIONS TO MAINTAIN ACCESS.
9. PROVIDE FIRE STOPPING AT PENETRATIONS FOR FIRE RATED WALL, FLOOR AND CEILING ASSEMBLIES.
10. ROUTE MECHANICAL DUCTWORK TIGHT TO OVERHEAD STRUCTURAL DECK TO THE GREATEST EXTENT POSSIBLE.

0 4' 8' 16'

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

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US Army Corps of Engineers ®

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SUBMITTED BY:

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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

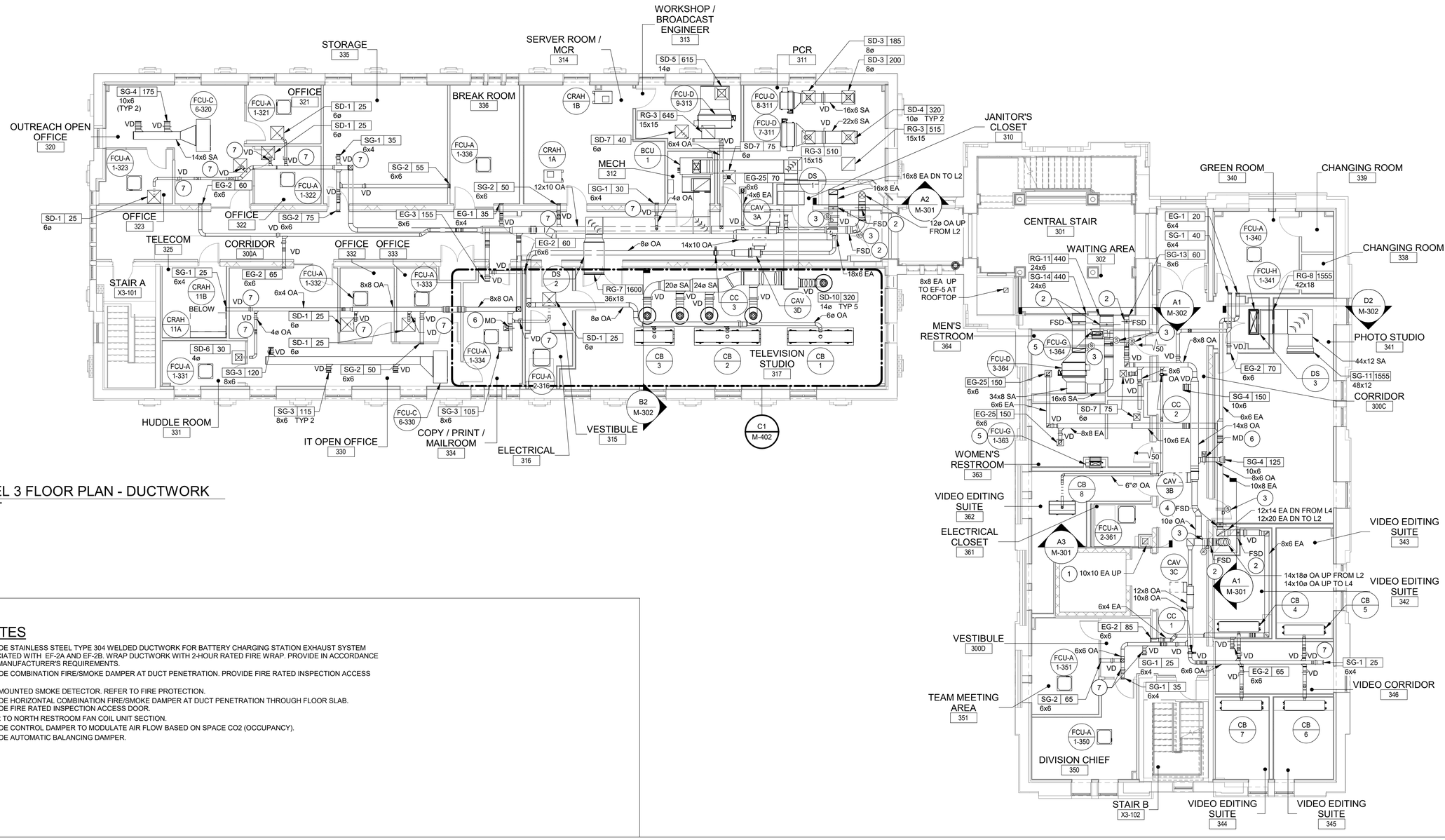
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

LEVEL 2 FLOOR PLAN - DUCTWORK

SHEET ID

MH105

REVISED RTA SUBMISSION 03/01/2023



C1 LEVEL 3 FLOOR PLAN - DUCTWORK

1/8" = 1'-0"

KEYNOTES

1. PROVIDE STAINLESS STEEL TYPE 304 WELDED DUCTWORK FOR BATTERY CHARGING STATION EXHAUST SYSTEM ASSOCIATED WITH EF-2A AND EF-2B. WRAP DUCTWORK WITH 2-HOUR RATED FIRE WRAP. PROVIDE IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.
2. PROVIDE COMBINATION FIRE/SMOKE DAMPER AT DUCT PENETRATION. PROVIDE FIRE RATED INSPECTION ACCESS DOOR.
3. DUCT MOUNTED SMOKE DETECTOR. REFER TO FIRE PROTECTION.
4. PROVIDE HORIZONTAL COMBINATION FIRE/SMOKE DAMPER AT DUCT PENETRATION THROUGH FLOOR SLAB. PROVIDE FIRE RATED INSPECTION ACCESS DOOR.
5. REFER TO NORTH RESTROOM FAN COIL UNIT SECTION.
6. PROVIDE CONTROL DAMPER TO MODULATE AIR FLOW BASED ON SPACE CO2 (OCCUPANCY).
7. PROVIDE AUTOMATIC BALANCING DAMPER.

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. VOLUME BALANCING DAMPERS MUST BE OPPOSED BLADE TYPE UNLESS OTHERWISE NOTED. 4" ROUND DAMPERS MUST BE BUTTERFLY TYPE.
3. PROVIDE MITERED ELBOWS WITH TURNING VANES UNLESS OTHERWISE NOTED.
4. AIR TERMINALS LOCATED IN RESTROOMS AND JANITOR CLOSETS MUST BE ALUMINUM CONSTRUCTION.
5. SEE PIPING PLANS FOR LOCATIONS OF BAS ENCLOSURES, THERMOSTATS, SPACE TEMPERATURE, HUMIDITY, CO2 SENSORS, & ETC.
6. MAXIMUM FLEXIBLE DUCT LENGTH MUST BE 5 FEET.
7. MAINTAIN EQUIPMENT ACCESS CLEARANCE FOR ELECTRICAL MAINTENANCE. REPAIRS, MOTOR REPLACEMENT, ETC.
8. PROVIDE DUCTED FCUs WITH BOTTOM ACCESS FOR FILTER CHANGES AND MAINTENANCE ACCESS. COORDINATE REQUIRED LEFT HAND/RIGHT HAND SIDE FCU PIPING CONNECTIONS TO MAINTAIN ACCESS.
9. PROVIDE FIRE STOPPING AT PENETRATIONS FOR FIRE RATED WALL, FLOOR AND CEILING ASSEMBLIES.
10. ROUTE MECHANICAL DUCTWORK TIGHT TO OVERHEAD STRUCTURAL DECK TO THE GREATEST EXTENT POSSIBLE.

0 4' 8' 16'

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

N

US Army Corps of Engineers ®

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DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:

ISSUE DATE: 01 MARCH 2023
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CONTRACT NO.: W912DS-19-C-0031-L
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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

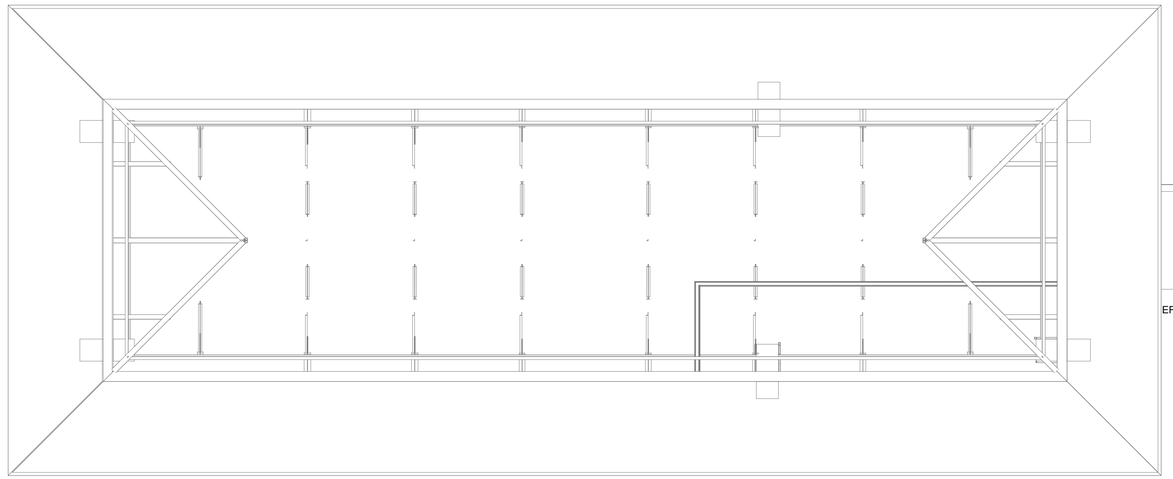
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

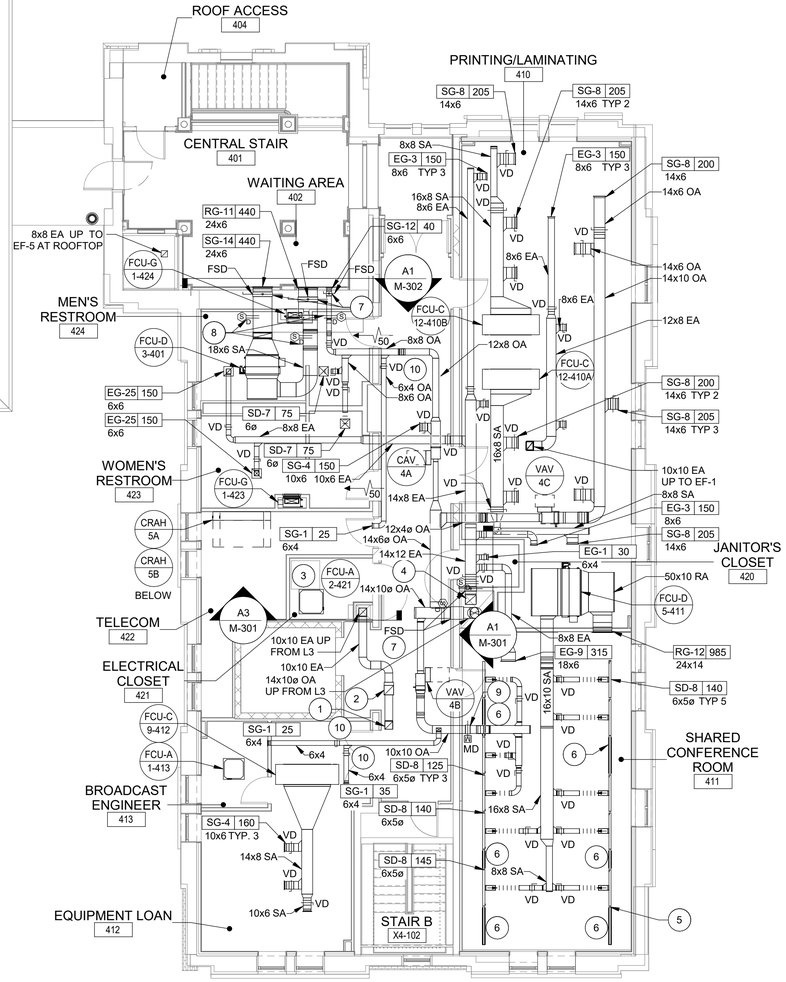
LEVEL 3 FLOOR PLAN - DUCTWORK

SHEET ID

MH106

REVISED RTA SUBMISSION 03/01/2023





C1 LEVEL 4 FLOOR PLAN - DUCTWORK

1/8" = 1'-0"

KEYNOTES

1 DUCT UP TO EF-2A.
2 DUCT UP TO EF-2B.
3 PROVIDE STAINLESS STEEL TYPE 304 WELDED DUCTWORK FOR BATTERY CHARGING STATION EXHAUST SYSTEM ASSOCIATED WITH EF-2A AND EF-2B. WRAP DUCTWORK WITH 2-HOUR RATED FIRE WRAP. PROVIDE IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.
4 12x14 EA DN TO L3.
5 PROVIDE END CAP AT THE END OF THE FINAL DIFFUSER IN THE ROW (TYPICAL 4).
6 PROVIDE RETURN SLOT DIFFUSER, 1.5" SLOT, TO MATCH ADJACENT WITH NO PLENUM BOX TYPICAL ALL.
7 PROVIDE COMBINATION FIRE/SMOKE DAMPER AT DUCT PENETRATION. PROVIDE FIRE RATED INSPECTION ACCESS DOOR.
8 DUCT MOUNTED SMOKE DETECTOR. REFER TO FIRE PROTECTION.
9 PROVIDE CONTROL DAMPER TO MODULATE AIR FLOW BASED ON SPACE CO2 (OCCUPANCY).
10 PROVIDE AUTOMATIC BALANCING DAMPER.

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. VOLUME BALANCING DAMPERS MUST BE OPPOSED BLADE TYPE UNLESS OTHERWISE NOTED. 4" ROUND DAMPERS MUST BE BUTTERFLY TYPE.
3. PROVIDE MITERED ELBOWS WITH TURNING VANES UNLESS OTHERWISE NOTED.
4. AIR TERMINALS LOCATED IN RESTROOMS AND JANITOR CLOSETS MUST BE ALUMINUM CONSTRUCTION.
5. SEE PIPING PLANS FOR LOCATIONS OF BAS ENCLOSURES, THERMOSTATS, SPACE TEMPERATURE, HUMIDITY, CO2 SENSORS, & ETC.
6. MAXIMUM FLEXIBLE DUCT LENGTH MUST BE 5 FEET.
7. MAINTAIN EQUIPMENT ACCESS CLEARANCE FOR ELECTRICAL MAINTENANCE. REPAIRS, MOTOR REPLACEMENT, ETC.
8. PROVIDE DUCTED FCUs WITH BOTTOM ACCESS FOR FILTER CHANGES AND MAINTENANCE ACCESS. COORDINATE REQUIRED LEFT HAND/RIGHT HAND SIDE FCU PIPING CONNECTIONS TO MAINTAIN ACCESS.
9. PROVIDE FIRE STOPPING AT PENETRATIONS FOR FIRE RATED WALL, FLOOR AND CEILING ASSEMBLIES.
10. ROUTE MECHANICAL DUCTWORK TIGHT TO OVERHEAD STRUCTURAL DECK TO THE GREATEST EXTENT POSSIBLE.

0 4' 8' 16'
SCALE: 1/8"=1'-0"

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US Army Corps of Engineers ®

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DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:
ISSUE DATE: 01 MARCH 2023
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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE A Joint Venture

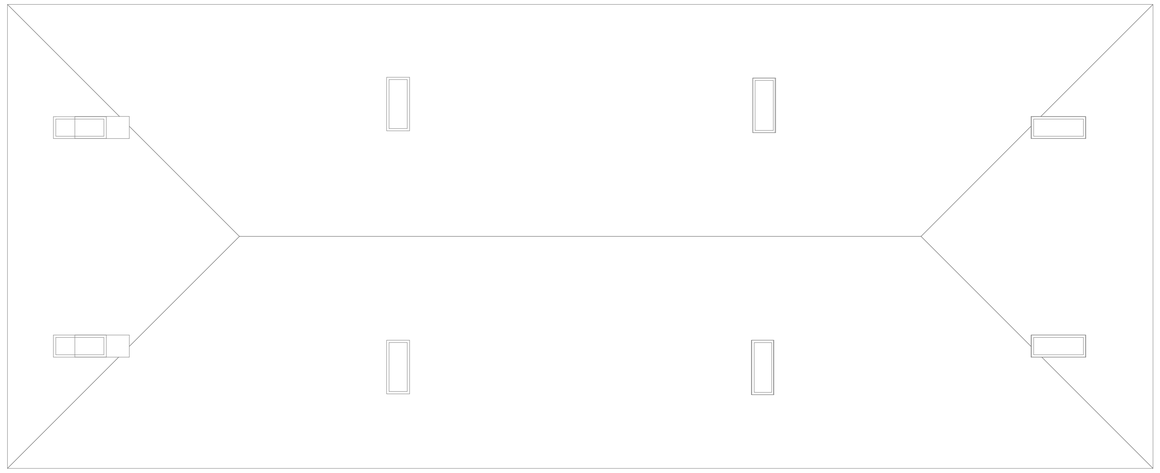
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

LEVEL 4 FLOOR PLAN - DUCTWORK

SHEET ID

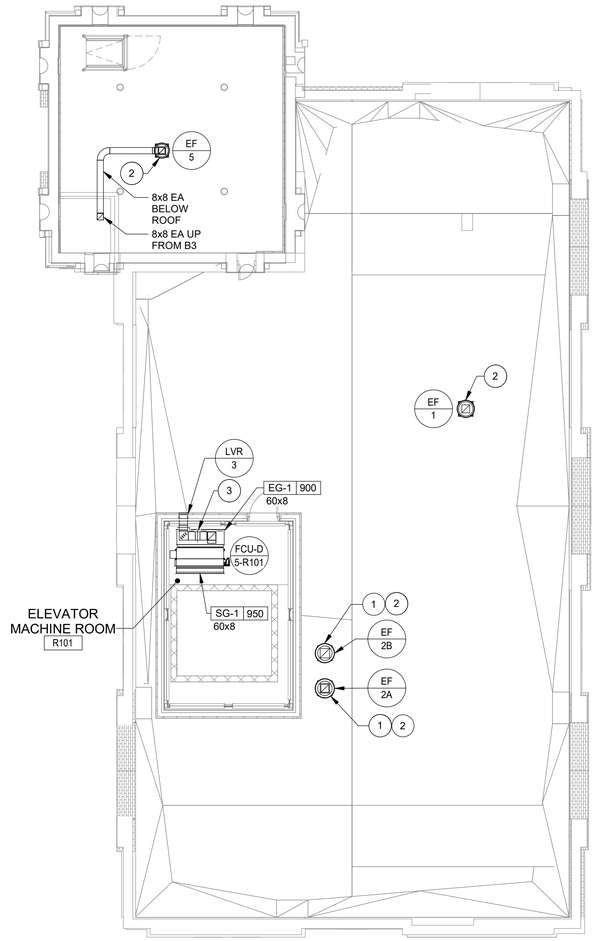
MH107

REVISED RTA SUBMISSION 03/01/2023



C1 ROOF PLAN - DUCTWORK

1/8" = 1'-0"



KEYNOTES

1 PROVIDE STAINLESS STEEL TYPE 304 WELDED DUCTWORK FOR BATTERY CHARGING STATION EXHAUST SYSTEM ASSOCIATED WITH EF-2A AND EF-2B. WRAP DUCTWORK WITH 2-HOUR RATED FIRE WRAP. PROVIDE IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.

2 PROVIDE MOTORIZED ISOLATION DAMPER IN DUCTWORK AT UNDERSIDE OF ROOF DECK. PROVIDE FLEX AT CONNECTION BETWEEN DUCTWORK AND OPENING UP TO EXHAUST FAN. PROVIDE ACCESS DOOR FOR MOTORIZED DAMPER MAINTENANCE AND INSPECTION.

3 BALANCE OUTDOOR AIR INTAKE TO 50 CFM.

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. MAINTAIN EQUIPMENT ACCESS CLEARANCES FOR ELECTRICAL, MAINTENANCE, REPAIRS, MOTOR REPLACEMENT, ETC. ON SIDES.

0 4' 8' 16'

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

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US Army Corps of Engineers ®

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DRAWN BY: C. DEVANEY
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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

ROOF PLAN - DUCTWORK

SHEET ID

MH108

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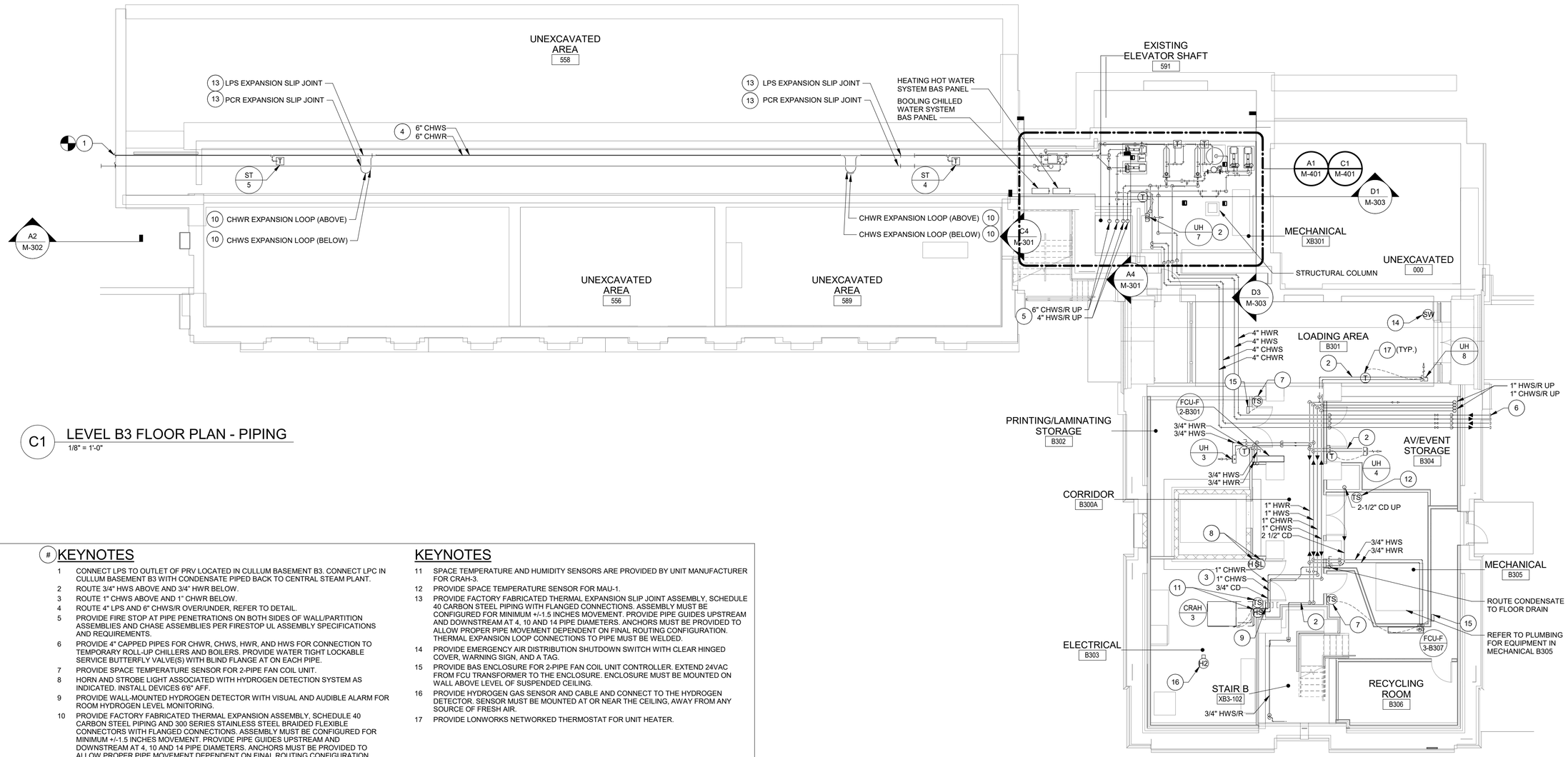

C1 LEVEL B3 FLOOR PLAN - PIPING

1/8" = 1'-0"

KEYNOTES

1. CONNECT LPS TO OUTLET OF PRV LOCATED IN CULLUM BASEMENT B3. CONNECT LPC IN CULLUM BASEMENT B3 WITH CONDENSATE PIPED BACK TO CENTRAL STEAM PLANT.
2. ROUTE 3/4" HWS ABOVE AND 3/4" HWR BELOW.
3. ROUTE 1" CHWS ABOVE AND 1" CHWR BELOW.
4. ROUTE 4" LPS AND 6" CHWS/R OVER/UNDER, REFER TO DETAIL.
5. PROVIDE FIRE STOP AT PIPE PENETRATIONS ON BOTH SIDES OF WALL/PARTITION ASSEMBLIES AND CHASE ASSEMBLIES PER FIRESTOP UL ASSEMBLY SPECIFICATIONS AND REQUIREMENTS.
6. PROVIDE 4" CAPPED PIPES FOR CHWR, CHWS, HWR, AND HWS FOR CONNECTION TO TEMPORARY ROLL-UP CHILLERS AND BOILERS. PROVIDE WATER TIGHT LOCKABLE SERVICE BUTTERFLY VALVE(S) WITH BLIND FLANGE AT ON EACH PIPE.
7. PROVIDE SPACE TEMPERATURE SENSOR FOR 2-PIPE FAN COIL UNIT.
8. HORN AND STROBE LIGHT ASSOCIATED WITH HYDROGEN DETECTION SYSTEM AS INDICATED. INSTALL DEVICES 6'6" AFF.
9. PROVIDE WALL-MOUNTED HYDROGEN DETECTOR WITH VISUAL AND AUDIBLE ALARM FOR ROOM HYDROGEN LEVEL MONITORING.
10. PROVIDE FACTORY FABRICATED THERMAL EXPANSION ASSEMBLY, SCHEDULE 40 CARBON STEEL PIPING AND 300 SERIES STAINLESS STEEL BRAIDED FLEXIBLE CONNECTORS WITH FLANGED CONNECTIONS. ASSEMBLY MUST BE CONFIGURED FOR MINIMUM +/-1.5 INCHES MOVEMENT. PROVIDE PIPE GUIDES UPSTREAM AND DOWNSTREAM AT 4, 10 AND 14 PIPE DIAMETERS. ANCHORS MUST BE PROVIDED TO ALLOW PROPER PIPE MOVEMENT DEPENDENT ON FINAL ROUTING CONFIGURATION. THERMAL EXPANSION LOOP CONNECTIONS TO PIPE MUST BE WELDED.

KEYNOTES

11. SPACE TEMPERATURE AND HUMIDITY SENSORS ARE PROVIDED BY UNIT MANUFACTURER FOR CRAH-3.
12. PROVIDE SPACE TEMPERATURE SENSOR FOR MAU-1.
13. PROVIDE FACTORY FABRICATED THERMAL EXPANSION SLIP JOINT ASSEMBLY, SCHEDULE 40 CARBON STEEL PIPING WITH FLANGED CONNECTIONS. ASSEMBLY MUST BE CONFIGURED FOR MINIMUM +/-1.5 INCHES MOVEMENT. PROVIDE PIPE GUIDES UPSTREAM AND DOWNSTREAM AT 4, 10 AND 14 PIPE DIAMETERS. ANCHORS MUST BE PROVIDED TO ALLOW PROPER PIPE MOVEMENT DEPENDENT ON FINAL ROUTING CONFIGURATION. THERMAL EXPANSION LOOP CONNECTIONS TO PIPE MUST BE WELDED.
14. PROVIDE EMERGENCY AIR DISTRIBUTION SHUTDOWN SWITCH WITH CLEAR HINGED COVER, WARNING SIGN, AND A TAG.
15. PROVIDE BAS ENCLOSURE FOR 2-PIPE FAN COIL UNIT CONTROLLER. EXTEND 24VAC FROM FCU TRANSFORMER TO THE ENCLOSURE. ENCLOSURE MUST BE MOUNTED ON WALL ABOVE LEVEL OF SUSPENDED CEILING.
16. PROVIDE HYDROGEN GAS SENSOR AND CABLE AND CONNECT TO THE HYDROGEN DETECTOR. SENSOR MUST BE MOUNTED AT OR NEAR THE CEILING, AWAY FROM ANY SOURCE OF FRESH AIR.
17. PROVIDE LONWORKS NETWORKED THERMOSTAT FOR UNIT HEATER.

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. PROVIDE FIRE-STOPPING AT FIRE-RATED PENETRATIONS.
3. PROVIDE DRIP PAN FOR PIPING RUNNING IN ELECTRICAL AND TELECOM ROOMS WITH WATER LEAK DETECTOR AND CABLE. INSTALL CABLE IN TRAY IN SERPENTINE PATTERN.
4. LOCATE PIPING IN OR AT CEILING UNLESSOTHERWISE INDICATED. BRANCH RUNOUTS TO TERMINAL EQUIPMENT MUST BE MINIMUM 3/4 INCH UNLESS NOTED OTHERWISE.
5. PROVIDE PIPING ISOLATION VALVES IN ACCESSIBLE LOCATIONS, AS CLOSE TO MAIN RISERS AND BRANCH TAKE-OFFS AS POSSIBLE.
6. CONNECTED PIPING SYSTEMS MUST NOT IMPART ANY WEIGHT TO EQUIPMENT ITSELF, AND VICE VERSA.
7. MAINTAIN EQUIPMENT ACCESS CLEARANCES FOR ELECTRICAL, MAINTENANCE, REPAIRS, MOTOR REPLACEMENT, ETC. ON SIDES.
8. PROVIDE DUCTED FCUs WITH BOTTOM ACCESS FOR FILTER CHANGES AND MAINTENANCE ACCESS. COORDINATED REQUIRED LEFT HAND/RIGHT HAND SIDE FCU PIPING CONNECTIONS TO MAINTAIN ACCESS.
9. PROVIDE FIRE STOP AT PIPE PENETRATIONS ON BOTH SIDES OF WALL/PARTITION ASSEMBLIES AND CHASE ASSEMBLIES PER FIRESTOP UL ASSEMBLY SPECIFICATIONS AND REQUIREMENTS.

0 4' 8' 16'

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

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US Army Corps of Engineers ®

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DESIGNED BY: N. SLEEM
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CHECKED BY: D. GORDON
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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

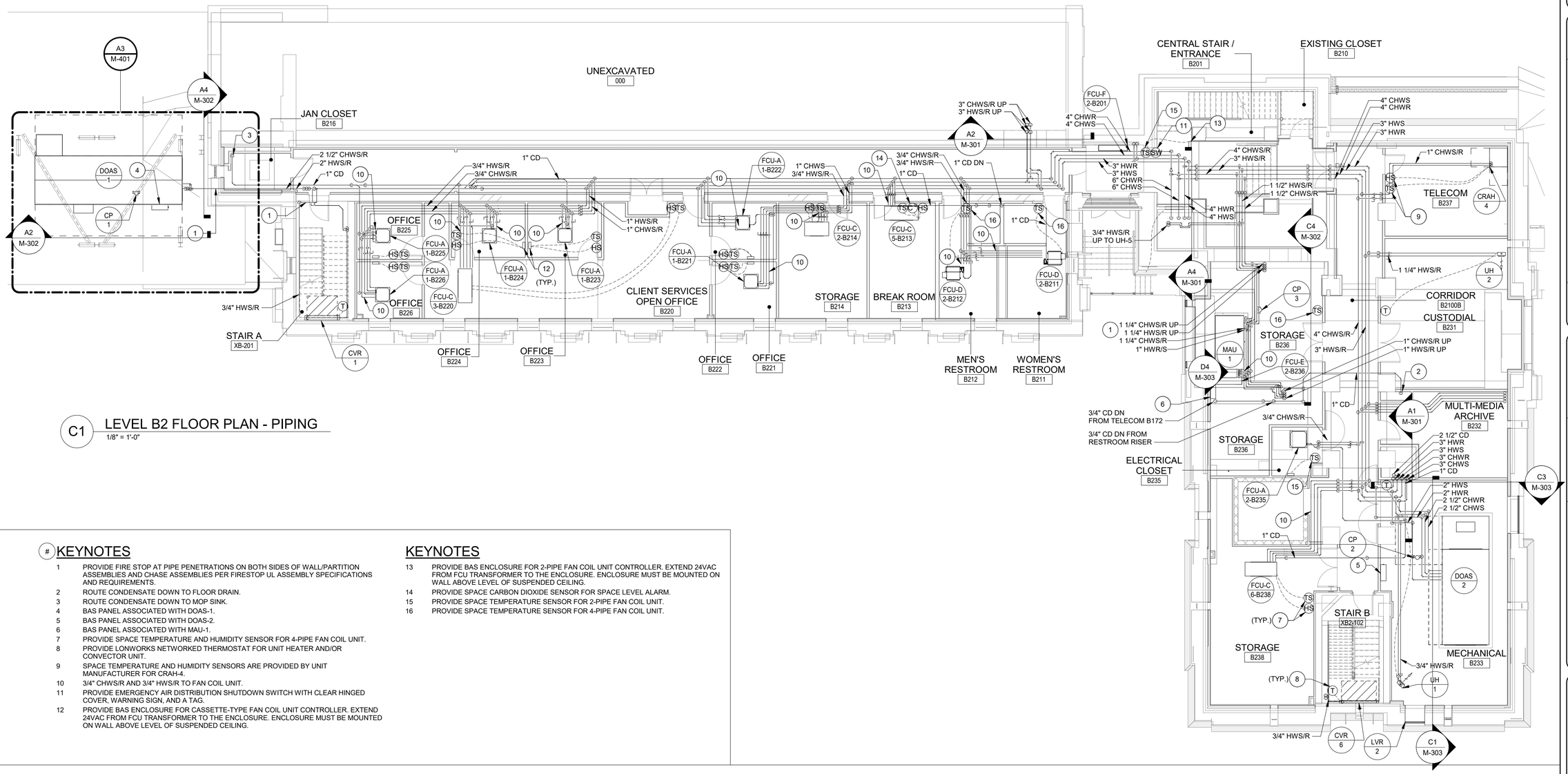
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

LEVEL B3 FLOOR PLAN - PIPING

SHEET ID

MP101

REVISED RTA SUBMISSION 03/01/2023



C1 LEVEL B2 FLOOR PLAN - PIPING

1/8" = 1'-0"

KEYNOTES

1 PROVIDE FIRE STOP AT PIPE PENETRATIONS ON BOTH SIDES OF WALL/PARTITION ASSEMBLIES AND CHASE ASSEMBLIES PER FIRESTOP UL ASSEMBLY SPECIFICATIONS AND REQUIREMENTS.

2 ROUTE CONDENSATE DOWN TO FLOOR DRAIN.

3 ROUTE CONDENSATE DOWN TO MOP SINK.

4 BAS PANEL ASSOCIATED WITH DOAS-1.

5 BAS PANEL ASSOCIATED WITH DOAS-2.

6 BAS PANEL ASSOCIATED WITH MAU-1.

7 PROVIDE SPACE TEMPERATURE AND HUMIDITY SENSOR FOR 4-PIPE FAN COIL UNIT.

8 PROVIDE LONWORKS NETWORKED THERMOSTAT FOR UNIT HEATER AND/OR CONVECTOR UNIT.

9 SPACE TEMPERATURE AND HUMIDITY SENSORS ARE PROVIDED BY UNIT MANUFACTURER FOR CRAH-4.

10 3/4" CHWS/R AND 3/4" HWS/R TO FAN COIL UNIT.

11 PROVIDE EMERGENCY AIR DISTRIBUTION SHUTDOWN SWITCH WITH CLEAR HINGED COVER, WARNING SIGN, AND A TAG.

12 PROVIDE BAS ENCLOSURE FOR CASSETTE-TYPE FAN COIL UNIT CONTROLLER. EXTEND 24VAC FROM FCU TRANSFORMER TO THE ENCLOSURE. ENCLOSURE MUST BE MOUNTED ON WALL ABOVE LEVEL OF SUSPENDED CEILING.

KEYNOTES

13 PROVIDE BAS ENCLOSURE FOR 2-PIPE FAN COIL UNIT CONTROLLER. EXTEND 24VAC FROM FCU TRANSFORMER TO THE ENCLOSURE. ENCLOSURE MUST BE MOUNTED ON WALL ABOVE LEVEL OF SUSPENDED CEILING.

14 PROVIDE SPACE CARBON DIOXIDE SENSOR FOR SPACE LEVEL ALARM.

15 PROVIDE SPACE TEMPERATURE SENSOR FOR 2-PIPE FAN COIL UNIT.

16 PROVIDE SPACE TEMPERATURE SENSOR FOR 4-PIPE FAN COIL UNIT.

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. PROVIDE FIRE-STOPPING AT FIRE-RATED PENETRATIONS.
3. PROVIDE DRIP PAN FOR PIPING RUNNING IN ELECTRICAL AND TELECOM ROOMS WITH WATER LEAK DETECTOR AND CABLE. INSTALL CABLE IN TRAY IN SERPENTINE PATTERN.
4. LOCATE PIPING IN OR AT CEILING UNLESSOTHERWISE INDICATED. BRANCH RUNOUTS TO TERMINAL EQUIPMENT MUST BE MINIMUM 3/4 INCH UNLESS NOTED OTHERWISE.
5. PROVIDE PIPING ISOLATION VALVES IN ACCESSIBLE LOCATIONS, AS CLOSE TO MAIN RISERS AND BRANCH TAKE-OFFS AS POSSIBLE.
6. CONNECTED PIPING SYSTEMS MUST NOT IMPART ANY WEIGHT TO EQUIPMENT ITSELF, AND VICE VERSA.
7. MAINTAIN EQUIPMENT ACCESS CLEARANCES FOR ELECTRICAL, MAINTENANCE, REPAIRS, MOTOR REPLACEMENT, ETC. ON SIDES.
8. PROVIDE DUCTED FCUs WITH BOTTOM ACCESS FOR FILTER CHANGES AND MAINTENANCE ACCESS. COORDINATED REQUIRED LEFT HAND/RIGHT HAND SIDE FCU PIPING CONNECTIONS TO MAINTAIN ACCESS.
9. PROVIDE FIRE STOP AT PIPE PENETRATIONS ON BOTH SIDES OF WALL/PARTITION ASSEMBLIES AND CHASE ASSEMBLIES PER FIRESTOP UL ASSEMBLY SPECIFICATIONS AND REQUIREMENTS.

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

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-18-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

SIZE: ANSI D
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE A Joint Venture

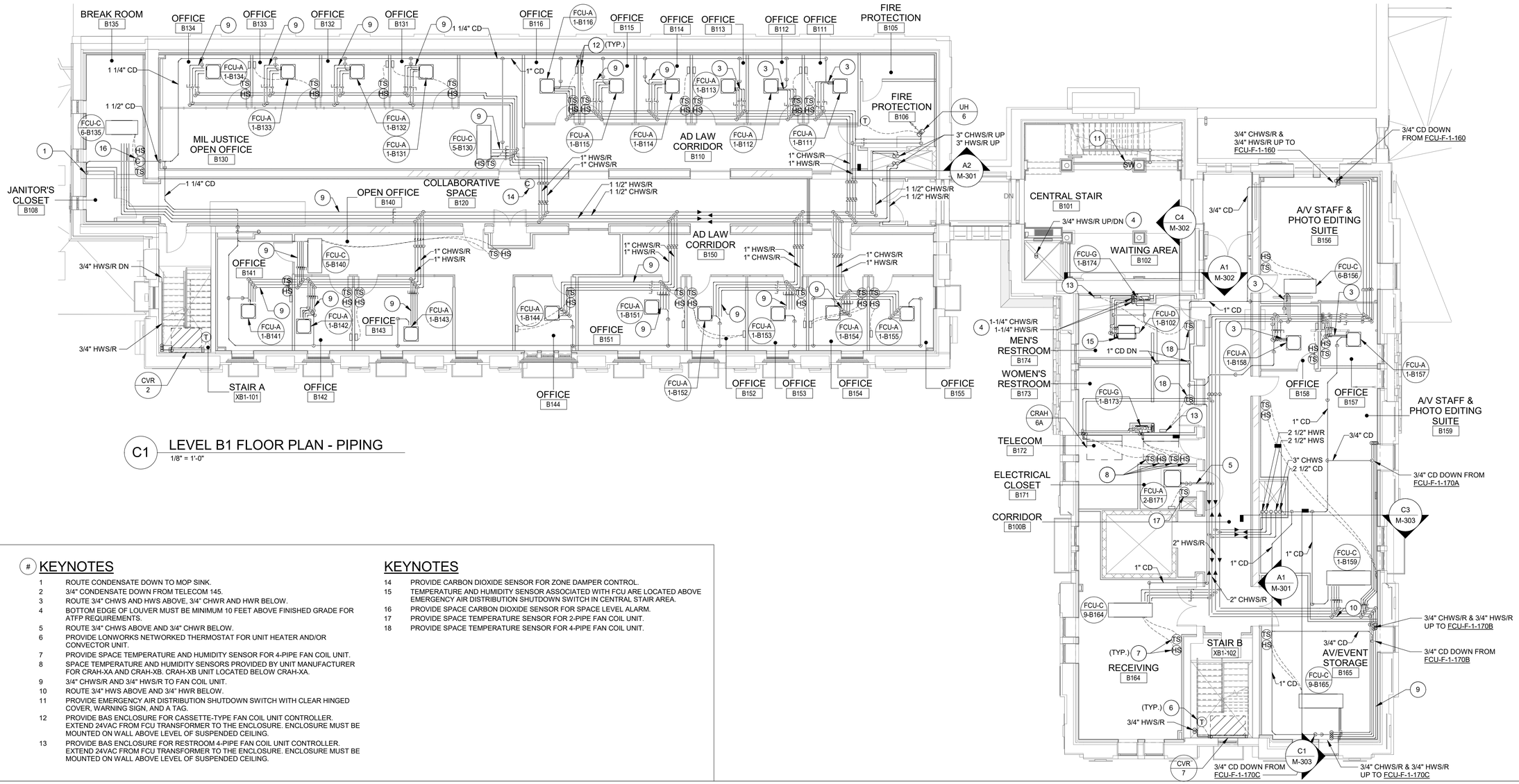
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

LEVEL B2 FLOOR PLAN - PIPING

SHEET ID

MP102

REVISED RTA SUBMISSION 03/01/2023



C1 LEVEL B1 FLOOR PLAN - PIPING

1/8" = 1'-0"

KEYNOTES

#	
1	ROUTE CONDENSATE DOWN TO MOP SINK.
2	3/4" CONDENSATE DOWN FROM TELECOM 145.
3	ROUTE 3/4" CHWS AND HWS ABOVE, 3/4" CHWR AND HWR BELOW.
4	BOTTOM EDGE OF LOUVER MUST BE MINIMUM 10 FEET ABOVE FINISHED GRADE FOR ATFP REQUIREMENTS.
5	ROUTE 3/4" CHWS ABOVE AND 3/4" CHWR BELOW.
6	PROVIDE LONWORKS NETWORKED THERMOSTAT FOR UNIT HEATER AND/OR CONVECTOR UNIT.
7	PROVIDE SPACE TEMPERATURE AND HUMIDITY SENSOR FOR 4-PIPE FAN COIL UNIT.
8	SPACE TEMPERATURE AND HUMIDITY SENSORS PROVIDED BY UNIT MANUFACTURER FOR CRAH-XA AND CRAH-XB. CRAH-XB UNIT LOCATED BELOW CRAH-XA.
9	3/4" CHWS/R AND 3/4" HWS/R TO FAN COIL UNIT.
10	ROUTE 3/4" HWS ABOVE AND 3/4" HWR BELOW.
11	PROVIDE EMERGENCY AIR DISTRIBUTION SHUTDOWN SWITCH WITH CLEAR HINGED COVER, WARNING SIGN, AND A TAG.
12	PROVIDE BAS ENCLOSURE FOR CASSETTE-TYPE FAN COIL UNIT CONTROLLER. EXTEND 24VAC FROM FCU TRANSFORMER TO THE ENCLOSURE. ENCLOSURE MUST BE MOUNTED ON WALL ABOVE LEVEL OF SUSPENDED CEILING.
13	PROVIDE BAS ENCLOSURE FOR RESTROOM 4-PIPE FAN COIL UNIT CONTROLLER. EXTEND 24VAC FROM FCU TRANSFORMER TO THE ENCLOSURE. ENCLOSURE MUST BE MOUNTED ON WALL ABOVE LEVEL OF SUSPENDED CEILING.

KEYNOTES

14	PROVIDE CARBON DIOXIDE SENSOR FOR ZONE DAMPER CONTROL.
15	TEMPERATURE AND HUMIDITY SENSOR ASSOCIATED WITH FCU ARE LOCATED ABOVE EMERGENCY AIR DISTRIBUTION SHUTDOWN SWITCH IN CENTRAL STAIR AREA.
16	PROVIDE SPACE CARBON DIOXIDE SENSOR FOR SPACE LEVEL ALARM.
17	PROVIDE SPACE TEMPERATURE SENSOR FOR 2-PIPE FAN COIL UNIT.
18	PROVIDE SPACE TEMPERATURE SENSOR FOR 4-PIPE FAN COIL UNIT.

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. PROVIDE FIRE-STOPPING AT FIRE-RATED PENETRATIONS.
3. PROVIDE DRIP PAN FOR PIPING RUNNING IN ELECTRICAL AND TELECOM ROOMS WITH WATER LEAK DETECTOR AND CABLE. INSTALL CABLE IN TRAY IN SERPENTINE PATTERN.
4. LOCATE PIPING IN OR AT CEILING UNLESSOTHERWISE INDICATED. BRANCH RUNOUTS TO TERMINAL EQUIPMENT MUST BE MINIMUM 3/4 INCH UNLESS NOTED OTHERWISE.
5. PROVIDE PIPING ISOLATION VALVES IN ACCESSIBLE LOCATIONS, AS CLOSE TO MAIN RISERS AND BRANCH TAKE-OFFS AS POSSIBLE.
6. CONNECTED PIPING SYSTEMS MUST NOT IMPART ANY WEIGHT TO EQUIPMENT ITSELF, AND VICE VERSA.
7. MAINTAIN EQUIPMENT ACCESS CLEARANCES FOR ELECTRICAL, MAINTENANCE, REPAIRS, MOTOR REPLACEMENT, ETC. ON SIDES.
8. PROVIDE DUCTED FCUs WITH BOTTOM ACCESS FOR FILTER CHANGES AND MAINTENANCE ACCESS. COORDINATED REQUIRED LEFT HAND/RIGHT HAND SIDE FCU PIPING CONNECTIONS TO MAINTAIN ACCESS.
9. PROVIDE FIRE STOP AT PIPE PENETRATIONS ON BOTH SIDES OF WALL/PARTITION ASSEMBLIES AND CHASE ASSEMBLIES PER FIRESTOP UL ASSEMBLY SPECIFICATIONS AND REQUIREMENTS.

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

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-18-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

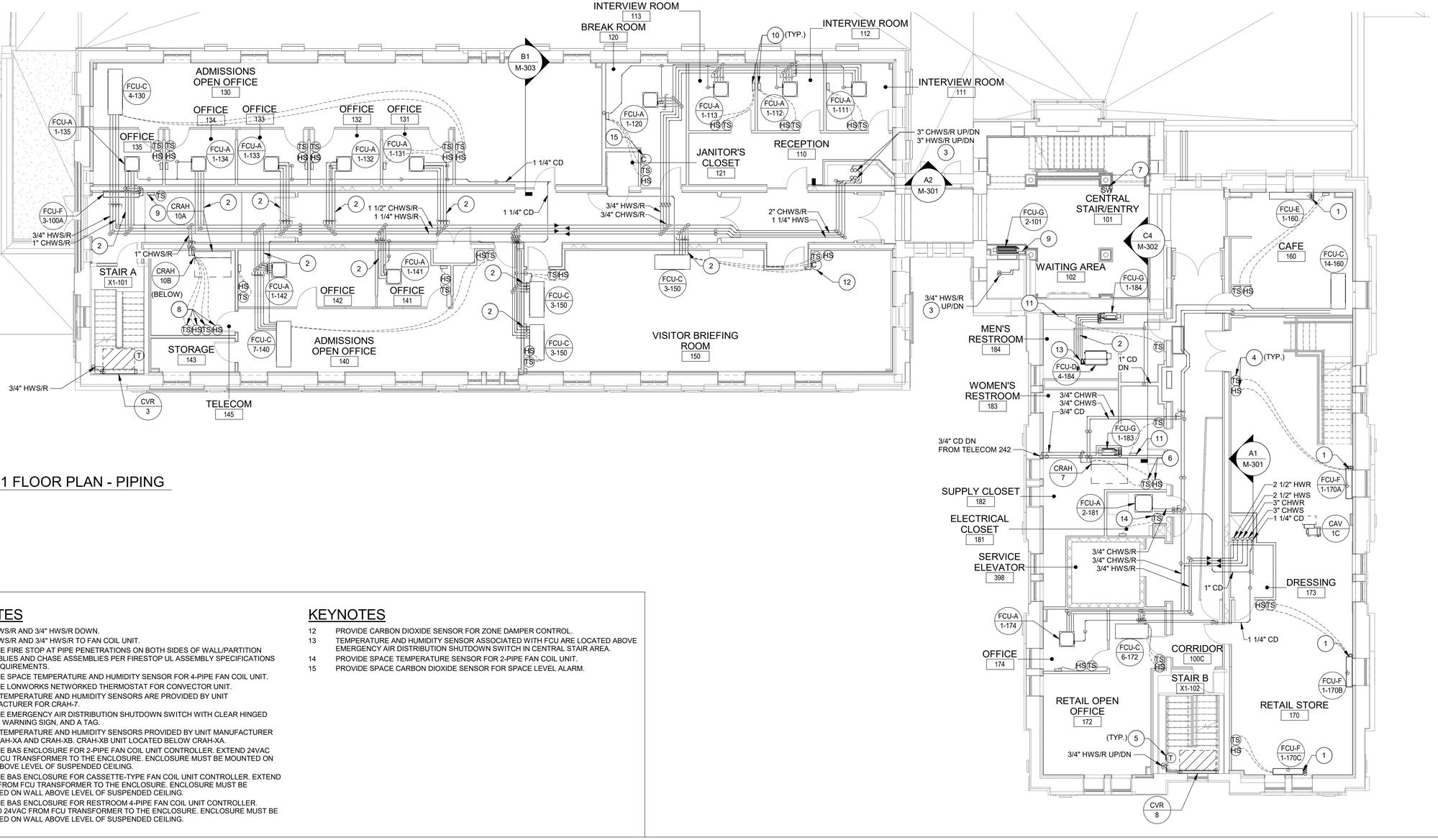
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

LEVEL B1 FLOOR PLAN - PIPING

SHEET ID

MP103

REVISED RTA SUBMISSION 03/01/2023



C1 LEVEL 1 FLOOR PLAN - PIPING

1/8" = 1'-0"

KEYNOTES

1. 3/4" CHWS/R AND 3/4" HWS/R DOWN.
2. 3/4" CHWS/R AND 3/4" HWS/R TO FAN COIL UNIT.
3. PROVIDE FIRE STOP AT PIPE PENETRATIONS ON BOTH SIDES OF WALL/PARTITION ASSEMBLIES AND CHASE ASSEMBLIES PER FIRESTOP UL ASSEMBLY SPECIFICATIONS AND REQUIREMENTS.
4. PROVIDE SPACE TEMPERATURE AND HUMIDITY SENSOR FOR 4-PIPE FAN COIL UNIT.
5. PROVIDE LONWORKS NETWORKED THERMOSTAT FOR CONVECTOR UNIT.
6. SPACE TEMPERATURE AND HUMIDITY SENSORS ARE PROVIDED BY UNIT MANUFACTURER FOR CRAH-7.
7. PROVIDE EMERGENCY AIR DISTRIBUTION SHUTDOWN SWITCH WITH CLEAR HINGED COVER, WARNING SIGN, AND A TAG.
8. SPACE TEMPERATURE AND HUMIDITY SENSORS PROVIDED BY UNIT MANUFACTURER FOR CRAH-XA AND CRAH-XB. CRAH-XB UNIT LOCATED BELOW CRAH-XA.
9. PROVIDE BAS ENCLOSURE FOR 2-PIPE FAN COIL UNIT CONTROLLER. EXTEND 24VAC FROM FCU TRANSFORMER TO THE ENCLOSURE. ENCLOSURE MUST BE MOUNTED ON WALL ABOVE LEVEL OF SUSPENDED CEILING.
10. PROVIDE BAS ENCLOSURE FOR CASSETTE-TYPE FAN COIL UNIT CONTROLLER. EXTEND 24VAC FROM FCU TRANSFORMER TO THE ENCLOSURE. ENCLOSURE MUST BE MOUNTED ON WALL ABOVE LEVEL OF SUSPENDED CEILING.
11. PROVIDE BAS ENCLOSURE FOR RESTROOM 4-PIPE FAN COIL UNIT CONTROLLER. EXTEND 24VAC FROM FCU TRANSFORMER TO THE ENCLOSURE. ENCLOSURE MUST BE MOUNTED ON WALL ABOVE LEVEL OF SUSPENDED CEILING.

KEYNOTES

12. PROVIDE CARBON DIOXIDE SENSOR FOR ZONE DAMPER CONTROL.
13. TEMPERATURE AND HUMIDITY SENSOR ASSOCIATED WITH FCU ARE LOCATED ABOVE EMERGENCY AIR DISTRIBUTION SHUTDOWN SWITCH IN CENTRAL STAIR AREA.
14. PROVIDE SPACE TEMPERATURE SENSOR FOR 2-PIPE FAN COIL UNIT.
15. PROVIDE SPACE CARBON DIOXIDE SENSOR FOR SPACE LEVEL ALARM.

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. PROVIDE FIRE-STOPPING AT FIRE-RATED PENETRATIONS.
3. PROVIDE DRIP PAN FOR PIPING RUNNING IN ELECTRICAL AND TELECOM ROOMS WITH WATER LEAK DETECTOR AND CABLE. INSTALL CABLE IN TRAY IN SERPENTINE PATTERN.
4. LOCATE PIPING IN OR AT CEILING UNLESSOTHERWISE INDICATED. BRANCH RUNOUTS TO TERMINAL EQUIPMENT MUST BE MINIMUM 3/4 INCH UNLESS NOTED OTHERWISE.
5. PROVIDE PIPING ISOLATION VALVES IN ACCESSIBLE LOCATIONS, AS CLOSE TO MAIN RISERS AND BRANCH TAKE-OFFS AS POSSIBLE.
6. CONNECTED PIPING SYSTEMS MUST NOT IMPART ANY WEIGHT TO EQUIPMENT ITSELF, AND VICE VERSA.
7. MAINTAIN EQUIPMENT ACCESS CLEARANCES FOR ELECTRICAL, MAINTENANCE, REPAIRS, MOTOR REPLACEMENT, ETC. ON SIDES.
8. PROVIDE DUCTED FCUs WITH BOTTOM ACCESS FOR FILTER CHANGES AND MAINTENANCE ACCESS. COORDINATED REQUIRED LEFT HAND/RIGHT HAND SIDE FCU PIPING CONNECTIONS TO MAINTAIN ACCESS.
9. PROVIDE FIRE STOP AT PIPE PENETRATIONS ON BOTH SIDES OF WALL/PARTITION ASSEMBLIES AND CHASE ASSEMBLIES PER FIRESTOP UL ASSEMBLY SPECIFICATIONS AND REQUIREMENTS.

0 4' 8' 16'

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

N

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-18-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

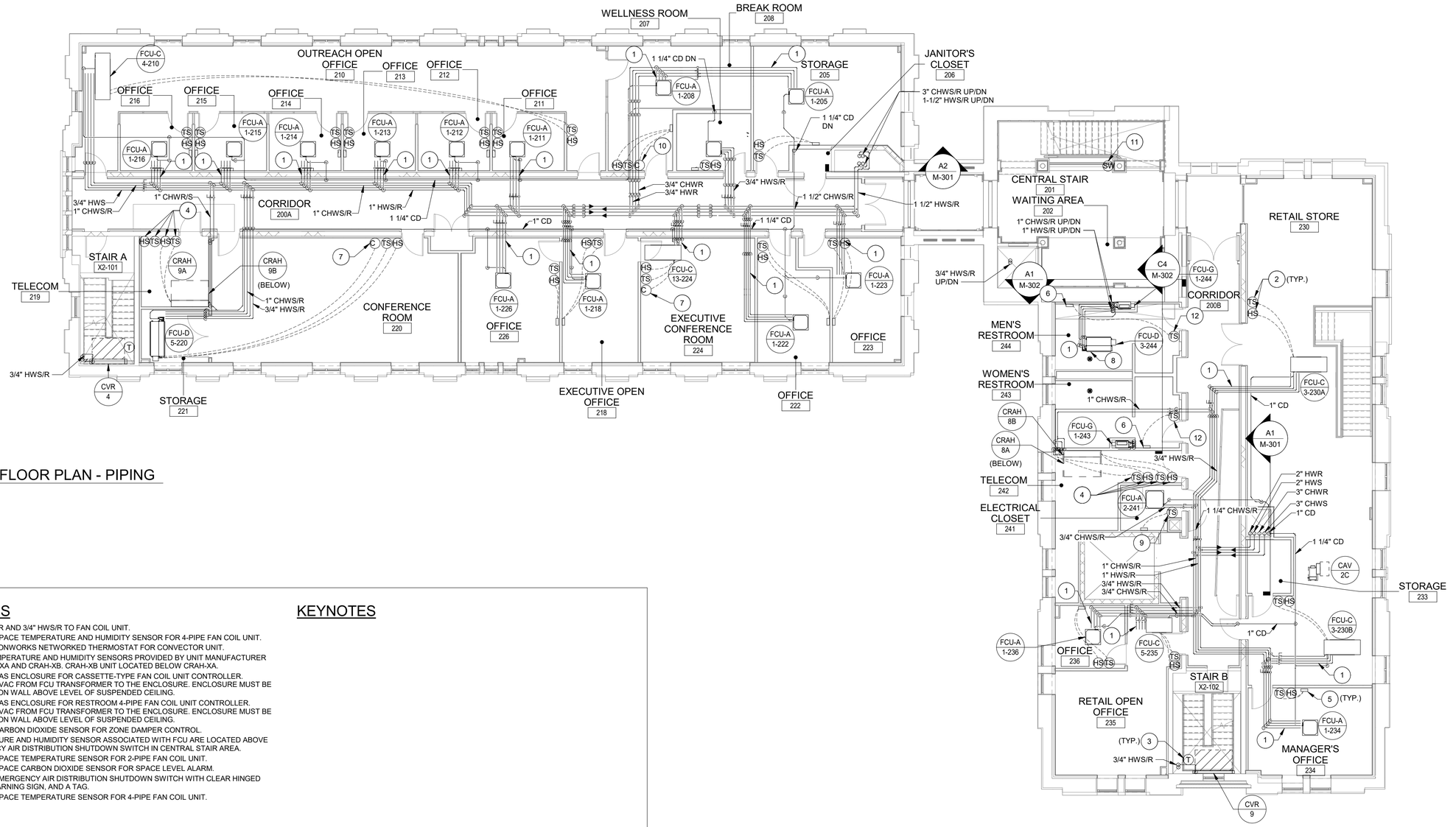
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

LEVEL 1 FLOOR PLAN - PIPING

SHEET ID

MP104

REVISED RTA SUBMISSION 03/01/2023



C1 LEVEL 2 FLOOR PLAN - PIPING

1/8" = 1'-0"

KEYNOTES

1. 3/4" CHWS/R AND 3/4" HWS/R TO FAN COIL UNIT.
2. PROVIDE SPACE TEMPERATURE AND HUMIDITY SENSOR FOR 4-PIPE FAN COIL UNIT.
3. PROVIDE LONWORKS NETWORKED THERMOSTAT FOR CONVECTOR UNIT.
4. SPACE TEMPERATURE AND HUMIDITY SENSORS PROVIDED BY UNIT MANUFACTURER FOR CRAH-XA AND CRAH-XB. CRAH-XB UNIT LOCATED BELOW CRAH-XA.
5. PROVIDE BAS ENCLOSURE FOR CASSETTE-TYPE FAN COIL UNIT CONTROLLER. EXTEND 24VAC FROM FCU TRANSFORMER TO THE ENCLOSURE. ENCLOSURE MUST BE MOUNTED ON WALL ABOVE LEVEL OF SUSPENDED CEILING.
6. PROVIDE BAS ENCLOSURE FOR RESTROOM 4-PIPE FAN COIL UNIT CONTROLLER. EXTEND 24VAC FROM FCU TRANSFORMER TO THE ENCLOSURE. ENCLOSURE MUST BE MOUNTED ON WALL ABOVE LEVEL OF SUSPENDED CEILING.
7. PROVIDE CARBON DIOXIDE SENSOR FOR ZONE DAMPER CONTROL.
8. TEMPERATURE AND HUMIDITY SENSOR ASSOCIATED WITH FCU ARE LOCATED ABOVE EMERGENCY AIR DISTRIBUTION SHUTDOWN SWITCH IN CENTRAL STAIR AREA.
9. PROVIDE SPACE TEMPERATURE SENSOR FOR 2-PIPE FAN COIL UNIT.
10. PROVIDE SPACE CARBON DIOXIDE SENSOR FOR SPACE LEVEL ALARM.
11. PROVIDE EMERGENCY AIR DISTRIBUTION SHUTDOWN SWITCH WITH CLEAR HINGED COVER, WARNING SIGN, AND A TAG.
12. PROVIDE SPACE TEMPERATURE SENSOR FOR 4-PIPE FAN COIL UNIT.

KEYNOTES

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. PROVIDE FIRE-STOPPING AT FIRE-RATED PENETRATIONS.
3. PROVIDE DRIP PAN FOR PIPING RUNNING IN ELECTRICAL AND TELECOM ROOMS WITH WATER LEAK DETECTOR AND CABLE. INSTALL CABLE IN TRAY IN SERPENTINE PATTERN.
4. LOCATE PIPING IN OR AT CEILING UNLESSOTHERWISE INDICATED. BRANCH RUNOUTS TO TERMINAL EQUIPMENT MUST BE MINIMUM 3/4 INCH UNLESS NOTED OTHERWISE.
5. PROVIDE PIPING ISOLATION VALVES IN ACCESSIBLE LOCATIONS, AS CLOSE TO MAIN RISERS AND BRANCH TAKE-OFFS AS POSSIBLE.
6. CONNECTED PIPING SYSTEMS MUST NOT IMPART ANY WEIGHT TO EQUIPMENT ITSELF, AND VICE VERSA.
7. MAINTAIN EQUIPMENT ACCESS CLEARANCES FOR ELECTRICAL, MAINTENANCE, REPAIRS, MOTOR REPLACEMENT, ETC. ON SIDES.
8. PROVIDE DUCTED FCUs WITH BOTTOM ACCESS FOR FILTER CHANGES AND MAINTENANCE ACCESS. COORDINATED REQUIRED LEFT HAND/RIGHT HAND SIDE FCU PIPING CONNECTIONS TO MAINTAIN ACCESS.
9. PROVIDE FIRE STOP AT PIPE PENETRATIONS ON BOTH SIDES OF WALL/PARTITION ASSEMBLIES AND CHASE ASSEMBLIES PER FIRESTOP UL ASSEMBLY SPECIFICATIONS AND REQUIREMENTS.

0 4' 8' 16'

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

N

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI D
FILE NAME:
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE A Joint Venture

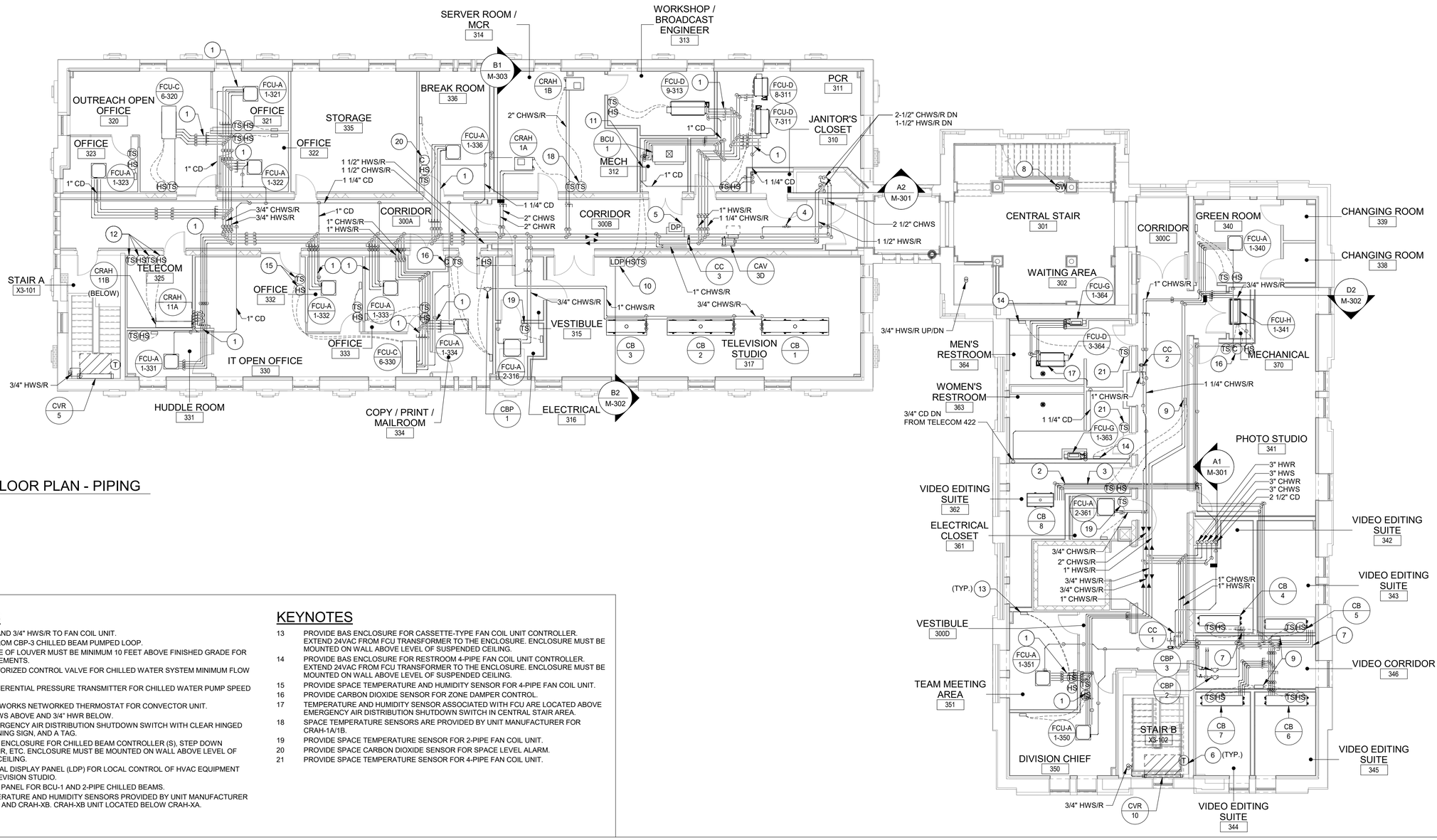
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

LEVEL 2 FLOOR PLAN - PIPING

SHEET ID

MP105

REVISED RTA SUBMISSION 03/01/2023



C1 LEVEL 3 FLOOR PLAN - PIPING

1/8" = 1'-0"

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

KEYNOTES

1. 3/4" CHWS/R AND 3/4" HWS/R TO FAN COIL UNIT.
2. 3/4" HWS/R FROM CBP-3 CHILLED BEAM PUMPED LOOP.
3. BOTTOM EDGE OF LOUVER MUST BE MINIMUM 10 FEET ABOVE FINISHED GRADE FOR ATFP REQUIREMENTS.
4. PROVIDE MOTORIZED CONTROL VALVE FOR CHILLED WATER SYSTEM MINIMUM FLOW BYPASS.
5. PROVIDE DIFFERENTIAL PRESSURE TRANSMITTER FOR CHILLED WATER PUMP SPEED CONTROL.
6. PROVIDE LONWORKS NETWORKED THERMOSTAT FOR CONVECTOR UNIT.
7. ROUTE 3/4" HWS ABOVE AND 3/4" HWR BELOW.
8. PROVIDE EMERGENCY AIR DISTRIBUTION SHUTDOWN SWITCH WITH CLEAR HINGED COVER, WARNING SIGN, AND A TAG.
9. PROVIDE BAS ENCLOSURE FOR CHILLED BEAM CONTROLLER (S), STEP DOWN TRANSFORMER, ETC. ENCLOSURE MUST BE MOUNTED ON WALL ABOVE LEVEL OF SUSPENDED CEILING.
10. PROVIDE LOCAL DISPLAY PANEL (LDP) FOR LOCAL CONTROL OF HVAC EQUIPMENT SERVING TELEVISION STUDIO.
11. PROVIDE BAS PANEL FOR BCU-1 AND 2-PIPE CHILLED BEAMS.
12. SPACE TEMPERATURE AND HUMIDITY SENSORS PROVIDED BY UNIT MANUFACTURER FOR CRAH-XA AND CRAH-XB. CRAH-XB UNIT LOCATED BELOW CRAH-XA.

KEYNOTES

13. PROVIDE BAS ENCLOSURE FOR CASSETTE-TYPE FAN COIL UNIT CONTROLLER. EXTEND 24VAC FROM FCU TRANSFORMER TO THE ENCLOSURE. ENCLOSURE MUST BE MOUNTED ON WALL ABOVE LEVEL OF SUSPENDED CEILING.
14. PROVIDE BAS ENCLOSURE FOR RESTROOM 4-PIPE FAN COIL UNIT CONTROLLER. EXTEND 24VAC FROM FCU TRANSFORMER TO THE ENCLOSURE. ENCLOSURE MUST BE MOUNTED ON WALL ABOVE LEVEL OF SUSPENDED CEILING.
15. PROVIDE SPACE TEMPERATURE AND HUMIDITY SENSOR FOR 4-PIPE FAN COIL UNIT.
16. PROVIDE CARBON DIOXIDE SENSOR FOR ZONE DAMPER CONTROL.
17. TEMPERATURE AND HUMIDITY SENSOR ASSOCIATED WITH FCU ARE LOCATED ABOVE EMERGENCY AIR DISTRIBUTION SHUTDOWN SWITCH IN CENTRAL STAIR AREA.
18. SPACE TEMPERATURE SENSORS ARE PROVIDED BY UNIT MANUFACTURER FOR CRAH-1A/1B.
19. PROVIDE SPACE TEMPERATURE SENSOR FOR 2-PIPE FAN COIL UNIT.
20. PROVIDE SPACE CARBON DIOXIDE SENSOR FOR SPACE LEVEL ALARM.
21. PROVIDE SPACE TEMPERATURE SENSOR FOR 4-PIPE FAN COIL UNIT.

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. PROVIDE FIRE-STOPPING AT FIRE-RATED PENETRATIONS.
3. PROVIDE DRIP PAN FOR PIPING RUNNING IN ELECTRICAL AND TELECOM ROOMS WITH WATER LEAK DETECTOR AND CABLE. INSTALL CABLE IN TRAY IN SERPENTINE PATTERN.
4. LOCATE PIPING IN OR AT CEILING UNLESSOTHERWISE INDICATED. BRANCH RUNOUTS TO TERMINAL EQUIPMENT MUST BE MINIMUM 3/4 INCH UNLESS NOTED OTHERWISE.
5. PROVIDE PIPING ISOLATION VALVES IN ACCESSIBLE LOCATIONS, AS CLOSE TO MAIN RISERS AND BRANCH TAKE-OFFS AS POSSIBLE.
6. CONNECTED PIPING SYSTEMS MUST NOT IMPART ANY WEIGHT TO EQUIPMENT ITSELF, AND VICE VERSA.
7. MAINTAIN EQUIPMENT ACCESS CLEARANCES FOR ELECTRICAL, MAINTENANCE, REPAIRS, MOTOR REPLACEMENT, ETC. ON SIDES.
8. PROVIDE DUCTED FCUs WITH BOTTOM ACCESS FOR FILTER CHANGES AND MAINTENANCE ACCESS. COORDINATED REQUIRED LEFT HAND/RIGHT HAND SIDE FCU PIPING CONNECTIONS TO MAINTAIN ACCESS.
9. PROVIDE FIRE STOP AT PIPE PENETRATIONS ON BOTH SIDES OF WALL/PARTITION ASSEMBLIES AND CHASE ASSEMBLIES PER FIRESTOP UL ASSEMBLY SPECIFICATIONS AND REQUIREMENTS.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI D
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-18-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

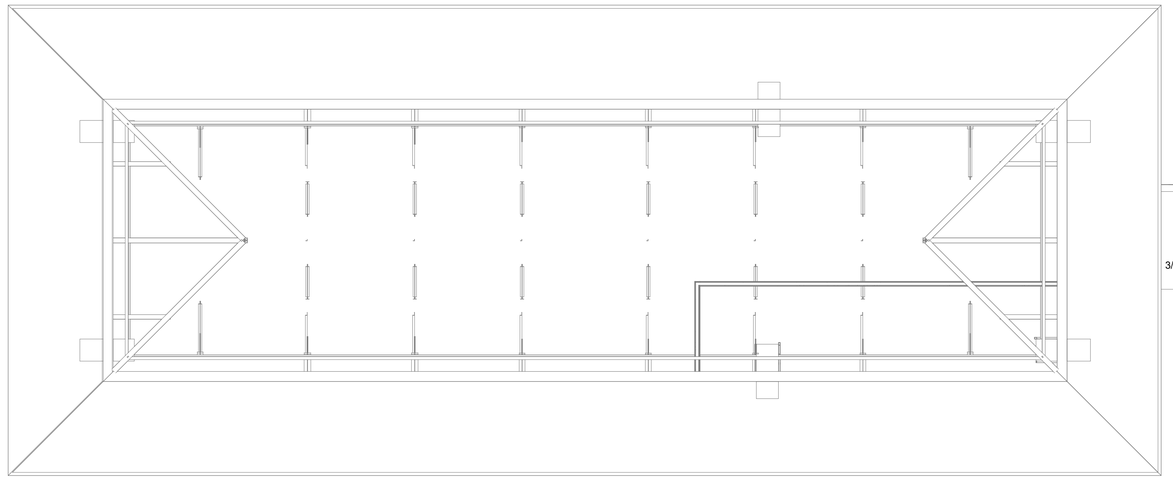
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

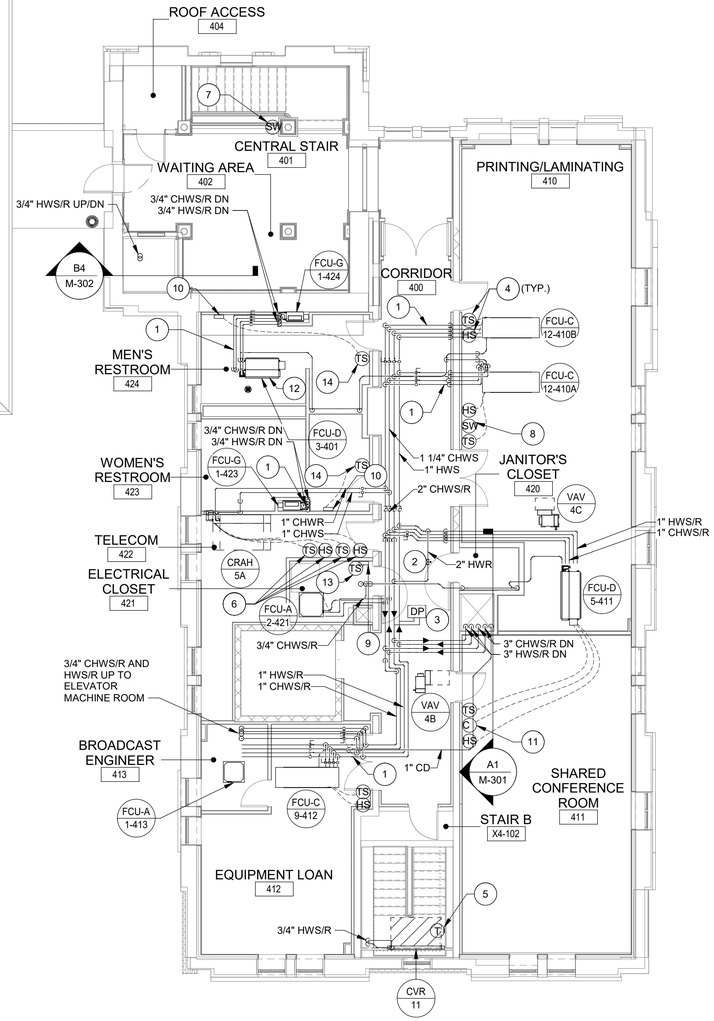
LEVEL 3 FLOOR PLAN - PIPING

SHEET ID

MP106

REVISED RTA SUBMISSION 03/01/2023





C1 LEVEL 4 FLOOR PLAN - PIPING

1/8" = 1'-0"

KEYNOTES

1. 3/4" CHWS/R AND 3/4" HWS/R TO FAN COIL UNIT.
2. PROVIDE MOTORIZED CONTROL VALVE FOR HOT WATER SYSTEM MINIMUM FLOW BYPASS.
3. PROVIDE DIFFERENTIAL PRESSURE TRANSMITTER FOR HEATING HOT WATER PUMP SPEED CONTROL.
4. PROVIDE SPACE TEMPERATURE AND HUMIDITY SENSOR FOR 4-PIPE FAN COIL UNIT.
5. PROVIDE LONWORKS NETWORKED THERMOSTAT FOR CONVECTOR UNIT.
6. SPACE TEMPERATURE AND HUMIDITY SENSORS PROVIDED BY UNIT MANUFACTURER FOR CRAH-XA AND CRAH-XB. CRAH-XB UNIT LOCATED BELOW CRAH-XA.
7. PROVIDE EMERGENCY AIR DISTRIBUTION SHUTDOWN SWITCH WITH CLEAR HINGED COVER, WARNING SIGN, AND A TAG.
8. PROVIDE SWITCH FOR EXHAUST FAN EF-1.
9. PROVIDE BAS ENCLOSURE FOR CASSETTE-TYPE FAN COIL UNIT CONTROLLER. EXTEND 24VAC FROM FCU TRANSFORMER TO THE ENCLOSURE. ENCLOSURE MUST BE MOUNTED ON WALL ABOVE LEVEL OF SUSPENDED CEILING.
10. PROVIDE BAS ENCLOSURE FOR RESTROOM 4-PIPE FAN COIL UNIT CONTROLLER. EXTEND 24VAC FROM FCU TRANSFORMER TO THE ENCLOSURE. ENCLOSURE MUST BE MOUNTED ON WALL ABOVE LEVEL OF SUSPENDED CEILING.
11. PROVIDE CARBON DIOXIDE SENSOR FOR ZONE DAMPER CONTROL.
12. TEMPERATURE AND HUMIDITY SENSOR ASSOCIATED WITH FCU ARE LOCATED ABOVE EMERGENCY AIR DISTRIBUTION SHUTDOWN SWITCH IN CENTRAL STAIR AREA.
13. PROVIDE SPACE TEMPERATURE SENSOR FOR 2-PIPE FAN COIL UNIT.

KEYNOTES

14. PROVIDE SPACE TEMPERATURE SENSOR FOR 4-PIPE FAN COIL UNIT.

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. PROVIDE FIRE-STOPPING AT FIRE-RATED PENETRATIONS.
3. PROVIDE DRIP PAN FOR PIPING RUNNING IN ELECTRICAL AND TELECOM ROOMS WITH WATER LEAK DETECTOR AND CABLE. INSTALL CABLE IN TRAY IN SERPENTINE PATTERN.
4. LOCATE PIPING IN OR AT CEILING UNLESSOTHERWISE INDICATED. BRANCH RUNOUTS TO TERMINAL EQUIPMENT MUST BE MINIMUM 3/4 INCH UNLESS NOTED OTHERWISE.
5. PROVIDE PIPING ISOLATION VALVES IN ACCESSIBLE LOCATIONS, AS CLOSE TO MAIN RISERS AND BRANCH TAKE-OFFS AS POSSIBLE.
6. CONNECTED PIPING SYSTEMS MUST NOT IMPART ANY WEIGHT TO EQUIPMENT ITSELF, AND VICE VERSA.
7. MAINTAIN EQUIPMENT ACCESS CLEARANCES FOR ELECTRICAL, MAINTENANCE, REPAIRS, MOTOR REPLACEMENT, ETC. ON SIDES.
8. PROVIDE DUCTED FCUs WITH BOTTOM ACCESS FOR FILTER CHANGES AND MAINTENANCE ACCESS. COORDINATED REQUIRED LEFT HAND/RIGHT HAND SIDE FCU PIPING CONNECTIONS TO MAINTAIN ACCESS.
9. PROVIDE FIRE STOP AT PIPE PENETRATIONS ON BOTH SIDES OF WALL/PARTITION ASSEMBLIES AND CHASE ASSEMBLIES PER FIRESTOP UL ASSEMBLY SPECIFICATIONS AND REQUIREMENTS.

0 4' 8' 16'

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

N

REVISED RTA SUBMISSION 03/01/2023

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-18-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

SIZE: ANSI D
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

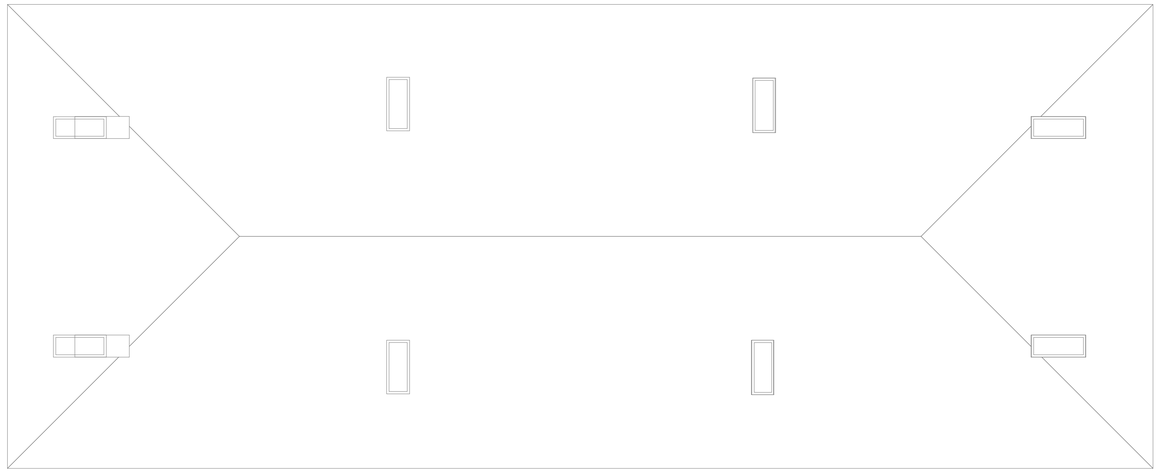
JACOBS / EWING COLE *A Joint Venture*

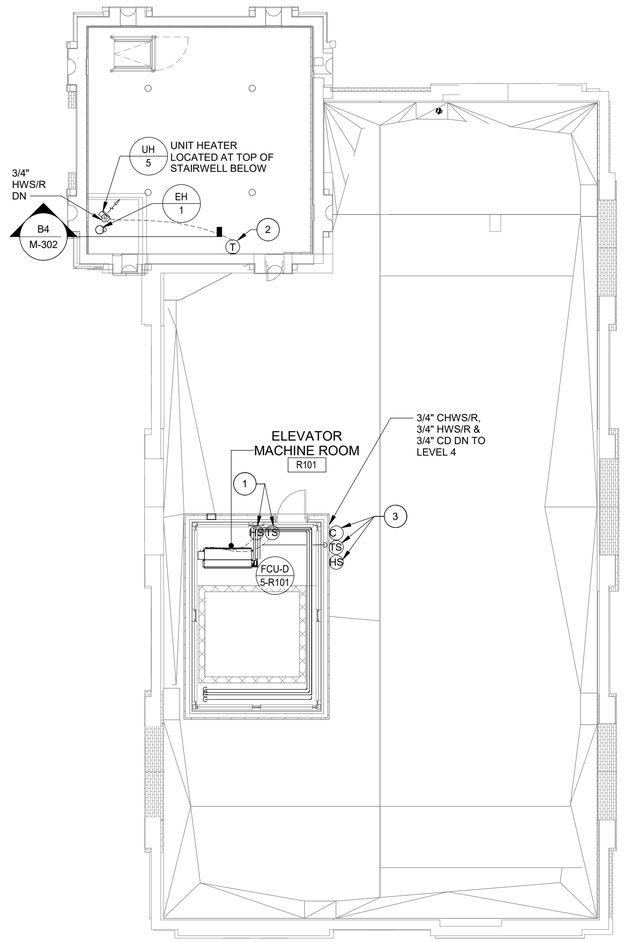
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

LEVEL 4 FLOOR PLAN - PIPING

SHEET ID

MP107





C1 ROOF PLAN - PIPING

1/8" = 1'-0"

KEYNOTES

1 PROVIDE SPACE TEMPERATURE AND HUMIDITY SENSOR FOR 4-PIPE FAN COIL UNIT.

2 PROVIDE LONWORKS NETWORKED THERMOSTAT FOR UNIT HEATER.

3 PROVIDE OUTSIDE AIR TEMPERATURE, HUMIDITY AND CARBON DIOXIDE SENSORS, MOUNT OUTSIDE SENSORS UNDER SUN SHIELD, AS HIGH ON THE WALL AS POSSIBLE, ON THE NORTH SIDE OF THE WALL. LOCATION MUST BE SELECTED SUCH THAT SOLAR RADIATION, EXHAUST OR COOLING SOURCES WILL NOT AFFECT SENSOR READING. VALUES MUST BE BROADCASTED TO CONTROLLERS IN THE BUILDING THAT REQUIRE OUTSIDE AIR VALUES.

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. MAINTAIN EQUIPMENT ACCESS CLEARANCES FOR ELECTRICAL, MAINTENANCE, REPAIRS, MOTOR REPLACEMENT, ETC. ON SIDES.

0 4' 8' 16'

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

N

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

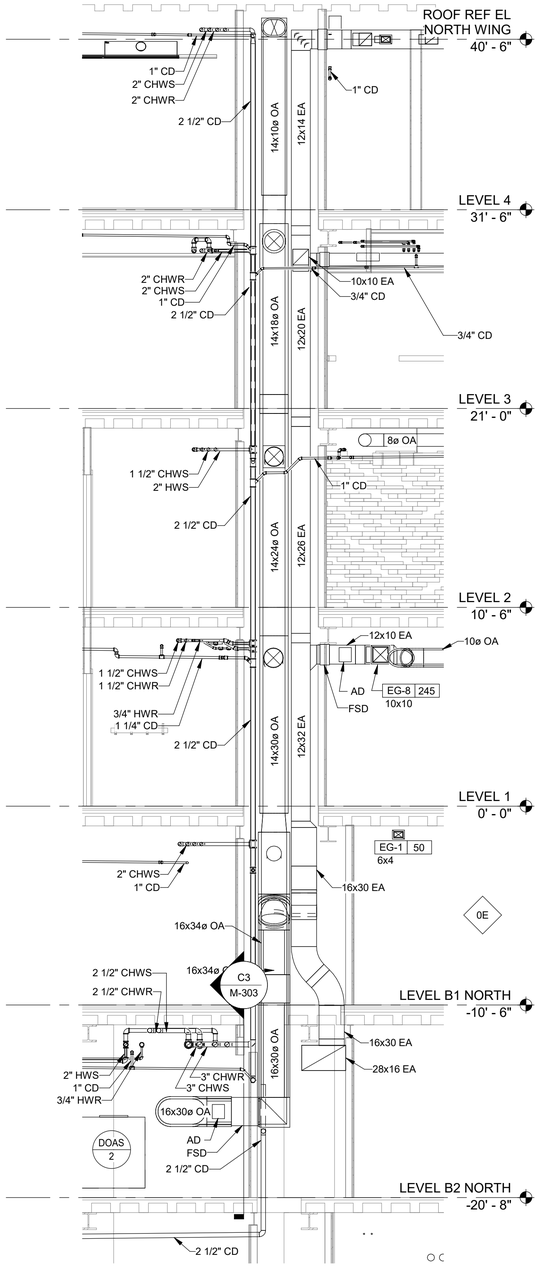
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

ROOF PLAN - PIPING

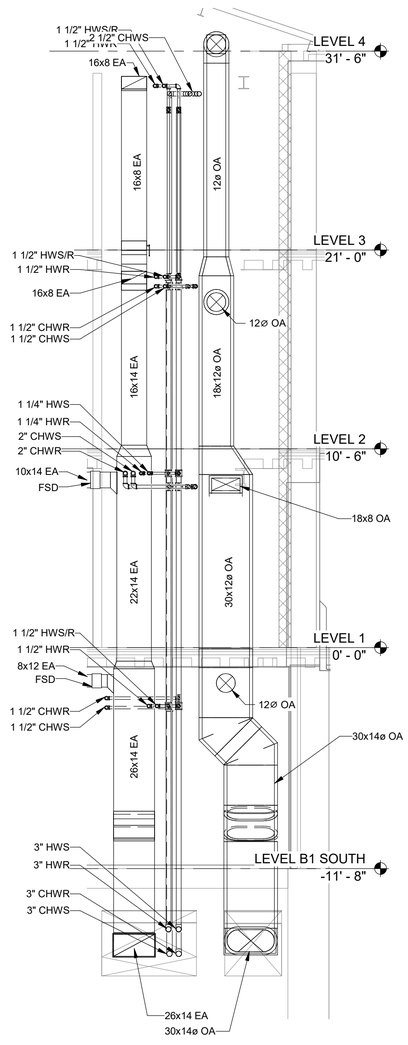
SHEET ID

MP108

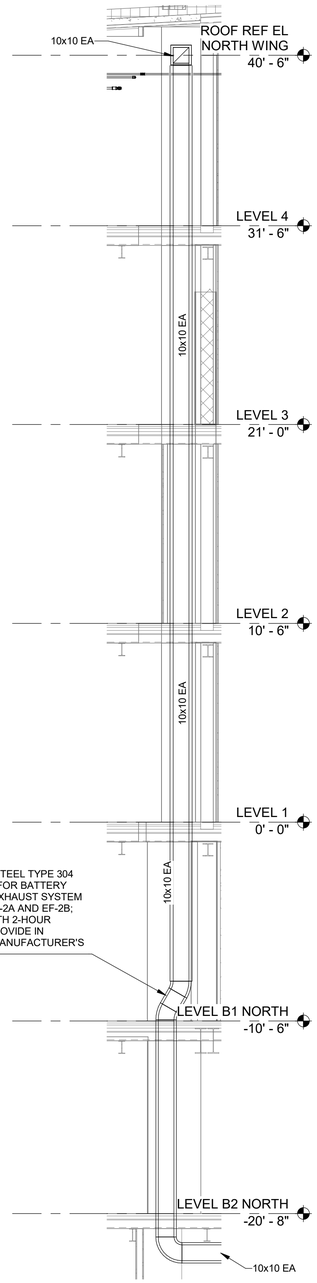
REVISED RTA SUBMISSION 03/01/2023



A1 MH101 NORTH WING SHAFT
1/4" = 1'-0"

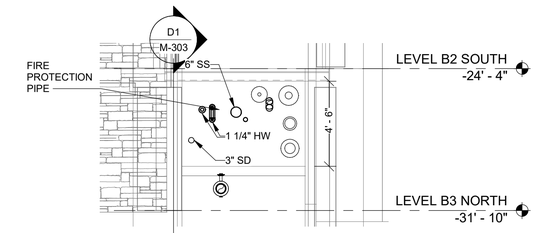


A2 MH102 SOUTH WING SHAFT
1/4" = 1'-0"

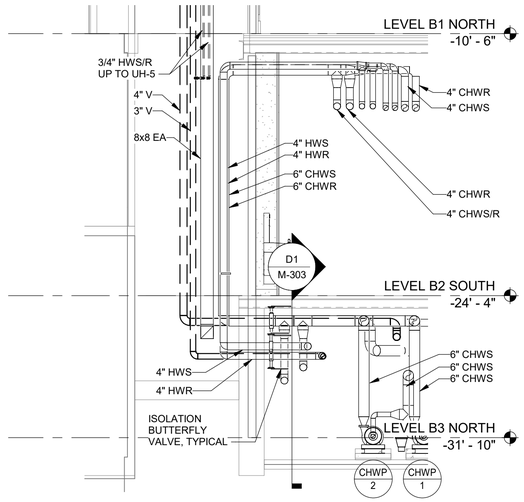


PROVIDE STAINLESS STEEL TYPE 304 WELDED DUCTWORK FOR BATTERY CHARGING STATION EXHAUST SYSTEM ASSOCIATED WITH EF-2A AND EF-2B; WRAP DUCTWORK WITH 2-HOUR RATED FIRE WRAP; PROVIDE IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS

A3 MH101 B303 ELECTRICAL ROOM EXHAUST
1/4" = 1'-0"



C4 MP101 UTILITY TUNNEL SECTION
1/4" = 1'-0"



A4 MP101 EXISTING ELEVATOR SHAFT
1/4" = 1'-0"

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. PROVIDE FIRE-STOPPING AT FIRE-RATED PENETRATIONS.
3. LOCATE PIPING IN OR AT CEILING UNLESS OTHERWISE INDICATED. BRANCH RUNOUTS TO TERMINAL REHEAT EQUIPMENT MUST BE MINIMUM 3/4 INCH UNLESS NOTED OTHERWISE.
4. PROVIDE PIPING ISOLATION VALVES IN ACCESSIBLE LOCATIONS, AS CLOSE TO MAIN RISERS AND BRANCH TAKE-OFFS AS POSSIBLE.

0 2' 4' 8'
SCALE: 1/4" = 1'-0"

0 4' 8' 16'
SCALE: 1/8"=1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE:	01 MARCH 2023
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CONTRACT NO.:	W912DS-19-C-0031-L
FILE NUMBER:	
DESIGNED BY:	N. SLEEM
DRAWN BY:	C. DEVANEY
CHECKED BY:	D. GORDON
SUBMITTED BY:	
SIZE:	ANSI 'D'
FILE NAME:	

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE A Joint Venture

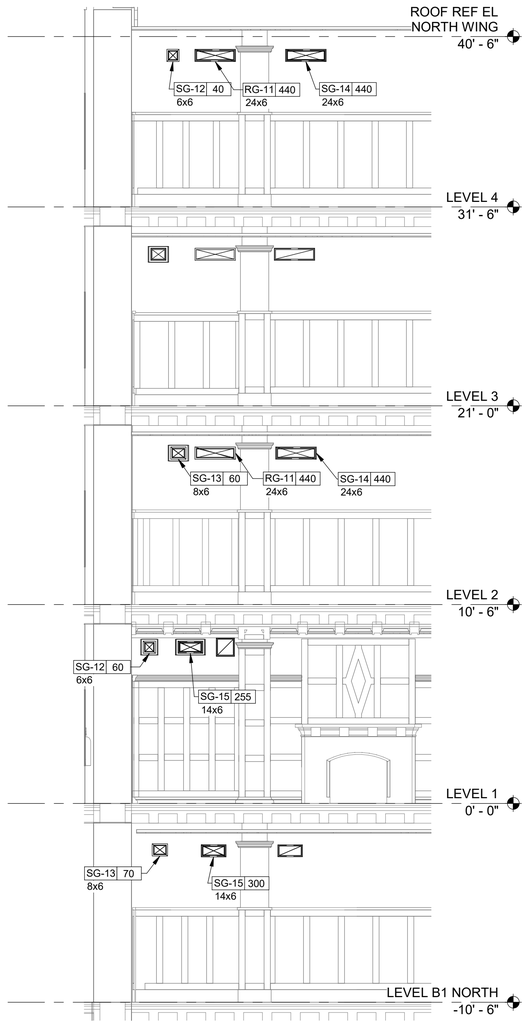
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

MECHANICAL SECTIONS
HVAC SHAFTS

SHEET ID

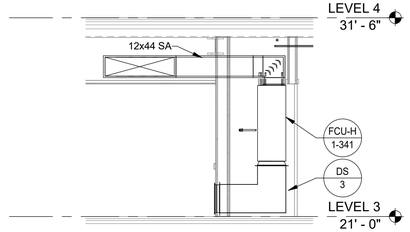
M-301

REVISED RTA SUBMISSION 03/01/2023



A1 MH103 CENTRAL STAIR - HVAC GRILLES

1/4" = 1'-0"



D2 MH106 PHOTO STUDIO FAN COIL SECTION VIEW

1/4" = 1'-0"

B2 MH106 TELEVISION STUDIO NORTH VIEW

1/4" = 1'-0"

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
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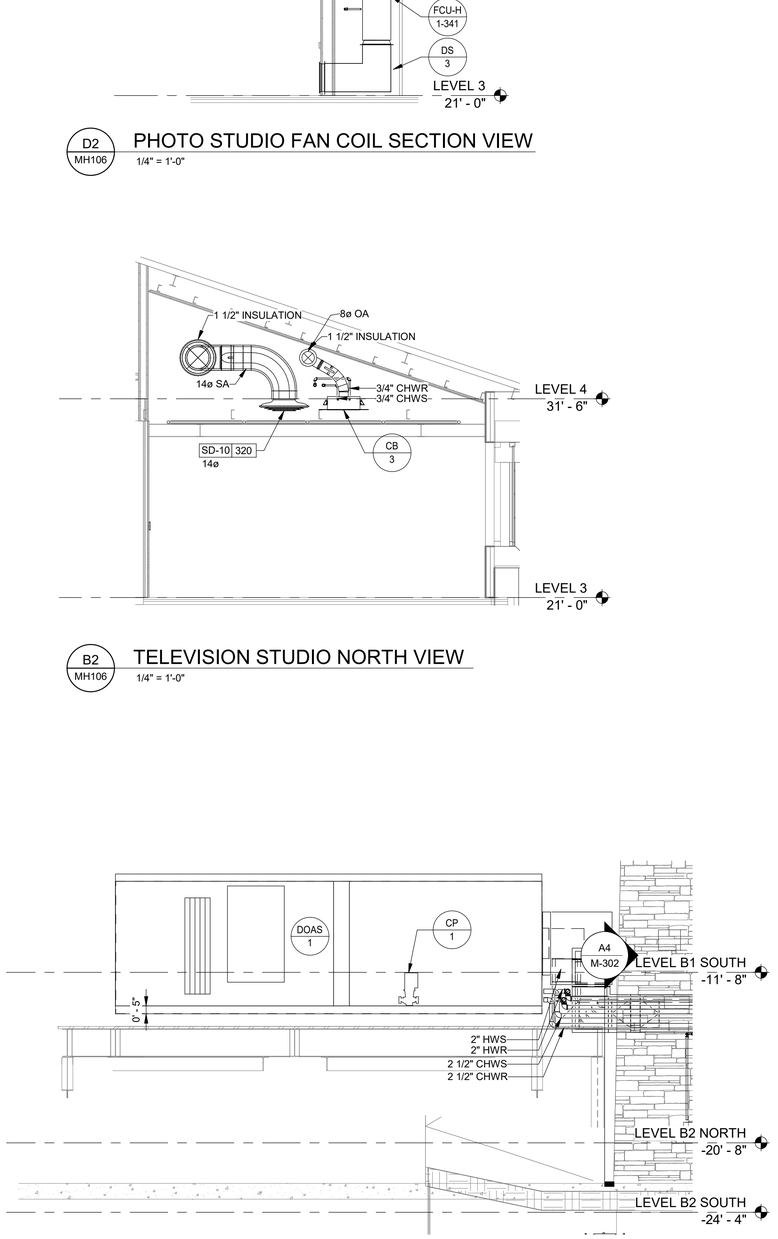
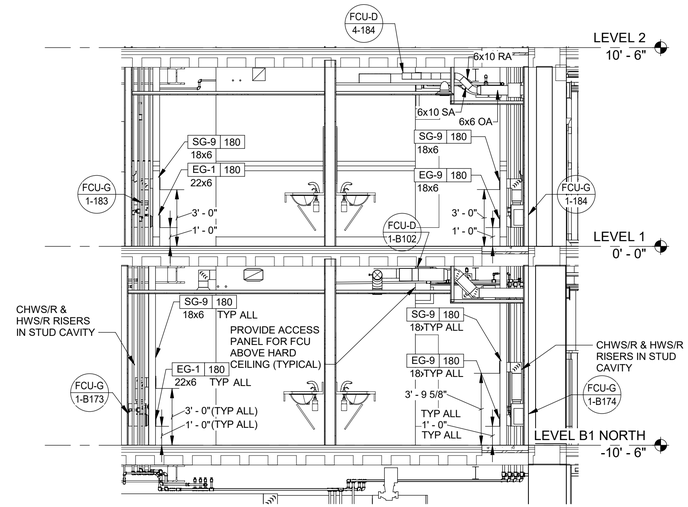


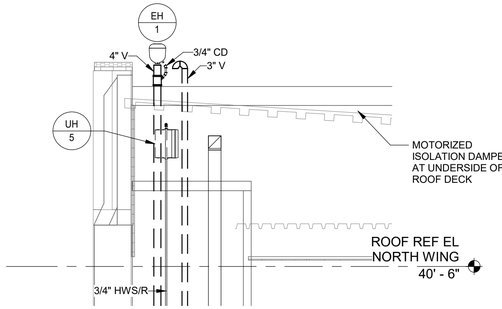
A2 MH102 DOAS-1 ELEVATION

1/4" = 1'-0"



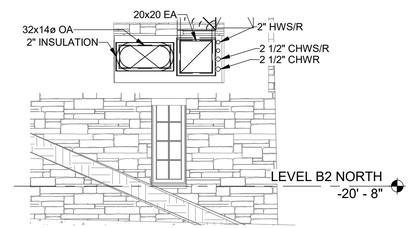
C4 MH103 NORTH RESTROOM FAN COIL UNITS

1/4" = 1'-0"



B4 MP107 ROOF ACCESS AND EXHAUST HEAD

1/4" = 1'-0"



A4 M-302 DOAS-1 DUCTS ENTRANCE

1/4" = 1'-0"

US Army Corps of Engineers ®

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DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:
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CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

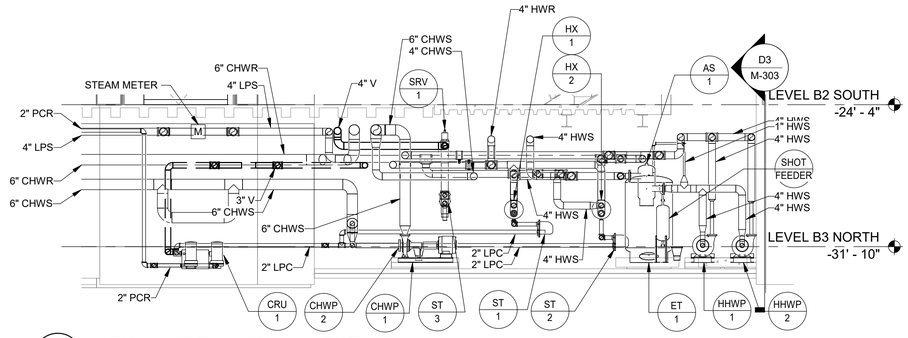
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

MECHANICAL SECTIONS

SHEET ID

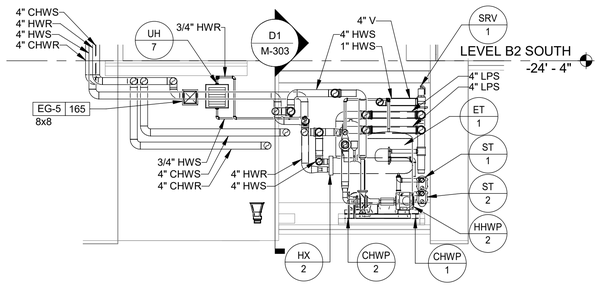
M-302

REVISED RTA SUBMISSION 03/01/2023



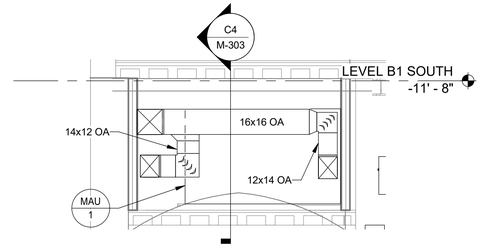
D1 / M-301 XB301 MECHANICAL WEST VIEW

1/4" = 1'-0"



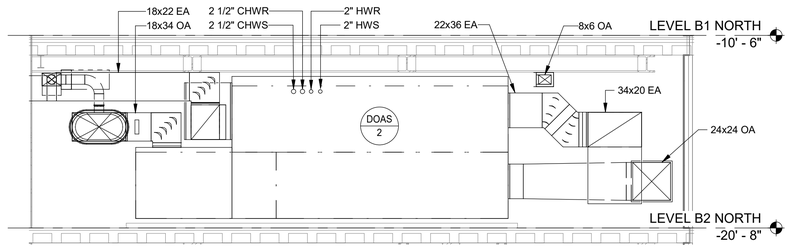
D3 / M-303 XB301 MECHANICAL SOUTH VIEW

1/4" = 1'-0"



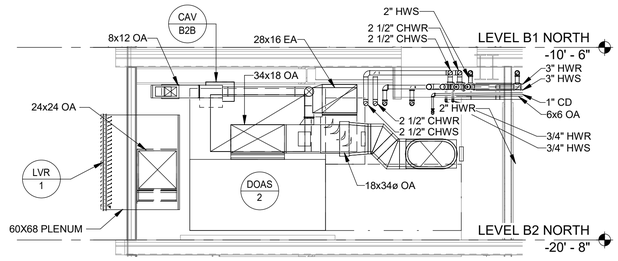
D4 / M-303 MAU-1 SOUTH VIEW

1/4" = 1'-0"



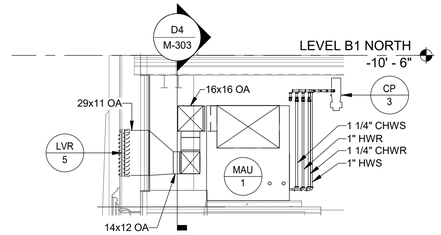
C1 / MH102 DOAS-2 SOUTH VIEW

1/4" = 1'-0"



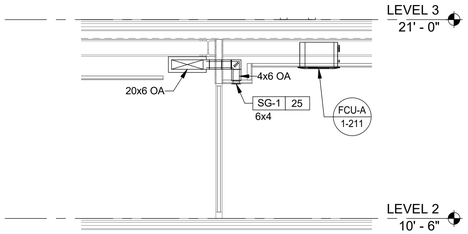
C3 / M-301 DOAS-2 EAST VIEW

1/4" = 1'-0"



C4 / M-303 MAU-1 EAST VIEW

1/4" = 1'-0"



B1 / MH104 SECOND FLOOR - OFFICE 211, 212, 213, 214 - OA DISTRIBUTION

1/4" = 1'-0"

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. PROVIDE FIRE-STOPPING AT FIRE-RATED PENETRATIONS.
3. LOCATE PIPING IN OR AT CEILING UNLESS OTHERWISE INDICATED. BRANCH RUNOUTS TO TERMINAL REHEAT EQUIPMENT MUST BE MINIMUM 3/4 INCH UNLESS NOTED OTHERWISE.
4. PROVIDE PIPING ISOLATION VALVES IN ACCESSIBLE LOCATIONS, S CLOSE TO MAIN RISERS AND BRANCH TAKE-OFFS AS POSSIBLE.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-18-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

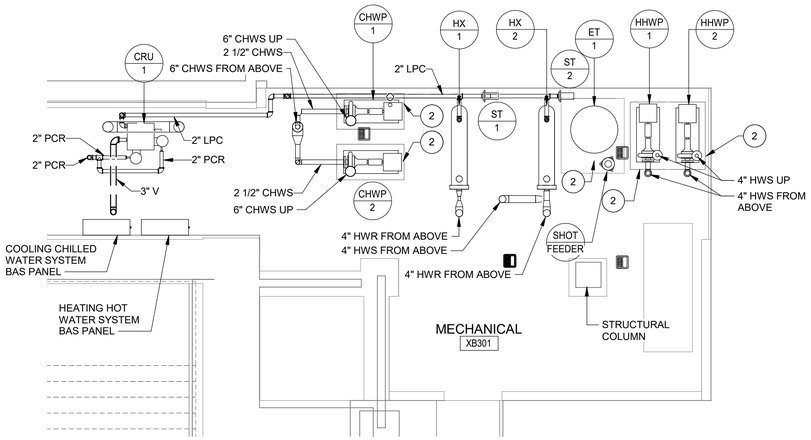
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

MECHANICAL SECTIONS

SHEET ID

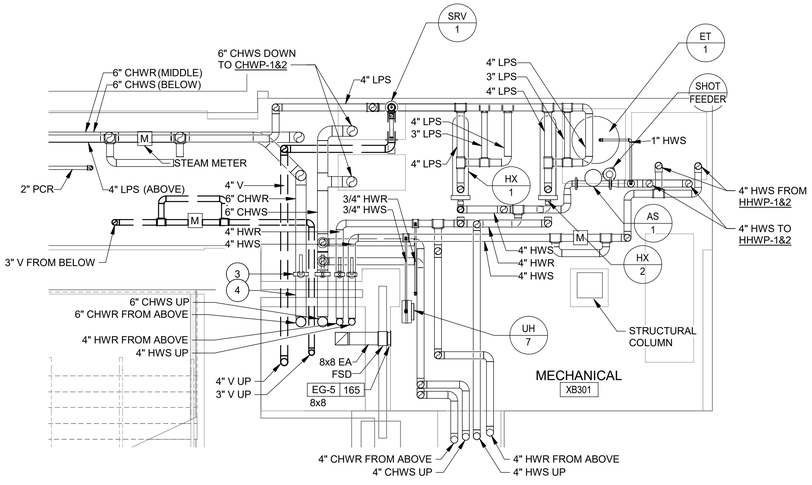
M-303

REVISED RTA SUBMISSION 03/01/2023



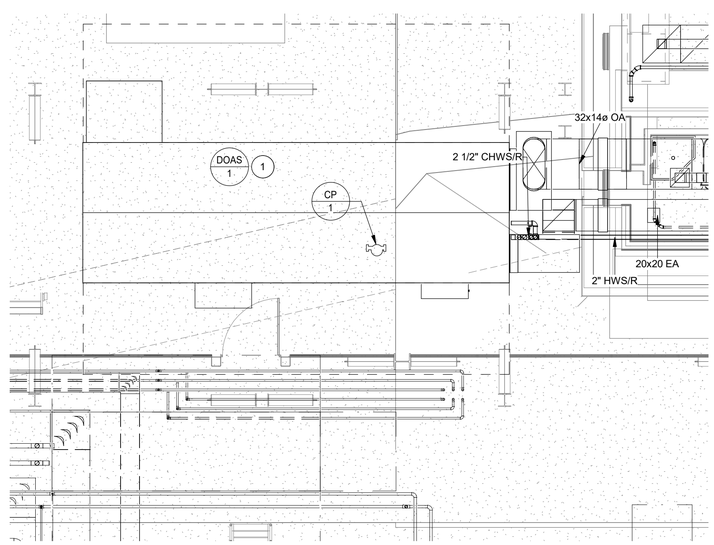
C1 XB301 MECHANICAL ROOM ENLARGED PLAN - LOWER LEVEL

1/4" = 1'-0"



A1 XB301 MECHANICAL ROOM ENLARGED PLAN - UPPER LEVEL

1/4" = 1'-0"



A3 ENLARGED SHARED MECHANICAL YARD PLAN

1/4" = 1'-0"

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. PROVIDE FIRE-STOPPING AT FIRE-RATED PENETRATIONS.
3. LOCATE PIPING IN OR AT CEILING UNLESS OTHERWISE INDICATED. BRANCH RUNOUTS TO TERMINAL REHEAT EQUIPMENT MUST BE MINIMUM 3/4 INCH UNLESS NOTED OTHERWISE.
4. PROVIDE PIPING ISOLATION VALVES IN ACCESSIBLE LOCATIONS, AS CLOSE TO MAIN RISERS AND BRANCH TAKE-OFFS AS POSSIBLE.

KEYNOTES

1 UNIT TO BE SUPPORTED ON STEEL DUNNAGE TO MATCH REST OF SHARED CULLUM AND LINCOLN MECHANICAL YARD.
2 PROVIDE 4" CONCRETE HOUSEKEEPING PAD. EXTEND 6" BEYOND EQUIPMENT DIMENSIONS ON ALL SIDES.
3 PROVIDE LINE-SIZE BUTTERFLY ISOLATION VALVES 6" OFF OF WALL FOR CHWS/R AND HWS/R.
4 PROVIDE FIRE STOP AT PIPE PENETRATIONS ON BOTH SIDES OF WALL/PARTITION ASSEMBLIES AND CHASE ASSEMBLIES PER FIRESTOP UL ASSEMBLY SPECIFICATIONS AND REQUIREMENTS.

0 2' 4' 8'
SCALE: 1/4" = 1'-0"

N

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE:
01 MARCH 2023
SOLICITATION NO.:
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FILE NUMBER:

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
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SUBMITTED BY:
FILE NAME:
SIZE: ANSI 'D'

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

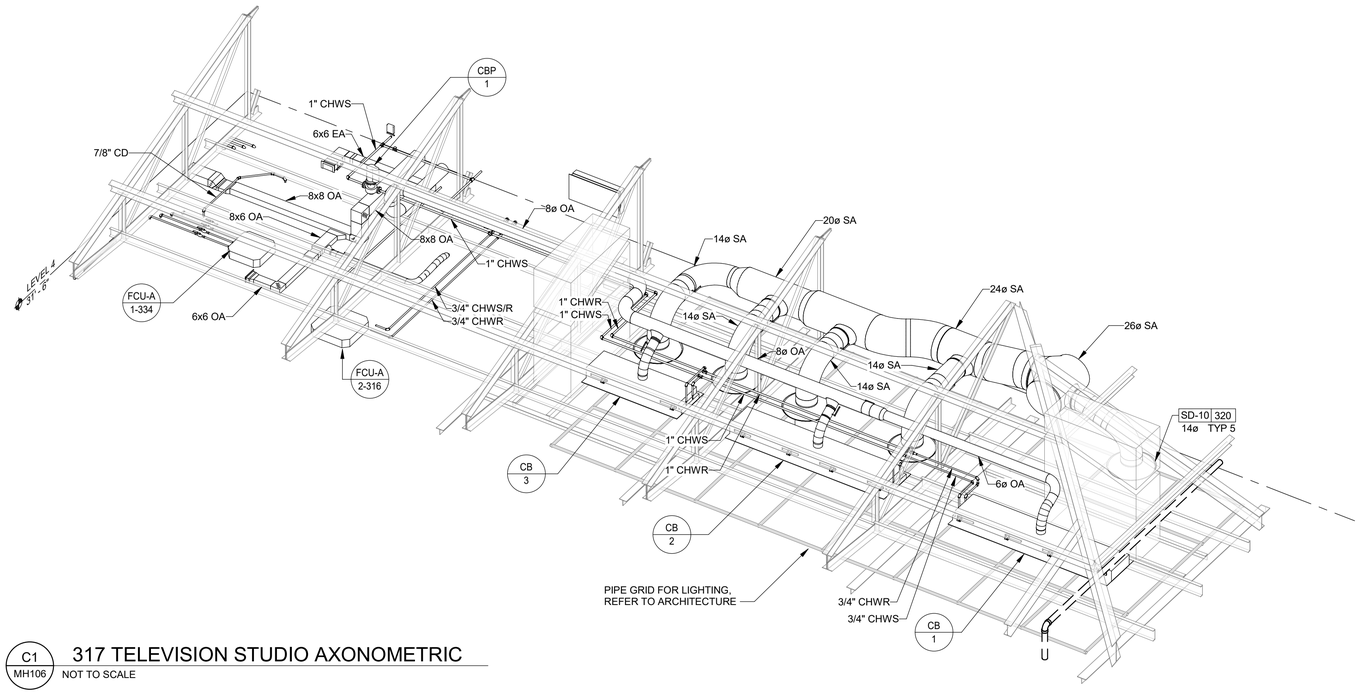
JACOBS / EWING COLE A Joint Venture

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC ENLARGED PLANS

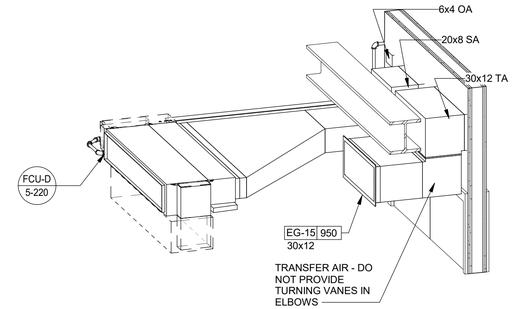
SHEET ID
M-401

REVISED RTA SUBMISSION 03/01/2023



C1 / MH106 — 317 TELEVISION STUDIO AXONOMETRIC

NOT TO SCALE



C4 / MH105 — LEVEL 2 CONFERENCE ROOM AXONOMETRIC VIEW

NOT TO SCALE

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. PROVIDE FIRE-STOPPING AT FIRE-RATED PENETRATIONS.
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4. PROVIDE PIPING ISOLATION VALVES IN ACCESSIBLE LOCATIONS, AS CLOSE TO MAIN RISERS AND BRANCH TAKE-OFFS AS POSSIBLE.

US Army Corps of Engineers ®

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SUBMITTED BY:
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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

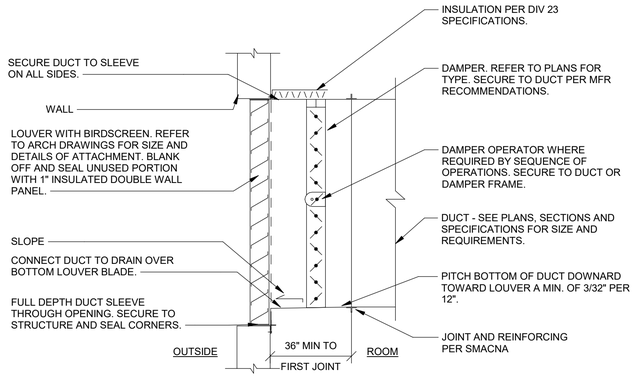
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC ENLARGED PLANS

SHEET ID

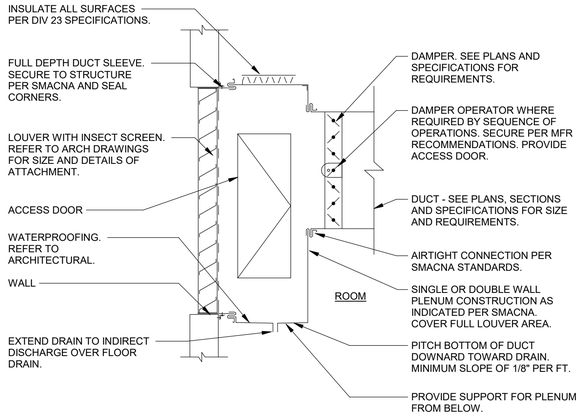
M-402

REVISED RTA SUBMISSION 03/01/2023



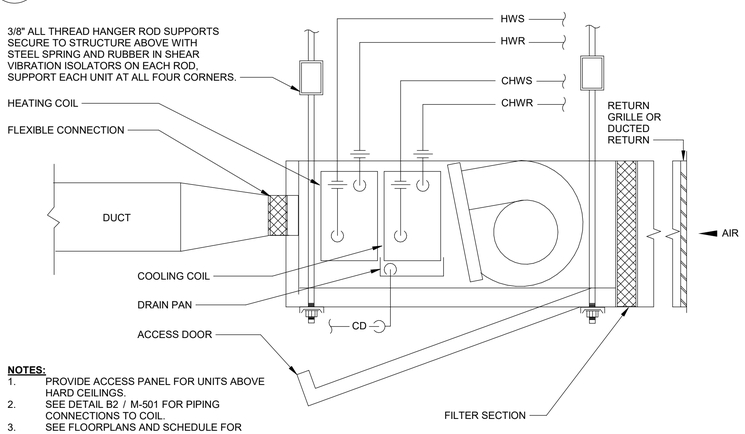
C1 DUCT CONNECTION TO LOUVER

NOT TO SCALE



B1 DUCT AND PLENUM CONNECTION TO LOUVER

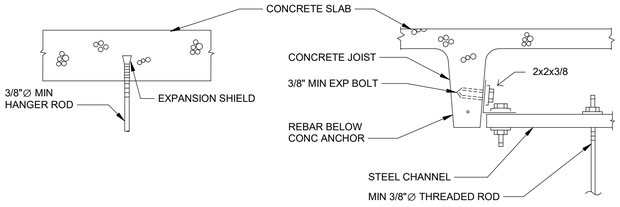
NOT TO SCALE



NOTES:
1. PROVIDE ACCESS PANEL FOR UNITS ABOVE HARD CEILINGS.
2. SEE DETAIL B2 / M-501 FOR PIPING CONNECTIONS TO COIL.
3. SEE FLOORPLANS AND SCHEDULE FOR RETURN TYPE

A1 HORIZONTAL CABINET FAN COIL UNIT

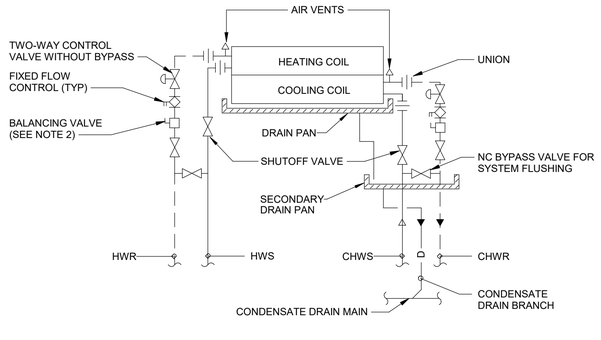
NOT TO SCALE



NOTES:
1. ALLOWABLE LOAD ON UPPER ATTACHMENT IS 1/4 OF FAILURE LOAD.
2. SELECT ONE METHOD TO SUIT SPECIFIC NEED.

C2 UPPER ATTACHEMENT FOR FAN COIL UNITS

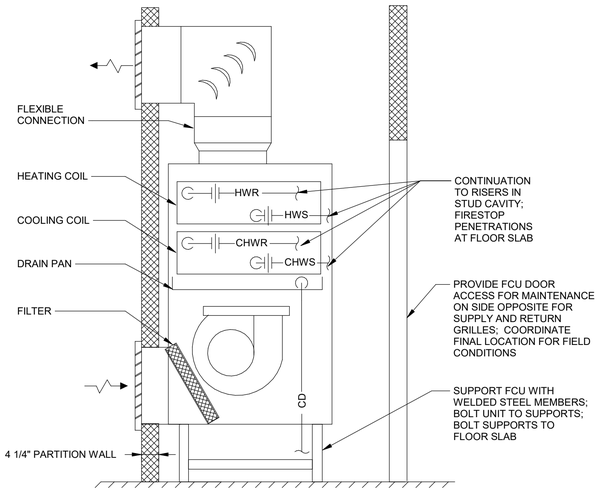
NOT TO SCALE



NOTES:
1. ALL CONNECTIONS ON SAME END ACCEPTABLE.
2. ALL BRANCH PIPING 3/4" UNLESS OTHERWISE NOTED ON DRAWINGS. PROVIDE 1/2" BALANCING VALVE WHERE FLOW RATE IS 1.3 GPM OR LESS AND FULL LINE SIZE BALANCING VALVE WHERE FLOW RATE IS GREATER.
3. MAKE WATER CONNECTIONS TO DISTRIBUTION MAINS USING 3-ELBOW SWING JOINT TYPE CONNECTIONS.

B2 4-PIPE FAN COIL UNIT - PIPING CONNECTIONS

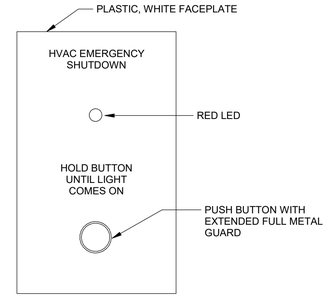
NTS



NOTES:
1. SEE DETAIL B2 / M-501 FOR PIPING CONNECTIONS TO COIL.

A2 VERTICAL CONCEALED CABINET FAN COIL UNIT

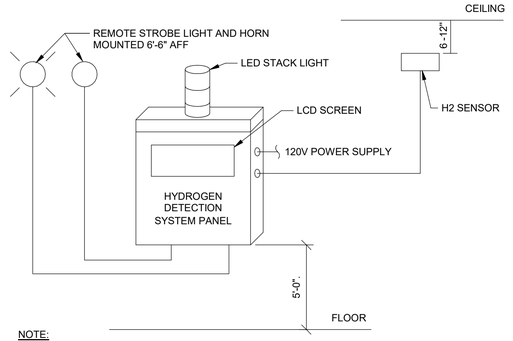
NOT TO SCALE



NOTE:
ALL TEXT SHALL BE ENGRAVED INTO THE FACEPLATE.

C4 AHU EMERGENCY STOP BUTTON

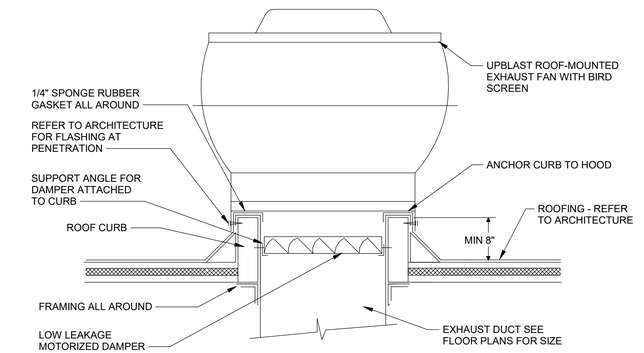
NOT TO SCALE



NOTE:
1. LABEL PANEL AND BEACON AS DIRECTED BY THE ACCEPTING AUTHORITY.
2. SYSTEM EQUIPPED WITH BUILT-IN LED STROBES, HORN, AND LCD SCREEN.

B4 HYDROGEN MONITORING SYSTEM WIRING

NOT TO SCALE



NOTES:
1. FAN AND ACCESSORIES MUST BE RATED FOR USE IN A CORROSIVE AND BRACKISH WATER ENVIRONMENT, INCLUDING BUT NOT LIMITED TO EPOXY COATED FAN HOUSING, OPEN DRIP PROOF MOTOR, STAINLESS STEEL FAN SHAFT, STEEL HARDWARE, NEMA 4X DISCONNECT, AND EPOXY COATED CURB. REFER TO EQUIPMENT SCHEDULES.
2. FANS SERVING EXPLOSION PROOF SPACES MUST BE PROVIDED WITH TEFC EXPLOSION PROOF MOTOR. REFER TO EQUIPMENT SCHEDULES.
3. COORDINATE FAN INSTALLATION WITH ROOFING WORK TO MAINTAIN ROOFING ASSEMBLY REQUIREMENTS AND WARRANTIES.

A4 ROOF MOUNTED UPBLAST FAN

NOT TO SCALE

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI D
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE A Joint Venture

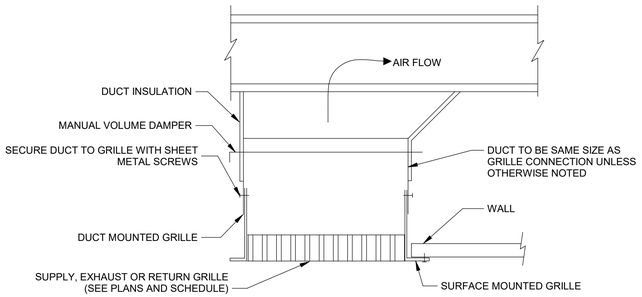
BUILDING5 605/607 RENOVATION - LINCOLN HALL

HVAC DETAILS

SHEET ID

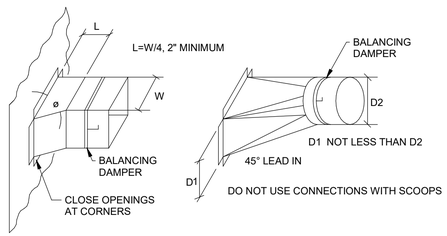
M-501

REVISED RTA SUBMISSION 03/01/2023



D1 TYPICAL GRILLE INSTALLATION

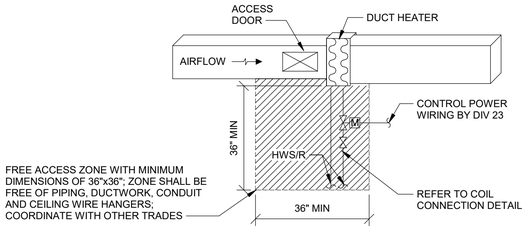
NOT TO SCALE



45 DEGREE ENTRY ø 45°

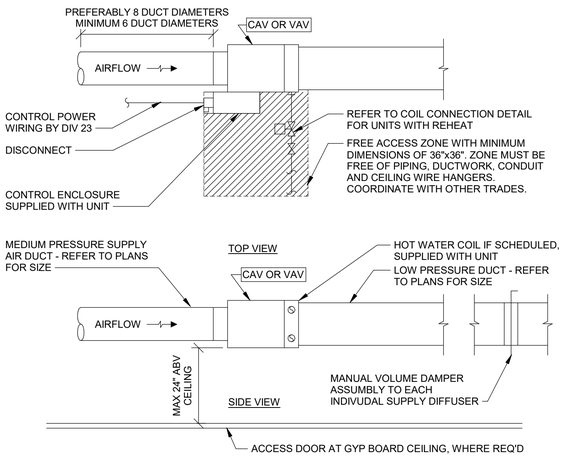
C1 BRANCH DUCT CONNECTIONS

NOT TO SCALE



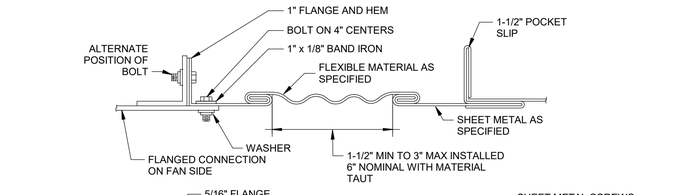
B1 TYPICAL DUCT HEATER CONNECTION

NOT TO SCALE



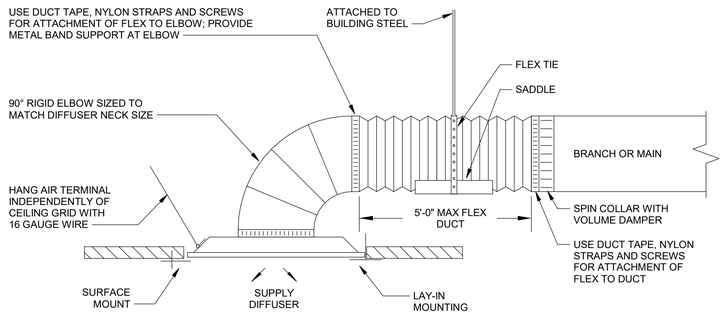
A1 TYPICAL TERMINAL UNIT CONNECTION

NOT TO SCALE



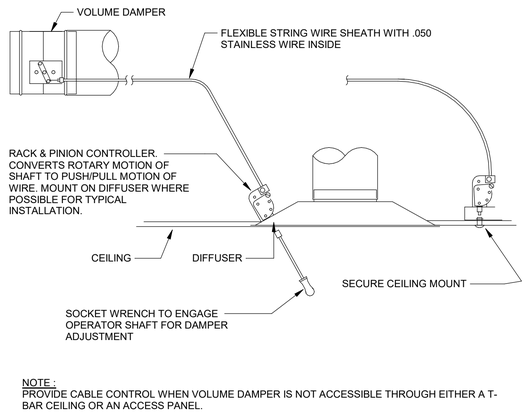
C2 DUCTWORK - TYPICAL ROUND & RECTANGULAR FLEX CONNECTION

NOT TO SCALE



B2 TYPICAL SUPPLY DIFFUSER INSTALLATION DETAIL

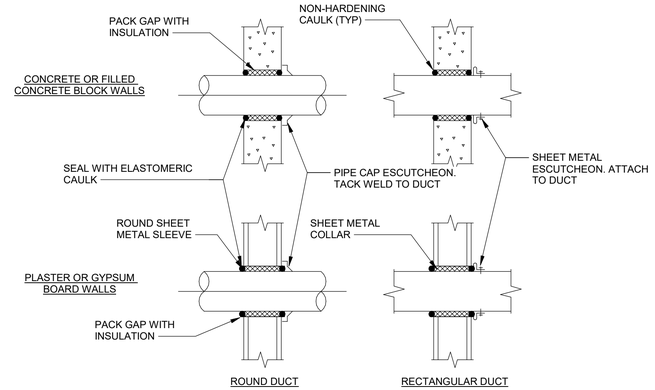
NOT TO SCALE



NOTE -
PROVIDE CABLE CONTROL WHEN VOLUME DAMPER IS NOT ACCESSIBLE THROUGH EITHER A T-BAR CEILING OR AN ACCESS PANEL.

A2 DAMPER REMOTE CABLE CONTROL DETAIL

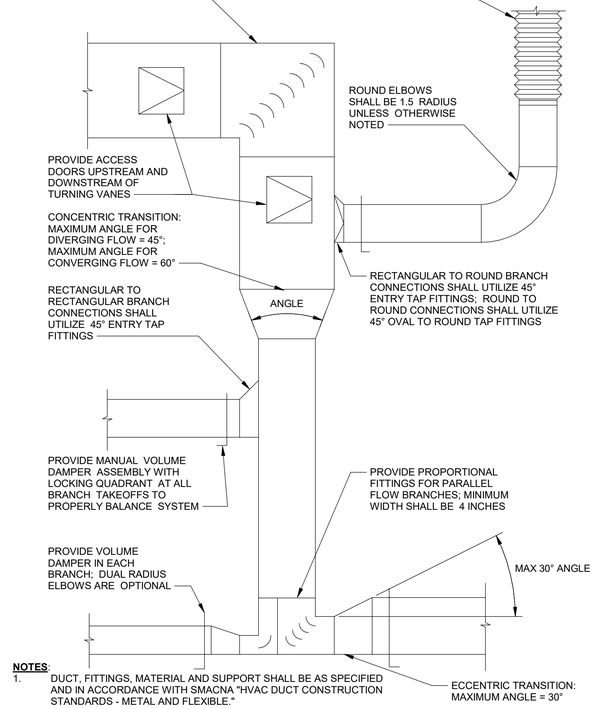
NOT TO SCALE



NOTES:
1. ESCUTCHEON SHALL NOT TOUCH WALL SLEEVE OR COLLAR
2. OMIT ESCUTCHEON FOR CONSEALED DUCTWORK

C4 DUCT PENETRATIONS THROUGH NON-RATED INTERIOR WALLS

NOT TO SCALE



NOTES:
1. DUCT, FITTINGS, MATERIAL AND SUPPORT SHALL BE AS SPECIFIED AND IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE."

A4 TYPICAL DUCT DETAIL

NOT TO SCALE

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-18-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

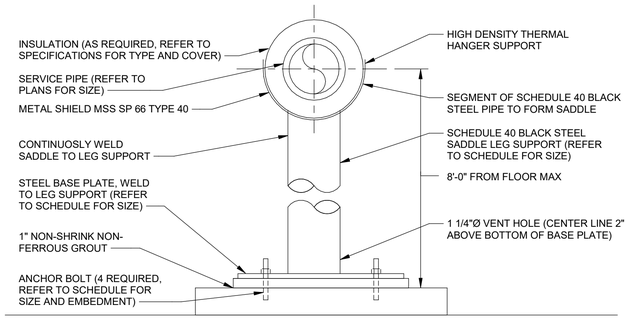
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC DETAILS

SHEET ID

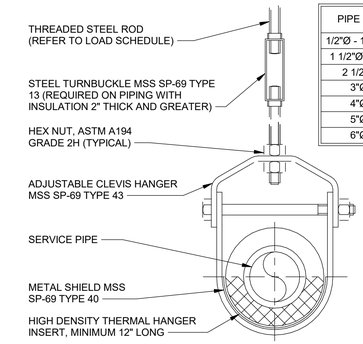
M-502

REVISED RTA SUBMISSION 03/01/2023



PIPE SIZE	SADDLE LEG SUPPORT	BASE PLATE	ANCHOR BOLTS	MIN. EMBEDMENT
30"Ø	12"Ø	18" x 18" x 1/2"	5/8"Ø x 8" LONG	5"
24"Ø	8"Ø	14" x 14" x 1/2"	5/8"Ø x 8" LONG	5"
20"Ø	8"Ø	14" x 14" x 1/2"	5/8"Ø x 8" LONG	4"
18"Ø	6"Ø	10" x 10" x 1/2"	5/8"Ø x 8" LONG	4"
16"Ø	6"Ø	10" x 10" x 1/2"	5/8"Ø x 8" LONG	4"
14"Ø	5"Ø	10" x 10" x 3/8"	5/8"Ø x 8" LONG	4"
12"Ø	5"Ø	10" x 10" x 3/8"	1/2"Ø x 8" LONG	4"
10"Ø	4"Ø	8" x 8" x 3/8"	1/2"Ø x 8" LONG	4"
8"Ø	3"Ø	8" x 8" x 3/8"	1/2"Ø x 8" LONG	4"
6"Ø	3"Ø	8" x 8" x 3/8"	1/2"Ø x 8" LONG	4"
5"Ø	2"Ø	6" x 8" x 3/8"	1/2"Ø x 6" LONG	3"
4"Ø	1 1/2"Ø	6" x 8" x 3/8"	1/2"Ø x 6" LONG	3"
3"Ø	1 1/2"Ø	6" x 8" x 3/8"	1/2"Ø x 6" LONG	3"

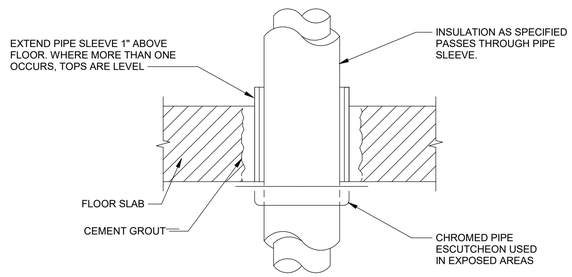
C1 PIPING - INSULATED PIPE SADDLE SUPPORT
NOT TO SCALE



PIPE SIZE	MAX SPACING	ROD SIZE
1/2"Ø - 1 1/4"Ø	7'	3/8"Ø
1 1/2"Ø - 2"Ø	9'	3/8"Ø
2 1/2"Ø	11'	1/2"Ø
3"Ø	12'	1/2"Ø
4"Ø	14'	5/8"Ø
5"Ø	16'	5/8"Ø
6"Ø	17'	3/4"Ø

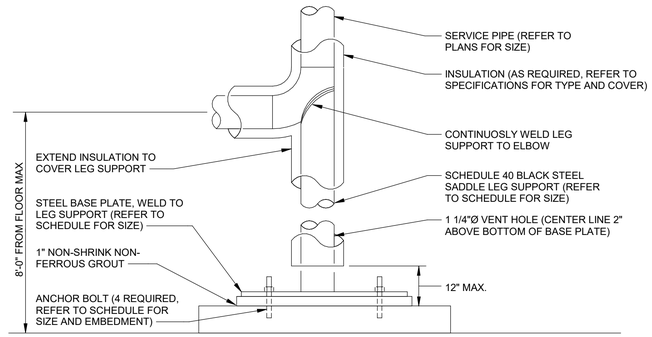
NOTES:
1. HANGERS THAT UTILIZE A TURNBUCKLE WILL REQUIRE THE INSTALLATION AND USE OF BOTH RIGHT AND LEFT HANDED THREADS.
2. PIPE SIZE NOT INCLUDED IN THE LOAD SCHEDULE WILL NOT BE PERMISSIBLE.
3. THE THICKNESS OF THE THERMAL HANGER INSERT SHALL BE AS REQUIRED TO FIT THE SUPPORT, BUT NOT LESS THAN THE PIPING SYSTEM SUPPORTED.
4. SADDLE SHALL BE FITTED TO THE DIAMETER OF THE INSULATION.
5. ATTACH HANGER TO STRUCTURAL ELEMENTS DEPENDENT ON LOCATION CONDITIONS AND AS SPECIFIED.

B1 PIPING - ADJUSTABLE CLEVIS HANGER
NOT TO SCALE



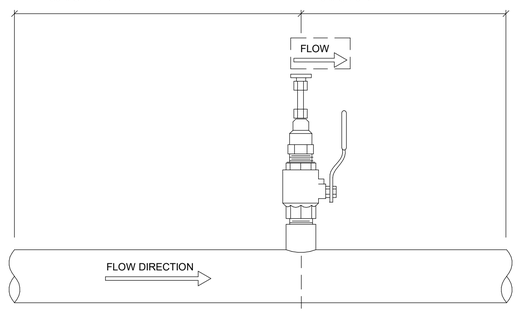
NOTES:
1. REFER TO AND COMPLY WITH FIRESTOPPING SPECIFICATIONS.

A1 PIPING - FLOOR SLAB PENETRATION
NOT TO SCALE

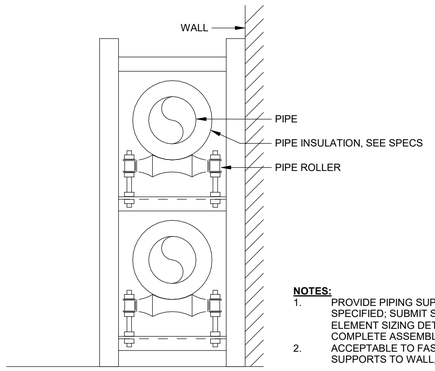


PIPE SIZE	SADDLE LEG SUPPORT	BASE PLATE	ANCHOR BOLTS	MIN. EMBEDMENT
30"Ø	14"Ø	20" x 20" x 1/2"	3/4"Ø x 8" LONG	5"
24"Ø	10"Ø	18" x 18" x 1/2"	3/4"Ø x 8" LONG	5"
20"Ø	10"Ø	18" x 18" x 1/2"	3/4"Ø x 8" LONG	5"
18"Ø	8"Ø	14" x 14" x 1/2"	5/8"Ø x 8" LONG	4"
16"Ø	6"Ø	10" x 10" x 1/2"	5/8"Ø x 8" LONG	4"
14"Ø	6"Ø	10" x 10" x 1/2"	5/8"Ø x 8" LONG	4"
12"Ø	6"Ø	10" x 10" x 3/8"	5/8"Ø x 8" LONG	4"
10"Ø	6"Ø	10" x 10" x 3/8"	5/8"Ø x 8" LONG	4"
8"Ø	4"Ø	8" x 8" x 3/8"	1/2"Ø x 8" LONG	4"
6"Ø	3"Ø	8" x 8" x 3/8"	1/2"Ø x 8" LONG	4"
5"Ø	4"Ø	8" x 8" x 3/8"	1/2"Ø x 6" LONG	3"
4"Ø	4"Ø	8" x 8" x 3/8"	1/2"Ø x 6" LONG	3"
3"Ø	2"Ø	6" x 6" x 3/8"	1/2"Ø x 6" LONG	3"

C2 PIPING - INSULATED PIPE RISER FLOOR SUPPORT
NOT TO SCALE

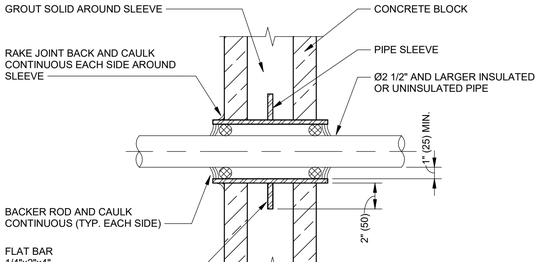


B2 TYPICAL WATERFLOW MEASURING DEVICE DETAIL
NOT TO SCALE



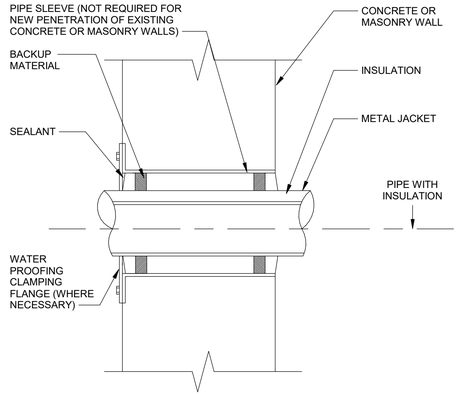
NOTES:
1. PROVIDE PIPING SUPPORTS AS SPECIFIED. SUBMIT SUPPORT ELEMENT SIZING DETAILS AS A COMPLETE ASSEMBLY FOR REVIEW. ACCEPTABLE TO FASTEN PIPE SUPPORTS TO WALL, SLAB, OR BOTH.

A2 PIPING - TUNNEL PIPE SUPPORT DETAIL (PIPE RACK)
NOT TO SCALE

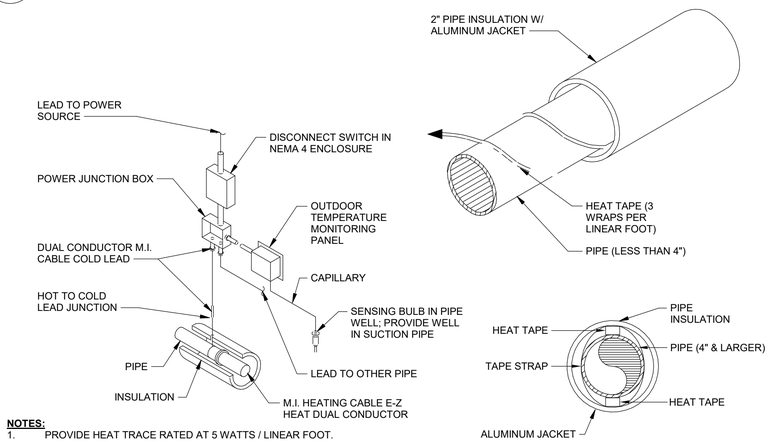


NOTES:
1. WHERE SLEEVE IS INSTALLED AFTER MASONRY WALL IS CONSTRUCTED, LOCATE 1/4"x2"x4" (10x50x100) BARS AT INTERIOR SIDE OF WALL FACE, WELD TO SLEEVE AND ATTACH TO CONCRETE BLOCK WITH EXPANSION BOLTS.

C4 PIPE SLEEVE THRU INTERIOR MASONRY WALL
NOT TO SCALE



B4 PIPE SLEEVE THRU EXTERIOR WALL DETAIL
NOT TO SCALE



NOTES:
1. PROVIDE HEAT TRACE RATED AT 5 WATTS / LINEAR FOOT.

A4 HEAT TRACE
NTS

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

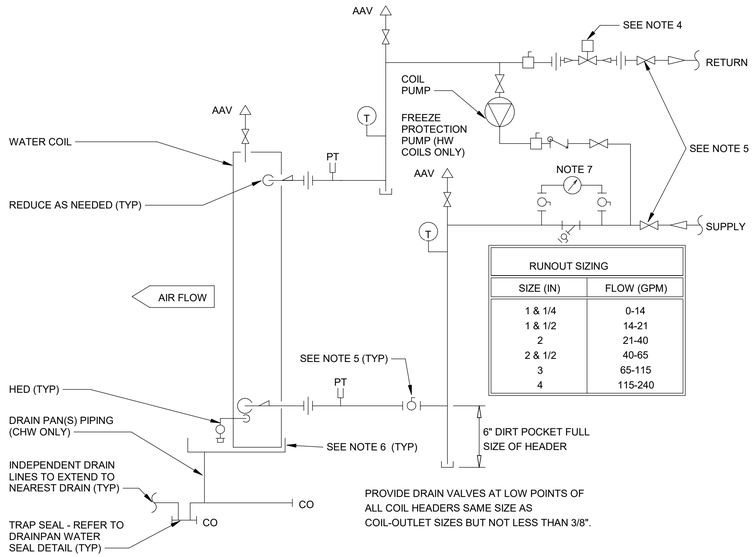
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC DETAILS

SHEET ID

M-503

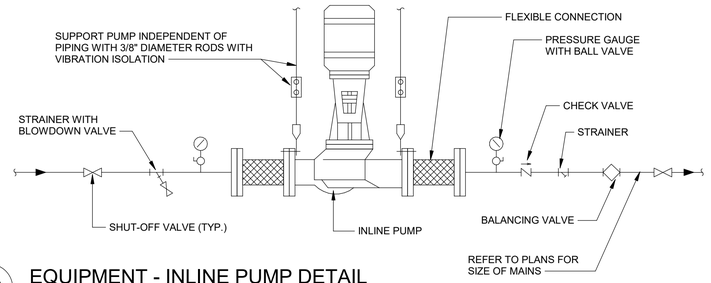
REVISED RTA SUBMISSION 03/01/2023



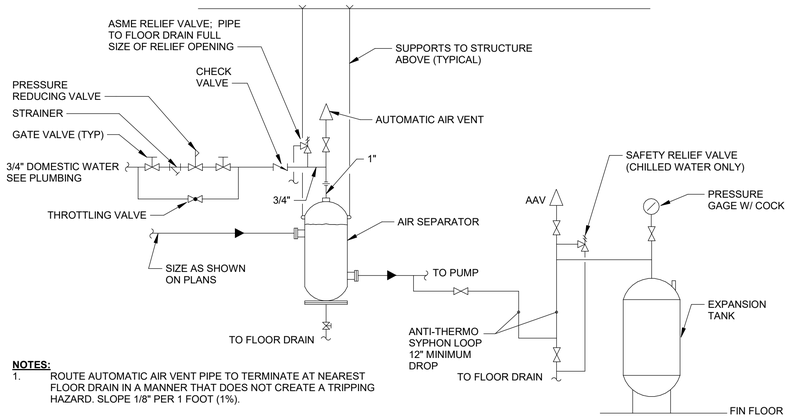
RUNOUT SIZING	
SIZE (IN)	FLOW (GPM)
1 & 1/4	0-14
1 & 1/2	14-21
2	21-40
2 & 1/2	40-65
3	65-115
4	115-240

NOTES:
1. PROVIDE SIMILAR PIPING FOR 3 OR MORE COILS HIGH.
2. LOCATE PIPE UNIONS (OR FLANGED BODY) AND ARRANGE PIPING TO FACILITATE COIL REMOVAL. PROVIDE REDUCERS AS REQUIRED FOR CONNECTION TO COIL PIPE SIZE.
3. PROVIDE SIMILAR PIPING ARRANGEMENTS ON EACH SIDE FOR TWO-SECTION-WIDE COIL ASSEMBLY.
4. TWO-WAY CONTROL VALVE SHOWN. SEE AUTOMATIC-TEMPERATURE-CONTROL DIAGRAM AND SPECIFICATIONS FOR ACTUAL JOB REQUIREMENTS. FOR 3-WAY VALVE PROVIDE VALVE BY-PASS WITH THERMOMETER AND ISOLATION VALVE W/MEMORY STOP.
5. FOR SUPPLY AND RETURN PIPES 2" AND SMALLER, USE BALL VALVES WITH UNIONS FOR ISOLATION. FOR SUPPLY AND RETURN PIPES LARGER THAN 2" USE GATE VALVES WITH FLANGES FOR ISOLATION.
6. REFER TO SPECIFICATIONS FOR DRAIN PAN REQUIREMENTS.
7. PROVIDE PRESSURE GAUGE ACROSS SUPPLY, RETURN AND STRAINER.
8. ROUTE AUTOMATIC AIR VENT PIPE TO TERMINATE AT NEAREST FLOOR DRAIN IN A MANNER THAT DOES NOT CREATE A TRIPPING HAZARD. SLOPE 1/8" PER 1 FOOT (1%).

B1 DOAS COIL CONNECTION
NOT TO SCALE

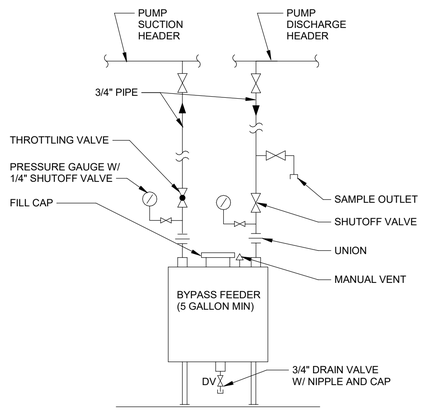


D2 EQUIPMENT - INLINE PUMP DETAIL
NTS

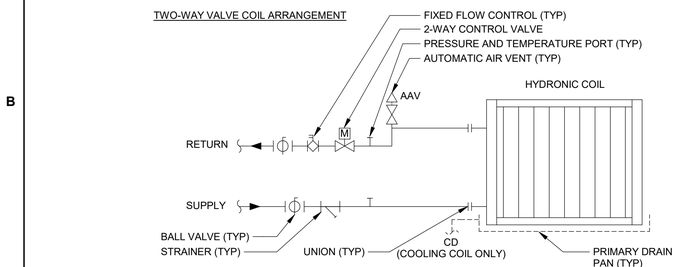


NOTES:
1. ROUTE AUTOMATIC AIR VENT PIPE TO TERMINATE AT NEAREST FLOOR DRAIN IN A MANNER THAT DOES NOT CREATE A TRIPPING HAZARD. SLOPE 1/8" PER 1 FOOT (1%).

B2 EXPANSION TANK AND AIR SEPARATOR PIPING
NOT TO SCALE

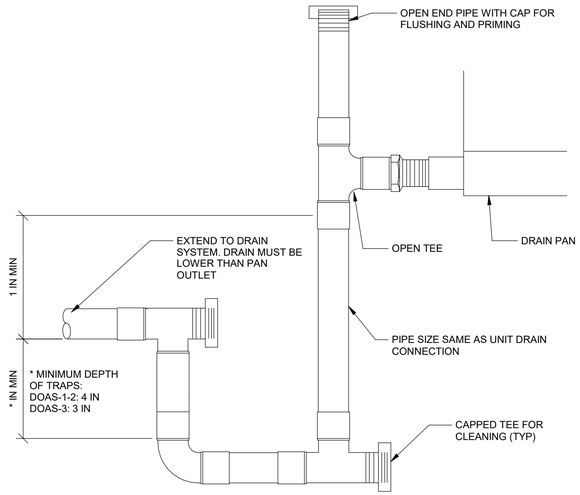


C4 WATER TREATMENT BYPASS FEEDER PIPING
NTS



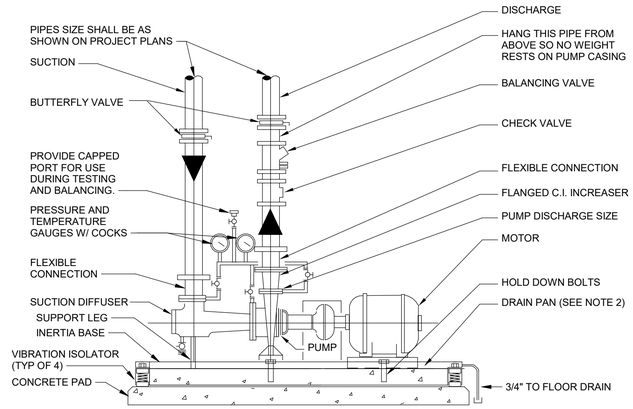
NOTES:
1. THIS DETAIL IS APPLICABLE FOR FAN COIL UNITS (FCU), DUCT HEATERS (DH), AND COMPUTER ROOM AIR HANDLERS (CRAH). SEE DETAIL B1 ON THIS SHEET FOR DOAS UNIT COILS.
2. THE SAME PIPING ARRANGEMENT APPLIES TO BOTH COOLING AND HEATING COILS. PROVIDE COOLING COILS WITH SECONDARY DRAIN PAN OR HIGH LEVEL SHUTOFF SWITCH LOCATED IN PRIMARY DRAIN PAN.
3. MAKE WATER CONNECTIONS TO DISTRIBUTION MAINS USING 3-ELBOW SWING JOINT TYPE CONNECTIONS.
4. ROUTE AUTOMATIC AIR VENT PIPE TO TERMINATE AT NEAREST FLOOR DRAIN IN A MANNER THAT DOES NOT CREATE A TRIPPING HAZARD. SLOPE 1/8" PER 1 FOOT (1%).

A1 HYDRONIC COIL CONNECTION PIPING DETAIL
NTS



NOTES:
1. ALLOW SUFFICIENT SPACE BELOW DRAIN PAN FOR TRAP.
2. PITCH DRAIN FOR PROPER RUNOFF.
3. MANUALLY PRIME FILL TRAP BEFORE START-UP TO FORM DRAIN SEAL
4. SUPPORT LENGTHY DRAIN LINES TO PREVENT SAG AND CONDENSATE OVERFLOW

A2 CONDENSATE DRAIN TRAP DETAIL
NOT TO SCALE



NOTES:
1. PRESSURE GAUGE WITH SNUBBER. PIPING TO GAUGE SHALL BE ALL 1/4" 304SS PIPING AND FITTINGS. PROVIDE 316SS BALL VALVES FOR SHUTOFF. INSULATION OF THIS PIPING IS NOT REQUIRED.
2. PROVIDE 16 GAUGE, ALL WELDED, 304 SS DRAIN PAN WITH 1-1/2" LIP UNDER ENTIRE PUMP AND 3/4"COPPER PIPE TO DRAIN. BOLTS FOR ANCHORING PUMP SHALL BE 304SS AND SHALL BE SEALED WITH RUBBER WASHERS.

A4 END SUCTION PUMP DETAIL
NOT TO SCALE

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

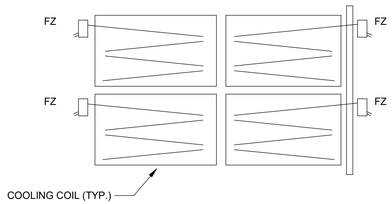
JACOBS / EWING COLE A Joint Venture

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC DETAILS

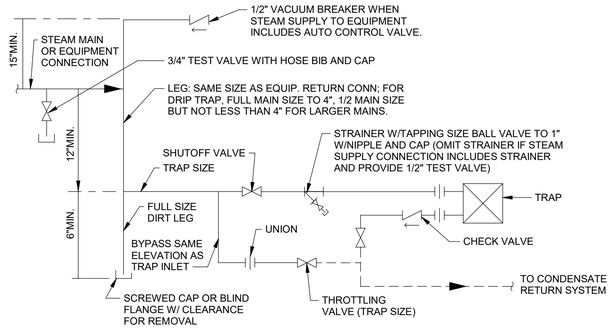
SHEET ID
M-504

REVISED RTA SUBMISSION 03/01/2023



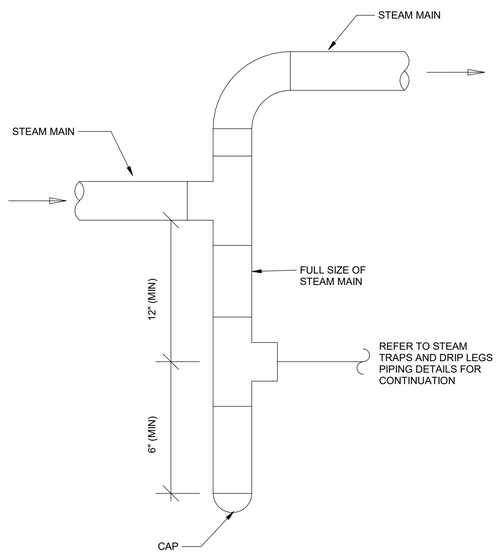
REFER TO SPEC. FOR LENGTH OF FREEZESTAT.

D1 FREEZESTAT INSTALLATION
NTS



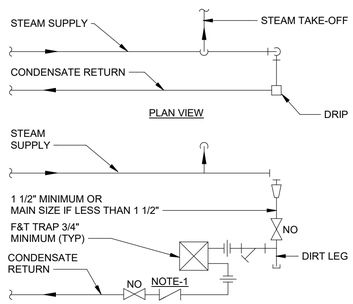
NOTES:
1. STEAM MAIN DRIP TRAP TO BE 3/4" UNLESS OTHERWISE NOTED.
2. OMIT CHECK VALVE IF STEAM PRESSURE IS 15 PSIG OR LESS AND CONDENSATE IS NOT LIFTED.
3. FOR PREHEAT COIL ONLY, PROVIDE THERMOSTATIC DRAIN VALVE AHEAD OF BYPASS, PIPE TO F.D.
4. PROVIDE ELEVATED SUPPORTS/LEGS AS REQUIRED FOR FLOOR MOUNTED EQUIPMENT TO OBTAIN MINIMUM TRAP LEG HEIGHT AS SHOWN AND PITCH OF CONDENSATE RETURN TO TERMINATION.
5. INSTALL TRAP ASSEMBLIES IN PARALLEL WHEN MORE THAN ONE TRAP REQUIRED FOR LOAD.
6. PROVIDE TEST TEES WITHIN 6" OF STEAM TRAPS.

B1 FLOAT AND THERMOSTATIC STEAM TRAP PIPING
NTS

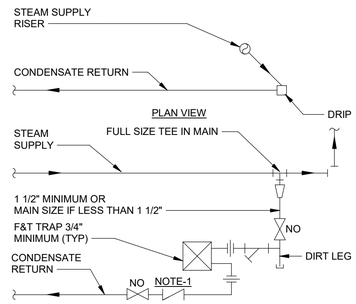


A1 STEAM CONDENSATE DRIP LEG
NOT TO SCALE

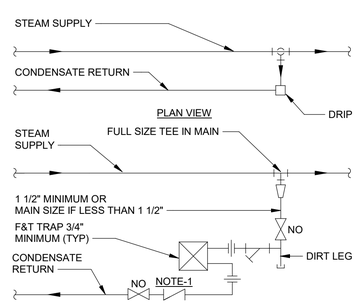
END OF MAIN



VERTICAL MAIN

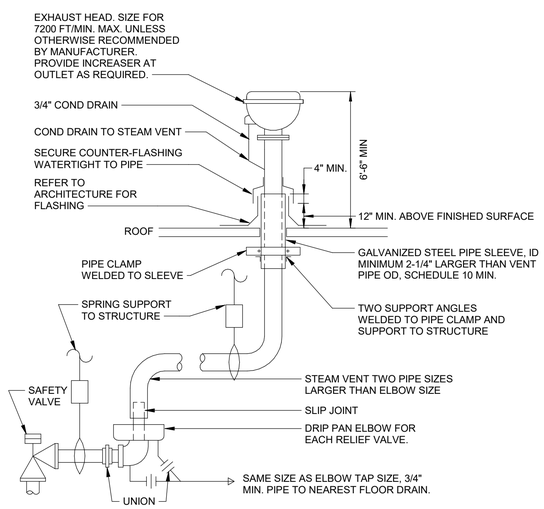


HORIZONTAL

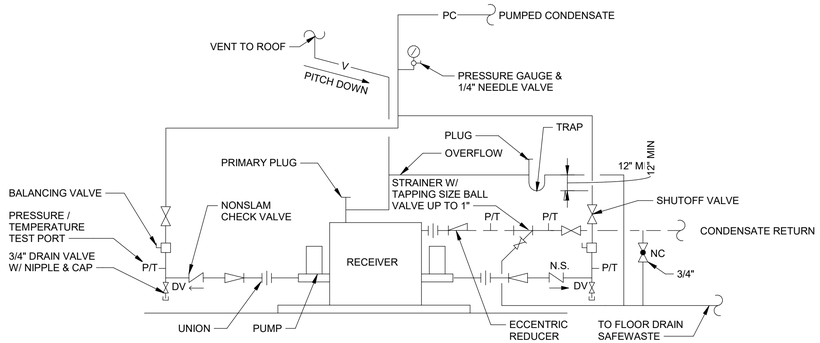


NOTES:
1. PROVIDE CHECK VALVE ONLY WHEN CONDENSATE IS TO BE LIFTED ABOVE TRAP INLET.

C2 DRIP LEGS PIPING ARRANGEMENTS
NTS

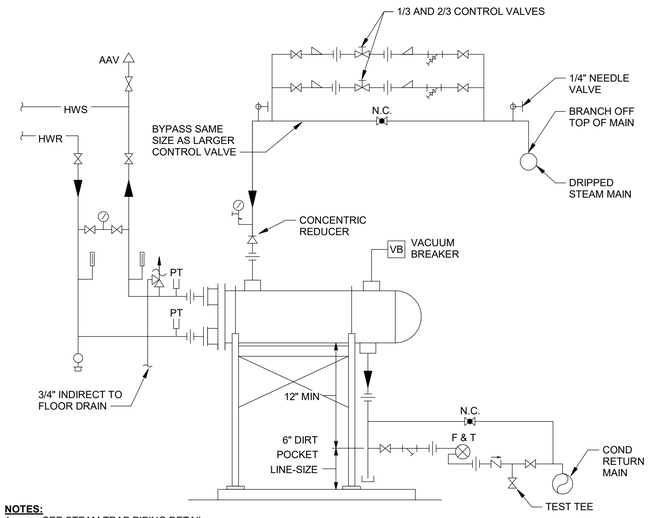


B2 STEAM SAFETY RELIEF VALVE
NTS



NOTES:
1. VENT AND OVERFLOW SAME SIZE AS RECEIVER VENT CONNECTION UNLESS OTHERWISE NOTED ON DRAWINGS.

A2 DUPLEX CONDENSATE RETURN UNIT
NTS



NOTES:
1. SEE STEAM TRAP PIPING DETAIL.
2. PROVIDE PIPE UNIONS, FLANGES, AND ARRANGE WATER PIPING TO FACILITATE TUBE BUNDLE REMOVAL WITH MINIMUM DISTURBANCE TO PIPING.
3. PRESSURE RELIEF VALVE SET AT EQUIPMENT'S RATED PRESSURE.
4. PIPE AIR VENT AND RELIEF VALVE OUTLETS IS TO NEAREST FLOOR DRAIN.
5. STEAM CONTROL VALVES MUST BE SIZED FOR 1/3 AND 2/3 CAPACITY OF HEAT EXCHANGER. INSTALL CONTROL VALVES AT THE SAME ELEVATION.
6. PROVIDE STRAINER AT STEAM CONTROL VALVES. WHERE HORIZONTAL DISTANCE BETWEEN STRAINER AND STEAM MAIN IS GREATER THAN 10'-0", PROVIDE STRAINER WITH 3/4" NORMALLY OPEN VALVE AND STEAM TRAP PIPED TO CONDENSATE RETURN. WHERE DISTANCE IS LESS THAN 10'-0", TURN STRAINER ON ITS SIDE TO AVOID COLLECTING CONDENSATE IN STRAINER.
7. LOCATE STEAM DRIP CLOSE TO CONTROLS VALVES TO ENSURE THAT CONDENSATE DOES NOT REACH CONTROL VALVES.

A4 STEAM TO LIQUID HEAT EXCHANGER
NOT TO SCALE

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE:	01 MARCH 2023
SOLICITATION NO.:	W912DS-19-R-0014
CONTRACT NO.:	W912DS-19-C-0031-L
FILE NUMBER:	
DESIGNED BY:	N. SLEEM
DRAWN BY:	C. DEVANEY
CHECKED BY:	D. GORDON
SUBMITTED BY:	
SIZE:	ANSI 'D'
FILE NAME:	

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE A Joint Venture

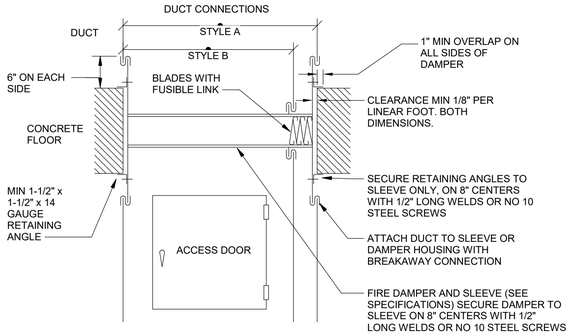
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC DETAILS

SHEET ID

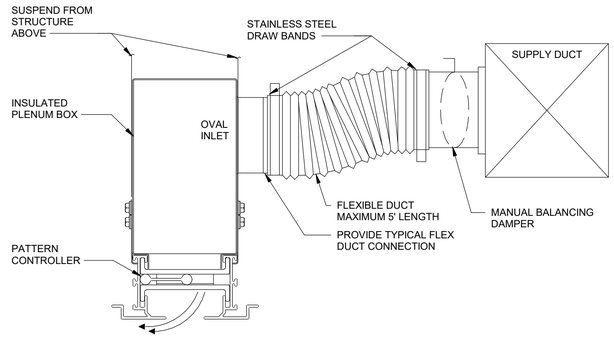
M-505

REVISED RTA SUBMISSION 03/01/2023



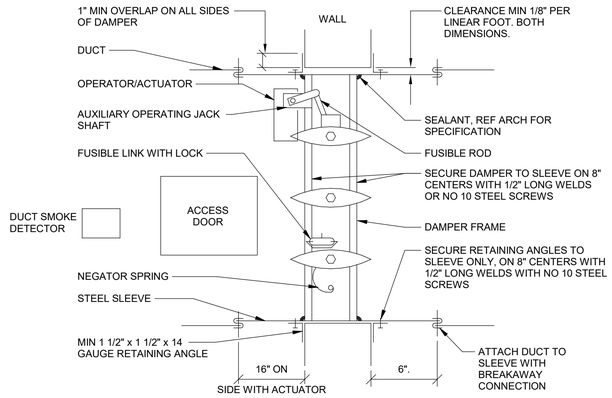
NOTES:
1. PROVIDE ALL FIRE/SMOKE DAMPERS WITH INTEGRAL STATUS FEEDBACK CONTACT FOR REMOTE MONITORING BY BUILDING DDC SYSTEM AND FIRE ALARM SYSTEM. REFER TO FIRE PROTECTION.

B1 HORIZONTAL FIRE DAMPER DETAIL
NOT TO SCALE



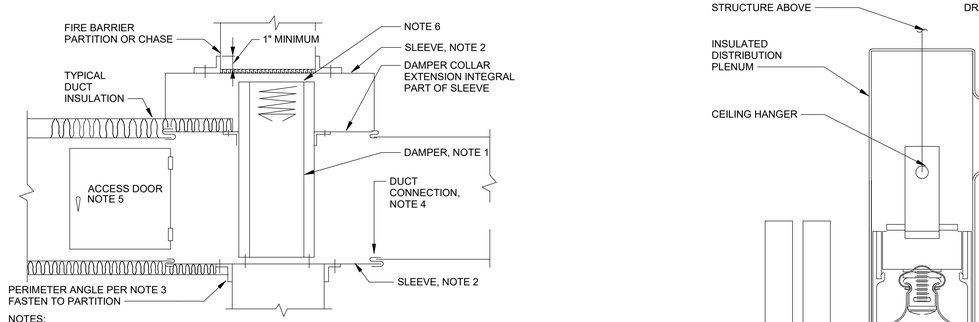
NOTES:
1. BASIS OF DESIGN: TITUS FL-TZ NOMINAL 4" WIDTH, LAY-IN, HIGH THROW, INSULATED PLENUM BOX FBP-10
2. CONTRACTOR MUST ADJUST PATTERN CONTROLLERS TO DIRECT AIRFLOW HORIZONTALLY AS INDICATED ON FLOORPLANS.
3. JOIN DIFFUSERS TOGETHER END TO END WITH ALIGNMENT PINS TO FORM A CONTINUOUS SLOT APPEARANCE.
4. PROVIDE END CAP TO CLOSE OFF THE END OF THE LAST DIFFUSER IN A ROW.

B2 SLOT DIFFUSER MOUNTING - CONFERENCE ROOMS
NOT TO SCALE



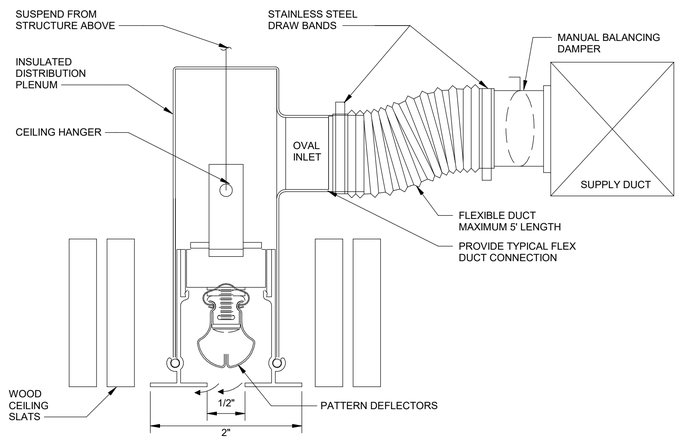
NOTES :
1. GENERAL ARRANGEMENT SHOWN. INSTALL ALL FIRE/SMOKE DAMPERS IN STRICT ACCORDANCE WITH ALL CONDITIONS OF THEIR LISTING, THE MANUFACTURER'S INSTALLATION INSTRUCTIONS, UL 555 AND 555S, AND AUTHORITIES HAVING JURISDICTION. SEE SPECIFICATIONS.
2. WHERE FIRE DAMPER IS TO BE MOUNTED WITHIN EXISTING WALL OR FLOOR, CUT OPENING AS REQUIRED TO MAINTAIN CLEARANCES STIPULATED BY THE MANUFACTURER BETWEEN WALL AND SLEEVE.
3. GAUGE OF SHEETMETAL SLEEVE, MOUNTING ANGLES, METHOD OR ATTACHMENT, ETC. AS PER CONDITIONS OF LISTING AND AS DIRECTED BY FIRE DAMPER MANUFACTURER.
4. INSTALL DUCT ACCESS DOOR ON ACTUATOR SIDE OF EACH DAMPER FOR INSPECTION AND RESETTING OF DAMPER.
5. PROVIDE DUCT SMOKE DETECTORS PER DIVISION 28 31 76.
6. PROVIDE FIRE/SMOKE DAMPERS WITH INTEGRAL STATUS FEEDBACK CONTACT FOR REMOTE MONITORING BY BUILDING DDC SYSTEM AND FIRE ALARM SYSTEM. REFER TO FIRE PROTECTION.

B4 VERTICAL COMBINATION FIRE/SMOKE DAMPER
NOT TO SCALE



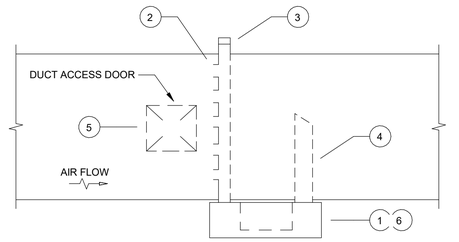
NOTES:
1. FOLLOW DAMPER MANUFACTURER'S INSTRUCTIONS, INCLUDING FASTENER OPTIONS AND GAUGES FOR SLEEVE AND PERIMETER ANGLES. FIRE DAMPERS MUST BE INSTALLED IN THE PARTITION. IF DAMPER IS TOO LARGE, AND DAMPER MUST BE INSIDE DUCT, THEN ENLARGE DUCT TO MAINTAIN FREE AREA.
2. GALVANIZED SLEEVE: GAUGE NOT LESS THAN CONNECTING DUCT. FASTEN SLEEVE TO DAMPER FRAME AND TO PERIMETER ANGLES.
3. PERIMETER ANGLES: GALVANIZED STEEL, NOT LESS THAN 1-1/2" x 1-1/2", 14 GAUGE, TO PROVIDE 1" MINIMUM OVERLAP OF OPENING ON ALL (4) SIDES.
4. BREAKAWAY DUCT CONNECTION: CONTRACTOR'S OPTION OF TYPES PER LATEST SMACNA STANDARDS.
5. ACCESS DOORS: SIZE AND LOCATION TO PERMIT SERVICING EACH FUSIBLE LINK OR LINKS. PROVIDE 24" x 24" ACCESS DOORS MINIMUM SIZE OR DUCT WIDTH MINUS 2" x 24" WHICHEVER IS LARGER.
6. PROVIDE 1/4" TO 1/2" CLEARANCE ON HEIGHT AND WIDTH. FILL OPEN SPACE WITH ROCK WOOL FIRESTOP FIBER.
7. PROVIDE ALL FIRE/SMOKE DAMPERS WITH INTEGRAL STATUS FEEDBACK CONTACT FOR REMOTE MONITORING BY BUILDING DDC SYSTEM AND FIRE ALARM SYSTEM. REFER TO FIRE PROTECTION.

A1 VERTICAL FIRE DAMPER
NOT TO SCALE



NOTES:
1. BASIS OF DESIGN: TITUS ML-37, BORDER TYPE 9A, INSULATED PLENUM BOX MPI-37
2. MOUNT SUCH THAT BOTTOM OF DIFFUSER IS FLUSH AND AT THE SAME PLANE AS THE BOTTOM OF WOOD CEILING SLATS.
3. CONTRACTOR MUST ADJUST PATTERN CONTROLLERS TO DIRECT AIRFLOW HORIZONTALLY AS INDICATED ON FLOORPLANS.
4. JOIN DIFFUSERS TOGETHER END TO END WITH ALIGNMENT PINS TO FORM A CONTINUOUS SLOT APPEARANCE.
5. PROVIDE END CAP TO CLOSE OFF THE END OF THE LAST DIFFUSER IN A ROW.

A2 SLOT DIFFUSER MOUNTING - BRIEFING ROOM
NOT TO SCALE



KEY NOTES	
1	INSTALL DUCT SMOKE DETECTOR ON SIDE OF DUCT AS SHOWN. (13852)
2	INLET TUBE HOLES SHALL FACE UPSTREAM.
3	SUPPORT INLET TUBE IN DUCT OPENING WHEN DUCT WIDTH EXCEEDS 32".
4	EXHAUST TUBE LENGTH 1/2 OF DUCT WIDTH.
5	ACCESS DOOR IN DUCT FOR INSPECTION AND TESTING. REFER TO FIRE DAMPER DETAIL FOR ACCESS DOOR SIZE.
6	MEASURE DIFFERENTAL PRESSURE ACROSS INLET TUBE AND EXHAUST TUBE. VERIFY THAT DIFFERENTIAL PRESSURE SATISFIES MINIMUM REQUIREMENTS AS SPECIFIED IN MANUFACTURERS INSTALLATION REQUIREMENTS.
7	INSTALL DUCT SMOKE DETECTORS IN ACCORDANCE WITH DETECTOR MANUFACTURER'S INSTALLATION INSTRUCTIONS.
8	PROVIDE ALL FIRE/SMOKE DAMPERS WITH INTEGRAL STATUS FEEDBACK CONTACT FOR REMOTE MONITORING BY BUILDING DDC SYSTEM AND FIRE ALARM SYSTEM. REFER TO FIRE PROTECTION.

A4 DUCT SMOKE DETECTOR
NOT TO SCALE

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI 'D'
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-18-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

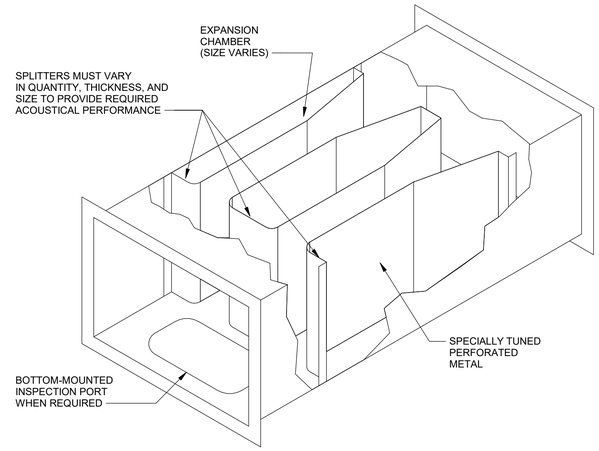
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC DETAILS

SHEET ID

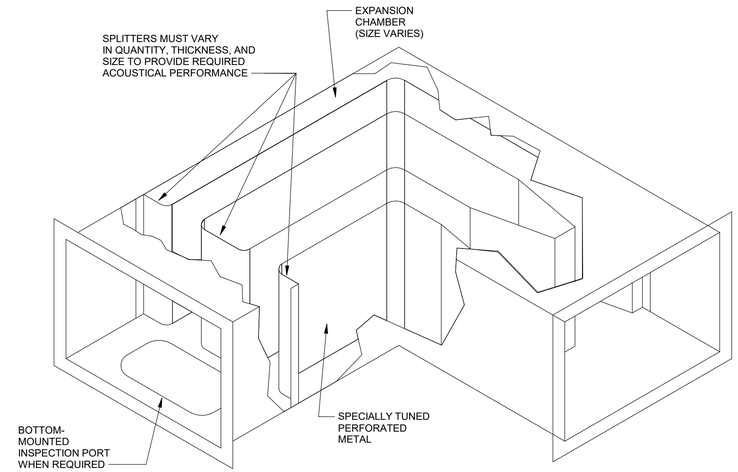
M-506

REVISED RTA SUBMISSION 03/01/2023



NOTES
1. PROVIDE FIRE RESISTANCE AS APPROPRIATE WHEN PENETRATING CONTROLLED BOUNDARY WALLS.
2. PROVIDE FACTORY FABRICATED STRAIGHT DUCT SILENCERS.
3. PROVIDE MODEL WITH ACOUSTIC FILL MATERIAL WHERE NEEDED TO MEET ACOUSTIC ATTENUATION RATING.
4. PROVIDE FILM LINING WHEN ELBOW DUCT SILENCER IS LOCATED NEAR MOISTURE SOURCE, SUCH AS AIR HANDLER DISCHARGE OR HUMIDIFIER.

C4 DUCT ACOUSTIC STRAIGHT SILENCER DETAIL
NOT TO SCALE



NOTES
1. PROVIDE FACTORY FABRICATED ELBOW DUCT SILENCERS.
2. PROVIDE MODEL WITH ACOUSTIC FILL MATERIAL WHERE NEEDED TO MEET ACOUSTIC ATTENUATION RATING.
3. PROVIDE FILM LINING WHEN ELBOW DUCT SILENCER IS LOCATED NEAR MOISTURE SOURCE, SUCH AS AIR HANDLER DISCHARGE OR HUMIDIFIER.

A4 DUCT ACOUSTIC ELBOW SILENCER DETAIL
NOT TO SCALE

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: A. HONDA
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI D
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
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M-507

REVISED RTA SUBMISSION 03/01/2023

DEDICATED OUTDOOR AIR SYSTEM WITH ENERGY RECOVERY SCHEDULE

TAG	BASIS OF DESIGN MODEL	BASIS OF DESIGN MODEL	LOCATION	SERVICE	SUPPLY FAN CFM	SUPPLY FAN ESP (IN WC)	SUPPLY FAN FAN TYPE	SUPPLY FAN QTY.	SUPPLY FAN MOTOR RPM	SUPPLY FAN HP EACH	SUPPLY FAN BHP EACH	EXHAUST FAN CFM	EXHAUST FAN ESP (IN WC)	EXHAUST FAN FAN TYPE	EXHAUST FAN QTY	EXHAUST FAN MOTOR RPM	EXHAUST FAN HP EACH	EXHAUST FAN BHP EACH	COOLING COIL TOTAL CAPACITY (MBH)	COOLING COIL SENSIBLE CAPACITY (MBH)	COOLING COIL EAT DB/WB (°F)	COOLING COIL LAT DB/WB (°F)	COOLING COIL APD (IN WC)	COOLING COIL FLUID TYPE	COOLING COIL EWT	COOLING COIL LWT	COOLING COIL GPM	COOLING COIL WPD (FT WC)	COOLING COIL ROWS	COOLING COIL MAX FACE VELOCITY (FPM)	HEATING COIL TOTAL CAPACITY (MBH)	HEATING COIL EAT (°F)	HEATING COIL LAT (°F)	HEATING COIL APD (IN WG)	HEATING COIL FLUID TYPE	HEATING COIL EWT	HEATING COIL LWT	HEATING COIL GPM	HEATING COIL WPD (FT WC)	HEATING COIL ROWS
DOAS-1	NAS VENTROL	CSU-5K HW/CHW	SOUTH MECHANICAL YARD	SOUTH WING	5,400	2.25	DIRECT DRIVE PLENUM	2	3,490	9	7.5	3,200	1.50	DIRECT DRIVE PLENUM	2	3,480	3.5	2.60	403.2	232.3	94.0 °F / 75.0 °F	54.8 °F / 54.5 °F	0.71	WATER	43 °F	55 °F	70.0	10.03	6	450	398.9	2.0 °F	70.6 °F	0.14	WATER	140 °F	120 °F	40.4	6.16	2
DOAS-2	NAS VENTROL	CSU-6K HW/CHW	B233 MECHANICAL	NORTH WING	5,900	2.25	DIRECT DRIVE PLENUM	2	3,485	9.5	7.66	3,600	1.50	DIRECT DRIVE PLENUM	2	1,730	2.5	2.36	440.5	258.5	94.0 °F / 75.0 °F	54.0 °F / 53.9 °F	0.56	WATER	43 °F	56 °F	67.0	6.17	4	450	432.3	2.0 °F	70.0 °F	0.1	WATER	140 °F	120 °F	43.8	6.7	2

DEDICATED OUTDOOR AIR SYSTEM WITH ENERGY RECOVERY SCHEDULE CONTINUED

TAG	ENERGY RECOVERY TYPE	ENERGY RECOVERY - SUMMER OA EAT DB/WB (°F)	ENERGY RECOVERY - SUMMER SA LAT DB/WB (°F)	ENERGY RECOVERY - SUMMER RA EAT DB/WB (°F)	ENERGY RECOVERY - SUMMER EA LAT DB/WB (°F)	ENERGY RECOVERY - SUMMER TOTAL EFFICIENCY	ENERGY RECOVERY - WINTER OA EAT (°F)	ENERGY RECOVERY - WINTER OA LAT DB/WB (°F)	ENERGY RECOVERY - WINTER RA EAT DB/WB (°F)	ENERGY RECOVERY - WINTER EA LAT DB/WB (°F)	ENERGY RECOVERY - WINTER TOTAL EFFICIENCY	FILTRATION SUPPLY PRE-FILTER / FINAL FILTER	FILTRATION EXHAUST FILTER	ELECTRICAL DATA V	PH	Hz	FLA	MAXIMUM HEIGHT (INCHES)	OPERATING WEIGHT (LBS)	NOTES
DOAS-1	TOTAL ENTHALPY WHEEL	92.0 °F / 75.0 °F	82.9 °F / 68.9 °F	75.0 °F / 62.5 °F	90.8 °F / 74.1 °F	91.3%	2.0 °F	37.6 °F / 31.5 °F	68.0 °F / 51.3 °F	6.0 °F / 3.8 °F	93.5%	MERV 8 / MERV 13	MERV 8	460	3	60	37.0	90.0	12,907	1 THRU 17,19, 20-23
DOAS-2	TOTAL ENTHALPY WHEEL	92.0 °F / 75.0 °F	82.6 °F / 68.6 °F	75.0 °F / 62.5 °F	90.8 °F / 74.1 °F	91.9%	2.0 °F	38.9 °F / 32.5 °F	68.0 °F / 51.3 °F	5.8 °F / 3.6 °F	93.9%	MERV 8 / MERV 13	MERV 8	460	3	60	37.0	90.0	11,083	1 THRU 12, 14 THRU 18, 20-23

NOTES:
1. PROVIDE PACKAGED DEDICATED OUTSIDE AIR HANDLING UNIT, WITH CHILLED WATER COOLING COIL, HOT WATER HEATING COIL.
2. PROVIDE LOW LEAKAGE DAMPERS, EACH WITH A DEDICATED/INDEPENDENT MOTORIZED DAMPER ACTUATOR(S).
3. PROVIDE 4-INCH DOUBLE-WALL CONSTRUCTION.
4. PROVIDE "NO THRU METAL" THERMAL BREAK CONSTRUCTION IN WALLS CEILING & BASE. GASKETED THERMAL BREAK NOT ACCEPTABLE.
5. PROVIDE TUBULAR STEEL BASE. C-CHANNEL BASE NOT ACCEPTABLE.
6. PROVIDE 0.025" TUBE THICKNESS WITH BRAZED RETURN BENDS. HAIRPIN RETURN BENDS NOT ACCEPTABLE.
7. PROVIDE MINIMUM TYPE 304 STAINLESS STEEL COIL CASINGS AND STAINLESS STEEL DRAIN PAN.
8. PROVIDE AMCA CERTIFIED FAN ARRAY SIZED FOR N+1 REDUNDANCY WITH INTEGRAL DEDICATED AIR FLOW MEASURING STATION AND DEDICATED VFD FOR EACH FAN.
9. PROVIDE R-I-S FAN ISOLATION. FANS MUST BE DYNAMICALLY BALANCED TO BV-5 SPEC.
10. PROVIDE INTEGRAL SILENCERS IN FAN SECTION.
11. PROVIDE INDIVIDUAL FANS WITH AUTOMATIC BACKDRAFT DAMPERS IN THE EVENT OF FAN FAILURE.
12. PROVIDE CERAMIC BEARING MOTORS. STEEL BEARING MOTORS WITH SHAFT GROUNDING NOT ACCEPTABLE.
13. PROVIDE INTEGRAL PIPING VESTIBULE.
14. PROVIDE OA DAMPER WITH INTEGRAL AFMS. AFMS MUST HAVE MERV 8 FILTRATION UPSTREAM.
15. COORDINATE DUCT ROUTING AND CONNECTIONS WITH FIELD CONDITIONS.
16. PROVIDE SINGLE POINT POWER CONNECTION WITH FACTORY MOUNTED AND WIRED NON-FUSED DISCONNECT SWITCH..
17. PROVIDE FACTORY MOUNTED LOW VOLTAGE CONTROL TRANSFORMER.
18. PROVIDE KNOCKDOWN CONSTRUCTION FOR BUILDING INGRESS.
19. DOAS ROOF MUST SLOPE A MINIMUM OF 1/4 IN PER FT AND OVERHANG WALL PANELS BY A MINIMUM OF 2 INCHES.
20. FANS MUST BE SIZED BASED ON A MINIMUM FILTER LOADING OF TWO TIMES THE INITIAL (CLEAN) CONDITION AND THEN ROUNDED UP TO THE NEAREST .05 IN WC PER FILTER BANK.
21. OA CFM SCHEDULED INCLUDES A 10% ALLOWANCE FOR LEAKAGE AND FUTURE GROWTH. TAB CONTRACTOR MUST BALANCE SYSTEM TO CFMS SHOWN ON FLOOR PLANS.
22. PROVIDE NAS VENTROL AIR HANDLING EQUIPMENT PER EXISTING WEST POINT JUSTIFICATION AND AUTHORIZATION (J&A).
23. PROVIDE MANUFACTURER'S FACTORY APPLIED COATING SUITABLE FOR A CORROSIVE BRACKISH ENVIRONMENT ON EQUIPMENT CASING AND COILS.

MAKEUP AIR UNIT SCHEDULE

TAG	LOCATION	SERVICE	SUPPLY FAN CFM	SUPPLY FAN ESP (IN WC)	SUPPLY FAN FAN TYPE	SUPPLY FAN QTY.	SUPPLY FAN MOTOR RPM	SUPPLY FAN HP EA	SUPPLY FAN TOTAL BHP	COOLING COIL TOTAL CAPACITY (MBH)	COOLING COIL SENSIBLE CAPACITY (MBH)	COOLING COIL EAT DB/WB (°F)	COOLING COIL LAT DB/WB (°F)	COOLING COIL APD (IN WC)	COOLING COIL FLUID TYPE	COOLING COIL EWT	COOLING COIL LWT	COOLING COIL GPM	COOLING COIL WPD (FT)	COOLING COIL ROWS	COOLING COIL MAX FACE VELOCITY (FPM)	HEATING COIL TOTAL CAPACITY (MBH)	HEATING COIL EAT (°F)	HEATING COIL LAT (°F)	HEATING COIL APD (IN WG)	HEATING COIL FLUID TYPE	HEATING COIL EWT	HEATING COIL LWT	HEATING COIL GPM	HEATING COIL WPD (FT)	HEATING COIL ROWS	SUPPLY PRE-FILTER / FINAL FILTER	ELECTRICAL DATA V	PH	Hz	MCA	MOCP	OPERATING WEIGHT (LBS)	NOTES
MAU-1	B236 STORAGE	LEVEL B3	865	0.70	DIRECT DRIVE PLENUM	1	1,750	1.0	0.19	67.8	40.6	94.0/75.0	51.5/51.4	0.06	WATER	43 °F	56 °F	10.4	0.5	4	450	62.3	2.0 °F	68.5 °F	0.01	WATER	140 °F	122 °F	6.9	0.2	1	MERV 8 / MERV 13	208	3	60	3.9	15.0	1,612	1 THRU 14

NOTES:
1. PROVIDE KNOCKDOWN CONSTRUCTION (FOR BUILDING INGRESS), VARIABLE VOLUME DEDICATED MAKEUP AIR HANDLING UNIT, WITH CHILLED WATER COOLING, HOT WATER HEATING AND ECONOMIZER CONTROL.
2. PROVIDE MANUFACTURER'S FACTORY APPLIED COATING SUITABLE FOR A CORROSIVE BRACKISH ENVIRONMENT ON EQUIPMENT CASING AND COILS.
3. PROVIDE LOW LEAKAGE DAMPERS IN AIR MIXING SECTIONS, EACH WITH A DEDICATED/INDEPENDENT MOTORIZED DAMPER ACTUATOR(S).
4. COORDINATE DUCT ROUTING AND CONNECTIONS WITH FIELD CONDITIONS.
5. PROVIDE SINGLE POINT POWER CONNECTION WITH FACTORY MOUNTED AND WIRED NON-FUSED DISCONNECT SWITCH NEMA 4x RATED SUITABLE FOR OUTSIDE USE.
6. PROVIDE FACTORY MOUNTED LOW VOLTAGE CONTROL TRANSFORMER AND FACTORY CONFIGURED VFD FOR FIELD INSTALLATION ONTO DOAS CASING; DOAS EQUIPMENT MUST BE FACTORY WIRED.
7. PROVIDE PREMIUM EFFICIENCY, INVERTER DUTY RATED MOTORS SUITABLE FOR USE WITH VFDs. EACH FAN MOTOR MUST HAVE A DEDICATED VFD.
8. WHERE THERE ARE MULTIPLE FANS BEING USED IN A FAN ARRAY, A DEDICATED DISCHARGE DAMPER MUST BE PROVIDED AT EACH FAN TO PREVENT RECIRCULATION OF AIR.
9. PROVIDE ACCESSORIES AND APPURTENANCES FOR INSTALLING DOAS AIR HANDLING UNIT.
10. PROVIDE AIR FLOW MEASURING STATION AT OUTDOOR AIR. AIR FLOW MEASURING STATION MUST BE PROTECTED UPSTREAM BY MERV 8 FILTER.
11. DOAS ROOF MUST SLOPE A MINIMUM OF 1/4 IN PER FT AND OVERHANG WALL PANELS BY A MINIMUM OF 2 INCHES.
12. FANS MUST BE SIZED BASED ON A MINIMUM FILTER LOADING OF TWO TIMES THE INITIAL (CLEAN) CONDITION AND THEN ROUNDED UP TO THE NEAREST .05 IN WC PER FILTER BANK.
13. OUTDOOR AIR DAMPERS MUST BE LOW LEAKAGE DAMPERS WITH A 3 CFM/SF LEAKAGE RATE OR LESS.
14. OA CFM SCHEDULED INCLUDES A 10% ALLOWANCE FOR LEAKAGE AND FUTURE GROWTH. TAB CONTRACTOR MUST BALANCE SYSTEM TO CFMS SHOWN ON FLOOR PLANS.

PUMP SCHEDULE

TAG	LOCATION	SERVICE	CONFIGURATION	FLUID TYPE	WATER TEMPERATURE	GPM	PUMP HEAD (FT WC)	EFF (%)	SUCTION SIZE (INCH)	DISCHARGE SIZE (INCH)	ELECTRICAL DATA HP	ELECTRICAL DATA BHP	ELECTRICAL DATA V	ELECTRICAL DATA PH	ELECTRICAL DATA Hz	NOTES
HHWP-1	XB301 MECHANICAL	HEATING HOT WATER SYSTEM	BASE MOUNTED END SECTION	WATER	140 °F	200	105	71.1	2"	1 1/2"	10.0	7.23	480	3	60	1, 3, 4, 5
HHWP-2	XB301 MECHANICAL	HEATING HOT WATER SYSTEM	BASE MOUNTED END SECTION	WATER	140 °F	200	105	71.1	2"	1 1/2"	10.0	7.23	480	3	60	1, 3, 4, 5
CHWP-1	XB301 MECHANICAL	CHILLED WATER SYSTEM	BASE MOUNTED END SECTION	WATER	43 °F	380	75	73.6	3"	2 1/2"	15.0	9.73	480	3	60	1, 3, 4, 5
CHWP-2	XB301 MECHANICAL	CHILLED WATER SYSTEM	BASE MOUNTED END SECTION	WATER	43 °F	380	75	73.6	3"	2 1/2"	15.0	9.73	480	3	60	1, 3, 4, 5
CBP-1	315 VESTIBULE	CHILLED BEAM LOOP - CHW - TELEVISION STUDIO, MOTHER'S ROOM	INLINE	WATER	57 °F	12	20	67.5	1"	1"	1/2	0.40	120	1	60	3, 4, 5, 6
CBP-2	346 VIDEO CORRIDOR	CHILLED BEAM LOOP - CHW - VIDEO EDITING SUITES	INLINE	WATER	57 °F	12	20	67.5	1"	1"	1/2	0.40	120	1	60	3, 4, 5, 6
CBP-3	346 VIDEO CORRIDOR	CHILLED BEAM LOOP - HW - VIDEO EDITING SUITES	INLINE	WATER	57 °F	12	20	67.5	1"	1"	1/2	0.40	120	1	60	3, 4, 5, 6
CP-1	DOAS-1 INTERIOR VESTIBULE	DOAS-1 HOT WATER COIL	INLINE	WATER	140 °F	50	20	61.2	2"	2"	3/4	0.40	120	1	60	2, 3, 4, 5
CP-2	B233 MECHANICAL	DOAS-2 HOT WATER COIL	INLINE	WATER	140 °F	50	20	61.2	2"	2"	3/4	0.40	120	1	60	2, 3, 4, 5
CP-3	B236 STORAGE	MAU-1 HOT WATER COIL	INLINE	WATER	140 °F	50	20	61.2	2"	2"	3/4	0.40	120	1	60	2, 3, 4, 5

NOTES:
1. PROVIDE PREMIUM EFFICIENCY MOTORS WITH THERMAL OVERLOAD PROTECTION.
2. PROVIDE STANDARD EFFICIENCY MOTORS WITH THERMAL OVERLOAD PROTECTION.
3. MOTORS MUST BE NON-OVERLOADING THROUGHOUT ENTIRE PUMP CURVE.
4. PROVIDE VFD WITH INVERTER DUTY RATED MOTOR. VFDs AND MOTOR STARTERS MUST BE PROVIDED BY ELECTRICAL. PROVIDE VFDs IN LINE-OF-SIGHT TO CONNECTED PUMP.
5. PROVIDE SHAFT GROUNDING RINGS.
6. PROVIDE EC MOTORS WITH THERMAL OVERLOAD PROTECTION.

HORIZONTAL SHELL & TUBE STEAM TO HOT WATER HEAT EXCHANGER SCHEDULE

TAG	LOCATION	SERVICE	CAPACITY (MBH)	SHELL SIDE STEAM PRESSURE (PSIG)	SHELL SIDE STEAM MASS FLOW (LBS/HR)	SHELL SIDE MAX TEMP	TUBE SIDE EWT (°F)	TUBE SIDE LWT (°F)	TUBE SIDE WATER FLOW RATE (GPM)	TUBE SIDE MAX PRESSURE DROP (FT WC)	TUBE SIDE FOULING FACTOR	NOTES
HX-1	XB301 MECHANICAL	HEATING HOT WATER SYSTEM	1,975	10.0	2,060	375 °F	120 °F	140 °F	200	15	0.0005	1, 2, 3, 4, 5, 6
HX-2	XB301 MECHANICAL	HEATING HOT WATER SYSTEM	1,975	10.0	2,060	375 °F	120 °F	140 °F	200	15	0.0005	1, 2, 3, 4, 5, 6

NOTES:
1. PROVIDE SHELL AND TUBE HEAT EXCHANGER DESIGNED, CONSTRUCTED, TESTED, AND STAMPED IN ACCORDANCE WITH SECTION VIII, DIVISION 1 OF THE ASME PRESSURE CODE.
2. PROVIDE WITH FABRICATED CARBON STEEL SHELL; CAST IRON BONNET; STEEL TIE-RODS AND SPACERS; CAST IRON/CARBON STEEL FEET AND BOLTING; COPPER TUBE BUNDLE.
3. COPPER TUBE BUNDLE MUST BE REMOVABLE FOR CLEANING, MAINTENANCE AND REPLACEMENT.
4. PROVIDE ISOLATION BUTTERFLY VALVES ON ALL INLET AND OUTLET WATER CONNECTIONS AND STEAM CONNECTIONS.
5. PROVIDE GASKETS MADE FROM MATERIAL SUITABLE FOR OPERATING TEMPERATURES AND FLUIDS/STEAM USED.
6. FIELD INSULATION FOR ALL HEAT EXCHANGER SURFACES AND PIPING PER MANUFACTURER'S REQUIREMENTS AND SPECIFICATIONS.

CONDENSATE RETURN UNIT SCHEDULE

TAG	LOCATION	SERVICE	CONFIGURATION	GPM	DISCHARGE PRESSURE (PSIG)	RATED TEMP	CONNECTIONS INLET (INCHES)	CONNECTIONS OUTLET (INCHES)	CONNECTIONS VENT (INCHES)	ELECTRICAL DATA MOTOR QTY	ELECTRICAL DATA HP EACH	ELECTRICAL DATA V	ELECTRICAL DATA PH	ELECTRICAL DATA Hz	CAPACITY (GAL)	NOTES
CRU-1	XB301 MECHANICAL	HEAT EXCHANGER CONDENSATE	DUPLEX, FLOOR MOUNTED	22	20.0	245 °F	1.5"	2.0"	2.0"	2	0.5	208	1	60	23.0	1, 2, 3, 4, 5, 6, 7

NOTES:
1. PROVIDE DUPLEX STEAM RETURN PUMPING PACKAGED UNIT WITH INTEGRAL PUMPS, RECEIVER TANK AND MECHANICAL ALTERNATOR PANEL.
2. PROVIDE FABRICATED CAST IRON CONDENSATE RECEIVER TANK DESIGNED. CONSTRUCTION, TESTED, AND STAMPED IN ACCORDANCE WITH SECTION VIII, DIVISION 1 OF THE ASME PRESSURE CODE.
3. PROVIDE INTEGRAL CENTRIFUGAL PUMPS WITH OPEN DRIP PROOF MOTORS.
4. PROVIDE FACTORY MECHANICAL ALTERNATOR WITH NEMA 3 PANEL CAPABLE OF SEQUENCING OF DUPLEX PUMPS AND STAND-BY OF SECOND PUMP ON HIGH LEVEL CONTROLLER FULLY FACTORY WIRED AND CONFIGURED.
5. PROVIDE HEAVY DUTY MECHANICAL FLOAT SWITCHES THAT EXTERNALLY ADJUSTABLE.
6. PROVIDE INTEGRAL WATER LEVEL GAUGE, SHUTOFF VALVE, DIAL THERMOMETER, INLET BASKET STRAINER, DISCHARGE PRESSURE GAUGES AND ISOLATION BUTTERFLY VALVES ON ALL INLET AND OUTLET WATER CONNECTIONS AND STEAM CONNECTIONS.
7. PROVIDE GASKETS MADE FROM MATERIAL SUITABLE FOR OPERATING TEMPERATURES AND FLUID/STEAM USED.

EXHAUST FAN SCHEDULE

TAG	SERVICE	CONFIGURATION	AIRFLOW (CFM)	ESP (IN WG)	ELECTRICAL DATA MOTOR RPM	ELECTRICAL DATA BHP	ELECTRICAL DATA HP	ELECTRICAL DATA V	ELECTRICAL DATA PH	ELECTRICAL DATA HZ	WEIGHT (LBS)	NOTES
EF-1	410 PRINTING/LAMINATING	DIRECT DRIVE CENTRIFUGAL UPBLAST	450	0.55	1725	0.09	1/15	115	1	60	67	1, 2, 3, 5, 7, 8
EF-2A	B303 ELECTRICAL ROOM	BELT DRIVE CENTRIFUGAL UPBLAST	400	0.35	1725	0.07	1/4	115	1	60	75	1-3, 5, 6, 8
EF-2B	B303 ELECTRICAL ROOM	BELT DRIVE CENTRIFUGAL UPBLAST	400	0.35	1725	0.07	1/4	115	1	60	75	1-3, 5, 6, 8
EF-4	B306 RECYCLING ROOM	DIRECT DRIVE AXIAL INLINE	160	0.35	1725	0.04	1/15	115	1	60	51	1, 2, 3, 4, 7, 8
EF-5	XB301 MECHANICAL	DIRECT DRIVE CENTRIFUGAL UPBLAST	165	0.25	1725	0.01	1/15	115	1	60	57	1-3, 5, 7, 8

NOTES:
1. PROVIDE WITH FACTORY MOUNTED AND WIRED NON-FUSED DISCONNECT.
2. PROVIDE PREMIUM EFFICIENCY MOTOR, WITH THERMAL OVERLOAD PROTECTION.
3. PROVIDE FACTORY MOUNTED AND WIRED LOW-LEAKAGE MOTORIZED ISOLATION DAMPERS, 120 VAC WITH POSITION INDICATION.
4. PROVIDE HOUSED SPRING VIBRATION ISOLATORS TO SUPPORT FAN FROM BUILDING STRUCTURE.
5. PROVIDE MANUFACTURER'S 18" HIGH ROOF CURB WITH HINGED CURB CAP, CURB SEAL AND DAMPER TRAY.
6. PROVIDE BELT DRIVEN EXPLOSION PROOF MOTOR OUTSIDE OF AIRSTREAM WITH SPARK-PROOF FAN IMPELLER.
7. PROVIDE EC MOTOR WITH HAND-OFF-AUTO (HOA) CONTROLLER.
8. PROVIDE MANUFACTURER'S FACTORY APPLIED COATING SUITABLE FOR A CORROSIVE BRACKISH ENVIRONMENT ON EQUIPMENT CASING AND COILS.

AIR SEPARATOR SCHEDULE

TAG	SERVICE	LOCATION	DESIGN FLOW (GPM)	MAX FLOW (GPM)	CONNECTION SIZE (INCHES)	PRESSURE DROP (FT WC)	FLOODED WEIGHT (LBS)	NOTES
AS-1	HEATING HOT WATER SYSTEM	XB301 MECHANICAL	205	300	4"	0.7	263	1 THRU 6

NOTES:
1. PROVIDE CENTRIFUGAL AIR SEPARATOR WITH CONNECTIONS TO MATCH PIPING SYSTEM.
2. PROVIDE WITHOUT STRAINER.
3. PROVIDE ISOLATION BUTTERFLY VALVES ON INLET AND OUTLET.
4. PROVIDE AUTOMATIC AIR VENT.
5. PROVIDE BLOW DOWN VALVE ON BOTTOM WITH CAP SECURED WITH CHAIN.
6. MAINTAIN MANUFACTURER'S CLEARANCES FOR MAINTENANCE ACCESS.

EXPANSION TANK SCHEDULE

TAG	SERVICE	TYPE	FLUID	ACCEPTANCE VOLUME (GAL)	TANK VOLUME (GAL)	FILL PRESSURE (PSIG)	RELIEF VALVE SETTING (PSIG)	DIAMETER (INCHES)	HEIGHT (INCHES)	NOTES
ET-1	HEATING HOT WATER SYSTEM	PRE-CHARGED BLADDER	WATER	132.0	132	45	125	30"	57"	1 THRU 6

NOTES:
1. PROVIDE VERTICAL EXPANSION TANK, WITH HEAVY DUTY BUTYL/EPDM DIAPHRAGM/PRE-CHARGED BLADDER, STEEL CONSTRUCTION MEETING ASME STANDARDS.
2. PROVIDE LINE SIZE ISOLATION BALL VALVES ON CONNECTIONS.
3. PROVIDE AUTOMATIC AIR VENT.
4. PROVIDE SYSTEM PRESSURE RELIEF VALVE FOR INSTALLATION IN SYSTEM PIPING.
5. PROVIDE BLOW DOWN VALVE ON BOTTOM WITH CAP SECURED WITH CHAIN.
6. MAINTAIN MANUFACTURER'S CLEARANCES FOR MAINTENANCE ACCESS.

STEAM TRAP SCHEDULE

MARK	LOCATION	SERVICE	TRAP TYPE	DESIGN CAPACITY (MBH)	STEAM PRESSURE (PSI)	DESIGN FLOW (LBS/HR)	RATED FLOW (LBS/HR)	INLET SIZE (IN)	NOTES
ST-1	XB301 MECHANICAL ROOM	HX-1	FLOAT & THERMOSTATIC	1,975	10	4,145	9,000	2"	1, 2, 3
ST-2	XB301 MECHANICAL ROOM	HX-2	FLOAT & THERMOSTATIC	1,975	10	4,145	9,000	2"	1, 2, 3
ST-3	XB301 MECHANICAL ROOM	LOW PRESSURE DRIP LEG	FLOAT & THERMOSTATIC	2,280	10	4,786	9,000	2"	1, 2, 3
ST-4	XB301 MECHANICAL ROOM	UTILITY TUNNEL DRIP LEG	FLOAT & THERMOSTATIC	2,280	10	4,786	9,000	4"	1, 2, 3
ST-5	XB301 MECHANICAL ROOM	UTILITY TUNNEL DRIP LEG	FLOAT & THERMOSTATIC	2,280	10	4,786	9,000	4"	1, 2, 3

NOTES:
1. PROVIDE NPT THREADED CONNECTIONS.
2. SELECT WITH A MINIMUM 2.0 SAFETY SIZING FACTORY. SELECT WITH LINE SIZE CONNECTION.
3. PROVIDE CAST IRON H-PATTERN FLOAT AND THERMOSTATIC STEAM TRAP WITH STAINLESS STEEL INTERNAL CONSTRUCTION.

STEAM SAFETY RELIEF VALVE SCHEDULE

MARK	LOCATION	SERVING	CAPACITY (LBS/HR)	PRESSURE SETTING (PSIG)	INLET SIZE (IN)	OUTLET SIZE (IN)	NOTES
SRV-1	XB301 MECHANICAL ROOM	LOW PRESSURE STEAM	18.4	20	6"	8"	

NOTES:
1. PROVIDE NPT THREADED CONNECTIONS.
2. SELECT WITH A MINIMUM 2.0 SAFETY SIZING FACTORY. SELECT WITH LINE SIZE CONNECTION.
3. PROVIDE CAST IRON STEAM SAFETY RELIEF VALVE WITH STAINLESS STEEL INTERNAL CONSTRUCTION.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.:
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
SIZE: ANSI D
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC SCHEDULES

SHEET ID

M-601

REVISED RTA SUBMISSION 03/01/2023

4-PIPE FAN COIL UNIT SCHEDULE

TAG	COUNT	CONFIGURATION	FAN SPEED	CFM	ESP (IN WC)	COOLING									REHEATING								ELECTRICAL DATA					WEIGHT (LBS)	NOTES
						TOTAL CAPACITY (MBH)	SENSIBLE (MBH)	AIRSIDE		WATERSIDE					TOTAL CAPCITY (MBH)	AIRSIDE		WATERSIDE												
								EAT DB/WB (°F)	LAT DB/WB (°F)	FLUID	EWT (°F)	LWT (°F)	GPM	WPD (FT WC)	ROWS	FPI		EAT (°F)	LAT (°F)	FLUID	EWT (°F)	LWT (°F)	GPM	WPD (FT WC)	ROWS	FPI	V	PH	Hz	FLA	MCA		
FCU-A-1	66	4-WAY CASSETTE, 2'X2' NOMINAL FACE	MEDIUM	350	0.0	7.3	6.7	75 °F / 62.5 °F	58.4 °F / 55.7 °F	WATER	43 °F	56 °F	1.2	2.8	2	14	10.6	68 °F	95.2 °F	WATER	140 °F	102 °F	0.6	2.3	1	14	208	1	60	0.4	0.50	51	1, 3, 6, 7, 9, 11
FCU-C-1	1	HORIZONTAL LOW PROFILE EXPOSED CABINET, REAR RETURN	MEDIUM	450	0.3	16.7	12.4	75 °F / 62.5 °F	49.2 °F / 48.6 °F	WATER	43 °F	56 °F	2.7	7.0	4	12	16.643	68 °F	100.9 °F	WATER	140 °F	120 °F	1.6	0.6	1	12	208	1	60	2.8	3.15	236	1-4, 6-8, 11
FCU-C-2	2	HORIZONTAL LOW PROFILE EXPOSED CABINET, REAR RETURN	MEDIUM	300	0.4	12.2	9.0	75 °F / 62.5 °F	51.0 °F / 50.3 °F	WATER	43 °F	56 °F	1.6	6.5	4	10	10.7	68 °F	100.0 °F	WATER	140 °F	120 °F	1.1	4.5	1	10	208	1	60	1.2	1.50	126	1-4, 6-8, 11
FCU-C-3	6	HORIZONTAL LOW PROFILE EXPOSED CABINET, REAR RETURN	MEDIUM	400	0.2	14.8	10.8	75 °F / 62.5 °F	49.8 °F / 49.3 °F	WATER	43 °F	56 °F	3.1	7.7	5	12	22.191	68 °F	100.0 °F	WATER	140 °F	120 °F	2.2	5.2	1	12	208	1	60	2.7	3.38	186	1-4, 6-8, 11
FCU-C-4	2	HORIZONTAL LOW PROFILE EXPOSED CABINET, REAR RETURN	MEDIUM	745	0.4	24.7	19.1	75 °F / 62.5 °F	51.4 °F / 50.6 °F	WATER	43 °F	56 °F	4.1	8.7	4	12	27.6	68 °F	99.0 °F	WATER	140 °F	120 °F	2.8	7.1	1	12	208	1	60	2.2	2.48	215	1-4, 6-8, 11
FCU-C-5	3	HORIZONTAL LOW PROFILE EXPOSED CABINET, REAR RETURN	MEDIUM	400	0.4	14.4	10.9	75 °F / 62.5 °F	51.0 °F / 50.3 °F	WATER	43 °F	56 °F	1.6	6.5	4	10	10.7	68 °F	100.0 °F	WATER	140 °F	120 °F	1.1	4.5	1	10	208	1	60	1.2	1.50	126	1-4, 6-8, 11
FCU-C-6	6	HORIZONTAL LOW PROFILE EXPOSED CABINET, REAR RETURN	MEDIUM	350	0.4	11.5	9.0	75 °F / 62.5 °F	51.4 °F / 50.6 °F	WATER	43 °F	56 °F	2.9	6.5	4	10	12.3	68 °F	95.3 °F	WATER	140 °F	120 °F	1.1	1.6	1	10	208	1	60	1.2	1.50	126	1-4, 6-8, 11
FCU-C-7	1	HORIZONTAL LOW PROFILE EXPOSED CABINET, REAR RETURN	MEDIUM	545	0.4	19.4	14.7	75 °F / 62.5 °F	51.2 °F / 50.7 °F	WATER	43 °F	56 °F	2.9	2.2	5	10	17	68 °F	94.6 °F	WATER	140 °F	120 °F	1.7	0.3	1	10	208	1	60	2	2.25	197	1-4, 6-8, 11
FCU-C-9	3	HORIZONTAL LOW PROFILE EXPOSED CABINET, REAR RETURN	MEDIUM	480	0.4	12.0	9.4	75 °F / 62.5 °F	59.4 °F / 55.2 °F	WATER	43 °F	56 °F	1.9	12.7	2	10	16.6	68 °F	94.4 °F	WATER	140 °F	120 °F	1.6	4.3	1	10	208	1	60	2.2	2.48	216	1-4, 6-8, 11
FCU-C-12	2	HORIZONTAL LOW PROFILE EXPOSED CABINET, REAR RETURN	MEDIUM	615	0.4	22.3	16.8	75 °F / 62.5 °F	50.7 °F / 50.2 °F	WATER	43 °F	56 °F	3.4	6.5	5	10	18.3	68 °F	93.3 °F	WATER	140 °F	120 °F	1.8	0.3	1	10	208	1	60	2.2	2.30	197	1-4, 6-8, 11
FCU-C-13	1	HORIZONTAL LOW PROFILE EXPOSED CABINET, REAR RETURN	MEDIUM	420	0.5	12.2	9.8	75 °F / 62.5 °F	50.4 °F / 49.9 °F	WATER	43 °F	56 °F	2	3.9	5	10	10.4	68 °F	93.6 °F	WATER	140 °F	120 °F	1.0	1.3	1	10	208	1	60	1.2	1.50	172	1-4, 6-8, 11
FCU-D-1	1	HORIZONTAL LOW PROFILE PLENUM	MEDIUM	300	0.3	6.4	5.8	75 °F / 62.5 °F	56.8 °F / 54.9 °F	WATER	43 °F	56 °F	1	0.7	3	12	10.17	68 °F	98.1 °F	WATER	140 °F	120 °F	1.0	1.0	1	12	208	1	60	1.9	2.38	86	1, 2, 4, 6-8, 11
FCU-D-2	2	HORIZONTAL LOW PROFILE PLENUM	MEDIUM	180	0.5	3.0	2.8	75 °F / 62.5 °F	55.5 °F / 53.5 °F	WATER	43 °F	56 °F	0.5	3.3	3	10	4.7	68 °F	99.3 °F	WATER	140 °F	120 °F	0.5	0.6	1	10	208	1	60	0.5	0.63	42	1, 2, 4, 6-8, 11
FCU-D-3	3	HORIZONTAL LOW PROFILE PLENUM	MEDIUM	440	0.5	10.6	8.9	75 °F / 62.5 °F	51.4 °F / 50.6 °F	WATER	43 °F	56 °F	2.9	6.5	4	12	16.7	68 °F	95.8 °F	WATER	140 °F	120 °F	1.1	1.3	1	12	208	1	60	1.2	1.50	42	1, 2, 4, 6-8
FCU-D-4	1	HORIZONTAL LOW PROFILE PLENUM	MEDIUM	255	0.5	8.1	6.2	75 °F / 62.5 °F	51.4 °F / 50.6 °F	WATER	43 °F	56 °F	1.3	5.0	4	12	9.3	68 °F	95.8 °F	WATER	140 °F	120 °F	0.9	1.1	1	12	208	1	60	1.2	1.50	42	1, 2, 4, 6-8
FCU-D-5	2	HORIZONTAL LOW PROFILE PLENUM	MEDIUM	985	0.4	31.4	24.6	75 °F / 62.5 °F	50.9 °F / 50.1 °F	WATER	43 °F	56 °F	5	16.9	5	10	24.9	68 °F	91.8 °F	WATER	140 °F	120 °F	2.5	0.7	1	10	208	1	60	2.2	2.48	155	1, 2, 4, 6-8, 11
FCU-D-7	1	HORIZONTAL LOW PROFILE PLENUM	MEDIUM	640	0.5	18.6	14.9	75 °F / 62.5 °F	50.9 °F / 50.2 °F	WATER	43 °F	56 °F	2.1	11.4	4	12	13.2	68 °F	98.3 °F	WATER	140 °F	120 °F	1.3	0.8	1	12	208	1	60	1.2	1.50	81	1, 2, 4, 6-8, 11
FCU-D-9	1	HORIZONTAL LOW PROFILE PLENUM	MEDIUM	615	0.4	21.6	16.2	75 °F / 62.5 °F	51.9 °F / 50.7 °F	WATER	43 °F	56 °F	3.3	8.8	4	12	17.5	68 °F	92.3 °F	WATER	140 °F	117 °F	1.5	0.5	1	12	208	1	60	2	2.25	150	1, 2, 4, 6-8, 11
FCU-E-1	1	VERTICAL LOW PROFILE FLOOR EXPOSED CABINET	MEDIUM	900	0.1	23.2	18.7	75 °F / 62.5 °F	52.4 °F / 51.6 °F	WATER	43 °F	56 °F	2.8	2.0	4	10	15.4	68 °F	91.8 °F	WATER	140 °F	120 °F	1.5	3.0	1	10	208	1	60	0.6	0.68	200	1, 2, 6, 7, 11
FCU-E-2	1	VERTICAL LOW PROFILE FLOOR EXPOSED CABINET	MEDIUM	270	0.1	5.2	4.2	75 °F / 62.5 °F	52.4 °F / 51.6 °F	WATER	43 °F	56 °F	1.1	2.0	4	12	7	68 °F	91.5 °F	WATER	140 °F	120 °F	0.7	3.0	1	10	208	1	60	0.6	0.68	200	1, 2, 6, 7, 11
FCU-F-1	3	VERTICAL FLOOR EXPOSED CABINET	MEDIUM	240	0.1	7.4	5.8	75 °F / 62.5 °F	57.8 °F / 54.9 °F	WATER	43 °F	56 °F	1.3	14.8	2	12	11.5	68 °F	95.6 °F	WATER	140 °F	120 °F	1.1	4.4	1	12	208	1	60	1.4	1.75	132	1-3, 6, 7, 11
FCU-G-1	10	VERTICAL LOW PROFILE FLOOR CONCEALED	MEDIUM	180	0.2	5.3	4.2	75 °F / 62.5 °F	53.2 °F / 52.1 °F	WATER	43 °F	56 °F	0.8	2.7	3	10	4.7	68 °F	91.1 °F	WATER	140 °F	120 °F	0.5	0.2	1	10	208	1	60	0.3	0.38	93	1, 2, 6, 7, 11
FCU-H-1	1	HIGH PERFORMANCE VERTICAL DUCTED	MEDIUM	1555	0.3	47.9	37.1	75 °F / 62.5 °F	53.6 °F / 52.1 °F	WATER	43 °F	56 °F	7.4	7.5	4	12	32.89	68 °F	85.8 °F	WATER	140 °F	120 °F	3.2	13.1	1	12	208	1	60	5.6	6.30	211	1-2, 5-7, 11

NOTES:
1. PROVIDE UNIT INTEGRAL NON-FUSED DISCONNECT SWITCH, MOUNTING BRACKETS AND HARDWARE.
2. PROVIDE UNIT WITH 1" PLEATED MERV 8 FILTERS WITH ANTI-MICROBIAL COATING.
3. PROVIDE EXPOSED CABINETS WITH 16 GAUGE GALVANIZED STEEL CASE WITH ENAMEL FINISH.
4. PROVIDE EC FAN MOTOR.
5. PROVIDE 3-SPEED EC FAN MOTOR.
6. PROVIDE WITH INSULATED 304 STAINLESS STEEL PRIMARY CONDENSATE DRAIN PAN. EQUIP PRIMARY DRAIN PAN WITH FLOAT SWITCH TO BE INTERLOCKED WITH THE BAS.
7. PROVIDE UNIT WITH INTEGRAL CONDENSATE PUMP.
8. PROVIDE HANGING FAN COIL UNIT WITH ARRESTING CABLE CONNECTED TO STRUCTURE AND SIZED FOR 1.5 TIMES THE EQUIPMENT WEIGHT.
9. PROVIDE UNIT WITH MERV 10 FILTER.
10. PROVIDE MANUFACTURER PIPING PACKAGE.
11. PROVIDE INTEGRAL CONDENSATE PUMP.

2-PIPE FAN COIL UNIT (COOLING) SCHEDULE

TAG	COUNT	CONFIGURATION	FAN SPEED	CFM	ESP (IN WG)	COOLING COIL								ELECTRICAL DATA					WEIGHT (LBS)	NOTES
						TOTAL CAPACITY (MBH)	SENSIBLE (MBH)	AIRSIDE		WATERSIDE										
								EAT DB/WB (°F)	LAT DB/WB (°F)	FLUID	EWT (°F)	LWT (°F)	GPM	WPD (FT)	V	PH	Hz	FLA	MCA	
FCU-A-2	7	4-WAY CASSETTE	HIGH	380	0.00	14.7	12.6	85 °F / 66.5 °F	55.6 °F / 54.1 °F	WATER	43 °F	56 °F	2.3	4.8	208	1	60	0.40	0.50	51	1, 3-5, 8-10
FCU-C-14	1	HORIZONTAL LOW PROFILE EXPOSED CABINET, REAR RETURN	MEDIUM	335	0.50	12.5	9.4	75 °F / 62.5 °F	48.7 °F / 48.4 °F	WATER	43 °F	56 °F	3.3	8.0	208	1	60	2.20	2.48	209	1-7, 9-10
FCU-D-8	1	HORIZONTAL LOW PROFILE PLENUM	MEDIUM	385	0.45	11.8	9.5	75 °F / 62.5 °F	48.7 °F / 48.4 °F	WATER	43 °F	56 °F	2.3	4.8	208	1	60	1.60	2.00	103	1-7, 9-10

NOTES:
1. PROVIDE UNIT INTEGRAL NON-FUSED DISCONNECT SWITCH, MOUNTING BRACKETS AND HARDWARE.
2. PROVIDE UNIT WITH 1" PLEATED MERV 8 FILTERS WITH ANTI-MICROBIAL COATING.
3. PROVIDE EXPOSED CABINETS WITH 16 GAUGE GALVANIZED STEEL CASE WITH ENAMEL FINISH.
4. PROVIDE WITH INSULATED 304 STAINLESS STEEL PRIMARY CONDENSATE DRAIN PAN. EQUIP PRIMARY DRAIN PAN WITH FLOAT SWITCH TO BE INTERLOCKED WITH THE BAS.
5. PROVIDE HANGING FAN COIL UNIT WITH ARRESTING CABLE CONNECTED TO STRUCTURE AND SIZED FOR 1.5 TIMES THE EQUIPMENT WEIGHT.
6. PROVIDE EC FAN MOTOR.
7. PROVIDE UNIT WITH MERV 10 FILTER.
8. PROVIDE MANUFACTURER PIPING PACKAGE.
9. PROVIDE INTEGRAL CONDENSATE PUMP; OPTION TO PROVIDE MANUFACTURER'S SEPARATE CONDENSATE PUMP FOR FIELD INSTALLATION IS ACCEPTABLE.
10. WHERE SEPARATE CONDENSATE PUMP IS PROVIDED, POWER THE UNIT FROM THE ASSOCIATED FCU.

2-PIPE FAN COIL UNIT (HEATING) SCHEDULE

TAG	COUNT	CONFIGURATION	FAN SPEED	(CFM)	ESP (IN WG)	HEATING COIL							ELECTRICAL DATA					WEIGHT (LBS)	NOTES
						TOTAL CAPACITY (MBH)	AIRSIDE		WATERSIDE										
							EAT (°F)	LAT (°F)	FLUID	EWT (°F)	LWT (°F)	GPM	WPD (FT)	V	PH	Hz	FLA	MCA	
FCU-D-5	1	DIRECT DRIVE AXIAL INLINE	MEDIUM	985	0.10	31.4	68 °F	92.0 °F	WATER	140 °F	120 °F	1.0	2.0	208	1	60	0.80	1.00	32	1, 2, 3, 4, 7
FCU-F-2	2	VERTICAL FLOOR EXPOSED CABINET	MEDIUM	440	0.10	14.3	68 °F	91.7 °F	WATER	140 °F	120 °F	1.0	3.6	208	1	60	0.80	1.00	107	1,2,3,4
FCU-F-3	2	VERTICAL FLOOR EXPOSED CABINET	MEDIUM	445	0.10	12.8	68 °F	94.8 °F	WATER	140 °F	120 °F	1.3	0.9	208	1	60	1.60	2.00	120	1,2,3,4
FCU-G-2	1	VERTICAL LOW PROFILE FLOOR CONCEALED	MEDIUM	270	0.22	9.2	68 °F	99.5 °F	WATER	140 °F	120 °F	0.9	1.1	208	1	60	0.30	0.38	85	1,2,4

NOTES:
1. PROVIDE UNIT INTEGRAL NON-FUSED DISCONNECT SWITCH, MOUNTING BRACKETS AND HARDWARE.
2. PROVIDE UNIT WITH 1" PLEATED MERV 8 FILTERS WITH ANTI-MICROBIAL COATING.
3. PROVIDE EXPOSED CABINETS WITH 16 GAUGE GALVANIZED STEEL CASE WITH ENAMEL FINISH.
4. PROVIDE MANUFACTURER PIPING PACKAGE.

2-PIPE CHILLED BEAM SCHEDULE

TAG	LOCATION	CONFIGURATION	NOMINAL LENGTH	NOMINAL WIDTH	AIR INLET SIZE	COOLING COIL								NC LEVEL	WEIGHT (LBS)	NOTES
						TOTAL CAPACITY (MBH)	SENSIBLE CAPACITY (MBH)	AIRSIDE			WATERSIDE					
								OA CFM	INLET PRESSURE (IN WC)	INDUCED ROOM AIR TEMP DB/WB (°F)	FLUID	EWT (°F)	GPM	WPD (FT WC)		
CB-1	317 TELEVISION STUDIO	2-PIPE ACTIVE LINEAR EXPOSED	10' - 0"	2' - 0"	6" ø	6.0	5.6	50	0.15	75 °F / 62.5 °F	WATER	57 °F	2.5	7.1	19	179	1 THRU 6
CB-2	317 TELEVISION STUDIO	2-PIPE ACTIVE LINEAR EXPOSED	10' - 0"	2' - 0"	6" ø	6.0	5.6	50	0.15	75 °F / 62.5 °F	WATER	57 °F	2.5	7.1	19	179	1 THRU 6
CB-3	317 TELEVISION STUDIO	2-PIPE ACTIVE LINEAR EXPOSED	6' - 0"	2' - 0"	6" ø	3.7	3.5	25	0.28	75 °F / 62.5 °F	WATER	57 °F	2.5	4.4	19	110	1 THRU 6

NOTES:
1. PROVIDE MANUFACTURER'S MOUNTING FRAMES, BRACKETS, HARDWARE, AND APPURTENANCES REQUIRED FOR TURNKEY INSTALLATION.
2. PROVIDE MANUFACTURER'S STANDARD EPOXY COATING.
3. PROVIDE 3-WAY VALVE FOR CHILLED WATER COIL. COORDINATE FOR LEFT HAND OR RIGHT HAND COIL CONNECTION AND ACCESS PER FINAL FIELD CONDITIONS.
4. CHILLED BEAM CONFIGURATION IS FOR COOLING ONLY.
5. PROVIDE CHILLED BEAM WITH CONDENSATION SENSOR.
6. PROVIDE SUPPORT FOR CHILLED BEAM FROM BUILDING STRUCTURE WITH ARRESTING CABLE SIZED FOR 1.5 TIMES THE EQUIPMENT WEIGHT.

4-PIPE CHILLED BEAM SCHEDULE

TAG	LOCATION	CONFIGURATION	NOMINAL LENGTH	NOMINAL WIDTH	AIR INLET SIZE	COOLING COIL									HEATING COIL									NC LEVEL	NOTES
						TOTAL CAPACITY (MBH)	SENSIBLE CAPACITY (MBH)	AIRSIDE			WATERSIDE				TOTAL CAPCITY (MBH)	AIRSIDE			WATERSIDE						
								OA CFM	INLET PRESSURE (IN WC)	INDUCED ROOM AIR TEMP DB/WB (°F)	FLUID	EWT (°F)	GPM	WPD (FT WC)		OA CFM	INDUCED ROOM AIR TEMP (°F)	LAT (°F)	FLUID	EWT (°F)	LWT (°F)	GPM	WPD (FT WC)		
CB-4	342 VIDEO EDITING SUITE	4-PIPE ACTIVE RECESSED BULKHEAD MOUNT	6' - 0"	1' - 6"	6" ø	3.2	2.9	30	0.17	75 °F / 62.5 °F	WATER	57 °F	2.5	4.4	3.1	30	68 °F	85.2 °F	WATER	120 °F	108 °F	0.50	0.23	17	1 THRU 5
CB-5	343 VIDEO EDITING SUITE	4-PIPE ACTIVE RECESSED BULKHEAD MOUNT	6' - 0"	1' - 6"	6" ø	3.4	2.9	30	0.17	75 °F / 62.5 °F	WATER	57 °F	2.5	4.4	3.6	30	68 °F	85.2 °F	WATER	120 °F	106 °F	0.50	0.23	17	1 THRU 5
CB-6	345 VIDEO EDITING SUITE	4-PIPE ACTIVE RECESSED BULKHEAD MOUNT	6' - 0"	1' - 6"	6" ø	3.4	2.9	30	0.17	75 °F / 62.5 °F	WATER	57 °F	2.5	4.4	3.8	30	68 °F	85.2 °F	WATER	120 °F	105 °F	0.50	0.23	17	1 THRU 5
CB-7	344 VIDEO EDITING SUITE	4-PIPE ACTIVE RECESSED BULKHEAD MOUNT	6' - 0"	1' - 6"	6" ø	3.2	2.9	30	0.17	75 °F / 62.5 °F	WATER	57 °F	2.5	4.4	3.1	30	68 °F	85.2 °F	WATER	120 °F	108 °F	0.50	0.23	17	1 THRU 5
CB-8	362 VIDEO EDITING SUITE	4-PIPE ACTIVE LINEAR RECESSED	4' - 0"	2' - 0"	4" ø	2.9	2.5	35	0.15	75 °F / 62.5 °F	WATER	57 °F	2.5	2.3	5.9	35	68 °F	88.0 °F	WATER	120 °F	112 °F	1.50	1.40	17	1 THRU 5

NOTES:
1. PROVIDE MANUFACTURER'S MOUNTING FRAMES, BRACKETS, HARDWARE, AND APPURTENANCES REQUIRED FOR TURNKEY INSTALLATION.
2. PROVIDE MANUFACTURER'S STANDARD EPOXY COATING.
3. PROVIDE 3-WAY VALVE FOR CHILLED WATER COIL. COORDINATE FOR LEFT HAND OR RIGHT HAND COIL CONNECTION AND ACCESS PER FINAL FIELD CONDITIONS.
4. PROVIDE CHILLED BEAM WITH CONDENSATION SENSOR.
5. PROVIDE SUPPORT FOR CHILLED BEAM FROM BUILDING STRUCTURE WITH ARRESTING CABLE SIZED FOR 1.5 TIMES THE EQUIPMENT WEIGHT.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
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FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC SCHEDULES

SHEET ID

M-602

REVISED RTA SUBMISSION 03/01/2023

4-PIPE BLOWER COIL UNIT SCHEDULE

TAG	LOCATION	SERVICE	CONFIGURATION	FAN SPEED	CFM	ESP (IN WG)	COOLING											HEATING									ELECTRICAL DATA					WEIGHT (LBS)	NOTES
							TOTAL CAPACITY (MBH)	SENSIBLE (MBH)	AIRSIDE		WATERSIDE							TOTAL CAPCITY (MBH)	AIRSIDE		WATERSIDE						V	PH	Hz	FLA	MCA		
									EAT DB/WB (°F)	LAT DB/WB (°F)	FLUID	EWT (°F)	LWT (°F)	GPM	WPD (FT)	ROWS	FPI		EAT (°F)	LAT (°F)	FLUID	EWT (°F)	LWT (°F)	GPM	WPD (FT)	ROWS	FPI							
BCU-1	312 MECH	L317 TELEVISION STUDIO	VERTICAL DIRECT DRIVE BLOWER COIL	MEDIUM	1600	0.6	54.1	41.8	75 °F / 62.5 °F	50.8 °F / 50.3 °F	WATER	43 °F	56 °F	8.3	3.25	6	8	24.9	68 °F	82.4 °F	WATER	140 °F	120.1 °F	2.5	0.07	1	8	208	1	60	14.60	16.43	505	1,2,3,4

NOTES:
1. PROVIDE UNIT INTEGRAL NON-FUSED DISCONNECT SWITCH, MOUNTING BRACKETS AND HARDWARE.
2. PROVIDE UNIT WITH 1" PLEATED MERV 8 FILTERS WITH ANTI-MICROBIAL COATING.
3. PROVIDE EC FAN MOTOR.
4. PROVIDE WITH INSULATED 304 STAINLESS STEEL PRIMARY CONDENSATE DRAIN PAN. EQUIP PRIMARY DRAIN PAN WITH FLOAT SWITCH TO BE INTERLOCKED WITH THE BAS.

COMPUTER ROOM AIR HANDLER SCHEDULE

TAG	LOCATION	CONFIGURATION	SUPPLY FAN		COOLING COIL										ELECTRICAL DATA				WEIGHT (LBS)	NOTES
			AIRFLOW (CFM)	ESP (IN WC)	EAT DB (°F)	EAT WB (°F)	TOTAL CAPACITY COOLING (MBH)	SENSIBLE COOLING CAPACITY (MBH)	FLUID	EWT (°F)	LWT (°F)	GPM	WPD (FT WC)	MAX APD (IN WC)	MAX FACE VELOCITY (FPM)	V	PH	HZ	FLA		
CRAH-1A	314 SERVER ROOM/MCR	IN-ROW	3,620	0.00	87 °F	67.0 °F	157.0	128.0	WATER	43 °F	56 °F	25.0	24.0	0.10	500	208	3	60	3.3	417	1 THRU 9
CRAH-1B	314 SERVER ROOM/MCR	IN-ROW	3,620	0.00	87 °F	67.0 °F	157.0	128.0	WATER	43 °F	56 °F	25.0	24.0	0.10	500	208	3	60	3.3	417	1 THRU 9
CRAH-3	B303 MAIN ELECTRICAL	CEILING MOUNTED, DUCTED DISCHARGE, PLENUM RETURN	2,500	0.50	72 °F	58.7 °F	50.8	48.5	WATER	43 °F	56 °F	8.5	11.0	0.10	500	208	1	60	2.6	665	1 THRU 9
CRAH-4	B237 MAIN TELECOM	FLOOR-MOUNTED, UPFLOW, PLENUM DISCHARGE, FRONT RETURN	2,000	0.00	72 °F	58.6 °F	40.7	38.1	WATER	43 °F	53 °F	8.5	5.1	0.10	500	208	3	60	2.6	575	1 THRU 9
CRAH-5A	422 TELECOM NORTH	WALL-MOUNTED	1,200	0.00	72 °F	61.2 °F	27.3	25.0	WATER	43 °F	55 °F	4.8	5.7	0.10	500	208	1	60	1.9	365	1 THRU 9
CRAH-5B	422 TELECOM NORTH	WALL-MOUNTED	1,200	0.00	72 °F	61.2 °F	27.3	25.0	WATER	43 °F	55 °F	4.8	5.7	0.10	500	208	1	60	1.9	365	1 THRU 9
CRAH-6A	B172 TELECOM NORTH	WALL-MOUNTED	1,200	0.00	72 °F	58.7 °F	22.3	21.9	WATER	43 °F	56 °F	3.6	3.5	0.10	500	208	1	60	1.9	365	1 THRU 9
CRAH-6B	B172 TELECOM NORTH	WALL-MOUNTED	1,200	0.00	72 °F	58.7 °F	22.3	21.9	WATER	43 °F	56 °F	3.6	3.5	0.10	500	208	1	60	1.9	365	1 THRU 9
CRAH-7	182 UNASSIGNED SPACE	WALL-MOUNTED	1,200	0.00	72 °F	58.7 °F	22.3	21.9	WATER	43 °F	56 °F	3.6	3.5	0.10	500	208	1	60	1.9	365	1 THRU 9
CRAH-8A	242 TELECOM NORTH	WALL-MOUNTED	1,200	0.00	72 °F	58.7 °F	22.3	21.9	WATER	43 °F	56 °F	3.6	3.5	0.10	500	208	1	60	1.9	365	1 THRU 9
CRAH-8B	242 TELECOM NORTH	WALL-MOUNTED	1,200	0.00	72 °F	58.7 °F	22.3	21.9	WATER	43 °F	56 °F	3.6	3.5	0.10	500	208	1	60	1.9	365	1 THRU 9
CRAH-9A	219 TELECOM SOUTH	WALL-MOUNTED	1,200	0.00	72 °F	58.7 °F	22.3	21.9	WATER	43 °F	56 °F	3.6	3.5	0.10	500	208	1	60	1.9	365	1 THRU 9
CRAH-9B	219 TELECOM SOUTH	WALL-MOUNTED	1,200	0.00	72 °F	58.7 °F	22.3	21.9	WATER	43 °F	56 °F	3.6	3.5	0.10	500	208	1	60	1.9	365	1 THRU 9
CRAH-10A	145 TELECOM NORTH	WALL-MOUNTED	1,200	0.00	72 °F	58.7 °F	22.3	21.9	WATER	43 °F	56 °F	3.6	3.5	0.10	500	208	1	60	1.9	365	1 THRU 9
CRAH-10B	145 TELECOM NORTH	WALL-MOUNTED	1,200	0.00	72 °F	58.7 °F	22.3	21.9	WATER	43 °F	56 °F	3.6	3.5	0.10	500	208	1	60	1.9	365	1 THRU 9
CRAH-11A	325 TELECOM SOUTH	WALL-MOUNTED	1,200	0.00	72 °F	58.7 °F	22.3	21.9	WATER	43 °F	56 °F	3.6	3.5	0.10	500	208	1	60	1.9	365	1 THRU 9
CRAH-11B	325 TELECOM SOUTH	WALL-MOUNTED	1,200	0.00	72 °F	58.7 °F	22.3	21.9	WATER	43 °F	56 °F	3.6	3.5	0.10	500	208	1	60	1.9	365	1 THRU 9

NOTES:
1. PROVIDE VARIABLE CAPACITY COMPUTER ROOM AIR CONDITIONING UNIT, CHILLED WATER COOLING COIL, AND DEHUMIDIFICATION CONTROL.
2. PROVIDE SINGLE POINT POWER CONNECTION TO UNIT WITH FACTORY MOUNTED AND WIRED NON-FUSED DISCONNECT SWITCH NEMA 3 RATED.
3. PROVIDE ECM FAN MOTORS WITH MANUFACTURER'S INTERNAL VIBRATION ISOLATION.
4. PROVIDE FACTORY MOUNTED, WIRED AND CONFIGURED WATER LEVEL SENSOR /SWITCH IN THE CONDENSATE DRAIN PAN INTERLOCKED TO STOP UNIT OPERATION AT DRAIN PAN HIGH WATER LEVEL.
5. WHERE CONDENSATE CANNOT BE GRAVITY DRAINED, PROVIDE MANUFACTURER'S INTEGRAL FACTORY MOUNTED, WIRED AND CONFIGURED CONDENSATE PUMP.
6. PROVIDE MANUFACTURER'S FACTORY APPLIED ENAMEL COATING.
7. PROVIDE MANUFACTURER'S DISPOSABLE 2" PLEATED FILTER MEDIA AT UNIT, MINIMUM MERV 8.
8. PROVIDE ACCESSORIES AND APPURTENANCES FOR INSTALLING COMPUTER ROOM AIR CONDITIONING UNIT.
9. PROVIDE ELECTRIC REHEAT FOR DEHUMIDIFICATION.

CHILLED WATER DUCT COOLING COIL SCHEDULE

TAG	SERVICE	DUCT WIDTH (INCHES)	DUCT HEIGHT (INCHES)	TOTAL CAPACITY (MBH)	SENSIBLE CAPACITY (MHB)	AIRSIDE					WATERSIDE								OPERATING WEIGHT (LBS)	NOTES
						CFM	EAT (°F)	LAT (°F)	APD (IN WC)	MAX FACE VELOCITY (FPM)	FLUID	GPM	EWT (°F)	LWT (°F)	WPD (FT)	SUPPLY CONNECTION (INCHES)	RETURN CONNECTION (INCHES)	ROWS		
CC-1	L342,L343,L344,L345 VIDEO EDITING SUITES	8	6	1.6	0.7	120	55	50	0.18	450	WATER	3.00	43.0	44.0	5.90	1	1	2	8	1
CC-2	L362 VIDEO EDITING SUITE	4.5	4	0.5	0.2	35	55	50	0.14	450	WATER	1.50	43.0	43.6	0.50	1	1	2	7	1
CC-3	L317 TELEVISION STUDIO	8	8	1.8	0.8	125	55	50	0.12	450	WATER	3.00	43.0	44.2	7.20	1	1	2	9	1

NOTES:
1. PROVIDE ACCESSORIES AND APPURTENANCES FOR CHILLED WATER DUCT COIL TURNKEY INSTALLATION.

UNIT HEATER SCHEDULE

TAG	LOCATION	TYPE	CAPACITY (MBH)	AIRSIDE				WATERSIDE					ELECTRICAL DATA				WEIGHT (LBS)	NOTES
				CFM	THROW (FT)	EAT DB (°F)	LAT DB (°F)	FLUID	EWT (°F)	LWT (°F)	GPM	WPD (FT)	V	PH	Hz	FLA		
UH-1	B233 MECHANICAL	HORIZONTAL	13.4	480	28'	60.0 °F	85.8 °F	WATER	140.0	120.0	2.70	0.09	115	1	60	1.2	30	1, 2
UH-2	B231 CUSTODIAL	HORIZONTAL	7.5	395	20'	60.0 °F	77.5 °F	WATER	140.0	120.0	1.30	0.01	115	1	60	0.8	26	1, 2
UH-3	B302 PRINTING/LAMINATING STORAGE	HORIZONTAL	7.5	395	20'	60.0 °F	77.5 °F	WATER	140.0	120.0	1.30	0.01	115	1	60	0.8	26	1, 2
UH-4	B304 AV/EVENT STORAGE	HORIZONTAL	7.5	395	20'	60.0 °F	77.5 °F	WATER	140.0	120.0	1.30	0.01	115	1	60	0.8	26	1, 2
UH-5	ROOF ACCESS AREA	HORIZONTAL	13.4	480	28'	60.0 °F	85.8 °F	WATER	140.0	120.0	2.70	0.09	115	1	60	1.2	30	1, 2
UH-6	B106 FIRE PROTECTION	HORIZONTAL	7.5	395	20'	60.0 °F	77.5 °F	WATER	140.0	120.0	1.30	0.01	115	1	60	0.8	26	1, 2
UH-7	XB301 MECHANICAL	HORIZONTAL	7.5	395	20'	60.0 °F	77.5 °F	WATER	140.0	120.0	1.30	0.01	115	1	60	0.8	26	1, 2
UH-8	B301 LOADING AREA	HORIZONTAL	7.5	395	20'	60.0 °F	77.5 °F	WATER	140.0	120.0	1.30	0.01	115	1	60	0.8	26	1, 2

NOTES:
1. PROVIDE WITH MANUFACTURER'S INTEGRAL UNIT MOUNTED NON-FUSED DISCONNECT SWITCH, MOUNTING BRACKETS, HARDWARE AND EPOXY COATING.
2. PROVIDE MANUFACTURER'S SUMMER FAN SWITCH. PROVIDE ACCESSORIES AND APPURTENANCES FOR UNIT HEATERS TURNKEY INSTALLATION.

CONVECTOR SCHEDULE

TAG	LOCATION	CONFIGURATION	HEATING COIL							DIMENSIONS (INCHES)			NOTES
			TOTAL CAPCITY (MBH)	AIRSIDE	WATERSIDE								
				EAT (°F)	FLUID	EWT (°F)	LWT (°F)	GPM	WPD (FT)	LENGTH	WIDTH/DEPTH	HEIGHT	
CVR-1	STAIR A - LEVEL B2	WALL-HUNG FLAT TOP	5.2	68 °F	WATER	140 °F	120 °F	0.52	0.046	4' - 8"	0' - 8"	2' - 2"	1, 2
CVR-2	STAIR A - LEVEL B1	WALL-HUNG FLAT TOP	5.2	68 °F	WATER	140 °F	120 °F	0.52	0.046	4' - 8"	0' - 8"	2' - 2"	1, 2
CVR-3	STAIR A - LEVEL 1	WALL-HUNG FLAT TOP	5.2	68 °F	WATER	140 °F	120 °F	0.52	0.046	4' - 8"	0' - 8"	2' - 2"	1, 2
CVR-4	STAIR A - LEVEL 2	WALL-HUNG FLAT TOP	5.2	68 °F	WATER	140 °F	120 °F	0.52	0.046	4' - 8"	0' - 8"	2' - 2"	1, 2
CVR-5	STAIR A - LEVEL 4	WALL-HUNG FLAT TOP	5.2	68 °F	WATER	140 °F	120 °F	0.52	0.046	4' - 8"	0' - 8"	2' - 2"	1, 2
CVR-6	STAIR B - LEVEL B2	WALL-HUNG FLAT TOP	3.0	68 °F	WATER	140 °F	120 °F	0.30	0.067	5' - 4"	0' - 4"	1' - 6"	1, 2
CVR-7	STAIR B - LEVEL B1	WALL-HUNG FLAT TOP	3.0	68 °F	WATER	140 °F	120 °F	0.30	0.067	5' - 4"	0' - 4"	1' - 6"	1, 2
CVR-8	STAIR B - LEVEL 1	WALL-HUNG FLAT TOP	3.0	68 °F	WATER	140 °F	120 °F	0.30	0.067	5' - 4"	0' - 4"	1' - 6"	1, 2
CVR-9	STAIR B - LEVEL 2	WALL-HUNG FLAT TOP	3.0	68 °F	WATER	140 °F	120 °F	0.30	0.067	5' - 4"	0' - 4"	1' - 6"	1, 2
CVR-10	STAIR B - LEVEL 3	WALL-HUNG FLAT TOP	3.0	68 °F	WATER	140 °F	120 °F	0.30	0.067	5' - 4"	0' - 4"	1' - 6"	1, 2
CVR-11	STAIR B - LEVEL 4	WALL-HUNG FLAT TOP	3.0	68 °F	WATER	140 °F	120 °F	0.30	0.067	5' - 4"	0' - 4"	1' - 6"	1, 2

NOTES:
1. PROVIDE WITH MANUFACTURER'S INTEGRAL UNIT MOUNTED NON-FUSED DISCONNECT SWITCH, MOUNTING BRACKETS, TAMPERPROOF HARDWARE, AND EPOXY COATING.
2. PROVIDE MANUFACTURER'S ACCESSORIES AND APPURTENANCES FOR CONVECTORS TURNKEY INSTALLATION.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
SIZE: ANSI D
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC SCHEDULES

SHEET ID

M-603

REVISED RTA SUBMISSION 03/01/2023

VARIABLE AIR VOLUME TERMINAL BOX SCHEDULE

TAG	LOCATION	SERVED BY	INLET SIZE (INCHES)	OUTLET SIZE (INCHES)	MIN FLOW (CFM)	MAX FLOW (CFM)	STATIC PRESSURES (IN WC)		MAX NC LEVEL	NOTES
							INLET MIN	LOSS THRU BOX		
VAV-1A	LEVEL 1 - SOUTH	DOAS-1	12	16" x 15"	895	1405	1.0	0.25	31	1, 2
VAV-2A	LEVEL 2 - SOUTH	DOAS-1	12	16" x 15"	800	1125	1.0	0.25	25	1, 2
VAV-4B	LEVEL 4 - NORTHEAST	DOAS-2	8	12" x 10"	135	410	1.0	0.50	25	1, 2
VAV-4C	LEVEL 4 - NORTHEAST/CENTRAL	DOAS-2	10	14" x 12 1/2"	375	815	1.0	0.50	25	1, 2

NOTES:
1. PROVIDE LONWORKS COMMUNICATIONS MICROPROCESSOR BASED VAV DDC CONTROLLER TO CAV MANUFACTURER FOR FACTORY MOUNTING, WIRING AND CONFIGURATION.
2. PROVIDE ACCESSORIES AND APPURTENANCES FOR TURNKEY INSTALLATION OF CAV/VAV TERMINAL UNITS.

CONSTANT AIR VOLUME TERMINAL BOX SCHEDULE

TAG	LOCATION	SERVED BY	INLET SIZE (INCHES)	OUTLET SIZE (INCHES)	AIR FLOW (CFM)	STATIC PRESSURES (IN WC)		MAX NC LEVEL	NOTES
						INLET MIN	LOSS THRU BOX		
CAV-1B	LEVEL 1 - NORTHWEST	DOAS-2	10	14" x 12 1/2"	610	1.0	0.50	25	1, 2
CAV-1C	LEVEL 1 - NORTHEAST	DOAS-2	8	12" x 10"	470	1.0	0.17	25	1, 2
CAV-2B	LEVEL 2 - NORTHWEST	DOAS-2	6	12" x 8"	385	1.0	0.50	25	1, 2
CAV-2C	LEVEL 2 - NORTHEAST	DOAS-2	8	12" x 10"	510	1.0	0.07	25	1, 2
CAV-3A	LEVEL 3 - SOUTH	DOAS-1	10	14" x 12 1/2"	785	1.0	0.50	25	1, 2
CAV-3B	LEVEL 3 - NORTHWEST	DOAS-2	10	14" x 12 1/2"	570	1.0	0.50	25	1, 2
CAV-3C	LEVEL 3 - NORTHEAST	DOAS-2	6	12" x 8"	250	1.0	0.50	25	1, 2
CAV-3D	LEVEL 3 - SOUTH	DOAS-1	6	12" x 8"	125	1.0	0.03	25	1, 2
CAV-4A	LEVEL 4 - NORTHWEST	DOAS-2	6	12" x 8"	365	1.0	0.50	25	1, 2
CAV-B1A	LEVEL B1 - SOUTH	DOAS-1	12	16" x 15"	925	1.0	0.50	25	1, 2
CAV-B1B	LEVEL B1 - NORTHWEST	DOAS-2	9	14" x 12 1/2"	660	1.0	0.50	25	1, 2
CAV-B2A	LEVEL B2 - SOUTH	DOAS-1	9	14" x 12 1/2"	665	1.0	0.50	25	1, 2
CAV-B2B	LEVEL B2 - NORTH	DOAS-2	6	12" x 8"	275	1.0	0.50	25	1, 2

NOTES:
1. PROVIDE LONWORKS COMMUNICATIONS MICROPROCESSOR BASED CAV DDC CONTROLLER TO CAV MANUFACTURER FOR FACTORY MOUNTING, WIRING AND CONFIGURATION.
2. PROVIDE ACCESSORIES AND APPURTENANCES FOR TURNKEY INSTALLATION OF CAV TERMINAL UNITS.

DUCT SILENCER SCHEDULE

TAG	SERVING	TYPE	LENGTH	CFM	INLET SIZE	VELOCITY (FPM)	MAX PRESSURE DROP (IN WG)	NET INSERTION LOSS RATINGS OCTAVE BAND NUMBER AND CENTER FREQ.								NOTES
								1 63 Hz	2 125 Hz	3 250 Hz	4 500 Hz	5 1000 Hz	6 2000 Hz	7 4000 Hz	8 8000 Hz	
DS-1	BCU-1 SUPPLY DUCT	ROUND	2' - 0"	1,600	24" DIA	+509	0.02	3	6	16	21	32	26	21	8	1 THRU 12
DS-2	BCU-1 RETURN DUCT	RECTANGULAR	1' - 6"	1,600	30"x18"	-427	0.18	5	7	9	20	36	26	21	14	1 THRU 12
DS-3	FCU-H-1-341 RETURN DUCT	ELBOW	5' - 0"	1,610	42"x18"	-307	0.01	6	9	15	22	28	20	19	14	1 THRU 12

NOTES:
1. SOUND ATTENUATORS MUST BE SELECTED FOR PROJECT ELEVATION AT 17 FEET ABOVE SEA LEVEL.
2. SOUND ATTENUATOR INTERNAL BAFFLING CONSTRUCTION MUST BE STAINLESS STEEL WITH BAGGED FILL, HOSPITAL GRADE.
3. VELOCITY SHOWN IS FORWARD FLOW (+) OR REVERSE FLOW (-) AS DEFINED PER ASTM E477-13.
4. PRESSURE DROP AND DYNAMIC INSERTION LOSS PLUS SYSTEM EFFECT FOR NEARBY/CONNECTED DUCT ELEMENTS PER ASTM E477-13 A NVLAP-ACCREDITED ACOUSTICAL LABORATORY.
5. MAXIMUM PRESSURE DROP WITH SYSTEM EFFECTS = SILENCER PRESSURE DROP PER ASTM E477-13 + SYSTEM EFFECTS FOR NEARBY DUCT ELEMENTS.
6. PROVIDE SOUND ATTENUATORS DESIGNED AND FACTORY CERTIFIED BY QUALIFIED ACOUSTICS PROFESSIONAL FOR SCHEDULED PRESSURE DROP AND STC VALUES.
7. CALCULATIONS MUST DEMONSTRATE WALL/PARTITION ASSEMBLY RATING IS MAINTAINED.
8. SILENCERS MUST BE CONSTRUCTED IN ACCORDANCE WITH SMACNA STANDARDS FOR ASSOCIATED AIR FLOW, VELOCITY AND PRESSURE CLASS.
9. LENGTH SHOWN FOR ELBOW SILENCERS IS CENTERLINE LENGTH.
10. FIBERGLASS CLOTH MEDIA PROTECTION. MEDIA MUST BE VIBRO-ACOUSTICS® MOLDBLOCK MEDIA™ CONTAINING 100% NATURAL COTTON FIBERS TREATED WITH AN EPA REGISTERED, NON-TOXIC BORATE SOLUTION, "FLASH DRIED" TO PROVIDE RESISTANCE TO MOLD, MILDEW AND FUNGI. MEDIA SHALL COMPLY WITH UL181 AND NFPA 90A. MANUFACTURER'S MEDIA MUST BE PACKED WITH A MINIMUM OF 15% COMPRESSION DURING SILENCER ASSEMBLY. MEDIA MUST NOT CAUSE OR ACCELERATE CORROSION OF ALUMINUM OR STEEL. GLASS FIBER AND ROCKWOOL ARE NOT ACCEPTABLE ALTERNATES.
11. PROVIDE FOR APPROVAL PROFESSIONAL ENGINEER STAMPED ACOUSTICAL CALCULATIONS FOR ALL SYSTEMS WITH SILENCERS TO DEMONSTRATE THAT THE RESULTANT DUCTBORNE FAN SOUND LEVELS, INCLUDING AIRBORNE AND BREAKOUT NOISE, MEET THE REQUIRED CRITERIA.
12. PROVIDE, FOR APPROVAL, PROFESSIONAL ENGINEER STAMPED PRESSURE DROP CALCULATIONS FOR ALL SYSTEMS WITH SILENCERS TO DEMONSTRATE THAT THE RESULTANT INSTALLED PRESSURE DROP WITH SYSTEM EFFECTS DOES NOT EXCEED SCHEDULED VALUES.

DUCTWORK CONSTRUCTION AND LEAKAGE TESTING SCHEDULE

DUCT SYSTEM	DUCT PRESSURE CLASS INCHES OF WATER COLUMN				DUCTWORK				DUCT TEST PRESSURE (IN WC)	REMARKS
					ROUND/OVAL		RECTANGULAR			
	SUPPLY DUCT	RETURN DUCT	EXHAUST DUCT	OUTSIDE AIR DUCT	DUCT SEAL CLASS	DUCT LEAK CLASS	DUCT SEAL CLASS	DUCT LEAK CLASS		
DOAS OA SUPPLY DUCTS (UPSTREAM OF TERMINAL EQUIPMENT)	-	-	-	4	A	3	A	6	4.0	1,2,3,4,5,6
CAV, VAV OA SUPPLY DUCTS (DOWNSTREAM OF TERMINAL EQUIPMENT TO SPACES)	-	-	-	2	A	6	A	6	2.0	1,2,3,4,5,6
FCU, BCU, CRAH SUPPLY DUCTS	2	-	-	-	A	6	A	12	2.0	1,2,5,6
FCU, BCU, CRAH RETURN DUCTS	-	-2	-	-	A	6	A	12	2.0	1,2,5,6
EXHAUST DUCTS	-	-	-3	-	-	-	A	6	2.0	1,2,5,6

NOTES:
1. TAB CONTRACTORS MUST NOT BE ALLOWED TO SUM THE AIRFLOWS AT EACH AIR TERMINAL DEVICE WITHOUT ACCURATELY MEASURING THE TOTAL FLOW RATE AT THE FAN FOR COMPARISON AND DETERMINATION OF APPROXIMATE LEAKING RATES.
2. TEST IN ACCORDANCE WITH UFGS 23 05 93, TESTING, ADJUSTING AND BALANCING FOR HVAC AND THE PROCEDURES IN SMACNA'S ""HVAC AIR DUCT LEAKAGE TEST MANUAL."
3. DUCTWORK DOWNSTREAM OF THE DOAS UNITS IS SUPPLY DUCT PROVIDING VENTILATION AIR DIRECTLY TO THE SPACES, AND TAGGED AS "OA" ON THE PLANS.
4. DUCTWORK UPSTREAM OF THE DOAS UNITS IS SUPPLY DUCT PROVIDING VENTILATION AIR DIRECTLY TO THE SPACES AND TAGGED AS "OA" ON THE PLANS.
5. TEST NO LESS THAN 30% OF DUCTWORK.
6. VFDs CANNOT RUN ABOVE 60Hz OR 85% LEVEL WITHOUT APPROVAL OF THE DESIGNER.

DESIGN CONDITIONS		
OUTDOOR DESIGN CONDITIONS		NOTES
SUMMER	92°F DB, 75°F WB	1
WINTER	2°F DB	1
INDOOR DESIGN CONDITIONS - ADMIN, OFFICE, ETC.		
SUMMER	75°F DB, 50% RH	1
WINTER	68°F DB	1, 2
INDOOR DESIGN CONDITIONS - MAIN TELECOM		
SUMMER	75°F DB, 55% RH	1
WINTER	64°F DB, 30% RH	1, 3
INDOOR DESIGN CONDITIONS - INTERMEDIATE TELECOM		
SUMMER	72°F DB, 60% RH	1
WINTER	72°F DB, 20% RH	1, 3
INDOOR DESIGN CONDITIONS - MECH, ELEC		
SUMMER	75°F DB / 95°F DB MAX	1
WINTER	60°F DB MIN	1,2

NOTES:
1. OUTDOOR AND INDOOR DESIGN CONDITIONS OBTAINED FROM WEST POINT ENGINEERING STANDARDS, OCTOBER 9, 2020.
2. THERE IS NO MINIMUM RELATIVE HUMIDITY REQUIREMENT.
3. HUMIDIFICATION MUST NOT BE PROVIDED.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC SCHEDULES

SHEET ID

M-604

REVISED RTA SUBMISSION 03/01/2023

AIR DEVICE SCHEDULE

TAG	SERVICE	CFM RANGE MIN	CFM RANGE MAX	MAX PD (IN WC)	NECK SIZE (INCHES)	MODULE SIZE (INCHES)	MAX NC	PATTERN	INTEGRAL DAMPER	NOTES
CEILING DIFFUSERS										
EG-21	EXHAUST	0 CFM	175 CFM	0.17	6x6	24x24	20	PERFORATED WITH BACKPAN	N/A	1, 2, 3, 4, 7, 8
EG-22	EXHAUST	0 CFM	500 CFM	0.09	12x12	24x24	20	PERFORATED WITH BACKPAN	N/A	1, 2, 3, 4, 7, 8
EG-23	EXHAUST	0 CFM	700 CFM	0.09	15x15	24x24	20	PERFORATED WITH BACKPAN	N/A	1, 2, 3, 4, 7, 8
EG-24	EXHAUST	0 CFM	1,345 CFM	0.06	22x22	24x24	20	PERFORATED WITH BACKPAN	N/A	1, 2, 3, 4, 7, 8
EG-25	EXHAUST	0 CFM	150 CFM	0.13	6x6	12x12	20	PERFORATED WITH BACKPAN	N/A	1, 2, 3, 4, 7, 8
RG-1	RETURN	0 CFM	175 CFM	0.17	6x6	24x24	20	PERFORATED WITH BACKPAN	N/A	1, 2, 3, 4, 7, 8
RG-2	RETURN	0 CFM	500 CFM	0.09	12x12	24x24	20	PERFORATED WITH BACKPAN	N/A	1, 2, 3, 4, 7, 8
RG-3	RETURN	0 CFM	700 CFM	0.09	15x15	24x24	20	PERFORATED WITH BACKPAN	N/A	1, 2, 3, 4, 7, 8
SD-1	SUPPLY	0 CFM	50 CFM	0.06	6ø	24x24	24	SQUARE PLAQUE JET NOZZLE	N/A	1, 2, 3, 4, 6, 7, 8
SD-2	SUPPLY	0 CFM	160 CFM	0.06	6ø	24x24	20	4-WAY ADJUSTABLE CORE	N/A	1, 2, 3, 4, 6, 7, 8
SD-3	SUPPLY	0 CFM	280 CFM	0.06	8ø	24x24	20	4-WAY ADJUSTABLE CORE	N/A	1, 2, 3, 4, 6, 7, 8
SD-4	SUPPLY	0 CFM	400 CFM	0.05	10ø	24x24	20	4-WAY ADJUSTABLE CORE	N/A	1, 2, 3, 4, 6, 7, 8
SD-5	SUPPLY	0 CFM	650 CFM	0.04	14ø	24x24	20	4-WAY ADJUSTABLE CORE	N/A	1, 2, 3, 4, 6, 7, 8
SD-6	SUPPLY	0 CFM	90 CFM	0.07	4ø	12x12	20	4-WAY ADJUSTABLE CORE	N/A	1, 2, 3, 4, 6, 7, 8
SD-7	SUPPLY	0 CFM	180 CFM	0.07	6ø	12x12	20	4-WAY ADJUSTABLE CORE	N/A	1, 2, 3, 4, 6, 7, 8
SD-8	SUPPLY	0 CFM	160 CFM	0.07	6/5	1" SLOT, 4" NOMINAL WIDTH, 4' LONG	16	REFER TO PLANS	N/A	1, 2, 3, 4, 6, 8, 9
SD-9	SUPPLY	0 CFM	100 CFM	0.11	14/8	1/2" SLOT, 4' LONG	25	REFER TO PLANS	N/A	1, 2, 3, 4, 6, 8, 9
SD-10	SUPPLY	0 CFM	425 CFM	0.03	14ø	N/A	11	360° ROUND	N/A	1, 2, 3, 4, 6, 7, 8
GRILLES AND REGISTERS										
EG-1	EXHAUST	0 CFM	50 CFM	0.10	6x4	N/A	25	35° DEFLECTION	N/A	1, 2, 4, 5, 7, 8
EG-2	EXHAUST	0 CFM	135 CFM	0.10	6x6	N/A	20	35° DEFLECTION	N/A	1, 2, 4, 5, 7, 8
EG-3	EXHAUST	0 CFM	185 CFM	0.10	8x6	N/A	20	35° DEFLECTION	N/A	1, 2, 4, 5, 7, 8
EG-4	EXHAUST	0 CFM	205 CFM	0.07	10x6	N/A	20	35° DEFLECTION	N/A	1, 2, 4, 5, 7, 8
EG-5	EXHAUST	0 CFM	225 CFM	0.07	8x8	N/A	20	35° DEFLECTION	N/A	1, 2, 4, 5, 7, 8
EG-6	EXHAUST	0 CFM	290 CFM	0.07	14x6	N/A	20	35° DEFLECTION	N/A	1, 2, 4, 5, 7, 8
EG-7	EXHAUST	0 CFM	345 CFM	0.07	12x8	N/A	20	35° DEFLECTION	N/A	1, 2, 4, 5, 7, 8
EG-8	EXHAUST	0 CFM	355 CFM	0.07	10x10	N/A	20	35° DEFLECTION	N/A	1, 2, 4, 5, 7, 8
EG-9	EXHAUST	0 CFM	380 CFM	0.07	18x6	N/A	20	35° DEFLECTION	N/A	1, 2, 4, 5, 7, 8
EG-10	EXHAUST	0 CFM	465 CFM	0.07	22x6	N/A	20	35° DEFLECTION	N/A	1, 2, 4, 5, 7, 8
EG-11	EXHAUST	0 CFM	530 CFM	0.07	24x6	N/A	20	35° DEFLECTION	N/A	1, 2, 4, 5, 7, 8
EG-12	EXHAUST	0 CFM	665 CFM	0.07	30x6	N/A	20	35° DEFLECTION	N/A	1, 2, 4, 5, 7, 8
EG-13	EXHAUST	0 CFM	855 CFM	0.10	14x14	N/A	27	35° DEFLECTION	N/A	1, 2, 4, 5, 7, 8
EG-14	EXHAUST	0 CFM	1,070 CFM	0.05	24x14	N/A	20	35° DEFLECTION	N/A	1, 2, 4, 5, 7, 8
EG-15	EXHAUST	0 CFM	1,145 CFM	0.05	30x12	N/A	20	35° DEFLECTION	N/A	1, 2, 4, 5, 7, 8
EG-16	EXHAUST	0 CFM	1,670 CFM	0.03	36x18	N/A	15	35° DEFLECTION	N/A	1, 2, 4, 5, 7, 8
EG-17	EXHAUST	0 CFM	1,975 CFM	0.03	42x18	N/A	15	35° DEFLECTION	N/A	1, 2, 4, 5, 7, 8
RG-4	RETURN	0 CFM	290 CFM	0.07	14x6	N/A	20	35° DEFLECTION	N/A	1, 2, 4, 5, 7, 8
RG-5	RETURN	0 CFM	355 CFM	0.07	10x10	N/A	20	35° DEFLECTION	N/A	1, 2, 4, 5, 7, 8
RG-6	RETURN	0 CFM	530 CFM	0.07	24x6	N/A	20	35° DEFLECTION	N/A	1, 2, 4, 5, 7, 8
RG-7	RETURN	0 CFM	1,670 CFM	0.03	36x18	N/A	15	35° DEFLECTION	N/A	1, 2, 4, 5, 7, 8
RG-8	RETURN	0 CFM	1,975 CFM	0.03	42x18	N/A	15	35° DEFLECTION	N/A	1, 2, 4, 5, 7, 8
RG-9	RETURN	0 CFM	290 CFM	0.07	14x6	N/A	20	DECORATIVE	N/A	1, 2, 4, 5, 7, 8, 10
RG-10	RETURN	0 CFM	355 CFM	0.07	10x10	N/A	20	DECORATIVE	N/A	1, 2, 4, 5, 7, 8, 10
RG-11	RETURN	0 CFM	530 CFM	0.10	24x6	N/A	20	DECORATIVE	N/A	1, 2, 4, 5, 7, 8, 10
RG-12	RETURN	0 CFM	950 CFM	0.07	24x12	N/A	20	35° DEFLECTION	N/A	1, 2, 4, 5, 7, 8
RG-13	RETURN	0 CFM	1,000 CFM	0.12	SEE PLANS	N/A	20	DECORATIVE	N/A	1, 2, 4, 5, 7, 8, 10
SG-1	SUPPLY	0 CFM	50 CFM	0.09	6x4	N/A	25	22.5° DEFLECTION	OBD	1, 2, 4, 5, 7, 8
SG-2	SUPPLY	0 CFM	115 CFM	0.07	6x6	N/A	20	22.5° DEFLECTION	OBD	1, 2, 4, 5, 7, 8
SG-3	SUPPLY	0 CFM	160 CFM	0.07	8x6	N/A	20	22.5° DEFLECTION	OBD	1, 2, 4, 5, 7, 8
SG-4	SUPPLY	0 CFM	205 CFM	0.07	10x6	N/A	20	22.5° DEFLECTION	OBD	1, 2, 4, 5, 7, 8
SG-5	SUPPLY	0 CFM	220 CFM	0.07	8x8	N/A	20	22.5° DEFLECTION	OBD	1, 2, 4, 5, 7, 8
SG-6	SUPPLY	0 CFM	250 CFM	0.07	12x6	N/A	20	22.5° DEFLECTION	OBD	1, 2, 4, 5, 7, 8
SG-7	SUPPLY	0 CFM	285 CFM	0.07	10x8	N/A	20	22.5° DEFLECTION	OBD	1, 2, 4, 5, 7, 8
SG-8	SUPPLY	0 CFM	290 CFM	0.07	14x6	N/A	20	22.5° DEFLECTION	OBD	1, 2, 4, 5, 7, 8
SG-9	SUPPLY	0 CFM	380 CFM	0.11	18x6	N/A	20	22.5° DEFLECTION	OBD	1, 2, 4, 5, 7, 8
SG-10	SUPPLY	0 CFM	530 CFM	0.11	24x6	N/A	22	22.5° DEFLECTION	OBD	1, 2, 4, 5, 7, 8
SG-11	SUPPLY	0 CFM	2,625 CFM	0.15	48x12	N/A	33	22.5° DEFLECTION	OBD	1, 2, 4, 5, 7, 8
SG-12	SUPPLY	0 CFM	115 CFM	0.07	6x6	N/A	20	DECORATIVE	N/A	1, 2, 4, 5, 7, 8, 10
SG-13	SUPPLY	0 CFM	160 CFM	0.07	8x6	N/A	20	DECORATIVE	N/A	1, 2, 4, 5, 7, 8, 10
SG-14	SUPPLY	0 CFM	530 CFM	0.11	24x6	N/A	20	DECORATIVE	N/A	1, 2, 4, 5, 7, 8, 10
SG-15	SUPPLY	0 CFM	300 CFM	0.11	14x6	N/A	20	DECORATIVE	N/A	1, 2, 4, 5, 7, 8, 10
SG-16	SUPPLY	0 CFM	1,000 CFM	0.12	SEE PLANS	N/A	20	DECORATIVE	N/A	1, 2, 4, 5, 7, 8, 10

NOTES:

1. COORDINATE FRAME STYLE AND TYPE WITH CEILING/MOUNTING TYPE.
2. PROVIDE MANUFACTURER'S MOUNTING HARDWARE, FRAME, ACCESSORIES AND APPURTENANCES FOR COMPLETE AIR TERMINAL INSTALL.
3. FLEXIBLE/HARD DUCT SERVING AIR DEVICE MUST BE SAME SIZE AS DEVICE NECK.
4. NECK SIZE/DUCT TAKE-OFF CONNECTION MUST BE THE SAME.
5. SURFACE MOUNTED GRILLES MUST HAVE CONCEALED FASTENERS.
6. MAXIMUM FLEX DUCT LENGTH MUST BE 5 FT.
7. PROVIDE SEPARATE MANUAL VOLUME DAMPERS AT LOW PRESSURE DUCTWORK; AIR TERMINALS WITH INTEGRAL VOLUME DAMPERS MUST NOT BE USED.
8. PROVIDE REMOTE DAMPER CONTROLLER FOR DAMPER LOCATIONS ABOVE INACCESSIBLE CEILINGS OR FLOORS WITH ACCESSORIES FOR PROPER OPERATION.
9. PATTERN DEFLECTORS MUST BE INSTALLED BY CONTRACTOR PER THE ARROWS SHOWN ON PLANS.
10. DECORATIVE GRILLE. REFER TO AND COORDINATE WITH INTERIORS.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-18-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

DESIGNED BY: N. SLEEM
DRAWN BY: C. DEVANEY
CHECKED BY: D. GORDON
SUBMITTED BY:

SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC SCHEDULES

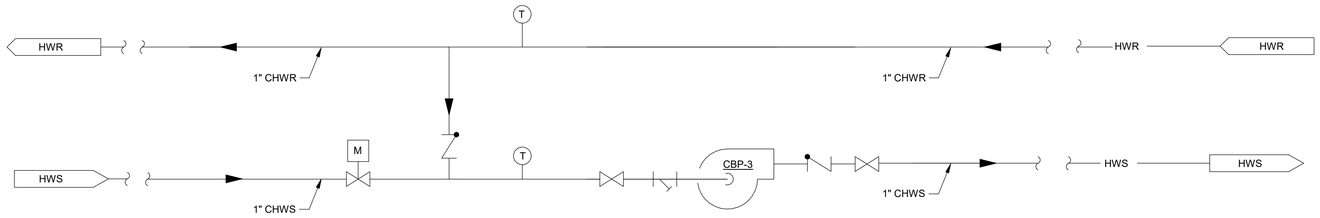
SHEET ID

M-605

REVISED RTA SUBMISSION 03/01/2023

B1 STEAM AND HOT WATER FLOW DIAGRAM

NTS



NOTES:

1. PROVIDE CHILLED BEAM WITH CONDENSATION SENSOR. REFER TO CONTROLS.

A1 CHILLED BEAM HOT WATER FLOW DIAGRAM (CBP-3)

NTS

REVISED RTA SUBMISSION 03/01/2023

US Army Corps of Engineers ®

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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

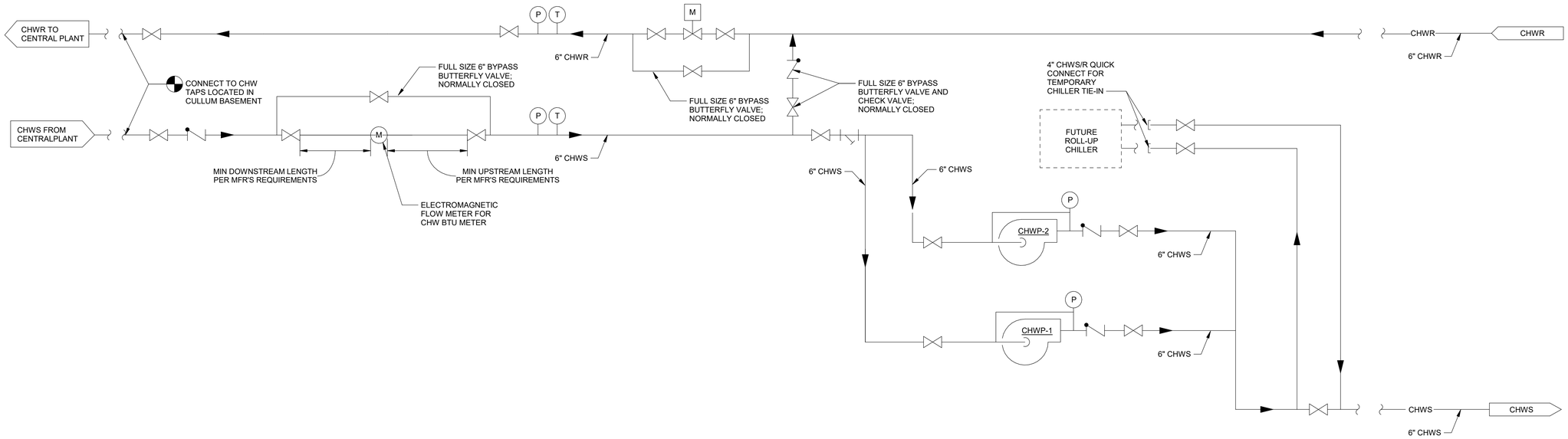
JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

STEAM AND HOT WATER FLOW DIAGRAM

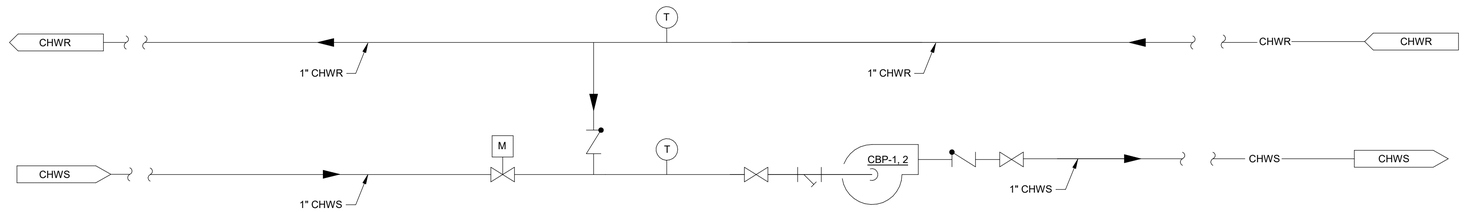
SHEET ID

M-701



C1 CAMPUS CHILLED WATER FLOW DIAGRAM

NTS



NOTES:

1. PROVIDE CHILLED BEAM WITH CONDENSATION SENSOR. REFER TO CONTROLS.

A1 CHILLED BEAM CHILLED WATER FLOW DIAGRAM (CBP-1, 2)

NTS

US Army Corps of Engineers ®

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CHECKED BY: D. GORDON
SUBMITTED BY:
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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
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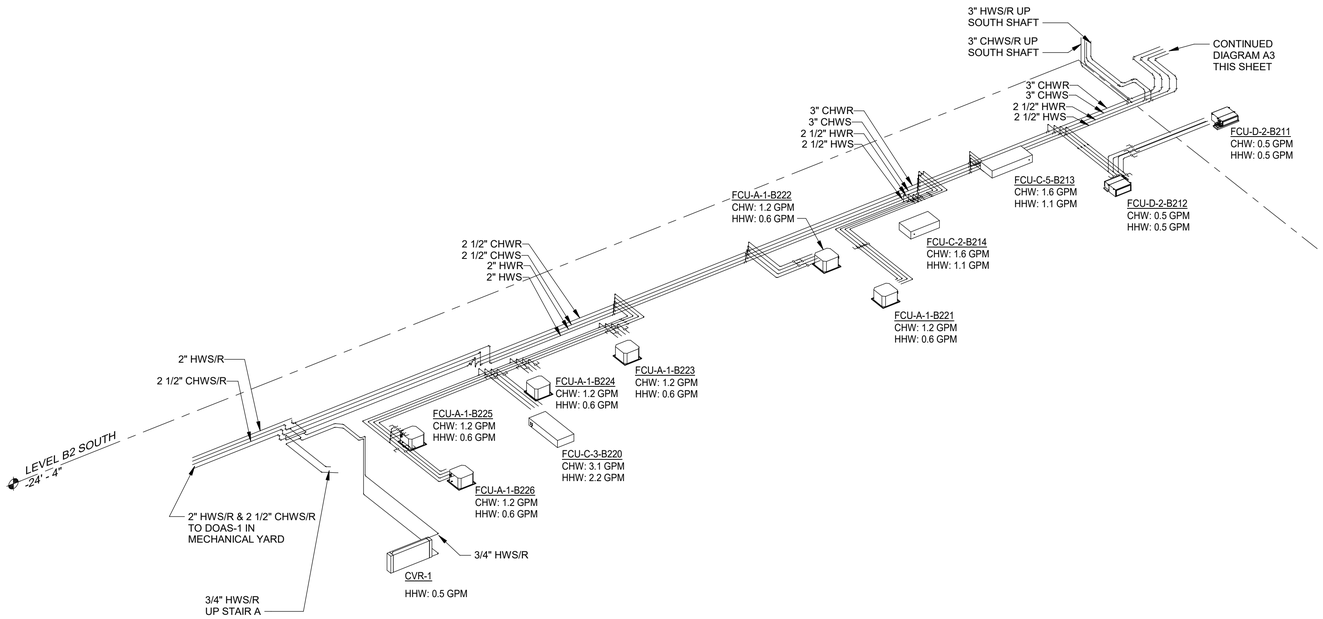
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

CHILLED WATER FLOW DIAGRAMS
CAMPUS CHW AND CHILLED BEAM LOOP

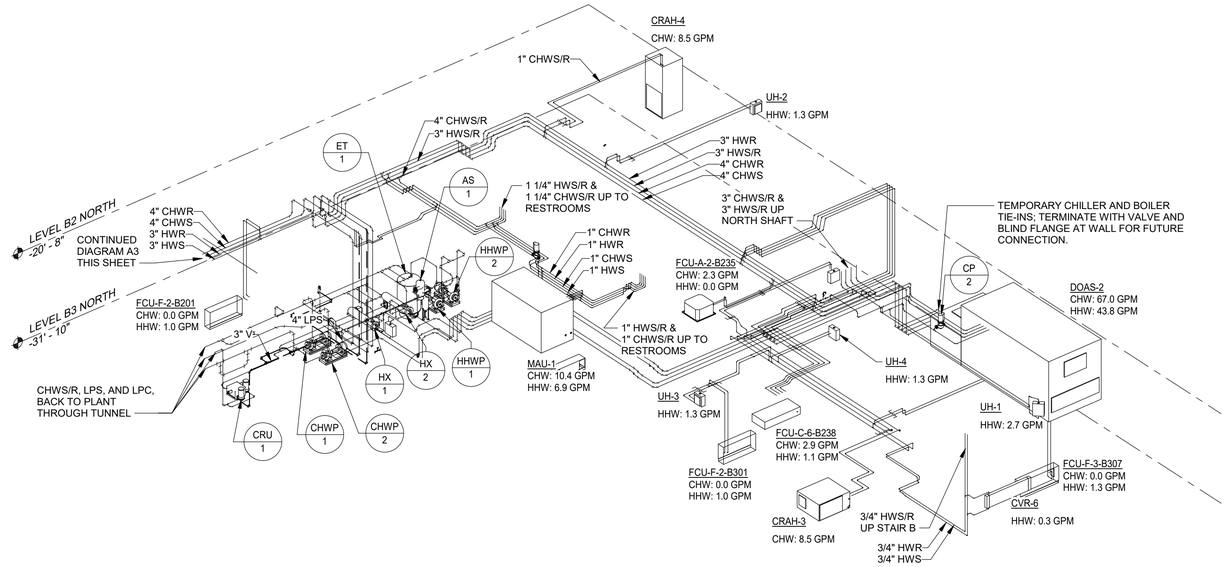
SHEET ID

M-702

REVISED RTA SUBMISSION 03/01/2023



B1 MECHANICAL FLOW DIAGRAM - SOUTH WING - LEVEL B2



A3 MECHANICAL FLOW DIAGRAM - NORTH WING - LEVELS B3 AND B2

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. VERTICAL PIPE RISERS SIZING IS BASED ON PEAK BLOCK LOAD, HORIZONTAL PIPE MAINS FOR INDIVIDUAL FLOORS ARE BASED ON SUM OF EQUIPMENT COIL GPMs.
3. PIPE SIZES TO INDIVIDUAL TERMINAL UNITS ARE 3/4" UNLESS OTHERWISE NOTED.
4. PROVIDE PIPING ISOLATION VALVES IN ACCESSIBLE LOCATIONS, AS CLOSE TO MAIN RISERS AND BRANCH TAKE-OFFS AS POSSIBLE.
5. LOCATE PIPING IN OR AT CEILING UNLESS OTHERWISE INDICATED.

US Army Corps of Engineers ®

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SUBMITTED BY:
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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

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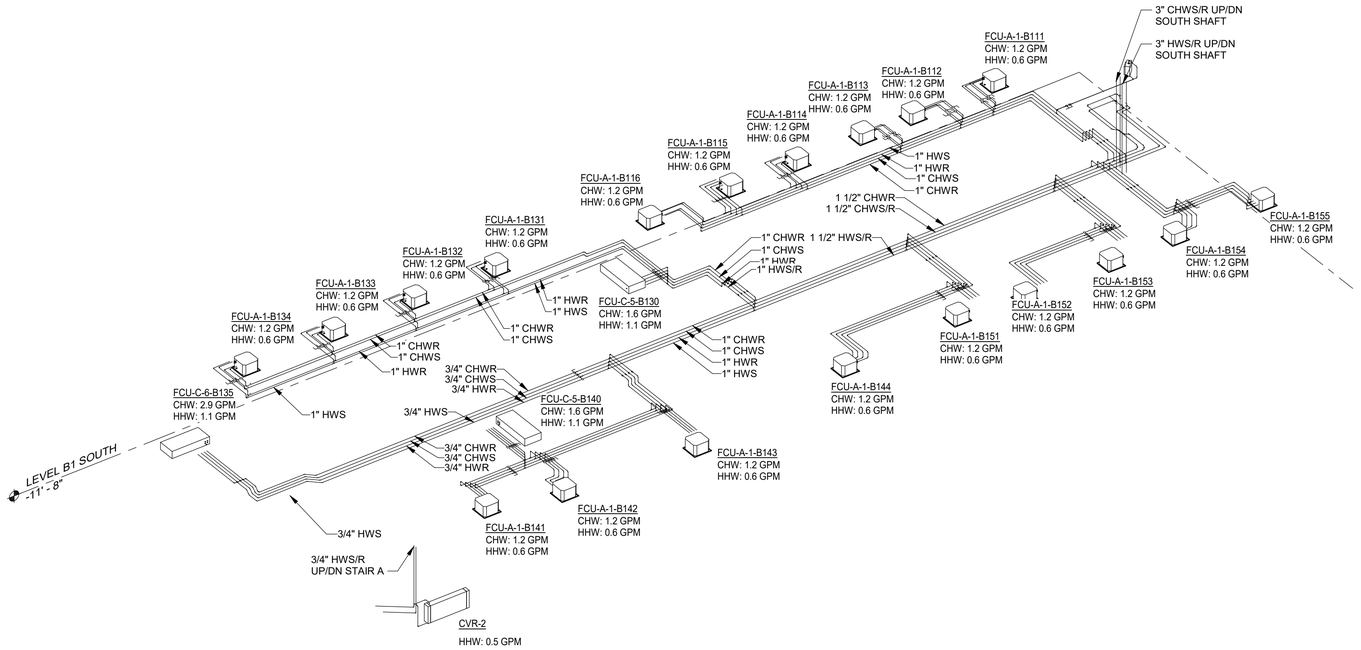
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HYDRONIC FLOW DIAGRAM
LEVEL B2 AND B3

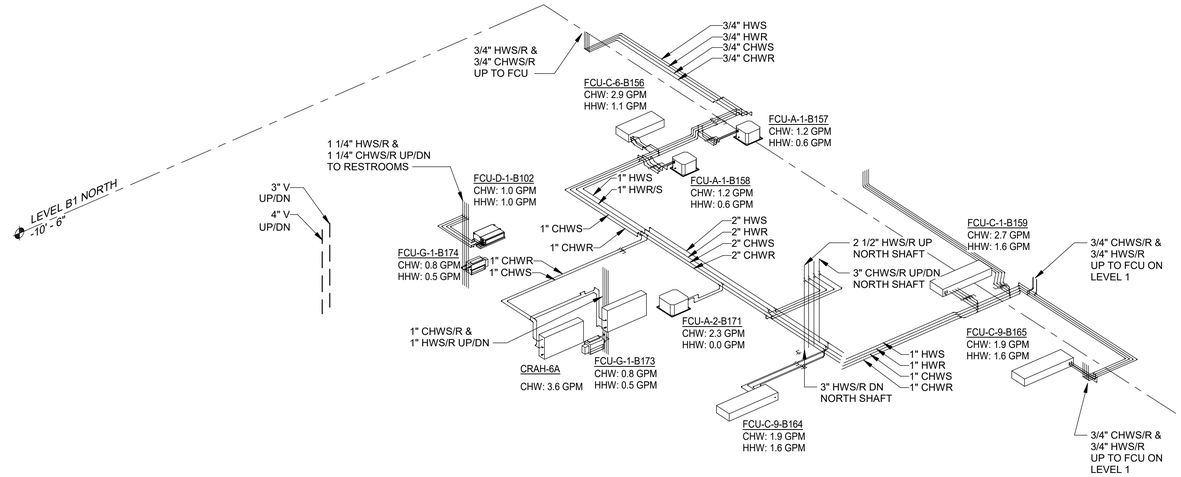
SHEET ID

M-703

REVISED RTA SUBMISSION 03/01/2023



B1 MECHANICAL FLOW DIAGRAM - SOUTH WING - LEVEL B1



A3 MECHANICAL FLOW DIAGRAM - NORTH WING - LEVEL B1

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. VERTICAL PIPE RISERS SIZING IS BASED ON PEAK BLOCK LOAD, HORIZONTAL PIPE MAINS FOR INDIVIDUAL FLOORS ARE BASED ON SUM OF EQUIPMENT COIL GPMs.
3. PIPE SIZES TO INDIVIDUAL TERMINAL UNITS ARE 3/4" UNLESS OTHERWISE NOTED.
4. PROVIDE PIPING ISOLATION VALVES IN ACCESSIBLE LOCATIONS, AS CLOSE TO MAIN RISERS AND BRANCH TAKE-OFFS AS POSSIBLE.
5. LOCATE PIPING IN OR AT CEILING UNLESS OTHERWISE IDICATED.

US Army Corps of Engineers ®

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SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

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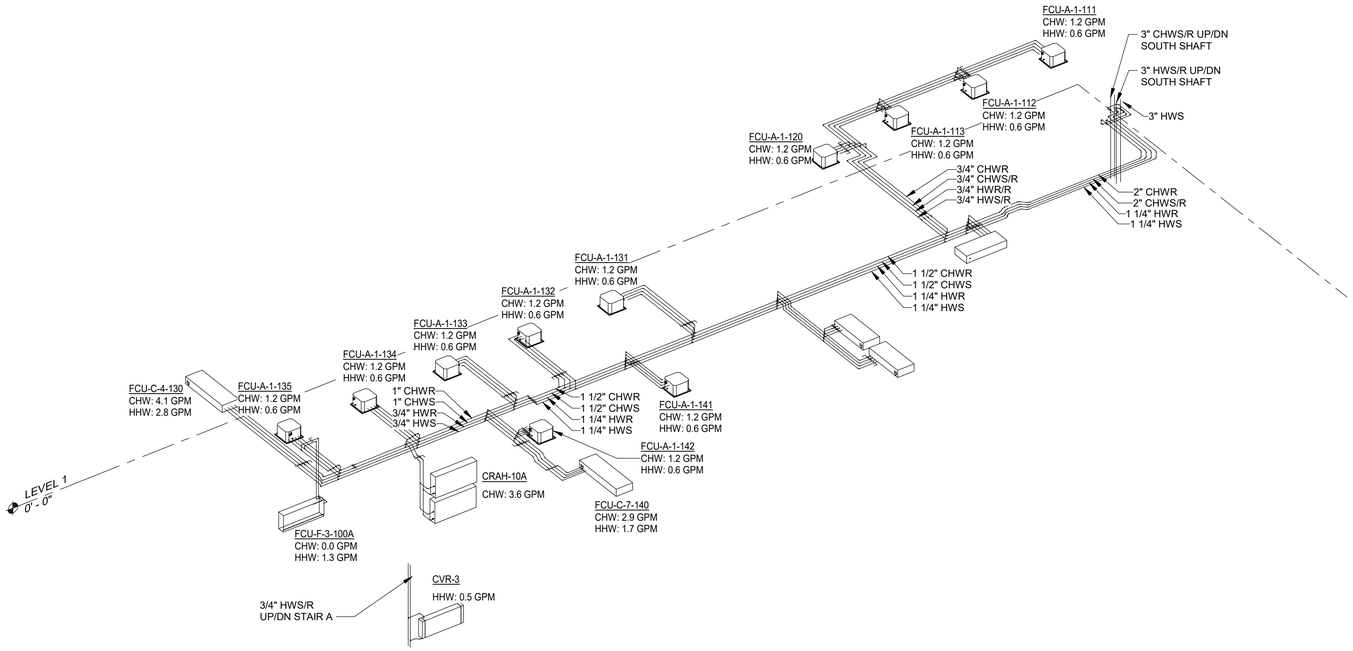
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

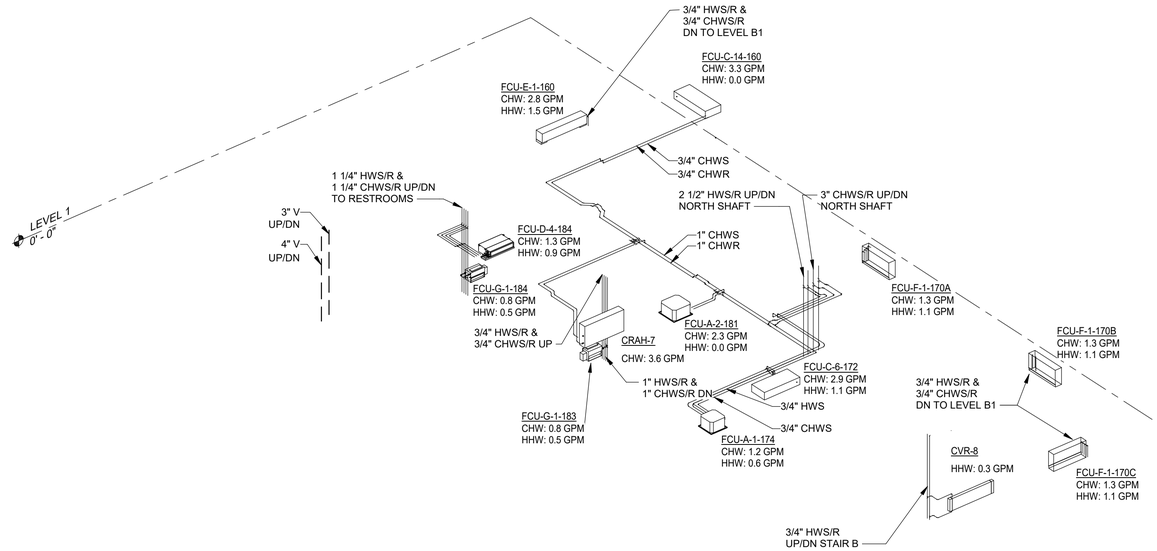
HYDRONIC FLOW DIAGRAM
LEVEL B1

SHEET ID
M-704

REVISED RTA SUBMISSION 03/01/2023



B1 MECHANICAL FLOW DIAGRAM - SOUTH WING - LEVEL 1



A3 MECHANICAL FLOW DIAGRAM - NORTH WING - LEVEL 1

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. VERTICAL PIPE RISERS SIZING IS BASED ON PEAK BLOCK LOAD, HORIZONTAL PIPE MAINS FOR INDIVIDUAL FLOORS ARE BASED ON SUM OF EQUIPMENT COIL GPMs.
3. PIPE SIZES TO INDIVIDUAL TERMINAL UNITS ARE 3/4" UNLESS OTHERWISE NOTED.
4. PROVIDE PIPING ISOLATION VALVES IN ACCESSIBLE LOCATIONS, AS CLOSE TO MAIN RISERS AND BRANCH TAKE-OFFS AS POSSIBLE.
5. LOCATE PIPING IN OR AT CEILING UNLESS OTHERWISE IDICATED.

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SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:

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LINCOLN HALL
WEST POINT, NEW YORK

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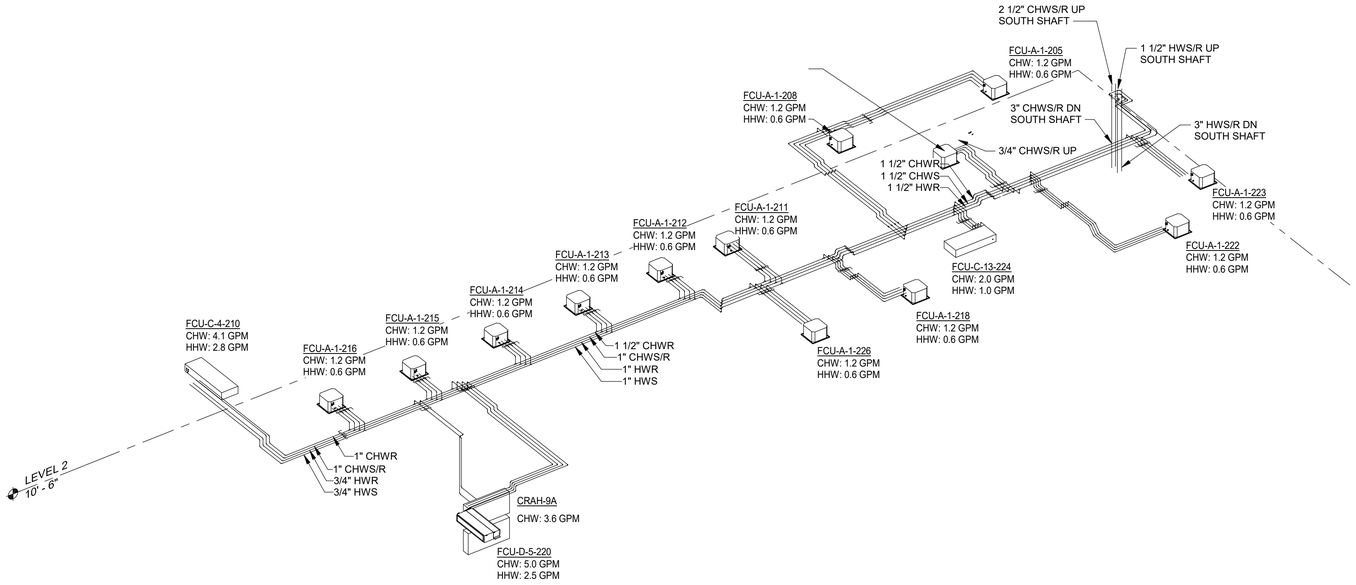
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HYDRONIC FLOW DIAGRAM
LEVEL 1

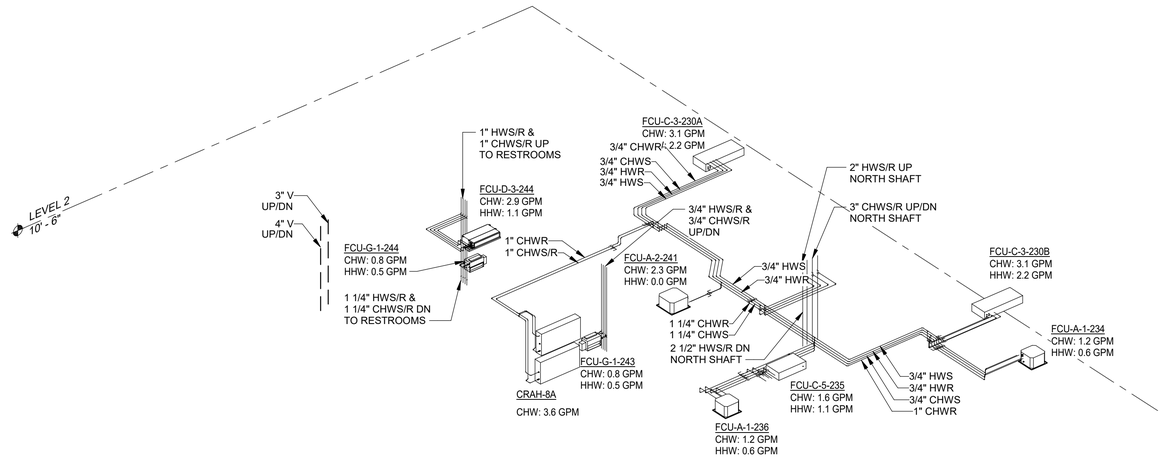
SHEET ID

M-705

REVISED RTA SUBMISSION 03/01/2023



B1 MECHANICAL FLOW DIAGRAM - SOUTH WING - LEVEL 2



A3 MECHANICAL FLOW DIAGRAM - NORTH WING - LEVEL 2

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. VERTICAL PIPE RISERS SIZING IS BASED ON PEAK BLOCK LOAD, HORIZONTAL PIPE MAINS FOR INDIVIDUAL FLOORS ARE BASED ON SUM OF EQUIPMENT COIL GPMs.
3. PIPE SIZES TO INDIVIDUAL TERMINAL UNITS ARE 3/4" UNLESS OTHERWISE NOTED.
4. PROVIDE PIPING ISOLATION VALVES IN ACCESSIBLE LOCATIONS, AS CLOSE TO MAIN RISERS AND BRANCH TAKE-OFFS AS POSSIBLE.
5. LOCATE PIPING IN OR AT CEILING UNLESS OTHERWISE IDICATED.

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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

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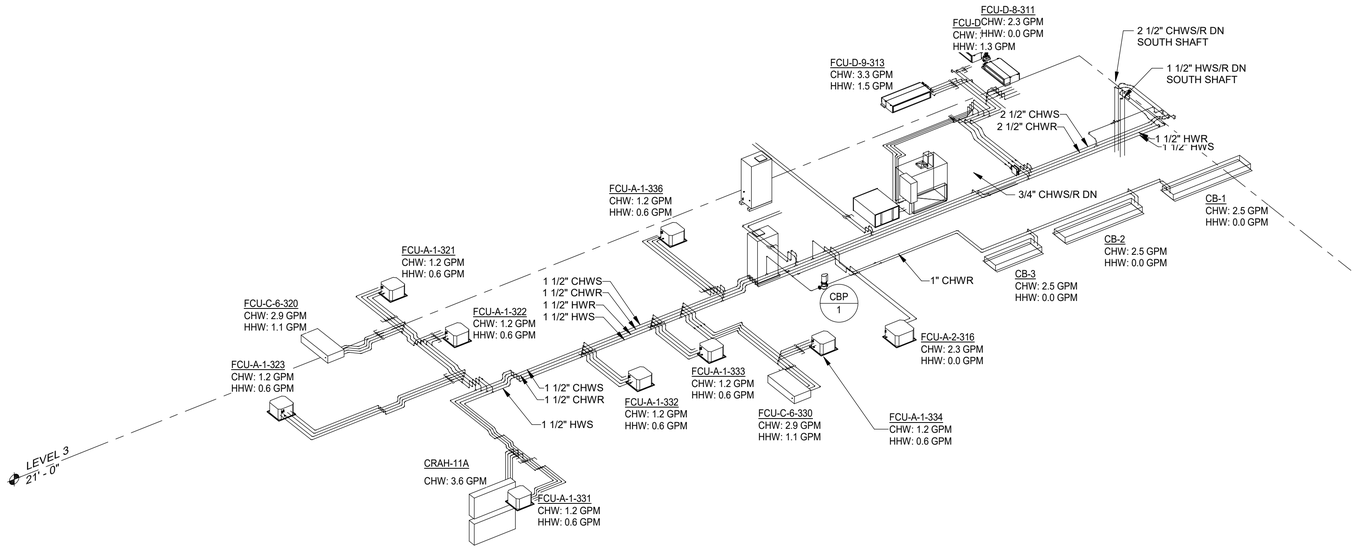
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HYDRONIC FLOW DIAGRAM
LEVEL 2

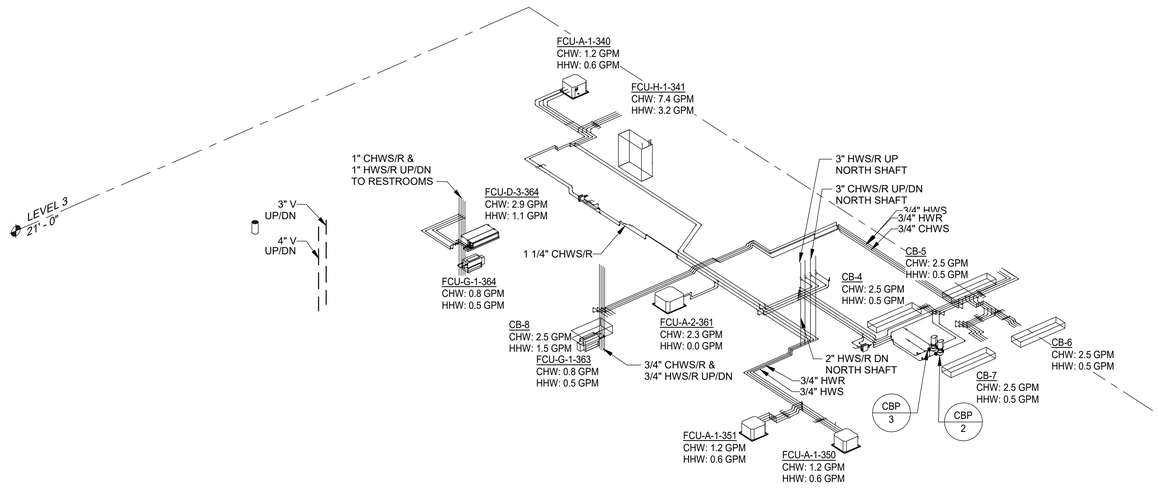
SHEET ID

M-706

REVISED RTA SUBMISSION 03/01/2023



B1 MECHANICAL FLOW DIAGRAM - SOUTH WING - LEVEL 3



A3 MECHANICAL FLOW DIAGRAM - NORTH WING - LEVEL 3

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. VERTICAL PIPE RISERS SIZING IS BASED ON PEAK BLOCK LOAD, HORIZONTAL PIPE MAINS FOR INDIVIDUAL FLOORS ARE BASED ON SUM OF EQUIPMENT COIL GPMs.
3. PIPE SIZES TO INDIVIDUAL TERMINAL UNITS ARE 3/4" UNLESS OTHERWISE NOTED.
4. PROVIDE PIPING ISOLATION VALVES IN ACCESSIBLE LOCATIONS, AS CLOSE TO MAIN RISERS AND BRANCH TAKE-OFFS AS POSSIBLE.
5. LOCATE PIPING IN OR AT CEILING UNLESS OTHERWISE IDICATED.

US Army Corps of Engineers ®

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WEST POINT, NEW YORK

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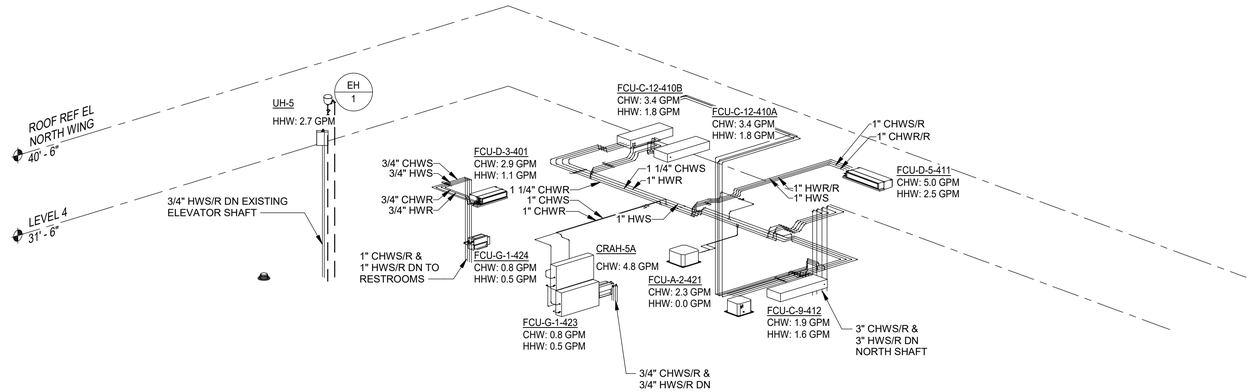
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HYDRONIC FLOW DIAGRAM
LEVEL 3

SHEET ID

M-707

REVISED RTA SUBMISSION 03/01/2023



B3 MECHANICAL FLOW DIAGRAM - NORTH WING - LEVEL 4 AND ROOF

GENERAL NOTES

1. REFER TO M-001 AND M-002 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. VERTICAL PIPE RISERS SIZING IS BASED ON PEAK BLOCK LOAD, HORIZONTAL PIPE MAINS FOR INDIVIDUAL FLOORS ARE BASED ON SUM OF EQUIPMENT COIL GPMs.
3. PIPE SIZES TO INDIVIDUAL TERMINAL UNITS ARE 3/4" UNLESS OTHERWISE NOTED.
4. PROVIDE PIPING ISOLATION VALVES IN ACCESSIBLE LOCATIONS, AS CLOSE TO MAIN RISERS AND BRANCH TAKE-OFFS AS POSSIBLE.
5. LOCATE PIPING IN OR AT CEILING UNLESS OTHERWISE IDICATED.

US Army Corps of Engineers ®

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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

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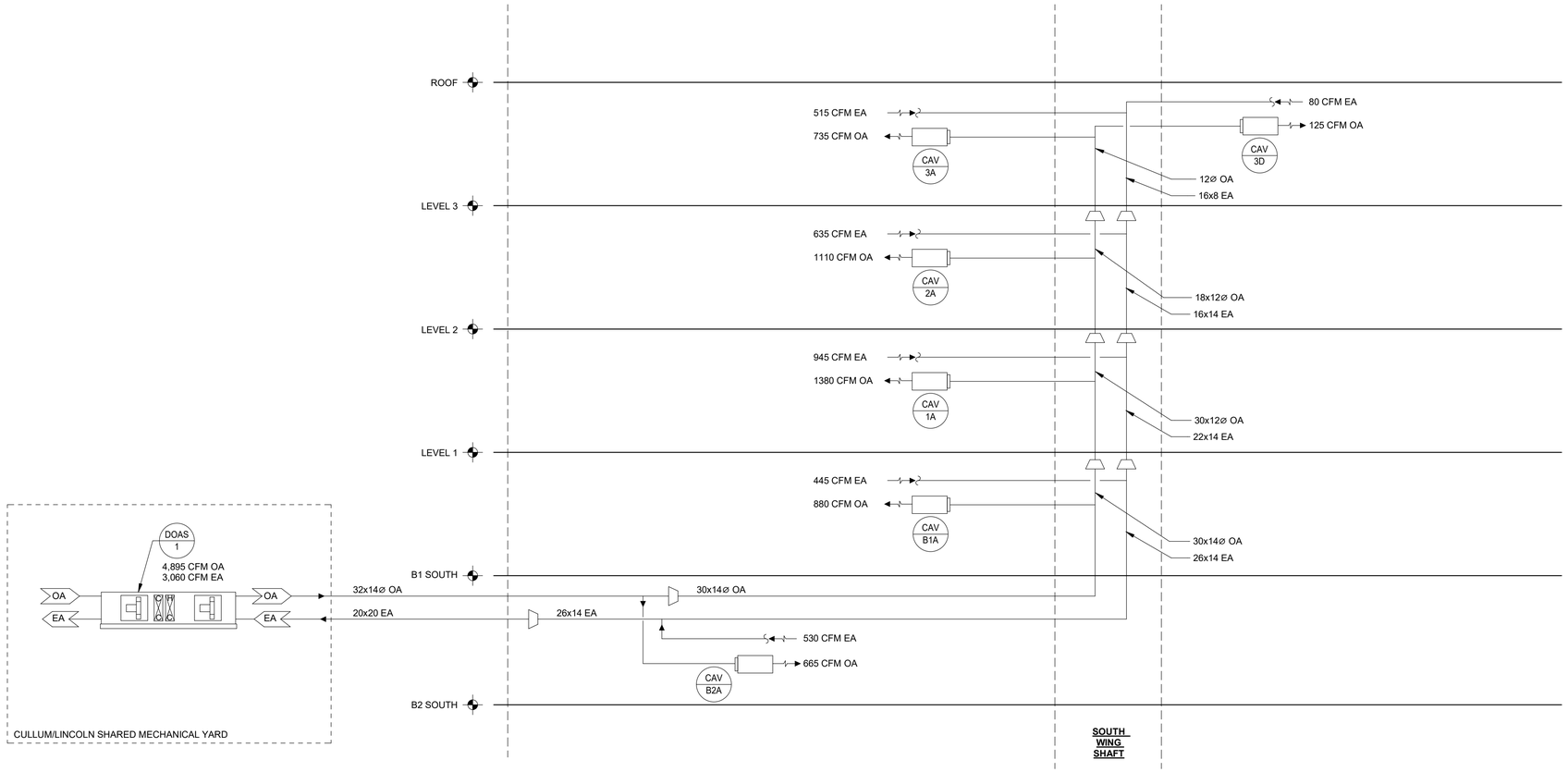
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HYDRONIC FLOW DIAGRAM
LEVEL 4 AND ROOF

SHEET ID

M-708

REVISED RTA SUBMISSION 03/01/2023



B1 AIRFLOW DIAGRAM - DOAS-1

NONE

GENERAL NOTES

1. REFER TO M-001 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. DRAWING IS DIAGRAMMATIC ONLY. REFER TO FLOOR PLANS FOR DUCTWORK ROUTING.

US Army Corps of Engineers ®

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CHECKED BY: D. GORDON
SUBMITTED BY:
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CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
SIZE: ANSI D
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

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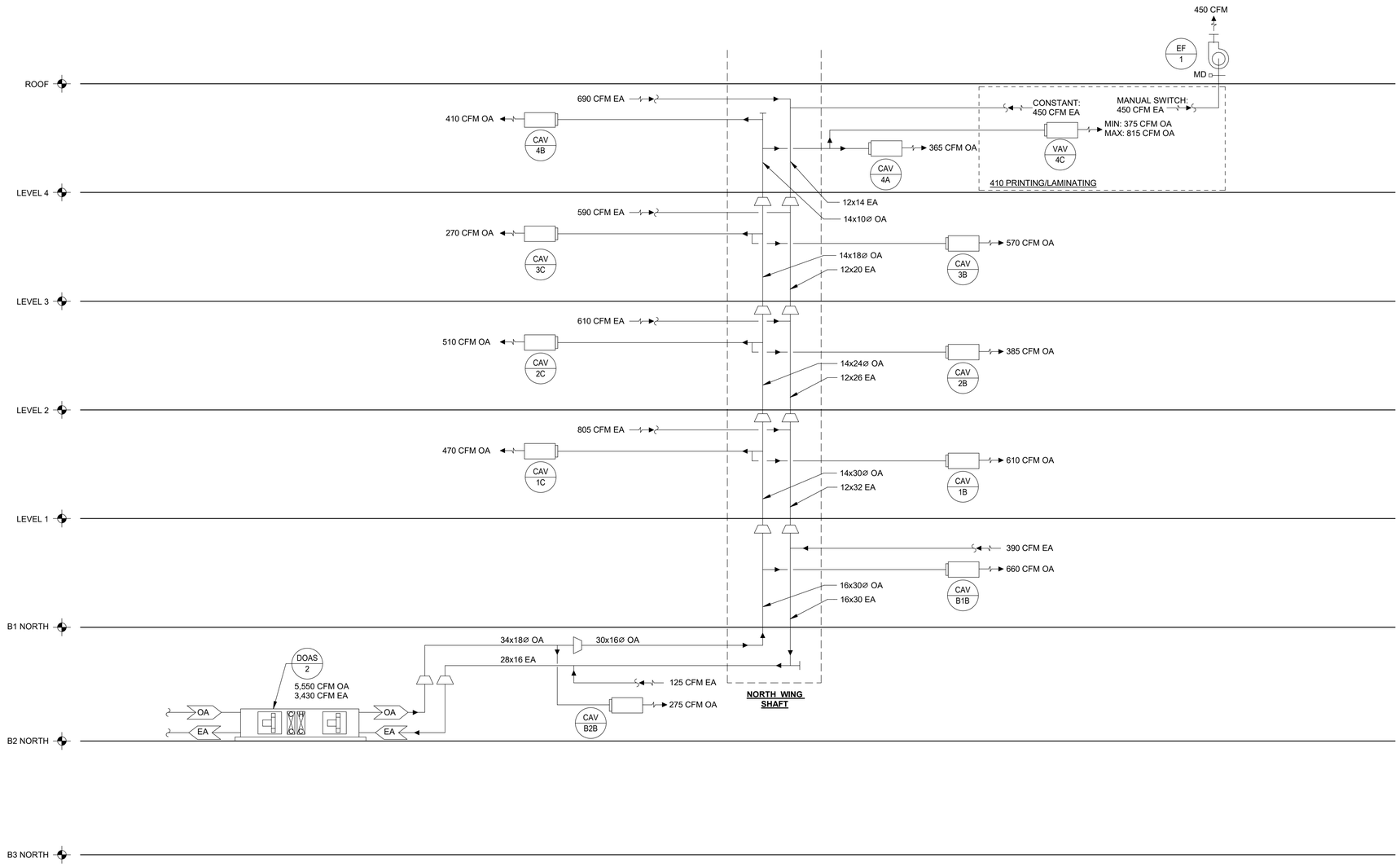
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

AIRFLOW RISER DIAGRAM
DOAS-1

SHEET ID

M-709

REVISED RTA SUBMISSION 03/01/2023



A1 AIRFLOW DIAGRAM - DOAS-2

NONE

GENERAL NOTES

1. REFER TO M-001 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. DRAWING IS DIAGRAMMATIC ONLY. REFER TO FLOOR PLANS FOR DUCTWORK ROUTING.

US Army Corps of Engineers ®

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LINCOLN HALL
WEST POINT, NEW YORK

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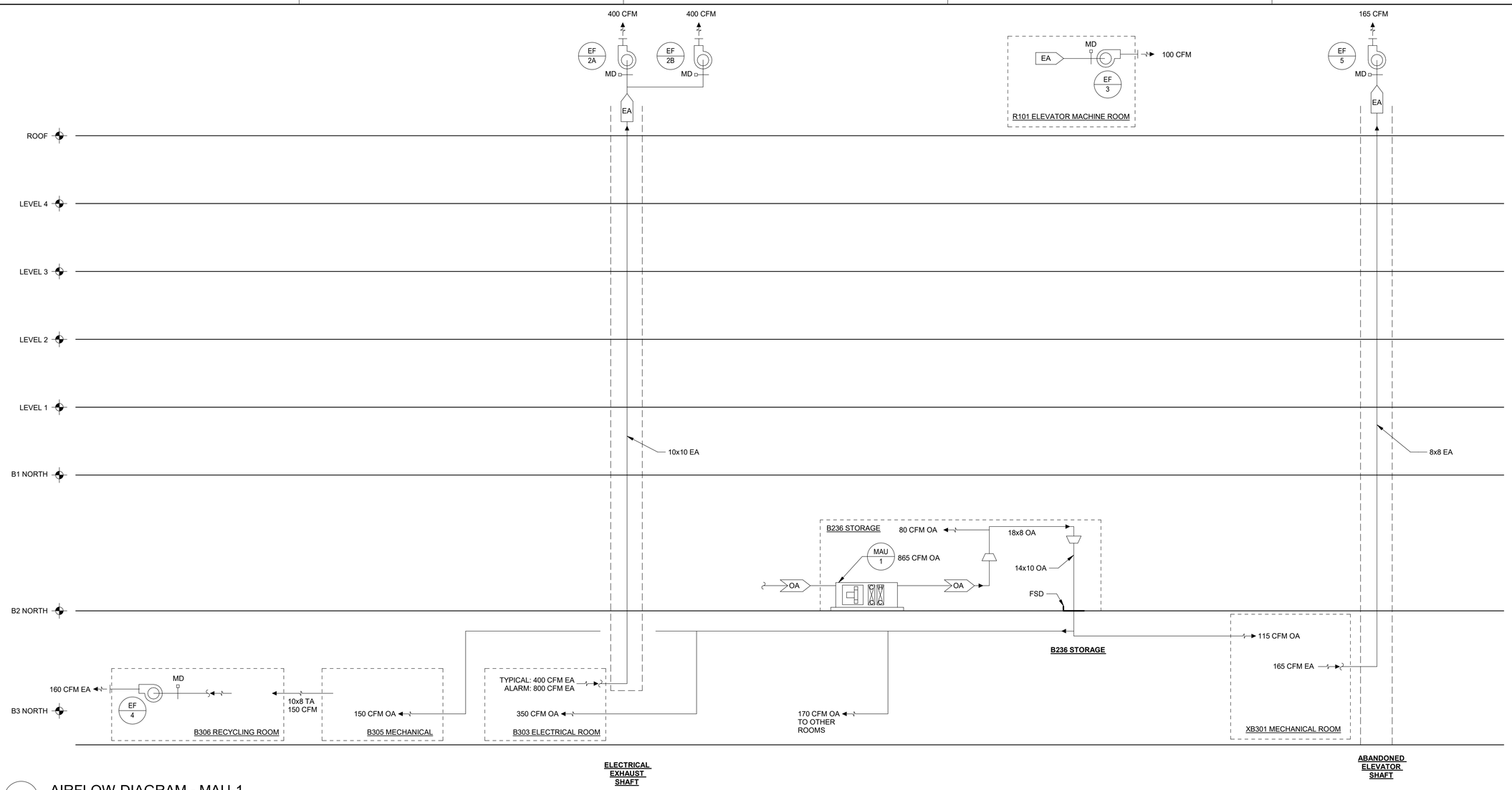
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

AIRFLOW RISER DIAGRAM
DOAS-2

SHEET ID

M-710

REVISED RTA SUBMISSION 03/01/2023



B1 AIRFLOW DIAGRAM - MAU-1

NONE

GENERAL NOTES

1. REFER TO M-001 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND SYMBOLS.
2. DRAWING IS DIAGRAMMATIC ONLY. REFER TO FLOOR PLANS FOR DUCTWORK ROUTING.

US Army Corps of Engineers ®

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N. SLEEM
DRAWN BY:
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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE, A Joint Venture

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

AIRFLOW RISER DIAGRAM
MAU-1

SHEET ID

M-711

REVISED RTA SUBMISSION 03/01/2023

CONTROL SCHEMATIC SYMBOLS

W-X-Y-Z
##

DEVICE SYMBOL, GENERIC
USED TO REPRESENT SENSORS, INSTRUMENTS
SAFETIES, AND OTHER CONTROL DEVICES
W-X-Y-Z (SEE ABBREVIATIONS AND ACRONYMS)
GENERIC USAGE TO SHOW LOCATION OF DEVICE,
PROCESS OR DEVICE BEING MEASURED OR
CONTROLLED, MODIFIERS AND OTHER APPLICATION
INFORMATION

W-X-Y-Z
##
W-X-Y-Z

DEVICE SYMBOL, GENERIC
MULTIPLE OUTPUT DEVICE WHERE AT LEAST 1 OUTPUT
IS ALWAYS SAFETY INTERLOCK

DDC
##
DIR
REV

DEVICE SYMBOL, CONTROLLER
DDC : DIRECT DIGITAL CONTROL
: DEVICE NUMBER
DIR : DIRECT CONTROL ACTION, OR
REV : REVERSE CONTROL ACTION
W-X-Y-Z : (SEE ABBREVIATIONS AND ACRONYMS)
GENERIC USAGE TO SHOW LOCATION OF DEVICE,
PROCESS OR DEVICE BEING MEASURED OR
CONTROLLED, SIGNAL TYPE, MODIFIERS AND
OTHER APPLICATION INFORMATION

ACTUATOR, ELECTRIC

AFMA

AIR FLOW MEASUREMENT ARRAY,
WITH FLOW TRANSMITTER
SEE "DEVICE SYMBOL, GENERIC"

BOILER

CHILLER

Heat Exchanger

C
COIL, COOLING

DX
COIL, COOLING, DIRECT-EXPANSION

EH
COIL, ELECTRIC HEATING

H
COIL, HEATING

PC
COIL, PRECOOL

PH
COIL, PREHEAT

CONTACT, PRESSURE, HIGH LIMIT (HL)
SHOWN IN ACTIVATED POSITION
OPEN WHEN PRESSURE IS ABOVE SETPOINT
CLOSE WHEN PRESSURE IS BELOW SETPOINT

CONTACT, PRESSURE, HIGH LIMIT (HL)
SHOWN IN UNACTIVATED POSITION
OPEN WHEN PRESSURE IS ABOVE SETPOINT
CLOSE WHEN PRESSURE IS BELOW SETPOINT

CONTACT, PRESSURE, LOW LIMIT (LL)
SHOWN IN ACTIVATED POSITION
OPEN WHEN PRESSURE IS BELOW SETPOINT
CLOSE WHEN PRESSURE IS ABOVE SETPOINT

CONTACT, PRESSURE, LOW LIMIT (LL)
SHOWN IN UNACTIVATED POSITION
OPEN WHEN PRESSURE IS BELOW SETPOINT
CLOSED WHEN PRESSURE IS ABOVE SETPOINT

CONTACT, TEMPERATURE, HIGH LIMIT (HL)
SHOWN IN ACTIVATED POSITION
OPEN WHEN TEMPERATURE IS ABOVE SETPOINT
CLOSE WHEN TEMPERATURE IS BELOW SETPOINT

CONTACT, TEMPERATURE, HIGH LIMIT (HL)
SHOWN IN UNACTIVATED POSITION
OPEN WHEN TEMPERATURE IS ABOVE SETPOINT
CLOSE WHEN TEMPERATURE IS BELOW SETPOINT

CONTACT, TEMPERATURE, LOW LIMIT (LL)
SHOWN IN ACTIVATED POSITION
OPEN WHEN TEMPERATURE IS BELOW SETPOINT
CLOSE WHEN TEMPERATURE IS ABOVE SETPOINT

CONTACT, TEMPERATURE, LOW LIMIT (LL)
SHOWN IN UNACTIVATED POSITION
OPEN WHEN TEMPERATURE IS BELOW SETPOINT
CLOSE WHEN TEMPERATURE IS ABOVE SETPOINT

CONTROL SIGNAL LINE, LOW VOLTAGE

CURRENT SENSOR / SWITCH

DAMPER, BALANCING

D-# #
DAMPER, PARALLEL BLADE
NORMALLY OPEN OR CLOSED AS SHOWN
= DAMPER NUMBER AS SHOWN
IN DAMPER SCHEDULE

D-# #
DAMPER, OPPOSED BLADE
NORMALLY OPEN OR CLOSED AS SHOWN
= DAMPER NUMBER AS SHOWN
IN DAMPER SCHEDULE

DISCONNECT SWITCH

M#
MOTOR

MS#
MOTOR STARTER

Rxx
RELAY COIL
XX = SEQUENTIAL RELAY
(SOLENOID) NUMBER

Rxx-YY
REAL COIL CONTACT
NORMALLY OPEN
XX = RELAY COIL NUMBER
YY = CONTACT NUMBER

Rxx-YY
REAL COIL CONTACT
NORMALLY OPEN
XX = RELAY COIL NUMBER
YY = CONTACT NUMBER

FAN

FILTER

LDP
# #
LOCAL DISPLAY PANEL
= SEQUENTIAL NUMBER
(WHEN MORE THAN 1 LDP)

P
PRESSURE GAGE

FM-#
FLOW METER

P
PRESSURE WITCH, DIFFERENTIAL, WITH GAGE
H = HIGH PRESSURE TAP
L = LOW PRESSURE TAP
SEE "DEVICE SYMBOL, GENERIC"

PUMP

RADIATOR

RST-BUT
RESET BUTTON FOR SAFETY RESET

SMOKE DETECTOR, DUCT-MOUNTED
SEE "DEVICE SYMBOL, GENERIC"

SWITCH, MANUAL

T
TEMPERATURE GAGE

TEMPERATURE SENSOR, AVERAGE
or TEMPERATURE LOW LIMIT / FREEZESTAT
SEE "DEVICE SYMBOL, GENERIC"

TEMPERATURE SENSOR, POINT
SEE "DEVICE SYMBOL, GENERIC"

STAT
THERMOSTAT WITH SPECIFIED I/O FUNCTIONS

THERMOWELL IN PIPE

VALVE, BALANCING

V-# #
NC
VALVE, NORMALLY CLOSED
WITH SPRING RETURN FAILSAFE
= VALVE NUMBER A SHOWN
IN VALVE SCHEDULE

V-# #
NO
VALVE, NORMALLY OPEN
WITH SPRING RETURN FAILSAFE
= VALVE NUMBER A SHOWN
IN VALVE SCHEDULE

V-# #
COM NO
VALVE, 3-WAY DIVERTING WITH
SPRING RETURN FAILSAFE
NO = NORMALLY OPEN
NC = NORMALLY CLOSED
COM = COMMON PORT
# # = VALVE NUMBER AS SHOWN
IN VALVE SCHEDULE

V-# #
NO COM
VALVE, 3-WAY MIXING WITH
SPRING RETURN FAILSAFE
NO = NORMALLY OPEN
NC = NORMALLY CLOSED
COM = COMMON PORT
# # = VALVE NUMBER AS SHOWN
IN VALVE SCHEDULE

VFD
XX-C XX-SS XX-S
VARIABLE FREQUENCY DRIVE
XX = PROCESS/DEVICE BEING CONTROLLED

SS = START/STOP COMMAND
S = STATUS FEEDBACK (ON/OFF)
C = 4 - 20 mA, VDC

ABBREVIATIONS AND ACRONYMS

2P	TWO - POSITION (CONTROL)
ADJ	ADJUSTABLE
AFMA	AIR FLOW MEASUREMENT ARRAY
AFS	AIR FLOW SWITCH
AI	ANALOG INPUT
ALM	ALARM
AO	ANALOG OUTPUT
B	BOILER
BAS	BUILDING AUTOMATION SYSTEM
BI	BINARY INPUT
BO	BINARY OUTPUT
BYP	BYPASS
C	COMMAND (MODULATING CONTROL SIGNAL)
CH	CHILLER
CLG	COOLING
CO	CARBON MONOXIDE
CO2	CARBON DIOXIDE
CDWR	CONDENSATE WATER RETURN
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CHW	CHILLED WATER
COMM	COMMUNICATION
CS	CURRENT SENSOR/SWITCH
D	DAMPER
DA	DISCHARGE AIR
DDC	DIRECT DIGITAL CONTROL(LER)
DDCP	DIRECT DIGITAL CONTROL PANEL
DIFF	DIFFERENCE
DPS	DIFFERENTIAL PRESSURE SENSOR/SWITCH
DX	DIRECT EXPANSION (UNIT)
EA	EXHAUST AIR
ECM	ELECTRONICALLY COMMUTATED MOTOR
ECON	ECONOMIZER
EF	EXHAUST FAN
EM	ELECTRIC METER
EMCS	ENERGY MONITORING AND CONTROL SYSTEM
ENA	ENABLE
ENT	ENTERING
ERW	ENERGY RECOVERY WHEEL
F	FLOW
FAP	FIRE ALARM PANEL
FLT	FILTER
FM	FLOW METER
FS	FLOW SWITCH
FZ	FREEZE STAT
GM	GAS METER
H	HIGH
HL	HIGH LIMIT
HS	HUMIDITY SENSOR
HT	HEAT TRACE
HTG	HEATING
HUM	HUMIDIFIER
HW	HOT WATER
HHWR	HEATING HOT WATER RETURN
HHWS	HEATING HOT WATER SUPPLY
HOA	HAND-OFF-AUTO
HX	HEAT EXCHANGER
I	CURRENT
JACE	JAVA APPLICATION CONTROL ENGINE
LD	LEAK DETECTOR
LDP	LOCAL DISPLAY PANEL
LAN	LOCAL AREA NETWORK
LON	LONWORKS
LL	LOW LIMIT
M	MOTOR or MAIN
M&C	MONITORING & CONTROL (SOFTWARE)
MA	MIXED AIR
MS	MOTOR STARTER
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NSW	NETWORK SWITCH
OA	OUTSIDE AIR
OCC	OCCUPIED
OUT	OUTPUT
OWS	OPERATOR WORKSTATION
P	PRESSURE
PC	PRE-COOLING
PCW	PRIMARY CHILLER WATER
PCWR	PRIMARY CHILLER WATER RETURN
PCWS	PRIMARY CHILLER WATER SUPPLY
PH	PREHEAT
PMP	PUMP
POS	POSITION
RA	RETURN AIR
RF	RETURN FAN
RH	RELATIVE HUMIDITY
RM	ROOM
S	STATUS
SA	SUPPLY AIR
SF	SUPPLY FAN
SMK	SMOKE
SP	SETPOINT
SS	START/STOP COMMAND
STAT	THERMOSTAT
STM	STEAM
SW	SWITCH
SYS	SYSTEM
T	TEMPERATURE
TS	TEMPERATURE SENSOR
VAV	VARIABLE AIR VOLUME
VFD	VARIABLE FREQUENCY DRIVE
WM	WATER METER
ZN	ZONE

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-18-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

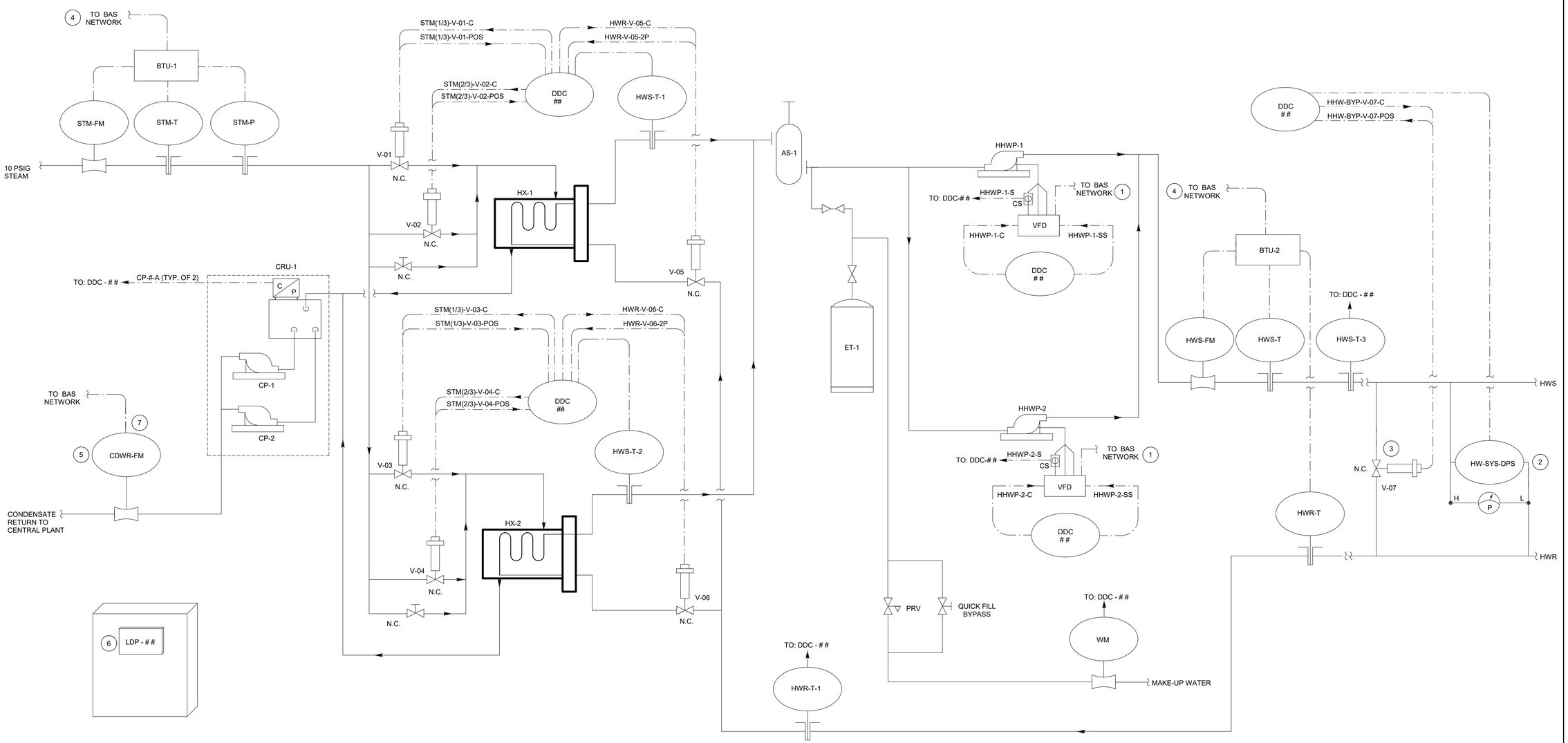
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

CONTROL SCHEMATIC SYMBOLS,
ABBREVIATIONS AND ACRONYMS

SHEET ID

M-801

REVISED RTA SUBMISSION 03/01/2023



B1 HEATING HOT WATER SYSTEM - CONTROL DIAGRAM

NTS

GENERAL NOTES

1. REFER TO M-001 AND M-801 FOR LEGEND AND GENERAL NOTES.
2. REFER TO SHEET M-803 FOR HEATING HOT WATER SYSTEM SEQUENCE OF OPERATION.
3. REFER TO M-824 AND M-825 FOR HEATING HOT WATER SYSTEM POINTS SCHEDULE.

KEYNOTES

1 CONNECT VFD LONWORKS COMMUNICATION INTERFACE TO BAS LONWORKS NETWORK. PROVIDE VFD MONITORING POINTS INDICATED IN THE POINTS SCHEDULE TO THE BAS THROUGH THE COMMUNICATION INTERFACE.

2 PROVIDE DIFFERENTIAL PRESSURE TRANSMITTER FOR HOT WATER PUMP SPEED CONTROL. SEE SHEET MP-107 FOR DIFFERENTIAL PRESSURE TRANSMITTER LOCATION

3 PROVIDE TWO-WAY CONTROL VALVE ACTUATED BY MODULATING ELECTRIC ACTUATOR FOR HOT WATER BYPASS. SEE MP-107 FOR HOT WATER BYPASS VALVE LOCATION.

4 CONNECT BTU METER LONWORKS COMMUNICATION INTERFACE TO BAS LONWORKS NETWORK. PROVIDE BTU METER MONITORING POINTS INDICATED IN THE POINTS SCHEDULE TO THE BAS THROUGH THE COMMUNICATION INTERFACE.

5 PROVIDE FLOW METER WITH INTEGRAL TEMPERATURE SENSOR.

6 LOCAL DISPLAY PANEL (LDP) LOCATED ON HW BAS PANEL.

7 PROVIDE COMMUNICATION WIRING AND CONNECT FLOW METER INTERFACE TO BAS. PROVIDE FLOW METER MONITORING POINTS INDICATED IN THE POINTS SCHEDULE.

US Army Corps of Engineers ®

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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
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BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL DIAGRAM

SHEET ID

M-802

REVISED RTA SUBMISSION 03/01/2023

HEATING HOT WATER SYSTEM SEQUENCES OF OPERATION

1. GENERAL:
   - A. THE CENTRAL UTILITY PLANT DELIVERS 160 PSIG STEAM TO THE BASEMENT OF CULLUM HALL. A PRESSURE REDUCING VALVE STATION REDUCES THE HIGH PRESSURE TO 10 PSIG LOW PRESSURE. CONDENSATE MUST BE RETURNED BACK TO THE CENTRAL UTILITY PLANT BY AN ELECTRICAL DUPLEX CONDENSATE RETURN UNIT.
   - B. THE CONDENSATE RETURN UNIT MUST BE MANUALLY INDEXED TO THE AUTOMATIC MODE VIA HAND-OFF-AUTO (HOA) SWITCH ON ITS CONTROL PANEL.
   - C. EACH HEATING HOT WATER PUMP MUST BE MANUALLY INDEXED TO HAND MODE OR AUTO MODE VIA HAND-OFF-AUTO (HOA) SETTINGS ON ASSOCIATED VARIABLE FREQUENCY DRIVE'S KEYPAD.
   - D. THE TWO (2) HEAT EXCHANGERS MUST WORK IN A DUTY/STANDBY ARRANGEMENT. THE BAS MUST ALTERNATE DUTY AND STANDBY HEAT EXCHANGERS MONTHLY.
2. SAFETIES:
   - A. THE BAS MUST MONITOR THE LOW PRESSURE STEAM TO THE HEAT EXCHANGERS THROUGH BTU-1 AND ALLOW THE SYSTEM TO OPERATE ONLY WHEN STEAM IS AVAILABLE IN THE BUILDING.
   - B. THE BAS MUST MONITOR THE HOT WATER PUMPS THROUGH THE LON INTERFACE TO THE ASSOCIATED VARIABLE FREQUENCY DRIVE (VFD) AND MUST PREVENT THE HEAT EXCHANGER STEAM CONTROL VALVES FROM OPENING UNLESS A MINIMUM OF ONE HOT WATER PUMP IS OPERATING.
   - C. IF LEAD PUMP FAILS TO START, AFTER A 3 MINUTE TIME DELAY (ADJUSTABLE), THE LEAD PUMP MUST BE DISABLED, LOCKED OUT OF OPERATION, THE STANDBY PUMP MUST BE STARTED AND AN ALARM MUST BE SENT TO THE BASE-WIDE BAS.
   - D. MODULATING CONTROL VALVES:
     - a. HX-1 STEAM VALVES V-1 & V-2 WILL NOT MODULATE UNLESS HX-1 ISOLATION VALVE V-5 IS OPEN AND A HW PUMP IS RUNNING.
     - b. HX-2 STEAM VALVES V-4 & V-5 WILL NOT MODULATE UNLESS HX-2 ISOLATION VALVE V-6 IS OPEN AND A HW PUMP IS RUNNING.
3. HEATING HOT WATER SYSTEM ENABLE MODE:
   - A. HEATING HOT WATER SYSTEM MUST BE ENABLED BY ONE OF THE FOLLOWING CONDITIONS:
     - a. MANUALLY INDEXED AT THE BAS OPERATOR INTERFACE.
     - b. THERE IS AT LEAST ONE (1) REQUEST FOR HEATING FOR A PERIOD OF FOUR (4) HOURS (ADJ.) FROM ANY EQUIPMENT SUPPLIED WITH HOT WATER.
   - B. WHEN THE HEATING HOT WATER SYSTEM IS ENABLED BY THE BAS, THE FOLLOWING MUST OCCUR:
     - a. HEATING WATER ISOLATION VALVE OF THE DUTY HEAT EXCHANGER MUST OPEN.
     - b. ONCE THE DUTY HEAT EXCHANGER'S ISOLATION VALVE HAS BEEN PROVEN FULLY OPEN, THE BAS MUST ENABLE THE LEAD HEATING HOT WATER PUMP AND CONTROL THE PUMP AS DESCRIBED IN THE "HEATING HOT WATER PUMP CONTROL".
     - c. THE 1/3 AND 2/3 STEAM CONTROL VALVES SERVING THE DUTY HEAT EXCHANGER MUST MODULATE TO MAINTAIN THE COMMON HEATING WATER SUPPLY TEMPERATURE SET POINT AS FOLLOWS:
       - WHEN THE SUPPLY TEMPERATURE IS BELOW SET POINT THE 1/3 VALVE MUST OPEN FIRST AND MUST MODULATE TO 90% OPEN.
       - WHEN THE 1/3 VALVE IS 90% OR MORE OPEN AND THE SUPPLY TEMPERATURE REMAINS BELOW SET POINT FOR 10 MINUTES (ADJ.), THE 2/3 VALVE MUST MODULATE OPEN 50% AND THE 1/3 VALVE MUST CLOSE.
       - WHEN THE 2/3 VALVE IS 90% OR MORE OPEN AND THE SUPPLY TEMPERATURE REMAINS BELOW SET POINT FOR 10 MINUTES (ADJ.), THE 1/3 VALVE MUST MODULATE OPEN. THE 2/3 VALVE MUST REMAIN FULL OPEN.
       - WHEN SUPPLY TEMPERATURE IS ABOVE SET POINT AND THE VALVES BEGIN TO CLOSE, THE 1/3 VALVE MUST MODULATE CLOSED FIRST.
       - WHEN THE 1/3 VALVE IS CLOSED AND THE SUPPLY TEMPERATURE REMAINS ABOVE SET POINT FOR 10 MINUTES (ADJ.), THE 2/3 VALVE MUST BEGIN TO MODULATE CLOSED.
       - WHEN THE 2/3 VALVE IS 60% CLOSED AND SUPPLY TEMPERATURE REMAINS ABOVE SET POINT FOR 10 MINUTES (ADJ.), THE 1/3 VALVE MUST OPEN TO 100% AND THE 2/3 VALVE MUST CLOSE.
     - d. IF THE 1/3 AND 2/3 STEAM CONTROL VALVES FOR THE DUTY HEAT EXCHANGER ARE BOTH 100% OPEN AND THE HEATING HOT WATER SUPPLY TEMPERATURE IS BELOW THE SET POINT, AN ALARM WILL BE ANNUNCIATED AT THE BAS.
     - e. IF THE HEATING HOT WATER SUPPLY TEMPERATURE EXCEEDS THE HEATING HOT WATER TEMPERATURE SETPOINT BY 10°F (ADJ), AN ALARM MUST BE ANNUNCIATED AT THE BAS.
     - f. IF THE HEATING WATER SUPPLY TEMPERATURE EXCEEDS THE HEATING WATER TEMPERATURE SETPOINT BY 20°F (ADJUSTABLE), A HIGH LIMIT ALARM MUST BE ANNUNCIATED AT THE BAS AND THE DUTY HEAT EXCHANGER STEAM MUST BE COMMANDED CLOSED AND THE HEAT EXCHANGER MUST BE LOCKED OUT OF DUTY / STANDBY ROTATION UNTIL THE ALARM IS MANUALLY CLEARED THROUGH THE BAS.
     - g. WHEN A DUTY HEAT EXCHANGER IS LOCKED OUT OF OPERATION DUE TO AN ALARM, THE STANDBY HEAT EXCHANGER MUST BE AUTOMATICALLY ASSIGNED AS THE DUTY HEAT EXCHANGER.
     - h. WHEN THERE IS NO COMMAND FOR HEATING, ALL STEAM VALVES MUST CLOSE.
4. HEATING HOT WATER SUPPLY TEMPERATURE RESET CONTROL: THE BAS MUST RESET HEATING HOT WATER SUPPLY TEMPERATURE BASED ON THE OUTSIDE AIR TEMPERATURE ACCORDING TO THE FOLLOWING SCHEDULE:

OUTSIDE AIR TEMPERATURE	HEATING HOT WATER SUPPLY TEMPERATURE
50 F AND BELOW	140 DEG F
70 F AND ABOVE	120 DEG F

5. HEAT EXCHANGER LEAD/STAND-BY CONTROL:
   - A. THE SYSTEM HAS TWO HEAT EXCHANGERS THAT MUST OPERATE IN A LEAD/STANDBY CONFIGURATION.
   - B. THE HEAT EXCHANGERS MUST ALTERNATE IN A LEAD/STANDBY CONFIGURATION EVERY 720 HOURS (ADJUSTABLE). THE RUNTIME MUST BE BASED ON THE ACTUAL "ON TIME" OF THE LEAD HEAT EXCHANGER.
   - C. WHEN LEAD HEAT EXCHANGER IS IN OPERATION AND THE HEAT EXCHANGER SUPPLY TEMPERATURE IS 20°F (ADJUSTABLE) BELOW THE ACTIVE SET-POINT FOR 10 MINUTES (ADJUSTABLE) THE STANDBY HEAT EXCHANGER MUST BE ENABLED. AFTER THE STANDBY HEAT EXCHANGER IS IN OPERATION, THE LEAD HEAT EXCHANGER MUST BE DISABLED.
   - D. A MANUAL OVERRIDE MUST BE PROGRAMMED TO MANUALLY CHANGE THE LEAD/STANDBY HEAT EXCHANGER CONFIGURATION.
6. STEAM PRESSURE MONITORING:
   - A. IF THE STEAM PRESSURE DROPS BELOW 8 PSI (ADJUSTABLE) FOR A TIME PERIOD OF 5 MINUTES (ADJUSTABLE) A WARNING ALARM MUST BE SENT TO THE BASE-WIDE BAS.
   - B. IF THE STEAM PRESSURE DROPS BELOW 5 PSI (ADJUSTABLE) FOR A TOTAL TIME PERIOD OF 15 MINUTES THE HEAT EXCHANGER STEAM VALVES (V-1, V-2, V-4 & V-5) MUST BE INDEXED TO CLOSE AND AN ALARM MUST BE SENT TO THE BASE-WIDE BAS. THE HEAT EXCHANGER ISOLATION VALVE (V-3 OR V-6) MUST STAY OPEN AND THE HW PUMPS MUST CONTINUE TO OPERATE AND CIRCULATE WATER FOR 30 MINUTES (ADJUSTABLE).
   - C. IF THE STEAM PRESSURE SYSTEM IS IN ALARM AND THE HEAT EXCHANGER STEAM CONTROL VALVES ARE CLOSED AFTER AN ADDITIONAL 30 MINUTE TIME DELAY (ADJUSTABLE) THE HW PUMPS MUST BE SHUT DOWN AND THEN ISOLATION VALVES MUST CLOSE.
   - D. ONCE STEAM PRESSURE HAS BEEN RESTORED AFTER A FAILURE THE SYSTEM MUST AUTOMATICALLY RESET AND OPERATE UNDER BAS CONTROL.
7. HEATING HOT WATER SYSTEM DISABLE MODE:
   - A. HEATING HOT WATER SYSTEM MUST BE DISABLED BY ONE OF THE FOLLOWING CONDITIONS:
     - a. MANUALLY DISABLED AT THE BAS OPERATOR INTERFACE.
     - b. THERE IS NO REQUEST FOR HEATING FOR A PERIOD OF FOUR (4) HOURS (ADJ.) FROM ANY EQUIPMENT SUPPLIED WITH HOT WATER.
   - B. WHEN THE HEATING HOT WATER SYSTEM IS DISABLED BY THE BAS, THE FOLLOWING MUST OCCUR:
     - a. THE BAS MUST CLOSE THE STEAM VALVE ASSOCIATED WITH DUTY HEAT EXCHANGER.
     - b. AFTER A USER-DEFINED TIME DELAY, INITIALLY SET AT 120 SECONDS (ADJUSTABLE), THE BAS MUST SEND A STOP SIGNAL TO THE LEAD HEATING HOT WATER PUMP AND THE PUMP MUST STOP.
     - c. WHEN THE LEAD HEATING HOT WATER PUMP HAS BEEN PROVEN OFF FOR MORE THAN 60 SECONDS (ADJUSTABLE), THE DUTY HEAT EXCHANGER'S ISOLATION VALVE MUST CLOSE.
8. HEATING HOT WATER PUMPING
   - A. GENERAL: ALL HEATING HOT WATER PUMPS EMPLOY VARIABLE SPEED DRIVES CONTROLLED BY THE BAS. THE HEATING HOT WATER PUMPS CAN BE OPERATED WITH ANY HEAT EXCHANGER. ONE HEATING HOT WATER PUMP MUST BE DESIGNATED AS THE LEAD PUMP; THE OTHER HEATING HOT WATER PUMP MUST BE DESIGNATED AS THE STANDBY PUMP, WHICH MUST BE ENABLED AUTOMATICALLY IN THE EVENT OF FAILURE OF ENABLED HEATING HOT WATER PUMP.
   - B. HEATING HOT WATER PUMP HAND-OFF-AUTO OPERATION: HAND-OFF-AUTO (HOA) SETTINGS MUST BE PROVIDED AS PART OF THE VARIABLE FREQUENCY DRIVE THROUGH THE DRIVE'S KEYPAD. IN THE OFF MODE, THE PUMP MUST BE STOPPED. IN THE HAND MODE, THE PUMP MUST RUN CONTINUOUSLY. IN THE AUTO MODE, THE PUMP MUST BE STARTED AND STOPPED BY THE BAS.
   - C. HEATING HOT WATER PUMP LOCAL-REMOTE SPEED CONTROL: LOCAL-REMOTE SETTINGS MUST BE PROVIDED AS PART OF EACH VARIABLE FREQUENCY DRIVE THROUGH THE DRIVE'S KEYPAD. IN THE LOCAL MODE, THE PUMP'S SPEED MUST BE CONTROLLED THROUGH A MANUAL SPEED CONTROL LOCATED AT THE RESPECTIVE DRIVE CONTROL PANEL. THE BAS MUST INDICATE EACH PUMP THAT IS IN LOCAL CONTROL MODE BY ADDING "MANUAL" TO THE GRAPHIC FOR THAT PUMP AND CHANGE THE COLOR OF THE SPEED SHOWN ON THE GRAPHICS PAGE. IN THE REMOTE MODE, THE PUMP'S SPEED MUST BE CONTROLLED BY THE BAS. IN THE REMOTE MODE, THE PUMP'S SPEED MUST BE CONTROLLED BY THE BAS.
   - D. HEATING HOT WATER PUMP ROTATION: A PROGRAM WILL BE PROVIDED TO AUTOMATICALLY ALTERNATE THE PUMPS WEEKLY (ADJUSTABLE) TO MAINTAIN EVEN USE. WHEN SWITCHING THE LEAD AND STANDBY PUMPS, THE STANDBY PUMP MUST BE STARTED BEFORE THE LEAD PUMP IS STOPPED. DURING THE ROTATION OF THE HEATING HOT WATER PUMPS, THE LEAD PUMP MUST BECOME THE STANDBY PUMP AND THE STANDBY PUMP MUST BECOME THE LEAD PUMP.
   - E. HOT WATER PUMP START/STOP CONTROL: HOT WATER PUMPS MUST BE STARTED ACCORDING TO THE "HEATING HOT WATER SYSTEM ENABLE MODE" SEQUENCES AND STOPPED ACCORDING "HEATING HOT WATER SYSTEM DISABLE MODE" SEQUENCES.
   - F. HEATING HOT WATER PUMP STATUS: A CURRENT SENSOR MUST BE USED TO MONITOR THE STATUS OF THE HEATING HOT WATER PUMP. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE PUMP AFTER A 60 SECONDS (ADJUSTABLE) TIME DELAY, A FAILURE ALARM MUST BE ISSUED, AND THE START COMMAND MUST BE CANCELED.
   - G. HEATING HOT WATER PUMP FAILURE:
     - a. IF A HOT WATER PUMP SHOULD FAIL, AN ALARM MUST BE GENERATED AT THE BAS. ASSUMING THE STANDBY HEATING HOT WATER PUMP IS IDLE AND AVAILABLE FOR OPERATION, THE BAS MUST AUTOMATICALLY ENABLE THAT PUMP TO REPLACE THE FAILED PUMP. AFTER THE NEWLY STARTED PUMP IS IN OPERATION, THE FAILED PUMP MUST BE DISABLED.
     - b. HEATING HOT WATER PUMP THAT FAILS DURING OPERATION MUST AUTOMATICALLY BE ASSIGNED A DESIGNATION OF "FAILED". HOT WATER PUMP FAILURE MUST INCLUDE: LOSS OF STATUS.
     - c. ANY HEATING HOT WATER PUMP THAT IS TAKEN OUT OF OPERATION FOR MAINTENANCE MUST BE ASSIGNED A DESIGNATION OF "FAILED" BY THE OPERATOR. THE BAS MUST NOT ATTEMPT TO START PUMP WITH AN ASSIGNED DESIGNATION OF "FAILED".
   - H. HOT WATER PUMP SPEED CONTROL:
     - a. THE BAS MUST MONITOR THE DIFFERENTIAL PRESSURE BETWEEN THE HOT WATER SUPPLY AND HOT WATER RETURN PIPING THROUGH DIFFERENTIAL PRESSURE SENSOR AS SHOWN ON MECHANICAL DRAWINGS.
     - b. THE BAS MUST CONTROL THE SPEED OF THE HEATING HOT WATER PUMP VFD TO MAINTAIN THE HOT WATER DIFFERENTIAL PRESSURE SETPOINT AT ALL TIMES.
     - c. IF THE DIFFERENTIAL PRESSURE DROPS BELOW THE DIFFERENTIAL PRESSURE SET POINT, WHICH MUST BE INITIALLY SET AT 15 PSI (ADJUSTABLE), THE VFD SPEED MUST BE INCREASED. IF THE DIFFERENTIAL PRESSURE RISES ABOVE THE DIFFERENTIAL PRESSURE SET POINT,THE VFD SPEED MUST BE DECREASED. IF THE DIFFERENTIAL PRESSURE SENSOR SHOULD FAIL, AN ALARM MUST BE DISPLAYED AT THE BAS FRONT-END AND THE BAS MUST RUN THE PUMP AT THE LAST SPEED COMMAND.
     - d. IF THE LEAD PUMP HAS REACHED 100% (ADJ.) OF IT MAXIMUM SPEED AND THE SYSTEM DIFFERENTIAL PRESSURE SET POINT IS NOT SATISFIED FOR 10 MIN (ADJ), AN ALARM MUST BE ANNUNCIATED AT THE BAS.
     - e. THE HEATING HOT WATER PUMP VFD MUST HAVE MINIMUM AND MAXIMUM SPEED SETTINGS. THE MINIMUM SPEED MUST BE SET BASED ON THE MINIMUM SPEED REQUIRED BY THE PUMP MANUFACTURER TO PREVENT MECHANICAL DAMAGE. THE MAXIMUM PUMP SPEED MUST BE 60 HZ.
     - f. WHEN A PUMP IS STOPPED, THE BAS SIGNAL MUST RETURN THE PUMP TO A SPEED OF ZERO.
9. HOT WATER BYPASS VALVE CONTROL:
   - A. IF THE HOT WATER DIFFERENTIAL PRESSURE EXCEEDS THE DIFFERENTIAL PRESSURE SET POINT, WHILE THE HEATING HOT WATER PUMP VFD IS RUNNING AT THE MINIMUM SPEED, THE BAS MUST MODULATE THE HOT WATER BYPASS VALVE TOWARDS OPEN POSITION TO MAINTAIN THE DIFFERENTIAL PRESSURE AT SET POINT.
   - B. IF THE HOT WATER DIFFERENTIAL PRESSURE DROPS BELOW THE SET POINT, WHILE THE HEATING HOT WATER PUMP VFD IS RUNNING AT THE MINIMUM SPEED, THE BAS MUST MODULATE THE HOT WATER BYPASS VALVE TOWARDS CLOSED POSITION TO MAINTAIN THE DIFFERENTIAL PRESSURE AT SET POINT.
   - C. PROVIDE A DIFFERENTIAL TO PREVENT RAPID CYCLING OF THE HOT WATER BYPASS VALVE. ADJUST THE DIFFERENTIAL TO PROVIDE A STABLE OPERATIONAL SYSTEM.
10. ALARMS:
    - A. IF THE STEAM PRESSURE DROPS BELOW 8 PSI (ADJUSTABLE) A "LINCOLN HALL – LOW STEAM PRESSURE ALARM" MUST BE SENT TO THE BASE-WIDE BAS.
    - B. IF THE STEAM PRESSURE DROPS BELOW 5 PSI (ADJUSTABLE) FOR A TIME PERIOD OF 15 MINUTES THE HW SYSTEM MUST BE INDEXED TO A COOL DOWN MODE AS DESCRIBED IN SECTION 6.B AND A "LINCOLN HALL – STEAM FAILURE ALARM" MUST BE SENT TO THE BASE-WIDE BAS.
    - C. IF THE STEAM PRESSURE RISES ABOVE 15 PSI (ADJUSTABLE) A "LINCOLN HALL – HIGH STEAM PRESSURE ALARM" MUST BE SENT TO THE BASE-WIDE BAS.
    - D. IF AN HX ISOLATION VALVE IS COMMANDED TO BE OPEN AND AFTER A 3 MINUTE TIME DELAY (ADJUSTABLE) THE VALVE IS CLOSED A "LINCOLN HALL – HX-# ISOLATION VALVE FAILURE" ALARM MUST BE SENT TO THE BASE-WIDE BAS. ONCE THE ALARM HAS BEEN INITIATED THE HX MUST SHUT DOWN AND BE LOCKED OUT UNTIL A "HX-## RESET" BUTTON IS SELECTED ON THE GRAPHICS.
    - E. IF A PUMP IS COMMANDED TO RUN AND FAILS TO START, AS SENSED BY THE ASSOCIATED CURRENT SENSOR LOCATED AT THE VFD, AND AFTER A 3 MINUTE TIME DELAY (ADJUSTABLE) A "LINCOLN HALL – HOT WATER PUMP HWP-# ALARM" MUST BE SENT TO THE BASE-WIDE BAS. ONCE THE ALARM HAS BEEN INITIATED THE PUMP MUST SHUT DOWN AND BE LOCKED OUT UNTIL A "HWP-## RESET" BUTTON IS SELECTED ON THE GRAPHICS AND THE STAND-BY PUMP MUST BE ENERGIZED.
    - F. IF THE SYSTEM IS ENABLED AND THE COMMON SUPPLY HOT WATER TEMPERATURE IS 10°F (ADJUSTABLE) HIGHER THAN THE SETPOINT FOR A 15 MINUTE TIME PERIOD (ADJUSTABLE), A "LINCOLN HALL – HX-## HIGH SUPPLY TEMPERATURE ALARM" MUST BE SENT TO THE BASE-WIDE BAS.
    - G. IF THE SYSTEM IS ENABLED AND THE COMMON SUPPLY HOT WATER TEMPERATURE IS 20°F (ADJUSTABLE) HIGHER THAN THE SETPOINT FOR A 15 MINUTE TIME PERIOD (ADJUSTABLE), A "LINCOLN HALL – HX-## HIGH SUPPLY TEMPERATURE ALARM" MUST BE SENT TO THE BASE-WIDE BAS. ONCE THE ALARM HAS BEEN INITIATED THE HX MUST SHUT DOWN AND BE LOCKED OUT UNTIL A "HX-## RESET" BUTTON IS SELECTED ON THE GRAPHICS.
    - H. IF THE SYSTEM IS ENABLED AND THE COMMON RETURN HOT WATER TEMPERATURE IS LESS THAN 110°F (ADJUSTABLE) FOR A 10 MINUTE TIME PERIOD (ADJUSTABLE), A "LINCOLN HALL – HX-## HIGH RETURN TEMPERATURE ALARM" MUST BE SENT TO THE BASE-WIDE BAS.
    - I. ONCE THE SYSTEM HAS BEEN RUNNING FOR MORE THAN 60 MINUTES (ADJUSTABLE) AND BOTH OF THE LEAD HEAT EXCHANGER STEAM VALVES (1/3 & 2/3) ARE AT 100% AND THE COMMON SUPPLY HOT WATER TEMPERATURE IS 10°F (ADJUSTABLE) LOWER THAN THE SET-POINT A "LINCOLN HALL – HX-## LOW TEMPERATURE ALARM" MUST BE SENT TO THE BASE-WIDE BAS.
    - I. IF THE LEAD PUMP HAS BEEN RUNNING FOR MORE THAN 30 MINUTES AND THE SYSTEM DIFFERENTIAL PRESSURE IS 20% (ADJUSTABLE) BELOW THE SETPOINT FOR A 10 MINUTE TIME PERIOD (ADJUSTABLE), A "LINCOLN HALL – HWP-## LOW WATER PRESSURE ALARM" MUST BE SENT TO THE BASE-WIDE BAS. THE FINAL SET-POINT FOR THIS ALARM MUST BE PROVIDED BY THE TAB CONTRACTOR AND MUST BE INDICATED IN THE AS-BUILT SEQUENCE OF OPERATIONS BY CONTROLS CONTRACTOR.
    - J. IF THE LEAD PUMP HAS BEEN RUNNING FOR MORE THAN 30 MINUTES AND THE SYSTEM DIFFERENTIAL PRESSURE IS 20% (ADJUSTABLE) ABOVE THE SETPOINT FOR A 10 MINUTE TIME PERIOD (ADJUSTABLE), A "LINCOLN HALL – HWP-## HIGH WATER PRESSURE ALARM" MUST BE SENT TO THE BASE-WIDE BAS. THE FINAL SET-POINT FOR THIS ALARM MUST BE PROVIDED BY THE TAB CONTRACTOR AND MUST BE INDICATED IN THE AS-BUILT SEQUENCE OF OPERATIONS BY CONTROLS CONTRACTOR.
    - K. IF THE LEAD PUMP REACHES ITS MAXIMUM SPEED OF 100% AND THE SYSTEM DIFFERENTIAL PRESSURE IS BELOW THE SET-POINT FOR A 10 MINUTE TIME PERIOD (ADJUSTABLE), A "LINCOLN HALL – HWP-## LOW WATER FLOW ALARM" MUST BE SENT TO THE BASE-WIDE BAS.
    - L. THE BAS MUST MONITOR THE HIGH LEVEL CONTACTS AT EACH OF THE 2 CONDENSATE PUMPS. IF THIS CONTACT IS CLOSED AND AFTER A 5 MINUTE TIME DELAY (ADJUSTABLE) THE CONTACT IS STILL CLOSED A "LINCOLN HALL – CONDENSATE PUMP-# HIGH LEVEL ALARM" ALARM MUST BE SENT TO THE BASE-WIDE BAS. ONCE THE ALARM HAS CLEARED AT THE RESPECTIVE CONDENSATE PUMP THE ALARM MUST AUTOMATICALLY RESET.
    - M. IF THE CONDENSATE FLUID SUPPLY TEMPERATURE, AS SENSED BY CONDENSATE METER, IS GREATER THAN 210°F (ADJUSTABLE) FOR A 10 MINUTE TIME PERIOD (ADJUSTABLE), A "LINCOLN HALL – CONDENSATE HIGH WATER TEMPERATURE ALARM" MUST BE SENT TO THE BASE-WIDE BAS.

GENERAL NOTES

1. REFER TO SHEET M-802 FOR HEATING HOT WATER SYSTEM CONTROL DIAGRAM.
2. REFER TO M-824 AND M-825 FOR HEATING HOT WATER SYSTEM POINTS SCHEDULE.

US Army Corps of Engineers ®

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DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
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SOLICITATION NO.:
CONTRACT NO.: W912DS-19-C-0031-L
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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

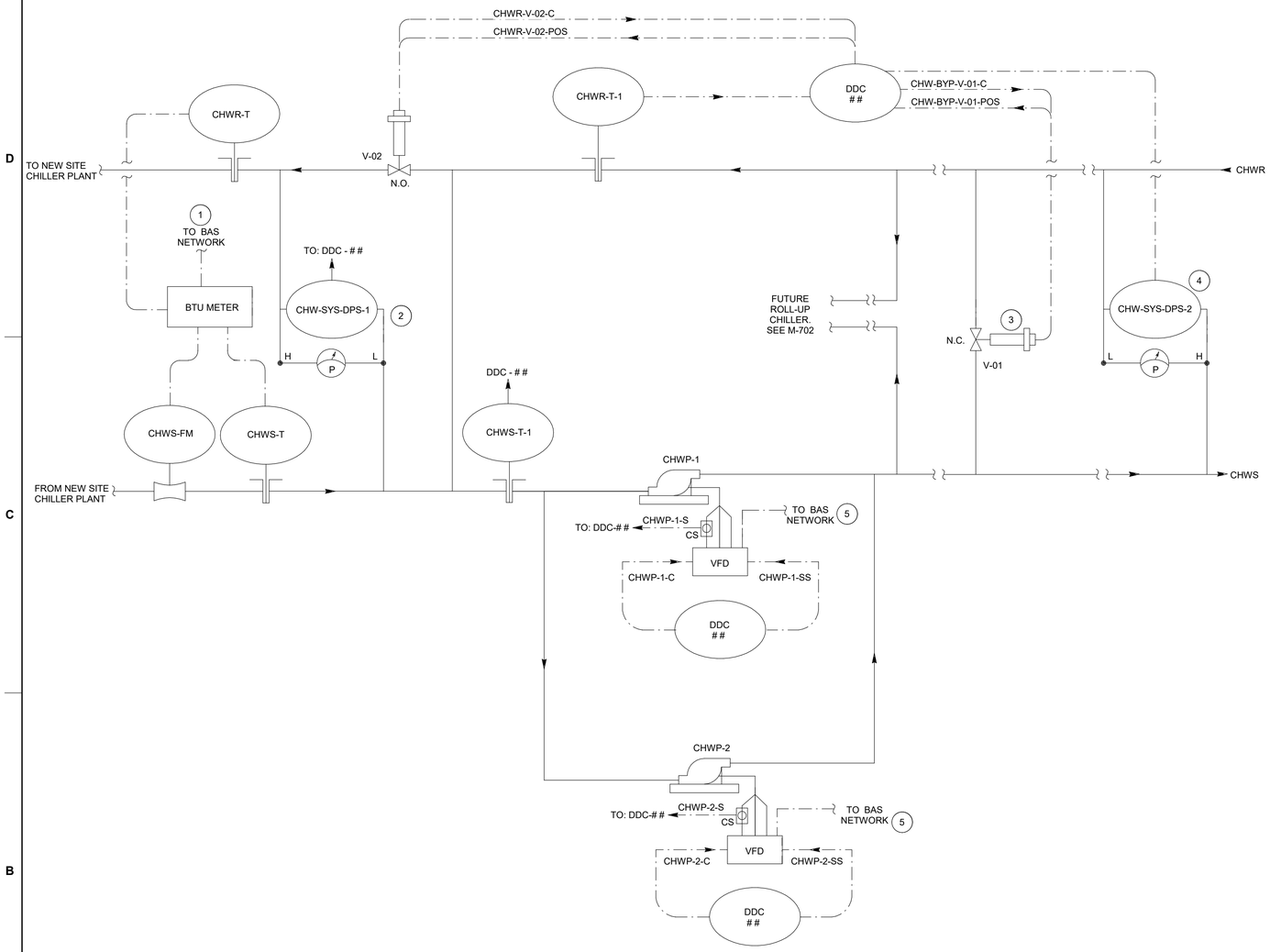
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL DIAGRAM

SHEET ID

M-803

REVISED RTA SUBMISSION 03/01/2023



B1 CHILLED WATER SYSTEM - CONTROL DIAGRAM

NTS

CHILLED WATER SYSTEM SEQUENCES OF OPERATION

1. GENERAL
   - A. THE WEST POINT LINCOLN HALL MUST UTILIZE CHILLED WATER DELIVERED TO THE BUILDING FROM THE NEW SITE CHILLER PLANT. THE CHILLED WATER SYSTEM WITHIN LINCOLN HALL CONSISTS OF TWO CHILLED WATER PUMPS IN A LEAD-STANDBY ARRANGEMENT.
2. CHILLED WATER SYSTEM ENABLE MODE: THE CHILLED WATER SYSTEM MUST BE ENABLED BY ONE OF THE FOLLOWING:
   - A. MANUAL: CHILLED WATER SYSTEM MUST BE MANUALLY ENABLED BY AN AUTHORIZED PERSONNEL AT THE BAS OPERATOR INTERFACE.
   - B. AUTOMATIC:
     - a. THE OUTDOOR AIR TEMPERATURE (OAT) IS GREATER THAN 55°F (ADJUSTABLE) FOR LONGER THAN 30 MINUTES (ADJUSTABLE);
     - b. OR IF A TOTAL OF 10% OF THE FCU COOLING VALVES IN THE BUILDING ARE OPEN MORE THAN 20% (ADJUSTABLE) FOR LONGER THAN 15 MINUTES (ADJUSTABLE);
     - c. OR THERE IS AT LEAST ONE REQUEST (ADJ.) FOR COOLING FROM DOASs OR MAU-1.
3. CHILLED WATER SYSTEM DISABLE MODE: THE CHILLED WATER SYSTEM MUST BE DISABLED BY ONE OF THE FOLLOWING:
   - A. MANUAL: CHILLED WATER SYSTEM MUST BE MANUALLY DISABLED BY AN AUTHORIZED PERSONNEL AT THE BAS OPERATOR INTERFACE.
   - B. AUTOMATIC:
     - a. THE OUTDOOR AIR TEMPERATURE (OAT) IS LESS THAN 55°F (ADJUSTABLE) FOR LONGER THAN 30 MINUTES (ADJUSTABLE);
     - b. OR IF LESS THAN 10% OF THE FCU COOLING VALVES IN THE BUILDING ARE OPEN LESS THAN 10% (ADJUSTABLE) FOR LONGER THAN 15 MINUTES (ADJUSTABLE) AND THERE IS NO REQUEST FOR COOLING FROM DOASs OR MAU.
4. CHILLED WATER PUMPING
   - A. GENERAL: CHILLED WATER PUMPS EMPLOY VARIABLE SPEED DRIVES CONTROLLED BY THE BAS. ONE CHILLED WATER PUMP MUST BE DESIGNATED AS THE LEAD PUMP; THE OTHER CHILLED WATER PUMP MUST BE DESIGNATED AS THE STANDBY PUMP, WHICH MUST BE ENABLED AUTOMATICALLY IN THE EVENT OF FAILURE OF ENABLED CHILLED WATER PUMP.
   - B. CHILLED WATER PUMP HAND-OFF-AUTO OPERATION: HAND-OFF-AUTO SETTINGS MUST BE PROVIDED AS PART OF THE VARIABLE FREQUENCY DRIVE THROUGH THE DRIVE'S KEYPAD. IN THE OFF MODE, THE PUMP MUST BE STOPPED. IN THE HAND MODE, THE PUMP MUST RUN CONTINUOUSLY. IN THE AUTO MODE, THE PUMP MUST BE STARTED AND STOPPED BY THE BAS.
   - C. CHILLED WATER PUMP LOCAL-REMOTE SPEED CONTROL: LOCAL-REMOTE SETTINGS MUST BE PROVIDED AS PART OF EACH VARIABLE FREQUENCY DRIVE THROUGH THE DRIVE'S KEYPAD. IN THE LOCAL MODE, THE PUMP'S SPEED MUST BE CONTROLLED THROUGH A MANUAL SPEED CONTROL LOCATED AT THE RESPECTIVE DRIVE CONTROL PANEL. THE BAS MUST INDICATE EACH PUMP THAT IS IN LOCAL CONTROL MODE BY ADDING "MANUAL" TO THE GRAPHIC FOR THAT PUMP AND CHANGE THE COLOR OF THE SPEED SHOWN ON THE GRAPHICS PAGE. IN THE REMOTE MODE, THE PUMP'S SPEED MUST BE CONTROLLED BY THE BAS. IN THE REMOTE MODE, THE PUMP'S SPEED MUST BE CONTROLLED BY THE BAS.
   - D. CHILLED WATER PUMP ROTATION: A PROGRAM WILL BE PROVIDED TO AUTOMATICALLY ALTERNATE THE PUMPS WEEKLY (ADJUSTABLE) TO MAINTAIN EVEN USE. WHEN SWITCHING THE LEAD AND STANDBY PUMPS, THE STANDBY PUMP MUST BE STARTED BEFORE THE LEAD PUMP IS STOPPED IN ORDER TO MAINTAIN FLOW IN THE SYSTEM. DURING THE ROTATION OF THE CHILLED WATER PUMPS, THE LEAD PUMP MUST BECOME THE STANDBY PUMP AND THE STANDBY PUMP MUST BECOME THE LEAD PUMP.
   - E. CHILLED WATER PUMP START/STOP CONTROL: CHILLED WATER PUMPS MUST BE STARTED ACCORDING TO THE "CHILLED WATER SYSTEM ENABLE MODE" SEQUENCES AND STOPPED ACCORDING "CHILLED WATER SYSTEM DISABLE MODE" SEQUENCES.
   - F. CHILLED WATER PUMP STATUS: A CURRENT SENSOR MUST BE USED TO MONITOR THE STATUS OF THE CHILLED WATER PUMP. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE PUMP AFTER A 60 SECONDS (ADJUSTABLE) TIME DELAY, A FAILURE ALARM MUST BE ISSUED, AND THE START COMMAND MUST BE CANCELED.
   - G. CHILLED WATER PUMP FAILURE:
     - a. IF A CHILLED WATER PUMP SHOULD FAIL, AN ALARM MUST BE GENERATED AT THE BAS. ASSUMING THE STANDBY CHILLED WATER PUMP IS IDLE AND AVAILABLE FOR OPERATION, THE BAS MUST AUTOMATICALLY ENABLE THAT PUMP TO REPLACE THE FAILED PUMP. AFTER THE NEWLY STARTED PUMP IS IN OPERATION, THE FAILED PUMP MUST BE DISABLED.
     - b. CHILLED WATER PUMP THAT FAILS DURING OPERATION MUST AUTOMATICALLY BE ASSIGNED A DESIGNATION OF "FAILED". CHILLED WATER PUMP FAILURE MUST INCLUDE: LOSS OF STATUS.
     - c. ANY CHILLED WATER PUMP THAT IS TAKEN OUT OF OPERATION FOR MAINTENANCE MUST BE ASSIGNED A DESIGNATION OF "FAILED" BY THE OPERATOR. THE BAS MUST NOT ATTEMPT TO START PUMP WITH AN ASSIGNED DESIGNATION OF "FAILED".
   - H. CHILLED WATER PUMP SPEED CONTROL:
     - a. THE BAS MUST MONITOR THE DIFFERENTIAL PRESSURE BETWEEN THE CHILLED WATER SUPPLY AND CHILLED WATER RETURN PIPING THROUGH DIFFERENTIAL PRESSURE SENSOR AS SHOWN ON MECHANICAL DRAWINGS.
     - b. THE BAS MUST CONTROL THE SPEED OF THE CHILLED WATER PUMP VFD TO MAINTAIN THE CHILLED WATER DIFFERENTIAL PRESSURE SETPOINT AT ALL TIMES.
     - c. IF THE DIFFERENTIAL PRESSURE DROPS BELOW THE DIFFERENTIAL PRESSURE SET POINT, WHICH MUST BE INITIALLY SET AT 15 PSI (ADJUSTABLE), THE VFD SPEED MUST BE INCREASED. IF THE DIFFERENTIAL PRESSURE RISES ABOVE THE DIFFERENTIAL PRESSURE SET POINT,THE VFD SPEED MUST BE DECREASED. IF THE DIFFERENTIAL PRESSURE SENSOR SHOULD FAIL, AN ALARM MUST BE DISPLAYED AT THE BAS FRONT-END AND THE BAS MUST RUN THE PUMP AT THE LAST SPEED COMMAND.
     - d. IF THE LEAD PUMP HAS REACHED 100% (ADJ.) OF IT MAXIMUM SPEED AND THE SYSTEM DIFFERENTIAL PRESSURE SET POINT IS NOT SATISFIED FOR 10 MIN (ADJ), AN ALARM MUST BE ANNUNCIATED AT THE BAS.
     - e. THE CHILLED WATER PUMP VFD MUST HAVE MINIMUM AND MAXIMUM SPEED SETTINGS. THE MINIMUM SPEED MUST BE SET BASED ON THE MINIMUM SPEED REQUIRED BY THE PUMP MANUFACTURER TO PREVENT MECHANICAL DAMAGE. THE MAXIMUM PUMP SPEED MUST BE 60 HZ.
     - f. WHEN A PUMP IS STOPPED, THE BAS SIGNAL MUST RETURN THE PUMP TO A SPEED OF ZERO.
5. CHILLED WATER BYPASS VALVE CONTROL:
   - A. IF THE CHILLED WATER DIFFERENTIAL PRESSURE EXCEEDS THE DIFFERENTIAL PRESSURE SET POINT, WHILE THE CHILLED WATER PUMP VFD IS RUNNING AT THE MINIMUM SPEED, THE BAS MUST MODULATE THE CHILLED WATER BYPASS VALVE TOWARDS OPEN POSITION TO MAINTAIN THE DIFFERENTIAL PRESSURE AT SET POINT.
   - B. IF THE DIFFERENTIAL PRESSURE DROPS BELOW THE SET POINT, WHILE THE CHILLED WATER PUMP VFD IS RUNNING AT THE MINIMUM SPEED, THE BAS MUST MODULATE THE CHILLED WATER BYPASS VALVE TOWARDS CLOSED POSITION TO MAINTAIN THE DIFFERENTIAL PRESSURE AT SET POINT.
   - C. PROVIDE A DIFFERENTIAL TO PREVENT RAPID CYCLING OF THE HOT WATER BYPASS VALVE. ADJUST THE DIFFERENTIAL TO PROVIDE A STABLE OPERATIONAL SYSTEM.
6. TERTIARY LOOP CHILLED WATER CONTROL:
   - A. THE BAS MUST MODULATE THE CHILLED WATER RETURN VALVE TO MAINTAIN THE CHILLED WATER SUPPLY TEMPERATURE AT SETPOINT, INITIALLY SET AT 43°F (ADJUSTABLE).
7. ALARMS:
   - A. IF A PUMP IS COMMANDED TO RUN AND FAILS TO START, AS SENSED BY THE ASSOCIATED CURRENT SENSOR LOCATED AT THE VFD, AND AFTER A 3-MINUTE TIME DELAY (ADJUSTABLE) A "LINCOLN HALL – CHILLED WATER SYSTEM CHWP-# ALARM" WILL BE SENT TO THE BASE-WIDE BAS. ONCE THE ALARM HAS BEEN INITIATED THE PUMP WILL SHUT DOWN AND BE LOCKED OUT UNTIL A "CHWP-## RESET" BUTTON IS SELECTED ON THE GRAPHICS AND THE STANDBY PUMP WILL BE ENERGIZED.
   - B. IF THE LEAD PUMP HAS BEEN RUNNING FOR MORE THAN 30 MINUTES AND THE SYSTEM DIFFERENTIAL PRESSURE IS 20% (ADJUSTABLE) BELOW THE SETPOINT FOR A 10 MINUTE TIME PERIOD (ADJUSTABLE), A "LINCOLN HALL – HWP-## LOW WATER PRESSURE ALARM" MUST BE SENT TO THE BASE-WIDE BAS. THE FINAL SETPOINT FOR THIS ALARM MUST BE PROVIDED BY THE TAB CONTRACTOR AND MUST BE INDICATED IN THE AS-BUILT SEQUENCE OF OPERATIONS BY THE CONTROLS CONTRACTOR.
   - C. IF THE LEAD PUMP HAS BEEN RUNNING FOR MORE THAN 30 MINUTES AND THE SYSTEM DIFFERENTIAL PRESSURE IS 20% (ADJUSTABLE) ABOVE THE SETPOINT FOR A 10 MINUTE TIME PERIOD (ADJUSTABLE), A "LINCOLN HALL – HWP-## HIGH WATER PRESSURE ALARM" MUST BE SENT TO THE BASE-WIDE BAS. THE FINAL SETPOINT FOR THIS ALARM MUST BE PROVIDED BY THE TAB CONTRACTOR AND MUST BE INDICATED IN THE AS-BUILT SEQUENCE OF OPERATIONS BY THE CONTROLS CONTRACTOR.

GENERAL NOTES

1. REFER TO M-001 AND M-801 FOR LEGEND AND GENERAL NOTES.
2. REFER TO M-826 FOR CHILLED WATER SYSTEM POINTS SCHEDULE.

KEYNOTES

1 CONNECT BTU METER LONWORKS COMMUNICATION INTERFACE TO BAS LONWORKS NETWORK. PROVIDE BTU METER MONITORING POINTS INDICATED IN THE POINTS SCHEDULE TO THE BAS THROUGH THE COMMUNICATION INTERFACE.

2 PROVIDE DIFFERENTIAL PRESSURE TRANSMITTER FOR CHILLED WATER SUPPLY FROM CENTRAL PLANT PRESSURE MONITORING.

3 PROVIDE TWO-WAY CONTROL VALVE ACTUATED BY MODULATING ELECTRIC ACTUATOR FOR CHILLED WATER BYPASS. SEE MP-106 FOR CHILLED WATER BYPASS VALVE LOCATION.

4 PROVIDE DIFFERENTIAL PRESSURE TRANSMITTER FOR CHILLED WATER PUMP SPEED CONTROL. SEE SHEET MP-106 FOR DIFFERENTIAL PRESSURE TRANSMITTER LOCATION

5 CONNECT VFD LONWORKS COMMUNICATION INTERFACE TO BAS LONWORKS NETWORK. PROVIDE VFD MONITORING POINTS INDICATED IN THE POINTS SCHEDULE TO THE BAS THROUGH THE COMMUNICATION INTERFACE.

US Army Corps of Engineers ®

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DESIGNED BY: N. SLEEM
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CHECKED BY: D. GORDON
SUBMITTED BY:
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FILE NAME:

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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL DIAGRAM

SHEET ID

M-804

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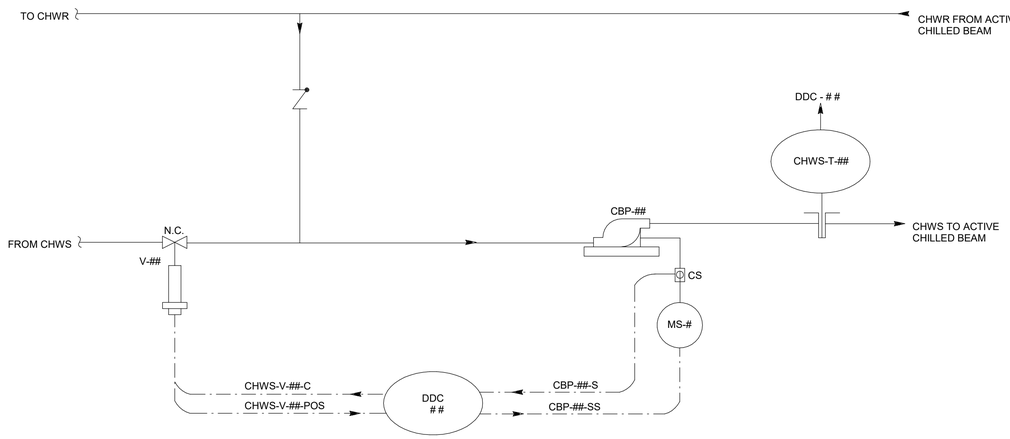
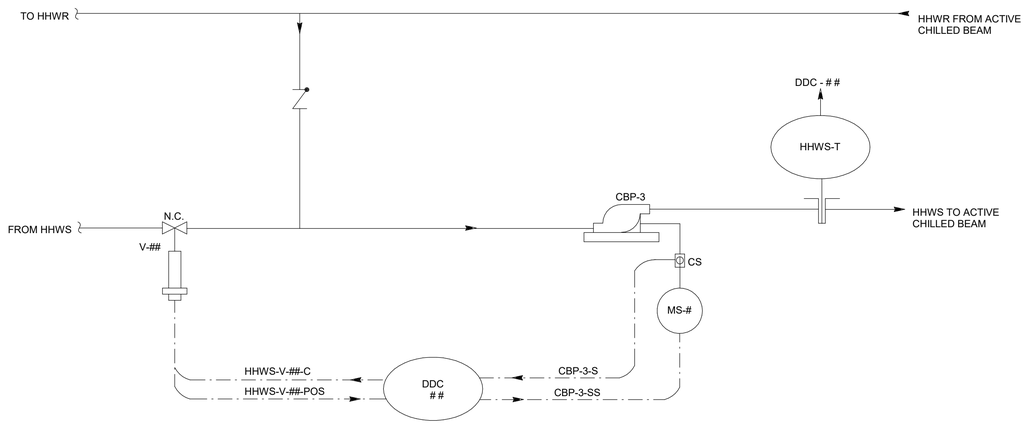


C1 CHILLED BEAM CHILLED WATER SYSTEM (TYPICAL FOR 2) - CONTROL DIAGRAM
NTS

CHILLED BEAM CHILLED WATER SYSTEM SEQUENCES OF OPERATION

1. GENERAL
   A. THE CHILLED BEAM CHILLED WATER LOOP CONSISTS OF ONE CHILLED WATER PUMP AND ONE TWO-WAY CONTROL VALVE. THE PUMP MUST CIRCULATE TEMPERED CHILLED WATER THROUGH THE LOOP THAT FEEDS THE ACTIVE CHILLED BEAMS AS INDICATED ON THE MECHANICAL FLOOR PLANS. A TWO-WAY CONTROL VALVE MUST BE PROVIDED IN THE LINE SUPPLYING WATER TO THE CHILLED BEAM TERMINAL UNITS TO MAINTAIN THE TEMPERED CHILLED WATER.
2. CHILLED BEAM LOOP CONTROL
   A. WHEN THERE IS A COOLING REQUEST FROM ANY CHILLED BEAM TERMINAL UNIT, THE BAS MUST ENABLE THE CHILLED BEAM CHILLED WATER PUMP.
   B. ONCE THE PUMP STATUS HAS BEEN PROVEN, THE BAS MUST MODULATE THE TWO-WAY CONTROL VALVE AS REQUIRED TO MAINTAIN CHILLED BEAM CHILLED WATER SUPPLY SETPOINT OF 58 DEG F (ADJUSTABLE).
   C. A CURRENT SENSOR MUST BE USED TO MONITOR THE STATUS OF THE CHILLED WATER PUMP. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE PUMP AFTER A 60 SECONDS (ADJUSTABLE) TIME DELAY, A FAILURE ALARM MUST BE ISSUED, AND THE START COMMAND MUST BE CANCELED
   D. WHEN THERE IS NO COOLING REQUEST FROM ANY CHILLED BEAM TERMINAL UNIT, THE PUMP MUST STOP AND TWO-WAY CONTROL VALVE MUST CLOSE.
3. ALARMS
   A. HIGH CHILLED BEAM CHILLED WATER SUPPLY TEMPERATURE: 63 DEG F (ADJUSTABLE)
   B. LOW CHILLED BEAM CHILLED WATER SUPPLY TEMPERATURE: 53 DEG F (ADJUSTABLE).



C2 CHILLED BEAM HEATING HOT WATER SYSTEM - CONTROL DIAGRAM
NTS

CHILLED BEAM HEATING HOT WATER SYSTEM SEQUENCES OF OPERATION

1. GENERAL
   A. THE CHILLED BEAM HEATING HOT WATER LOOP CONSISTS OF ONE HOT WATER PUMP AND ONE TWO-WAY CONTROL VALVE. THE PUMP MUST CIRCULATE HEATING HOT WATER THROUGH THE LOOP THAT FEEDS THE ACTIVE CHILLED BEAMS AS INDICATED ON THE MECHANICAL FLOOR PLANS. A TWO-WAY CONTROL VALVE MUST BE PROVIDED IN THE LINE SUPPLYING WATER TO THE CHILLED BEAM TERMINAL UNITS TO MAINTAIN THE TEMPERED HEATING HOT WATER.
2. CHILLED BEAM LOOP CONTROL
   A. WHEN THERE IS A HEATING REQUEST FROM ANY CHILLED BEAM TERMINAL UNIT, THE BAS MUST ENABLE THE CHILLED BEAM HOT WATER PUMP.
   B. ONCE THE PUMP STATUS HAS BEEN PROVEN, THE BAS MUST MODULATE THE TWO-WAY CONTROL VALVE AS REQUIRED TO MAINTAIN CHILLED BEAM HEATING HOT WATER SUPPLY SETPOINT OF 120 DEG F (ADJUSTABLE).
   C. A CURRENT SENSOR MUST BE USED TO MONITOR THE STATUS OF THE HOT WATER PUMP. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE PUMP AFTER A 60 SECONDS (ADJUSTABLE) TIME DELAY, A FAILURE ALARM MUST BE ISSUED, AND THE START COMMAND MUST BE CANCELED.
   D. WHEN THERE IS NO HEATING REQUEST FROM ANY CHILLED BEAM TERMINAL UNIT, THE PUMP MUST STOP AND TWO-WAY CONTROL VALVE MUST CLOSE.
3. ALARMS
   A. HIGH CHILLED BEAM HEATING HOT WATER SUPPLY TEMPERATURE: 125 DEG F (ADJUSTABLE)
   B. LOW CHILLED BEAM HEATING HOT WATER SUPPLY TEMPERATURE: 115 DEG F (ADJUSTABLE).

GENERAL NOTES

1. REFER TO M-001 AND M-801 FOR LEGEND AND GENERAL NOTES.
2. REFER TO M-827 FOR CHILLED BEAM CHILLED WATER WATER SYSTEM CHILLED BEAM HOT WATER SYSTEM POINTS SCHEDULE.

KEYNOTES

US Army Corps of Engineers ®

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BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL DIAGRAM

SHEET ID

M-805

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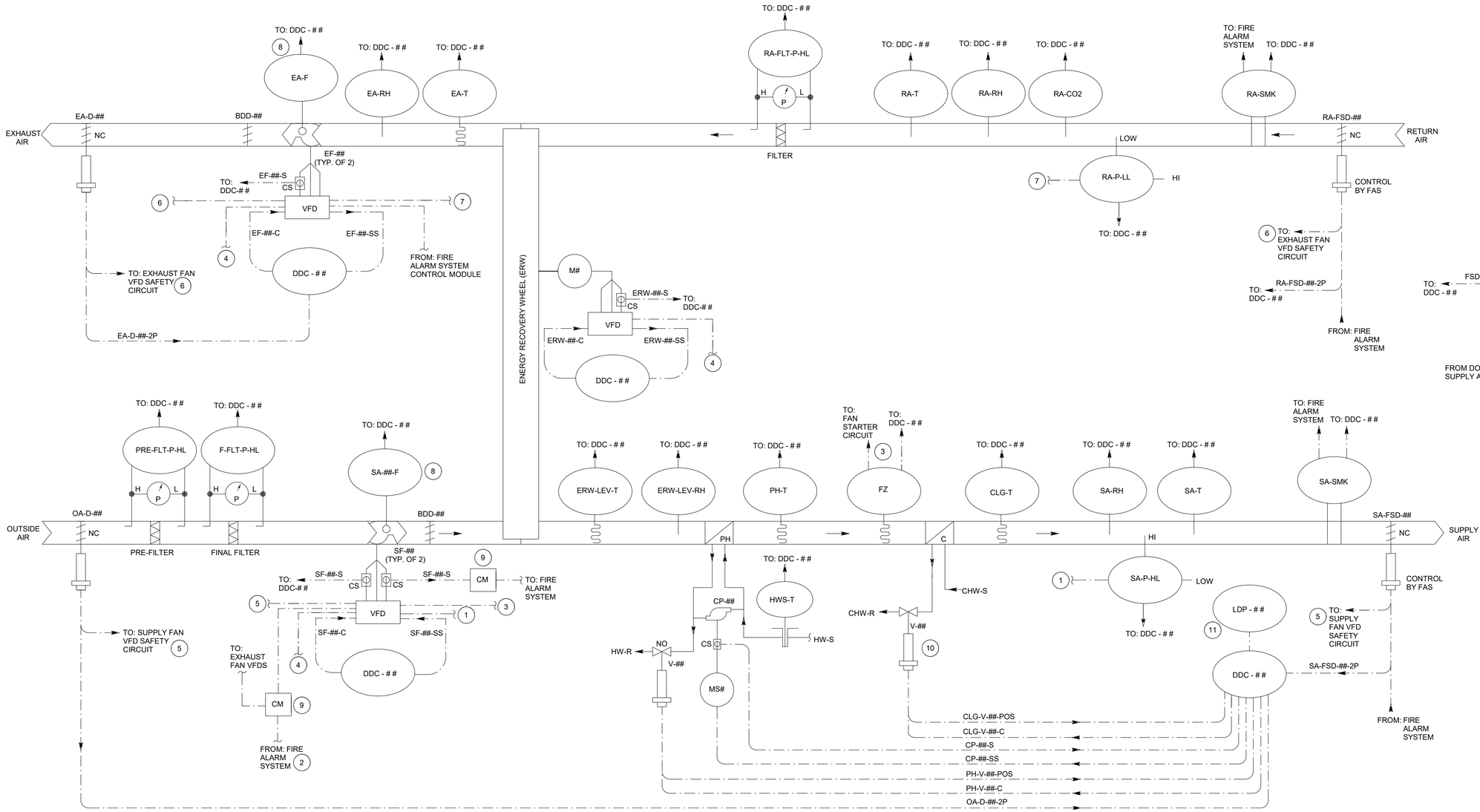

B2 DOAS-1 AND DOAS-2 CONTROL DIAGRAM

NTS

GENERAL NOTES

1. REFER TO M-001 AND M-801 FOR LEGEND AND GENERAL NOTES.
2. REFER TO SHEET M-808 FOR DOAS SEQUENCE OF OPERATION.
3. REFER TO M-828 AND M-829 FOR DOAS-1 AND DOAS-2 POINTS SCHEDULE.
4. DUCT SMOKE DETECTORS AND CONTROL MODULES (CM) PROVIDED AND CONNECTED TO FIRE ALARM SYSTEM BY DIVISION 28. SEE DIVISION 28 "FIRE DETECTION AND ALARM SYSTEM" FOR ADDITIONAL INFORMATION.
5. PROVIDE LOW LEAKAGE AIR DAMPERS TO MEET ATFP REQUIRMENTS.

KEYNOTES

1. PROVIDE HARDWIRE INTERLOCK BETWEEN SUPPLY FAN VFDS AND DUCT HIGH PRESSURE SWITCH. IF SWITCH IS ACTIVATED ON A HIGH DUCT PRESSURE CONDITION, SUPPLY FANS MUST BE DISABLE. FANS MUST BE STOPPED IN EITHER HAND OR AUTO MODE.
2. PROVIDE HARDWARE INTERLOCK BETWEEN SUPPLY AND EXHAUST FAN VFDS AND FIRE ALARM SYSTEM THROUGH FIRE ALARM CONTROL MODULE FOR DOAS SHUT DOWN. THE INTERLOCK MUST BE HARDWIRED AND NOT PERFORMED THROUGH THE BAS.
3. PROVIDE COVERAGE OF 12 INCHES OF ACTIVE ELEMENT PER SQUARE FOOT OF COIL. HARDWIRE INTERLOCK FREEZESTAT WITH SUPPLY FAN VFDS TO STOP FANS WHEN FREEZESTAT IS ACTIVATED.
4. CONNECT VFD LONWORKS COMMUNICATION INTERFACE TO BAS LONWORKS NETWORK. PROVIDE VFD MONITORING POINTS INDICATED IN THE POINTS LIST TO THE BAS THROUGH THE COMMUNICATION INTERFACE.
5. PROVIDE HARDWIRE INTERLOCK BETWEEN SUPPLY FAN VFDS AND OUTSIDE AIR DAMPER AND SUPPLY FIRE SMOKE AIR DAMPER. FAN MUST STOP IF ANY DAMPER CLOSES.
6. PROVIDE HARDWIRE INTERLOCK BETWEEN EXHAUST FAN VFDS AND EXHAUST AIR DAMPER AND RETURN FIRE SMOKE AIR DAMPER. FAN MUST STOP IF ANY DAMPER CLOSES.

KEYNOTES

7. PROVIDE HARDWIRE INTERLOCK BETWEEN EXHAUST FAN VFDS AND DUCT LOW PRESSURE SWITCH. IF SWITCH IS ACTIVATED ON A LOW DUCT PRESSURE CONDITION, FANS MUST BE DISABLE. FANS MUST BE STOPPED IN EITHER HAND OR AUTO MODE.
8. PROVIDE FAN ARRAY AIRFLOW MEASUREMENT FOR SUPPLY AND EXHAUST FANS.
9. REFER TO FIRE ALARM DRAWINGS FOR FIRE ALARM CONTROL MODULE (CM) LOCATION.
10. DOAS-1 CHILLED WATER CONTROL VALVE FAILURE MODE: OPEN; DOAS-2 CHILLED WATER CONTROL VALVE FAILURE MODE: CLOSED.
11. PROVIDE LOCAL DISPLAY PANEL AND CONNECT TO DOAS-2 CONTROLLER ONLY.

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SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE A Joint Venture

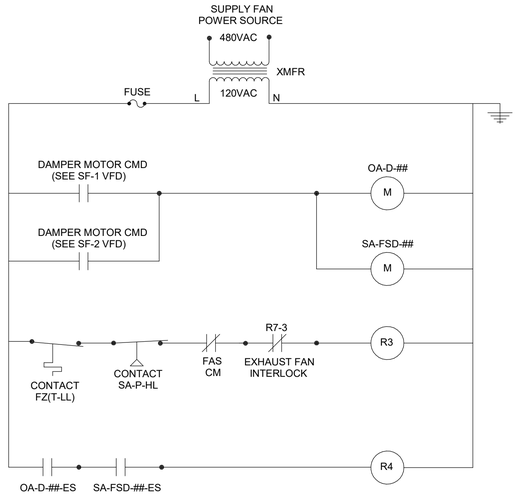
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

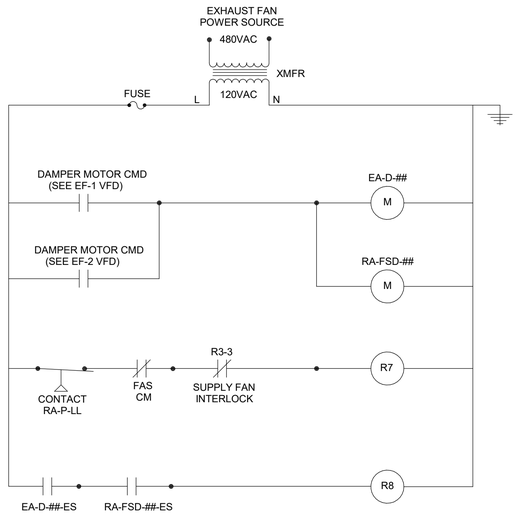
HVAC CONTROL DIAGRAM

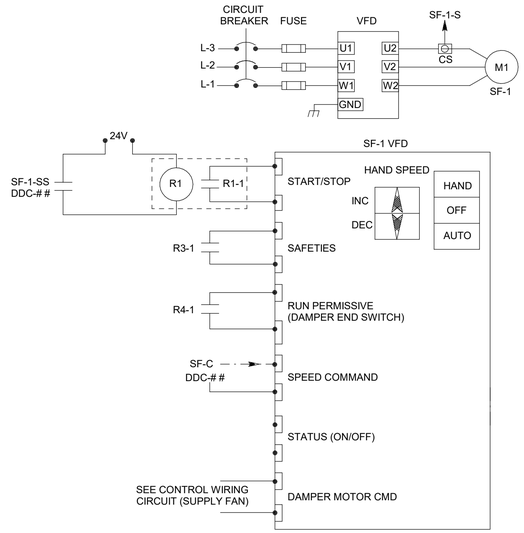
SHEET ID

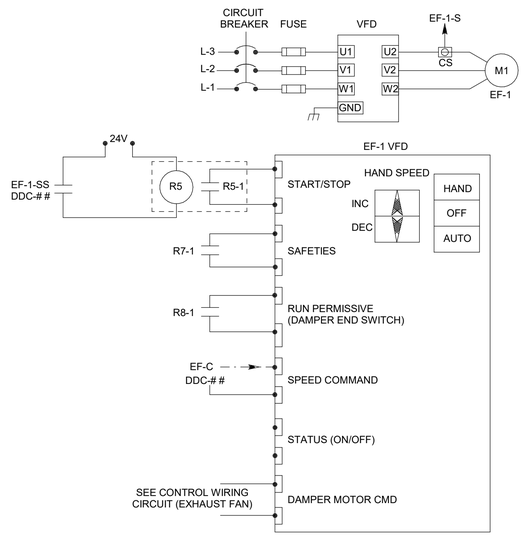
M-806

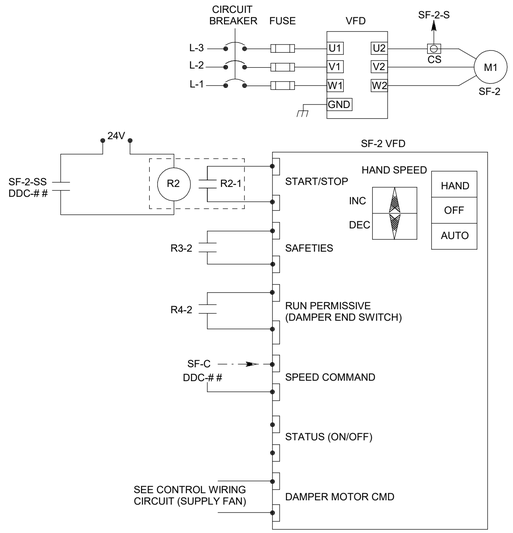
REVISED RTA SUBMISSION 03/01/2023

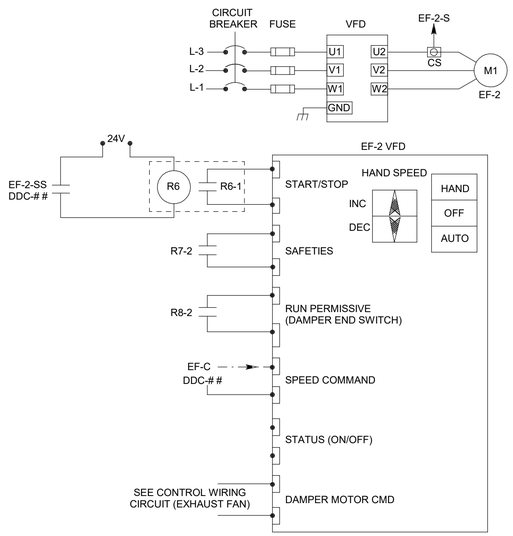












A2 DOAS SUPPLY FAN AND RETURN FAN WIRING DIAGRAM (1)

NTS

GENERAL NOTES

1. REFER TO M-001 AND M-801 FOR LEGEND AND GENERAL NOTES.

KEYNOTES

1 THE WIRING DIAGRAMS ARE SHOWN/PROVIDED AS A GUIDE TO THE BUILDING CONTROLS CONTRACTOR. THE CONTRACTOR MUST DEVELOP THE WIRING DIAGRAMS TO BE PROJECT SPECIFIC AND CONSISTENT WITH THE PROJECT SUBMITTALS.

US Army Corps of Engineers ®

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DOAS-1 & DOAS-2 SYSTEM SEQUENCES OF OPERATION

1. GENERAL:
   A. THE DEDICATED OUTSIDE AIR SYSTEM (DOAS) IS DESIGNED TO PROVIDE CONDITIONED OUTSIDE VENTILATION AIR TO THE BUILDING. THE DOAS UNIT IS PROVIDED WITH A TOTAL ENERGY (ENTHALPY) WHEEL WHICH RECOVERS RELIEF/EXHAUST AIR HEAT.
   B. THE DOAS MUST BE FULLY CONTROLLED BY THE BAS. THE CONTROLS MUST CONTAIN ALGORITHMS TO MAINTAIN ACCURATE TEMPERATURE CONTROL AND MINIMIZE DRIFT FROM SET POINT.
   C. THE CONTROLS CONTRACTOR MUST BE RESPONSIBLE FOR PROVIDING PROGRAMMING AND GRAPHICAL DISPLAYS NECESSARY TO IMPLEMENT THE DOAS INTO THE BAS.

2. DOAS OPERATIONAL MODE: DOAS MUST BE AUTOMATICALLY OR MANUALLY ENABLED TO RUN IN OCCUPIED OR UNOCCUPIED MODE AS FOLLOWS:
   A. AUTOMATIC OPERATION IN OCCUPIED/UNOCCUPIED MODES BASED ON A DAILY PROGRAM (TIME) SCHEDULE WHICH MUST INCLUDES A HOLIDAY FEATURE.
      a. OCCUPIED TIME: MON-FRIDAY: 0700 - 1800 / WEEKEND: ADJUSTABLE
      b. UNOCCUPIED TIME: MON-FRIDAY: 1800 - 0700 / WEEKEND: 0000 - 2400
   B. OR MANUALLY ACTIVATED BY USER FROM UTILITY MONITORING AND CONTROL SYSTEM (UMCS) FRONT-END.

3. DOAS UNOCCUPIED MODE:
   A. DURING THIS MODE, DOAS IS STOPPED AND REMAINS OFF THROUGHOUT THE UNOCCUPIED TIME PERIOD. WHEN THE DOAS IS DE-ENERGIZED THE FOLLOWING MUST OCCUR: SUPPLY FAN, EXHAUST FAN AND HEAT WHEEL MUST BE DE-ENERGIZED, OUTDOOR AIR INTAKE DAMPER AND EXHAUST AIR DAMPER MUST CLOSE, SUPPLY AND RETURN FIRE/SMOKE DAMPERS MUST CLOSE, COOLING AND HEATING VALVES MUST CLOSE, AND FREEZE PROTECTION PUMP MUST BE OFF. WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW 40°F (ADJ.), THE HEATING COIL FREEZE PROTECTION PUMP AND HEATING COIL CONTROL VALVE MUST BE CONTROLLED AS DESCRIBED BELOW.

4. DOAS OCCUPIED MODE: DURING THIS MODE, THE AIR HANDLING UNIT MUST OPERATE AS DESCRIBED BELOW.
   A. SUPPLY FANS CONTROL:
      a. SUPPLY FAN HAND-OFF-AUTO OPERATION: HAND-OFF-AUTO SETTINGS MUST BE PROVIDED AS PART OF THE VARIABLE FREQUENCY DRIVE (VFD) THROUGH THE DRIVE'S KEYPAD. BAS SYSTEM MUST MONITOR THE VFD HAND-OFF-AUTO POSITION AND ALARM IF THE SWITCH IS IN THE HAND OR OFF POSITION. IN THE OFF MODE, THE FAN MUST BE STOPPED AND ASSOCIATED OUTSIDE AIR DAMPER AND SUPPLY FIRE/SMOKE AIR DAMPER MUST BE CLOSED. IN THE HAND MODE, OUTSIDE AIR DAMPER AND SUPPLY FIRE/SMOKE AIR DAMPER MUST OPEN, AND THEIR POSITION SWITCHES MUST ENERGIZE THE SUPPLY FAN THROUGH A HARDWIRED INTERLOCK WITH THE DAMPER POSITION SWITCHES WHEN THE DAMPERS ARE FULLY OPEN. THE SUPPLY FAN MUST RUN AT THE SPEED SETPOINT MANUALLY SET AT VFD CONTROL PANEL. IN THE AUTO MODE, THE BAS MUST CONTROL THE SUPPLY FAN AS DESCRIBED BELOW. UPON ACTIVATION, SAFETIES MUST BE HARD WIRED TO THE VFD TO STOP SUPPLY FAN IN THE HAND AND AUTO MODES.
      b. SUPPLY FAN OPERATION AUTOMATIC MODE: THE BAS MUST COMMAND THE OPERATION OF THE SUPPLY FANS AND THE FANS MUST RUN WHENEVER THE AHU IS ENERGIZED IN ACCORDANCE WITH THE OCCUPANCY SCHEDULE. TO START THE FANS, THE BAS MUST SEND A COMMAND SIGNAL TO EACH SUPPLY FAN VFD, WHICH, THROUGH A HARDWIRE INTERLOCK, MUST OPEN THE OUTSIDE AIR DAMPER AND SUPPLY FIRE/SMOKE AIR DAMPER. ONCE DAMPERS ARE FULLY OPEN, AS SENSED BY ASSOCIATED DAMPER POSITION SWITCHES, SUPPLY FANS MUST BE ENERGIZED AND THE SUPPLY FANS MUST BE ALLOWED TO GO UNDER CONTROL. TO STOP THE SUPPLY FANS, THE BAS MUST SEND A STOP COMMAND TO EACH VFD AND DAMPER INTERLOCK MUST CLOSE THE OUTSIDE AIR DAMPER AND SUPPLY FIRE/SMOKE AIR DAMPER. WHEN THE DAMPERS ARE CLOSED, THE SUPPLY FANS MUST BE DE-ENERGIZED.
      c. SUPPLY FAN VFD SPEED CONTROL: WHEN THE SUPPLY FANS ARE STARTED, THE BAS MUST CONTROL THE SPEED OF EACH VFD IN UNISON TO MAINTAIN SUPPLY AIR FLOW RATE ACCORDING TO THE FOLLOWING RELATIONSHIP:

         SUPPLY AIRFLOW SETPOINT (CFM) = SUM OF CAV AIRFLOW RATES + SUM OF VAV AIRFLOW RATES

   B. A FAN INLET AIRFLOW MEASURING STATION MUST CONTINUOUSLY MONITOR THE SUPPLY AIR FAN VOLUME IN CFM AT EACH SUPPLY FAN AND SEND OUTPUT TO THE BAS.
   C. ON START AND STOP, THE VFD MUST RAMP TO SPEED AND SLOW DOWN WITHIN ADJUSTABLE ACCELERATION AND DECELERATION LIMITS. BAS MUST MONITOR A COMMON ALARM OUTPUT FROM THE VFD AND REPORT WHEN ACTIVE. WHEN THE SUPPLY FANS ARE STOPPED, THE BAS MUST SEND A SIGNAL TO SUPPLY FAN VFDs TO A SPEED OF ZERO.
   D. IF THE BAS SENSES THAT ONE OF THE SUPPLY FANS HAS FAILED THROUGH LOSS OF RUN STATUS OR THROUGH A LOSS OF AIR FLOW SENSED BY THE SUPPLY FAN AIR FLOW MEASURING STATION, THE REMAINING SUPPLY FAN MUST AUTOMATICALLY SPEED UP THE FAN TO DELIVER THE REQUIRED OPERATING CFM UNTIL THE FAILED SUPPLY FAN IS OPERATING AGAIN. WHEN THE FAILED SUPPLY FAN HAS RETURNED TO NORMAL OPERATION THE OPERATIONAL SUPPLY FAN MUST RETURN BACK TO NORMAL OPERATION.
   E. UPON FAILURE OF THE SUPPLY FAN SYSTEM, BAS MUST DE-ENERGIZE THE EXHAUST FAN SYSTEM AND ANNUNCIATE A CRITICAL ALARM.

5. EXHAUST FANS CONTROL:
   A. EXHAUST FAN HAND-OFF-AUTO OPERATION: HAND-OFF-AUTO SETTINGS MUST BE PROVIDED AS PART OF THE VARIABLE FREQUENCY DRIVE (VFD) THROUGH THE DRIVE'S KEYPAD. BAS SYSTEM MUST MONITOR THE VFD HAND-OFF-AUTO POSITION AND ALARM IF THE SWITCH IS IN THE HAND OR OFF POSITION. IN THE OFF MODE, THE FANS MUST BE STOPPED AND ASSOCIATED EXHAUST AIR DAMPER AND RETURN FIRE/SMOKE AIR DAMPER MUST BE CLOSED. IN THE HAND MODE, EXHAUST AIR DAMPER AND RETURN FIRE/SMOKE AIR DAMPER MUST OPEN, AND THEIR POSITION SWITCHES MUST ENERGIZE EXHAUST FAN THROUGH A HARDWIRED INTERLOCK WITH THE DAMPER POSITION SWITCHES WHEN THE DAMPERS ARE FULLY OPEN. THE EXHAUST FAN MUST RUN AT THE SPEED SETPOINT MANUALLY SET AT VFD CONTROL PANEL. IN THE AUTO MODE, THE BAS MUST CONTROL EACH EXHAUST FAN AS DESCRIBED BELOW. UPON ACTIVATION, SAFETIES MUST BE HARD WIRED TO THE VFDs TO STOP EXHAUST FANS IN THE HAND AND AUTO MODES.
   B. EXHAUST FAN OPERATION AUTOMATIC MODE: THE BAS MUST COMMAND THE OPERATION OF THE EXHAUST FANS AND THE FANS MUST BE ENABLED IN UNISON WITH THE SUPPLY FANS. TO START THE FANS, THE BAS MUST SEND A COMMAND SIGNAL TO EACH EXHAUST FAN VFD, WHICH, THROUGH A HARDWIRE INTERLOCK, MUST OPEN THE EXHAUST AIR DAMPER AND RETURN FIRE/SMOKE AIR DAMPER. ONCE DAMPERS ARE FULLY OPEN, AS SENSED BY ASSOCIATED DAMPER POSITION SWITCHES, EXHAUST FANS MUST BE ENERGIZED. TO STOP THE EXHAUST FANS, THE BAS MUST SEND A STOP COMMAND TO EACH VFD AND DAMPER INTERLOCK MUST CLOSE THE EXHAUST AIR DAMPER AND RETURN FIRE/SMOKE AIR DAMPER. WHEN THE DAMPERS ARE CLOSED, THE EXHAUST FANS MUST BE DE-ENERGIZED.
   C. EXHAUST FAN VFD SPEED CONTROL: ONCE THE STATUS OF EXHAUST FANS IS PROVEN, THE BAS MUST CONTROL THE SPEED OF THE EXHAUST FAN VFDs TO MAINTAIN THE EXHAUST AIR FLOW RATE ACCORDING TO THE FOLLOWING RELATIONSHIP:

      EXHAUST AIRFLOW SETPOINT (CFM) = SUPPLY AIRFLOW RATE - OFFSET (CFM)
      ***THIS OFFSET (CFM) MUST BE DETERMINED BY TAB CONTRACTOR DURING THE TESTING, ADJUSTING, AND BALANCING PROCESS.

   D. ON START AND STOP, THE VFD MUST RAMP TO SPEED AND SLOW DOWN WITHIN ADJUSTABLE ACCELERATION AND DECELERATION LIMITS. BCS MUST MONITOR A COMMON ALARM OUTPUT FROM THE VFD AND REPORT WHEN ACTIVE. WHEN THE SUPPLY FANS ARE STOPPED, THE BAS MUST SEND A SIGNAL TO SUPPLY FAN VFDs TO A SPEED OF ZERO.
   E. A FAN INLET AIRFLOW MEASURING STATION MUST CONTINUOUSLY MONITOR THE EXHAUST AIR FAN VOLUME IN CFM AT EACH EXHAUST FAN AND SEND OUTPUT TO THE BAS.
   F. IF THE BAS SENSES THAT ONE OF THE EXHAUST FANS HAS FAILED THROUGH LOSS OF RUN STATUS OR THROUGH A LOSS OF AIR FLOW SENSED BY THE EXHAUST FAN AIR FLOW MEASURING STATION, THE REMAINING EXHAUST FAN MUST AUTOMATICALLY SPEED UP THE FAN TO DELIVER THE REQUIRED OPERATING CFM UNTIL THE FAILED EXHAUST FAN IS OPERATING AGAIN. WHEN THE FAILED EXHAUST FAN HAS RETURNED TO NORMAL OPERATION THE OPERATIONAL EXHAUST FAN MUST RETURN BACK TO NORMAL OPERATION.
   F. UPON FAILURE OF THE EXHAUST FAN SYSTEM, BAS MUST DE-ENERGIZE THE SUPPLY FAN SYSTEM AND ANNUNCIATE AN ALARM.

6. DISCHARGE AIR TEMPERATURE SETPOINT RESET CONTROL:
   A. THE DISCHARGE AIR TEMPERATURE SETPOINT MUST RESET BASED ON THE OUTSIDE AIR TEMPERATURE. INITIAL DISCHARGE AIR TEMPERATURE SETPOINT WHEN TRANSITIONING INTO AN OCCUPIED MODE IS BASED ON THE FOLLOWING SCHEDULE:

OUTSIDE AIR TEMPERATURE:	DISCHARGE AIR TEMPERATURE SETPOINTS (ADJUSTABLE):
50 °F AND BELOW	65 °F
60 °F AND ABOVE	55 °F

7. PREHEAT COIL CONTROL:
   A. UNOCCUPIED MODE:
      a. WHEN THE UNIT IS OFF AND OA TEMPERATURE IS BELOW 45°F (ADJ.), THE BAS MUST MODULATE THE PREHEAT COIL VALVE TO MAINTAIN THE COIL LEAVING AIR TEMPERATURE SETPOINT, INITIALLY SET AT 60°F (ADJ.).
      b. WHEN THE UNIT IS OFF AND OA TEMPERATURE IS ABOVE 45°F (ADJ.), THE PREHEAT COIL VALVE MUST BE CLOSED.
   B. OCCUPIED MODE:
      a. WHEN THE AIR HANDLING UNIT IS ENABLED AND OA TEMPERATURE IS BELOW 45°F (ADJ.), THE BAS MUST CONTINUE MODULATE THE PREHEAT COIL VALVE TO MAINTAIN THE COIL LEAVING AIR TEMPERATURE AT THE COIL LEAVING AIR TEMPERATURE SETPOINT. ONCE THE SUPPLY FANS ARE UNDER CONTROL, THE BAS MUST MODULATE THE PREHEAT COIL VALVE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE AT THE DISCHARGE AIR TEMPERATURE SETPOINT.
      b. WHEN THE AIR HANDLING UNIT IS ENABLED AND OUTDOOR AIR TEMPERATURE IS ABOVE 45°F (ADJ.), THE BAS MUST MODULATE THE PREHEAT COIL VALVE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE AT THE DISCHARGE AIR THEMPERATURE SETPOINT.
      c. THE PREHEAT CONTROL VALVE OPERATION MUST NOT OVERLAP WITH THE COOLING VALVE OPERATION.

8. FREEZE PROTECTION PUMP CONTROL:
   A. PUMP HAND-OFF-AUTO OPERATION: AN HAND-OFF-AUTO (HOA) SWITCH MUST BE PROVIDED AS PART OF THE MOTOR STARTER. IN THE OFF MODE , THE PUMP MUST BE STOPPED. IN THE HAND MODE, THE PUMP MUST RUN CONTINUOUSLY. IN THE AUTO MODE, THE PUMP MUST BE STARTED AND STOPPED BY THE BAS AS DESCRIBED BELOW.
   B. PUMP AUTO OPERATION:
      a. REGARDLESS OF DOAS OPERATING MODE, BAS MUST COMMAND THE PUMP TO RUN CONTINUOUSLY WHENEVER THE OUTSIDE AIR TEMPERATURE IS BELOW 45°F (ADJ.).
      b. WHENEVER THE OUTSIDE AIR TEMPERATURE IS ABOVE 45°F (ADJ.), BAS MUST COMMAND THE PUMP TO STOP.
   C. THE BAS MUST MONITOR THE FREEZE PROTECTION PUMP STATUS THROUGH A CURRENT SWITCH LOCATED ON THE LOAD SIDE OF PUMP AND PROVE OPERATION OF PUMP. WHEN THE PUMP HAS BEEN RUNNING, THE PUMP DOES NOT PROVIDE A "PUMP RUNNING" STATUS AFTER A 120 SECOND (ADJ.) TIME DELAY, A PUMP FAILURE ALARM MUST BE ISSUED AT THE BAS AND THE PUMP START COMMAND MUST BE CANCELED.

9. CHILLED WATER COIL CONTROL:
   A. WHEN THE UNIT STATUS IS OFF, THE CHILLED WATER VALVE MUST BE CLOSED.
   B. WHEN THE UNIT STATUS IS ON, THE BAS MUST MODULATE THE CHILLED WATER VALVE AS REQUIRED TO MAINTAIN THE DISCHARGE AIR TEMPERATURE AT UNIT'S DISCHARGE AIR TEMPERATURE SET POINT.
   C. THE CHILLED WATER VALVE OPERATION MUST NOT OVERLAP WITH THE PREHEAT COIL VALVE OPERATION.

10. ENERGY RECOVERY WHEEL CONTROL:
   A. WHEN OUTSIDE AIR TEMPERATURE IS GREATER THAN 78°F (ADJ.), THE ENERGY RECOVERY WHEEL MUST RUN AT FULL SPEED.
   B. WHEN OUTSIDE AIR TEMPERATURE IS BETWEEN 50°F AND 78°F (ADJ.), THE ENERGY RECOVERY WHEEL MUST RUN AT MINIMUM SPEED. CONSULT WITH DOAS MANUFACTURER FOR ENERGY RECOVERY WHEEL MINIMUM SPEED.
   C. WHEN OUTSIDE AIR TEMPERATURE IS LESS THAN 50°F, THE ENERGY RECOVERY WHEEL MUST RUN AT FULL SPEED.
   D. WHEN OUTSIDE AIR TEMPERATURE IS LESS THAN 20°F (ADJ.) AND EXHAUST AIR RELATIVE HUMIDITY IS GREATER THAN 30% (ADJ.), OVERRIDE NORMAL ENERGY RECOVERY CONTROLS AND OPERATE THE WHEEL AT MINIMUM SPEED FOR 10 MINUTES PER HOUR. CONSULT WITH DOAS MANUFACTURER FOR FROST PROTECTION SETPOINTS.

11. SAFETIES AND ALARMS:
   A. FAN FAILURE:
      a. THE BAS MUST MONITOR THE FAN STATUS THROUGH A CURRENT SENSOR LOCATED AT VFD AND PROVE OPERATION OF FAN. IF UPON INITIAL START-UP, OR ONCE THE FAN HAS BEEN RUNNING, THE SUPPLY FAN DOES NOT PROVIDE A "FAN RUNNING" STATUS AFTER A 120 SECOND (ADJ.) TIME DELAY, A FAN FAILURE ALARM MUST BE ISSUED AT THE BAS AND THE FAN START COMMAND MUST BE CANCELED.
      b. THE BAS MUST MONITOR THE VFD DRIVE FAULT THROUGH THE LON INTERFACE TO EACH VFD. IF THE FAN IS RUNNING AND THE VFD DRIVE FAULT POINT GOES INTO ALARM AN ALARM MUST BE SENT TO THE BAS.
   B. ENERGY RECOVERY WHEEL FAILURE:
      a. THE BAS MUST MONITOR THE ENERGY RECOVERY WHEEL STATUS THROUGH A CURRENT SENSOR LOCATED AT VFD AND PROVE OPERATION OF WHEEL. IF UPON INITIAL START-UP, OR ONCE THE WHEEL HAS BEEN RUNNING, THE WHEEL DOES NOT PROVIDE A "WHEEL RUNNING" STATUS AFTER A 120 SECOND (ADJ.) TIME DELAY, A WHEEL FAILURE ALARM MUST BE ISSUED AT THE BAS AND THE WHEEL START COMMAND MUST BE CANCELED.
      b. THE BAS MUST MONITOR THE VFD DRIVE FAULT THROUGH THE LON INTERFACE TO WHEEL VFD. IF THE WHEEL IS RUNNING AND THE VFD DRIVE FAULT POINT GOES INTO ALARM AN ALARM MUST BE SENT TO THE BAS.
   C. HIGH/LOW PRESSURE ALARMING:
      a. HIGH STATIC PRESSURE SAFETY SWITCH ON SUPPLY FAN DISCHARGE MUST BE DIRECTLY WIRED THROUGH VFD CONTROL CIRCUIT TO SHUT DOWN SUPPLY FANS IMMEDIATELY. UPON DETECTION OF HIGH STATIC PRESSURE FROM THE SUPPLY STATIC PRESSURE SWITCH, THE FANS MUST STOP AND AN ALARM MUST BE SENT TO THE BAS. ONCE THE HIGH STATIC PRESSURE SWITCH IS MANUALLY RESET, THE UNIT MUST RETURN TO NORMAL CONTROL. PRESSURE SWITCH MUST BE MANUALLY SET TO TRIP AT +2" W.C. (ADJUSTABLE).
      b. LOW STATIC PRESSURE SAFETY SWITCH ON RETURN FAN SUCTION MUST BE DIRECTLY WIRED THROUGH VFD CONTROL CIRCUIT TO SHUT DOWN EXHAUST FANS IMMEDIATELY. UPON DETECTION OF LOW STATIC PRESSURE FROM THE RETURN STATIC PRESSURE SWITCH, THE FANS MUST STOP AND AN ALARM WILL BE SENT TO THE BAS. ONCE THE STATIC PRESSURE SWITCH IS MANUALLY RESET, THE UNIT MUST RETURN TO NORMAL CONTROL. PRESSURE SWITCH MUST BE MANUALLY SET TO TRIP AT -2" W.C. (ADJUSTABLE).
   D. FIRE ALARM/SMOKE DETECTOR SHUTDOWN:
      a. WHEN PARTICLES OF COMBUSTION ARE SENSED BY THE SUPPLY AIR DUCT SMOKE DETECTOR OR THE RETURN AIR DUCT SMOKE DETECTOR, A DUCT SMOKE ALARM SIGNAL MUST BE SENT TO THE FIRE ALARM SYSTEM. UPON RECEIVING AN ALARM SIGNAL FROM EITHER THE SUPPLY AIR DUCT SMOKE DETECTOR OR THE RETURN AIR DUCT SMOKE DETECTOR, THE FIRE ALARM SYSTEM MUST ACTIVATE A FIRE ALARM CONTROL MODULE (CM) TO STOP THE UNIT FANS. WHEN THE FIRE ALARM CONDITION HAS BEEN CLEARED AND THE FIRE ALARM SYSTEM HAS BEEN RESET, THE UNIT MUST BE RETURNED TO NORMAL OPERATION.
      b. SUPPLY AND RETURN AIR DUCT SMOKE DETECTORS MUST BE PROVIDED WITH AUXILIARY CONTACTS AND CONNECTED TO THE BAS. UPON ACTIVATION A CRITICAL ALARM MUST BE SENT TO THE BAS.
   E. LOW LIMIT TEMPERATURE (FREEZESTAT) PROTECTION:
      a. WHEN AIR TEMPERATURE DOWNSTREAM OF THE PREHEAT STEAM COIL DROPS BELOW 38 DEG F (ADJUSTABLE), AS SENSED BY LOW LIMIT THERMOSTAT, THE FOLLOWING MUST OCCUR:
         - THE SUPPLY AND EXHAUST FANS MUST BE DE-ENERGIZED.
         - THE OUTSIDE AND EXHAUST AIR DAMPERS MUST FULLY CLOSE.
         - THE SUPPLY AND RETURN FIRE/SMOKE DAMPERS MUST FULLY CLOSE.
         - HEATING HOT WATER CONTROL VALVE MUST FULLY OPEN.
         - FREEZE PROTECTION PUMP MUST START AND RUN CONTINUOUSLY.
         - DOAS-1 COOLING COIL CONTROL VALVE MUST FULLY OPEN; DOAS-2 COOLING COIL CONTROL VALVE MUST FULLY CLOSE.
         - A CRITICAL ALARM MUST BE SENT TO THE BAS.
         - THE LOW LIMIT THERMOSTAT MUST BE MANUALLY RESET FOR NORMAL OPERATION TO RESUME.
   F. FILTER ALARM:
      a. A DIFFERENTIAL PRESSURE SWITCH MUST MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE OUTDOOR AIR MERV 8 FILTER BANK WHEN THE FAN IS RUNNING. IF DURING NORMAL OPERATION THE DIFFERENTIAL AIR PRESSURE EXCEEDS FILTER CLEAN VALUE PLUS 0.25 INCHES WC (ADJUSTABLE) FOR 60 SECONDS (ADJUSTABLE), AN ALARM MUST BE SENT TO THE BAS.
      b. A DIFFERENTIAL PRESSURE SWITCH MUST MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE OUTDOOR AIR MERV 13 FILTER BANK WHEN THE FAN IS RUNNING. IF DURING NORMAL OPERATION THE DIFFERENTIAL AIR PRESSURE EXCEEDS FILTER CLEAN VALUE PLUS 0.25 INCHES WC (ADJUSTABLE) FOR 60 SECONDS (ADJUSTABLE), AN ALARM MUST BE SENT TO THE BAS.
      b. A DIFFERENTIAL PRESSURE SWITCH MUST MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE RETURN AIR FILTER BANK WHEN THE FAN IS RUNNING. IF DURING NORMAL OPERATION THE DIFFERENTIAL AIR PRESSURE EXCEEDS FILTER CLEAN VALUE PLUS 0.25 INCHES WC (ADJUSTABLE) FOR 60 SECONDS (ADJUSTABLE), AN ALARM MUST BE SENT TO THE BAS.
   G. AIRFLOW ALARMS:
      a. THE BAS MUST MONITOR THE AIR FLOW OF THE SUPPLY FAN WHENEVER THE DOAS IS RUNNING. AN ALARM MUST BE ANNUNCIATED AT THE BAS WHENEVER THE SUPPLY AIR FLOW RATE VARIES BY MORE THAN ±10% FROM ITS SET POINT.
      b. THE BAS MUST MONITOR THE AIR FLOW OF THE EXHAUST FAN WHENEVER THE DOAS IS RUNNING. AN ALARM MUST BE ANNUNCIATED AT THE BAS WHENEVER THE EXHAUST AIR FLOW RATE VARIES BY MORE THAN ±10% FROM ITS SET POINT.
   H. DUCT RETURN CO2 LEVEL ALARMS:
      a. IF RETURN CO2 LEVEL EXCEEDS OUTDOOR CO2 LEVEL BY MORE THAN 700 PPM (ADJUSTABLE), AN ALARM MUST BE ANNUNCIATED AT THE BAS.
   I. EMERGENCY AIR DISTRIBUTION SHUTDOWN:
      a. WHENEVER ANY OF EMERGENCY AIR DISTRIBUTION SHUTOFF SWITCHES IS ACTIVATED, THE BAS MUST SHUT DOWN DOAS-1 & DOAS-2 (ALL SUPPLY AND EXHAUST FANS ARE DE-ENERGIZED, OUTSIDE AND EXHAUST AIR DAMPERS ARE CLOSED, AND SUPPLY AND RETURN FIRE/SMOKE DAMPERS ARE CLOSED).
   J. DOAS STATUS (TO FIRE ALARM SYSTEM):
      a. VFD CURRENT SENSORS INSTALLED ON THE LOAD SIDE OF THE SUPPLY FAN VFDs MUST SEND SUPPLY FAN STATUS SIGNALS TO THE FIRE ALAM SYSTEM. UPON RECEIVING A STATUS SIGNAL FROM VFD CURRENT SENSORS WHEN SUPPLY FANS ARE OFF, THE FIRE ALARM SYSTEM MUST ACTIVATED THE FIRE ALARM CONTROL MODULES TO CLOSE ALL FIRE/SMOKE DAMPERS ASSOCIATED WITH RESPECTIVE DOAS.

US Army Corps of Engineers ®

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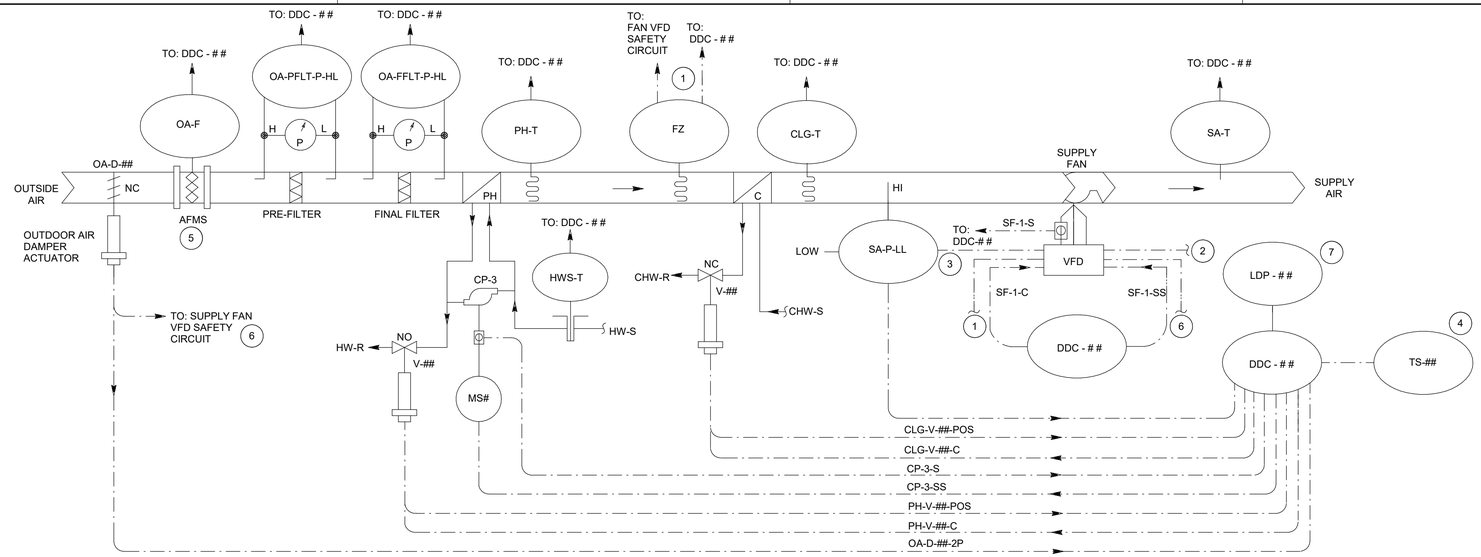

C2 MAU-1 - CONTROL DIAGRAM

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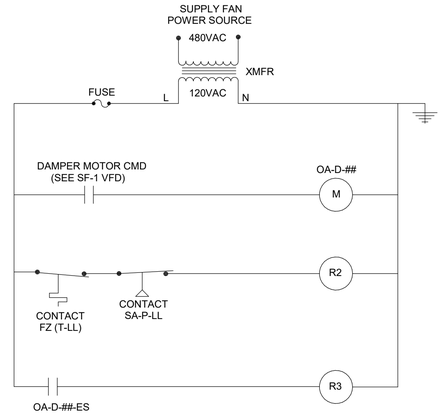
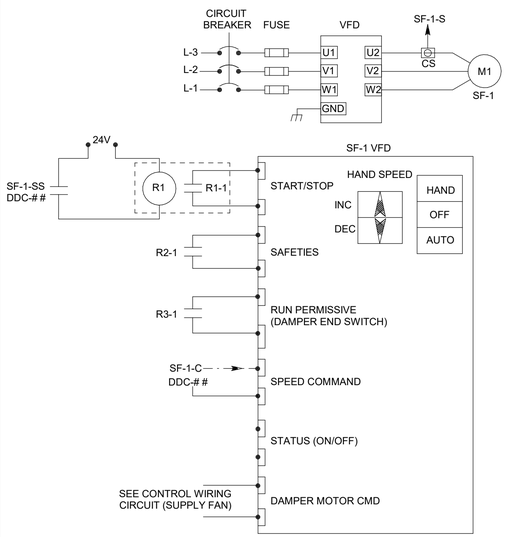


C4 MAU-1 WIRING DIAGRAM 8

NTS



MAU-1 SEQUENCES OF OPERATION

1. GENERAL:
   - A. THE MAKE-UP AIR UNIT 1 (MAU-1) IS DESIGNED TO PROVIDE CONDITIONED OUTSIDE VENTILATION AIR TO THE ELECTRICAL AND MECHANICAL ROOMS.
   - B. THE MAU-1 MUST BE FULLY CONTROLLED BY THE BAS. THE CONTROLS MUST CONTAIN ALGORITHMS TO MAINTAIN ACCURATE TEMPERATURE CONTROL AND MINIMIZE DRIFT FROM SET POINT.
   - C. THE CONTROLS CONTRACTOR MUST BE RESPONSIBLE FOR PROVIDING PROGRAMMING AND GRAPHICAL DISPLAYS NECESSARY TO IMPLEMENT THE DOAS INTO THE BAS.
2. MAU-1 OPERATIONAL MODE: MAU-1 MUST BE AUTOMATICALLY OR MANUALLY ENABLED/DISABLED THROUGH BAS AND IT MUST RUN 24 HOURS A DAY, YEAR-ROUND.
3. FAN OPERATION:
   - A. SUPPLY FAN HAND-OFF-AUTO OPERATION; HAND-OFF-AUTO SETTINGS MUST BE PROVIDED AS PART OF THE VARIABLE FREQUENCY DRIVE (VFD) THROUGH THE DRIVE'S KEYPAD. BAS SYSTEM MUST MONITOR THE VFD HAND-OFF-AUTO POSITION AND ALARM IF THE SWITCH IS IN THE HAND OR OFF POSITION. IN THE OFF MODE, THE FAN MUST BE STOPPED AND ASSOCIATED OUTSIDE AIR DAMPER MUST BE CLOSED. IN THE HAND MODE, OUTSIDE AIR DAMPER MUST OPEN AND ITS POSITION SWITCH MUST ENERGIZE THE SUPPLY FAN THROUGH A HARD-WIRED INTERLOCK WITH THE DAMPER POSITION SWITCH WHEN THE DAMPER IS FULLY OPEN. THE SUPPLY FAN MUST RUN AT THE SPEED SETPOINT MANUALLY SET AT VFD CONTROL PANEL. IN THE AUTO MODE, THE BAS MUST CONTROL THE SUPPLY FAN AS DESCRIBED BELOW. UPON ACTIVATION, SAFETIES MUST BE HARD WIRED TO THE VFD TO STOP SUPPLY FAN IN THE HAND AND AUTO MODES.
   - B. SUPPLY FAN OPERATION AUTOMATIC MODE: THE BAS MUST CONTROL THE STARTING AND STOPPING OF THE SUPPLY FAN. TO START THE SUPPLY FAN, THE BAS MUST SEND A COMMAND SIGNAL TO SUPPLY FAN VFD, WHICH, THROUGH A HARDWIRE INTERLOCK, MUST OPEN THE OUTSIDE AIR DAMPER. ONCE DAMPER IS FULLY OPEN, AS SENSED BY ASSOCIATED DAMPER POSITION SWITCH, SUPPLY FAN MUST BE ENERGIZED AND THE SUPPLY FAN MUST BE ALLOWED TO GO UNDER CONTROL. TO STOP THE SUPPLY FANS, THE BAS MUST SEND A STOP COMMAND TO SUPPLY FAN VFD AND DAMPER INTERLOCK MUST CLOSE THE OUTSIDE AIR DAMPER. WHEN THE DAMPER IS CLOSED, THE SUPPLY FAN MUST BE DE-ENERGIZED.
   - C. SUPPLY FAN VFD SPEED CONTROL: WHEN THE SUPPLY FAN IS STARTED, THE BAS MUST CONTROL THE SPEED OF SUPPLY FAN VFD TO A FIXED VALUE DETERMINED BY TAB CONTRACTOR TO MEET SCHEDULED FLOW AND FAN PERFORMANCE SCHEDULES. ON START AND STOP, THE VFD MUST RAMP TO SPEED AND SLOW DOWN WITHIN ADJUSTABLE ACCELERATION AND DECELERATION LIMITS. BAS MUST MONITOR A COMMON ALARM OUTPUT FROM THE VFD AND REPORT WHEN ACTIVE. WHEN THE SUPPLY FAN IS STOPPED, THE BAS MUST SEND A SIGNAL TO SUPPLY FAN VFD TO A SPEED OF ZERO.
4. CHILLED WATER COIL CONTROL:
   - A. WHEN THE DOAS IS ENABLED AND THE SPACE AIR TEMPERATURE IS ABOVE SPACE TEMPERATURE COOLING SETPOINT, INITIALLY SET AT 85 °F (ADJ.), THE BAS MUST MODULATE THE CHILLED WATER VALVE AS REQUIRED TO MAINTAIN THE SPACE AIR TEMPERATURE AT SPACE AIR TEMPERATURE COOLING SET POINT.
   - B. THE CHILLED WATER VALVE OPERATION MUST NOT OVERLAP WITH THE PREHEAT COIL VALVE OPERATION.
5. PREHEAT COIL CONTROL:
   - A. WHEN THE MAU IS COMMANDED TO START AND OUTSIDE AIR TEMPERATURE IS BELOW 45°F (ADJ.), PRIOR TO THE SUPPLY FAN STARTING AND/OR OUTSIDE AIR DAMPER OPENING, THE BAS MUST MODULATE THE PREHEAT COIL VALVE TO MAINTAIN THE COIL LEAVING AIR TEMPERATURE AT THE COIL LEAVING AIR TEMPERATURE SETPOINT, INITIALLY SET AT 60 °F (ADJ.). ONCE THE SUPPLY FAN IS UNDER CONTROL, THE BAS MUST MODULATE THE PREHEAT COIL VALVE TO MAINTAIN THE SPACE AIR TEMPERATURE AT SPACE TEMPERATURE HEATING SETPOINT TO SET AT 60 °F (ADJ.).
   - B. WHEN THE MAU IS COMMANDED TO START AND OA TEMPERATURE IS ABOVE 45°F (ADJ.), THE BAS MUST MODULATE THE PREHEAT COIL VALVE AS REQUIRED TO MAINTAIN THE SPACE AIR TEMPERATURE AT SPACE TEMPERATURE HEATING SETPOINT.
   - C. THE PREHEAT CONTROL VALVE OPERATION MUST NOT OVERLAP WITH THE COOLING VALVE OPERATION.
6. FREEZE PROTECTION PUMP CONTROL:
   - A. PUMP HAND-OFF-AUTO OPERATION: AN HAND-OFF-AUTO (HOA) SWITCH MUST BE PROVIDED AS PART OF THE MOTOR STARTER. IN THE OFF MODE , THE PUMP MUST BE STOPPED. IN THE HAND MODE, THE PUMP MUST RUN CONTINUOUSLY. IN THE AUTO MODE, THE PUMP MUST BE STARTED AND STOPPED BY THE BAS AS DESCRIBED BELOW.
   - B. PUMP AUTO OPERATION:
     - a. REGARDLESS OF MAU STATUS, BAS MUST COMMAND THE PUMP TO RUN CONTINUOUSLY WHENEVER THE OUTSIDE AIR TEMPERATURE IS BELOW 45°F (ADJ.).
     - b. WHENEVER THE OUTSIDE AIR TEMPERATURE IS ABOVE 45°F (ADJ.), BAS MUST COMMAND THE PUMP TO STOP.
   - C. THE BAS MUST MONITOR THE FREEZE PROTECTION PUMP STATUS THROUGH A CURRENT SWITCH LOCATED ON THE LOAD SIDE OF PUMP AND PROVE OPERATION OF PUMP. WHEN THE PUMP HAS BEEN RUNNING, THE PUMP DOES NOT PROVIDE A "PUMP RUNNING" STATUS AFTER A 120 SECOND (ADJ.) TIME DELAY, A PUMP FAILURE ALARM MUST BE ISSUED AT THE BAS AND THE PUMP START COMMAND MUST BE CANCELED.
7. SAFETIES AND ALARMS:
   - A. FAN FAILURE:
     - a. THE BAS MUST MONITOR THE FAN STATUS THROUGH A CURRENT SENSOR LOCATED AT VFD AND PROVE OPERATION OF FAN. IF UPON INITIAL START-UP, OR ONCE THE FAN HAS BEEN RUNNING, THE SUPPLY FAN DOES NOT PROVIDE A "FAN RUNNING" STATUS AFTER A 120 SECOND (ADJ.) TIME DELAY, A FAN FAILURE ALARM MUST BE ISSUED AT THE BAS AND THE FAN START COMMAND MUST BE CANCELED.
     - b. THE BAS MUST MONITOR THE VFD DRIVE FAULT THROUGH THE VFD LON INTERFACE. IF THE FAN IS RUNNING AND THE VFD DRIVE FAULT POINT GOES INTO ALARM AN ALARM MUST BE SENT TO THE BAS.
   - B. LOW PRESSURE ALARM:
     - a. LOW STATIC PRESSURE SAFETY SWITCH ON SUPPLY FAN SUCTION MUST BE DIRECTLY WIRED THROUGH VFD CONTROL CIRCUIT TO SHUT DOWN SUPPLY FAN IMMEDIATELY. UPON DETECTION OF LOW STATIC PRESSURE FROM THE STATIC PRESSURE SWITCH, THE FAN MUST STOP AND AN ALARM WILL BE SENT TO THE BAS. ONCE THE STATIC PRESSURE SWITCH IS MANUALLY RESET, THE UNIT MUST RETURN TO NORMAL CONTROL. PRESSURE SWITCH MUST BE MANUALLY SET TO TRIP AT -2" W.C. (ADJUSTABLE).
   - C. LOW LIMIT TEMPERATURE (FREEZESTAT) PROTECTION:
     - a. WHEN AIR TEMPERATURE DOWNSTREAM OF THE PREHEAT STEAM COIL DROPS BELOW 38°F (ADJ.), AS SENSED BY LOW LIMIT THERMOSTAT, THE FOLLOWING MUST OCCUR:
       - THE SUPPLY FAN MUST BE DE-ENERGIZED.
       - THE OUTSIDE AIR DAMPER MUST FULLY CLOSE.
       - HEATING HOT WATER CONTROL VALVE MUST FULLY OPEN.
       - COOLING COIL CONTROL VALVE MUST FULLY CLOSE.
       - FREEZE PROTECTION PUMP MUST START AND RUN CONTINUOUSLY.
       - A CRITICAL ALARM MUST BE SENT TO THE BAS.
       - THE LOW LIMIT THERMOSTAT MUST BE MANUALLY RESET FOR NORMAL OPERATION TO RESUME.
   - D. FILTER ALARM:
     - a. A DIFFERENTIAL PRESSURE SWITCH MUST MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE OUTDOOR AIR MERV 8 FILTER BANK WHEN THE FAN IS RUNNING. IF DURING NORMAL OPERATION THE DIFFERENTIAL AIR PRESSURE EXCEEDS FILTER CLEAN VALUE PLUS 0.25 INCHES WC (ADJUSTABLE) FOR 60 SECONDS (ADJUSTABLE), AN ALARM MUST BE SENT TO THE BAS.
     - b. A DIFFERENTIAL PRESSURE SWITCH MUST MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE OUTDOOR AIR MERV 13 FILTER BANK WHEN THE FAN IS RUNNING. IF DURING NORMAL OPERATION THE DIFFERENTIAL AIR PRESSURE EXCEEDS FILTER CLEAN VALUE PLUS 0.25 INCHES WC (ADJUSTABLE) FOR 60 SECONDS (ADJUSTABLE), AN ALARM MUST BE SENT TO THE BAS.
   - E. AIRFLOW ALARM:
     - a. THE BAS MUST MONITOR THE OUTSIDE AIR FLOW MEASURING STATION AND AN ALARM MUST BE ANNUNCIATED AT THE BAS WHENEVER THE OUTSIDE AIR FLOW RATE VARIES BY MORE THAN 10% FROM ITS SET POINT.
   - F. EMERGENCY AIR DISTRIBUTION SHUTDOWN:
     - a. WHENEVER EMERGENCY AIR DISTRIBUTION SHUTOFF IS ACTIVATED, THE BAS MUST NOT SHUT DOWN MAU-1 AND THE UNIT MUST CONTINUE TO OPERATE TO PROVIDE VENTILATION AIR TO BATTERIES LOCATED IN ELECTRICAL ROOM.

GENERAL NOTES

1. REFER TO M-001 AND M-801 FOR LEGEND AND GENERAL NOTES..
2. REFER TO M-830 FOR MAU-1 POINTS SCHEDULE.
3. PROVIDE LOW LEAKAGE AIR DAMPERS TO MEET ATFP REQUIRMENTS.

KEYNOTES

1 PROVIDE COVERAGE OF 12 INCHES OF ACTIVE ELEMENT PER SQUARE FOOT OF COIL. HARDWIRE INTERLOCK FREEZESTAT WITH SUPPLY FAN VFDS TO STOP FANS WHEN FREEZESTAT IS ACTIVATED.

2 CONNECT VFD LONWORKS COMMUNICATION INTERFACE TO BAS LONWORKS NETWORK. PROVIDE VFD MONITORING POINTS INDICATED IN THE POINTS SCHEDULE TO THE BAS THROUGH THE COMMUNICATION INTERFACE.

3 PROVIDE HARDWIRE INTERLOCK BETWEEN SUPPLY FAN VFD AND LOW PRESSURE SWITCH. IF SWITCH IS ACTIVATED ON A LOW DUCT PRESSURE CONDITION, THE SUPPLY FAN MUST BE DISABLE. FAN MUST BE STOPPED IN EITHER HAND OR AUTO MODE.

4 PROVIDE SPACE TEMPERATURE SENSOR FOR SPACE TEMPERATURE CONTROL AND MONITORING. SEE MECHANICAL FLOOR PLAN FOR SPACE TEMPERATURE SENSOR'S LOCATION.

5 PROVIDE AIRFLOW MEASURING STATION (AFMS) IN MAU-1 OUTSIDE DUCT. INSTALL AND CONNECT AFMS IN ACCORDANCE WITH REQUIREMENTS AND INSTRUCTIONS PROVIDED BY THE AFMS MANUFACTURER.

6 PROVIDE HARDWIRE INTERLOCK BETWEEN SUPPLY FAN VFD AND OUTSIDE AIR DAMPER. FAN MUST STOP IF THE OUTSIDE AIR DAMPER CLOSES.

7 PROVIDE LOCAL DISPLAY PANEL AND CONNECT TO MAU-1 CONTROLLER.

KEYNOTES

8 THE WIRING DIAGRAMS ARE SHOWN/PROVIDED AS A GUIDE TO THE BUILDING CONTROLS CONTRACTOR. THE CONTRACTOR MUST DEVELOP THE WIRING DIAGRAMS TO BE PROJECT SPECIFIC AND CONSISTENT WITH THE PROJECT SUBMITTALS.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

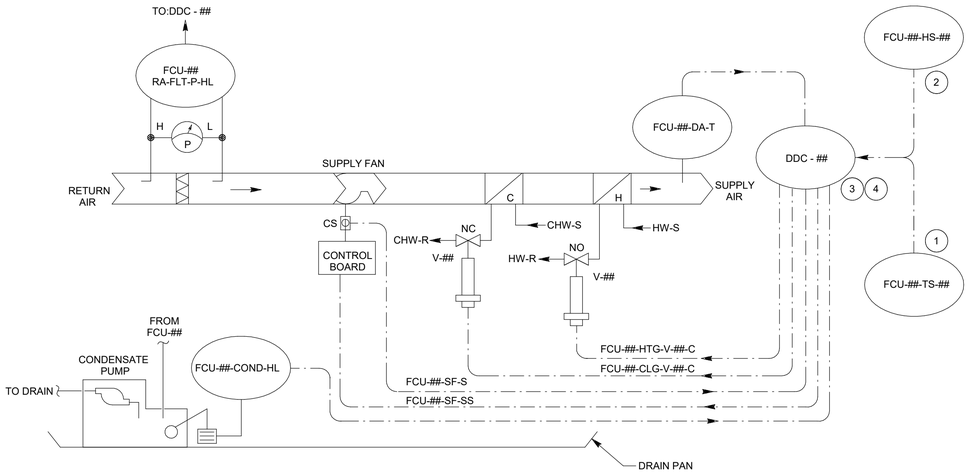
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL DIAGRAM

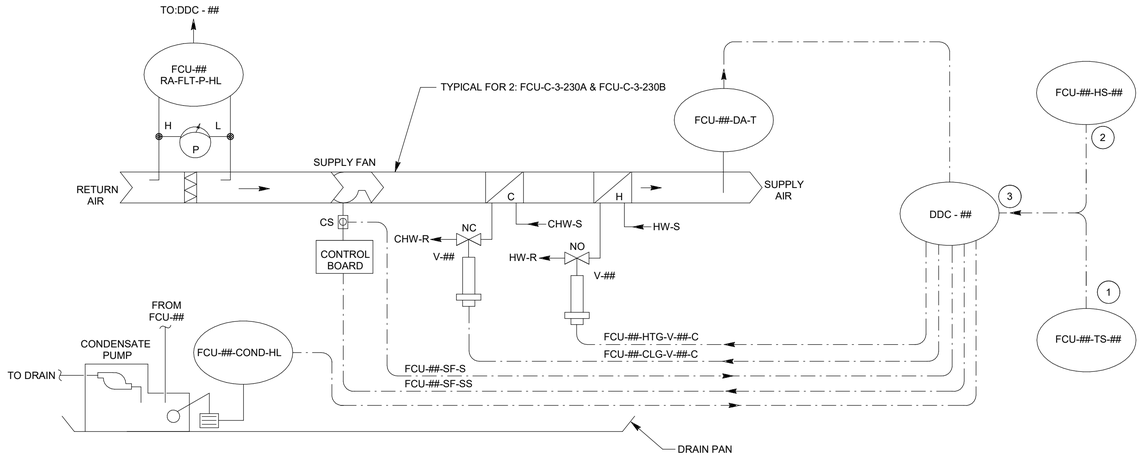
SHEET ID

M-809

REVISED RTA SUBMISSION 03/01/2023



C1 4-PIPE FAN COIL UNIT (TYPICAL) - CONTROL DIAGRAM
NTS



C4 4-PIPE FAN COIL UNITS (ROOM 230) - CONTROL DIAGRAM
NTS

4-PIPE FAN COIL UNIT (TYPICAL) SEQUENCES OF OPERATION

1. GENERAL:
   - A. THE FOUR-PIPE FAN COIL UNIT (FCU) MUST BE CONTROLLED BY BAS AS SHOWN ON THE CONTROL DIAGRAM.
   - B. THE BAS MUST COMMAND THE FCU IN OCCUPIED/UNOCCUPIED MODE OF OPERATION VIA A TIME SCHEDULING PROGRAM. SCHEDULE MUST BE THE SAME AS THE PARENT DOAS.
   - C. ZONE TEMPERATURE AND HUMIDITY SENSORS MUST TRANSMIT SPACE TEMPERATURE AND HUMIDITY INFORMATION TO THE BAS.
   - D. SET POINTS (ADJUSTABLE):
     HEATING: OCCUPIED - 68°F, UNOCCUPIED - 60°F
     COOLING: OCCUPIED - 75°F, UNOCCUPIED - 80°F
2. OCCUPIED MODE:
   - A. THE BAS MUST SEND A COMMAND SIGNAL TO THE FAN COIL UNIT SPEED CONTROLLER AND THE FAN MUST RUN CONTINUOUSLY AT SPEED INDICATED ON FAN COIL UNIT SCHEDULE.
   - B. COOLING MODE: WHEN SPACE TEMPERATURE IN THE AREA SERVED BY THE FAN COIL UNIT RISES ABOVE THE SPACE TEMPERATURE COOLING SETPOINT, THE BAS MUST COMMAND FCU COOLING COIL CONTROL VALVE TO MODULATE OPEN TO MAINTAIN THE SPACE TEMPERATURE COOLING SETPOINT. WHEN SPACE TEMPERATURE IS SATISFIED, THE FCU COOLING COIL CONTROL VALVES MUST MODULATE TOWARD THE CLOSED POSITION.
   - C. DEHUMIDIFICATION MODE: DURING COOLING MODE, IF THE SPACE HUMIDITY RISES ABOVE THE SPACE HUMIDITY SET POINT, INITIALLY SET AT 50 %RH (ADJUSTABLE), DEHUMIDIFICATION MODE MUST BE ENABLED. THE BAS MUST INCREASE COOLING TO 100% AND MODULATE THE REHEAT COIL TO HELP WITH SPACE OVER COOLING DUE TO THE DEHUMIDIFICATION PROCESS. WHEN THE SPACE HUMIDITY FALLS BELOW THE SET POINT, REHEAT COIL VALVE MUST CLOSE AND CONTROL OF THE CHILLED WATER VALVE MUST RETURN TO NORMAL OPERATION.
   - D. HEATING MODE: WHEN SPACE TEMPERATURE IN THE AREA SERVED BY THE FAN COIL UNIT DROPS BELOW THE SPACE TEMPERATURE HEATING SETPOINT, THE BAS MUST MODULATE FAN COIL UNIT HOT WATER VALVE AS REQUIRED TO MAINTAIN THE SPACE AIR TEMPERATURE AT THE SPACE HEATING SET POINT. WHEN AVERAGE SPACE TEMPERATURE IS SATISFIED, THE FCU HEATING COIL CONTROL VALVE MUST MODULATE TOWARD THE CLOSED POSITION.
   - E. THE FCU COOLING AND HEATING VALVES MUST NOT MODULATE UNTIL THE FAN OPERATION HAS BEEN PROVED.
   - F. THE HEATING AND COOLING CONTROL VALVES MUST MODULATE IN SEQUENCE WITHOUT OVERLAP AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.
   - G. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 80°F (ADJUSTABLE) OR DROPS BELOW 63°F (ADJUSTABLE).
3. UNOCCUPIED MODE:
   - A. THE FAN COIL UNIT MUST BE OFF AND THE COOLING VALVE AND HEATING VALVE MUST BE CLOSED, UNLESS THE SPACE TEMPERATURE FALLS OUTSIDE OF THE UNOCCUPIED MODE TEMPERATURE RANGE.
   - B. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED COOLING SETPOINT, THE FAN COIL UNIT MUST BE ENERGIZED AND THE COOLING VALVE MUST OPEN. WHEN THE SPACE TEMPERATURE DROPS BELOW THE UNOCCUPIED COOLING SET-POINT, THE FAN MUST BE DE-ENERGIZED AND THE COOLING VALVE MUST CLOSE.
   - C. WHEN THE SPACE TEMPERATURE DROPS BELOW THE UNOCCUPIED HEATING SETPOINT, THE FAN MUST BE ENERGIZED AND THE HEATING VALVE MUST OPEN. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED HEATING SETPOINT, THE FAN MUST BE DE-ENERGIZED AND THE HEATING VALVE MUST CLOSE.
   - D. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 85°F (ADJUSTABLE) OR DROPS BELOW 55°F (ADJUSTABLE).
4. OCCUPANCY OVERRIDE:
   - A. IT MUST BE POSSIBLE, THROUGH THE FAN COIL UNIT SPACE TEMPERATURE SENSOR BY PRESSING THE PUSH BUTTON, TO INITIATE AN AFTER-HOUR OVERRIDE DURING THE UNOCCUPIED PERIOD. WHEN THE OCCUPANCY OVERRIDE BUTTON ON THE SPACE TEMPERATURE IS DEPRESSED MOMENTARILY DURING THE UNOCCUPIED PERIOD, THE FAN COIL UNIT MUST BE INDEXED TO THE OCCUPIED PERIOD FOR 60 MINUTES (ADJ.). REFER TO THERMOSTAT SCHEDULE ON SHEET M-847 FOR SPACES WITH OCCUPANCY OVERRIDE.
5. FAN STATUS:
   - A. A CURRENT SENSOR MUST BE USED TO MONITOR THE STATUS OF THE FAN. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM MUST BE GENERATED AND SENT TO THE BAS AND THE FAN START COMMAND MUST BE CANCELED.
6. CONDENSATE HIGH LEVEL ALARM:
   - A. THE CONDENSATE PUMP MUST RUN WHENEVER A DEFINED AMOUNT OF CONDENSATE IS SENSED. IF THE HIGH LIMIT FLOAT DEVICE DETECTS THAT THE CONDENSATE REACHES OR EXCEEDS THE PUMP OPERATING LEVEL, AN ALARM MUST BE GENERATED AT THE BAS AND THE BAS MUST DE-ENERGIZE THE FCU FAN AND CLOSE THE COOLING VALVE.

4-PIPE FAN COIL UNITS (ROOM 230) SEQUENCES OF OPERATION

1. GENERAL:
   - A. THE FOUR-PIPE FAN COIL UNITS (FCUs) MUST BE CONTROLLED BY BAS AS SHOWN ON THE CONTROL DIAGRAM AND OPERATE AS ONE SYSTEM.
   - B. THE BAS MUST COMMAND THE SYSTEM IN OCCUPIED/UNOCCUPIED MODE OF OPERATION VIA A TIME SCHEDULING PROGRAM. SCHEDULE MUST BE THE SAME AS THE PARENT DOAS.
   - C. ZONE TEMPERATURE AND HUMIDITY SENSORS MUST TRANSMIT SPACE TEMPERATURE AND HUMIDITY INFORMATION TO THE BAS.
   - D. SET POINTS (ADJUSTABLE):
     HEATING: OCCUPIED - 68°F, UNOCCUPIED - 60°F
     COOLING: OCCUPIED - 75°F, UNOCCUPIED - 80°F
2. OCCUPIED MODE:
   - A. THE BAS MUST SEND A COMMAND SIGNAL TO EACH FAN COIL UNIT SPEED CONTROLLER AND THE FAN MUST RUN CONTINUOUSLY AT SPEED INDICATED ON FAN COIL UNIT SCHEDULE.
   - B. COOLING MODE: WHEN AVERAGE SPACE TEMPERATURE IN THE AREA SERVED BY THE FAN COIL UNITS RISES ABOVE THE SPACE TEMPERATURE COOLING SETPOINT, THE BAS MUST COMMAND FCU COOLING COIL CONTROL VALVES TO MODULATE OPEN TO MAINTAIN THE SPACE TEMPERATURE COOLING SETPOINT. WHEN AVERAGE SPACE TEMPERATURE IS SATISFIED, THE FCU COOLING COIL CONTROL VALVES MUST MODULATE TOWARD THE CLOSED POSITION.
   - C. DEHUMIDIFICATION MODE: DURING COOLING MODE, IF THE AVERAGE SPACE HUMIDITY IN THE AREA SERVED BY THE FAN COIL UNITS RISES ABOVE THE SPACE HUMIDITY SET POINT, INITIALLY SET AT 50 %RH (ADJUSTABLE), DEHUMIDIFICATION MODE MUST BE ENABLED. THE BAS MUST INCREASE COOLING TO 100% AND MODULATE THE REHEAT COIL VALVES TO HELP WITH SPACE OVER COOLING DUE TO THE DEHUMIDIFICATION PROCESS. WHEN AVERAGE SPACE HUMIDITY FALLS BELOW THE SET POINT, REHEAT COIL VALVES MUST CLOSE AND CONTROL OF THE CHILLED WATER VALVES MUST RETURN TO NORMAL OPERATION.
   - D. HEATING MODE: WHEN AVERAGE SPACE TEMPERATURE IN THE AREA SERVED BY THE FAN COIL UNITS DROPS BELOW THE SPACE TEMPERATURE HEATING SETPOINT, THE BAS MUST MODULATE FAN COIL UNIT HOT WATER VALVES AS REQUIRED TO MAINTAIN THE SPACE AIR TEMPERATURE AT THE SPACE HEATING SET POINT. WHEN AVERAGE SPACE TEMPERATURE IS SATISFIED, THE FCU HEATING COIL CONTROL VALVES MUST MODULATE TOWARD THE CLOSED POSITION.
   - E. THE FCU COOLING AND HEATING VALVES MUST NOT MODULATE UNTIL THE FAN OPERATION HAS BEEN PROVED.
   - F. THE HEATING AND COOLING CONTROL VALVES MUST MODULATE IN SEQUENCE WITHOUT OVERLAP AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.
   - G. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 80°F (ADJUSTABLE) OR DROPS BELOW 63°F (ADJUSTABLE).
3. UNOCCUPIED MODE:
   - A. THE FAN COIL UNITS MUST BE OFF AND THE COOLING VALVE AND HEATING VALVE MUST BE CLOSED, UNLESS THE AVERAGE SPACE TEMPERATURE FALLS OUTSIDE OF THE UNOCCUPIED MODE TEMPERATURE RANGE.
   - B. WHEN THE AVERAGE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED COOLING SETPOINT, THE FAN COIL UNITS MUST BE ENERGIZED AND THE COOLING VALVES MUST OPEN. WHEN THE AVERAGE SPACE TEMPERATURE DROPS BELOW THE UNOCCUPIED COOLING SETPOINT, THE FAN COIL UNITS MUST BE DE-ENERGIZED AND THE COOLING VALVES MUST CLOSE.
   - C. WHEN THE AVERAGE SPACE TEMPERATURE DROPS BELOW THE UNOCCUPIED HEATING SETPOINT, THE FAN COIL UNITS MUST BE ENERGIZED AND THE HEATING VALVES MUST OPEN. WHEN THE AVERAGE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED HEATING SETPOINT, THE FAN COIL UNITS MUST BE DE-ENERGIZED AND THE HEATING VALVES MUST CLOSE.
   - D. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 85°F (ADJUSTABLE) OR DROPS BELOW 55°F (ADJUSTABLE).
4. OCCUPANCY OVERRIDE:
   - A. IT MUST BE POSSIBLE, THROUGH THE FAN COIL UNIT SPACE TEMPERATURE SENSORS BY PRESSING THE PUSH BUTTON, TO INITIATE AN AFTER-HOUR OVERRIDE DURING THE UNOCCUPIED PERIOD. WHEN THE OCCUPANCY OVERRIDE BUTTON ON THE SPACE TEMPERATURE IS DEPRESSED MOMENTARILY DURING THE UNOCCUPIED PERIOD, THE FAN COIL UNIT MUST BE INDEXED TO THE OCCUPIED PERIOD FOR 60 MINUTES (ADJ.).
5. FAN STATUS:
   - A. A CURRENT SENSOR MUST BE USED TO MONITOR THE STATUS OF THE FAN. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM MUST BE GENERATED AND SENT TO THE BAS AND THE FAN START COMMAND MUST BE CANCELED.
6. CONDENSATE HIGH LEVEL ALARM:
   - A. THE CONDENSATE PUMP MUST RUN WHENEVER A DEFINED AMOUNT OF CONDENSATE IS SENSED. IF THE HIGH LIMIT FLOAT DEVICE DETECTS THAT THE CONDENSATE REACHES OR EXCEEDS THE PUMP OPERATING LEVEL, AN ALARM MUST BE GENERATED AT THE BAS AND THE BAS MUST DE-ENERGIZE THE FCU FAN AND CLOSE THE COOLING VALVE.

GENERAL NOTES

1. REFER TO SHEETS M-001 AND M-801 FOR LEGEND AND GENERAL NOTES.
2. REFER TO SHEET M-831 FOR 4-PIPE FAN COIL UNIT (TYPICAL) POINTS SCHEDULE.
3. REFER TO SHEET M-831 FOR 4-PIPE FAN COIL UNITS (ROOM 230) POINTS SCHEDULE.

KEYNOTES

1 PROVIDE SPACE TEMPERATURE SENSOR FOR SPACE TEMPERATURE CONTROL AND MONITORING. SEE MECHANICAL FLOOR PLANS FOR SPACE TEMPERATURE SENSOR'S LOCATION.

2 PROVIDE SPACE HUMIDITY SENSOR FOR SPACE HUMIDITY CONTROL AND MONITORING. SEE MECHANICAL FLOOR PLANS FOR SPACE HUMIDITY SENSOR'S LOCATION.

3 INSTALL DDC CONTROLLER IN FCU CONTROL ENCLOSURE. SEE MECHANICAL PIPING FLOOR PLANS FOR FCU LOCATIONS.

4 INSTALL DDC CONTROLLER IN WALL MOUNTED ENCLOSURE FOR FCU-G-1-### SYSTEMS (TYPICAL FOR 10). SEE MECHANICAL PIPING FLOOR PLANS FOR ENCLOSURE LOCATIONS.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-18-R-0014
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FILE NUMBER:
SIZE: ANSI D
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

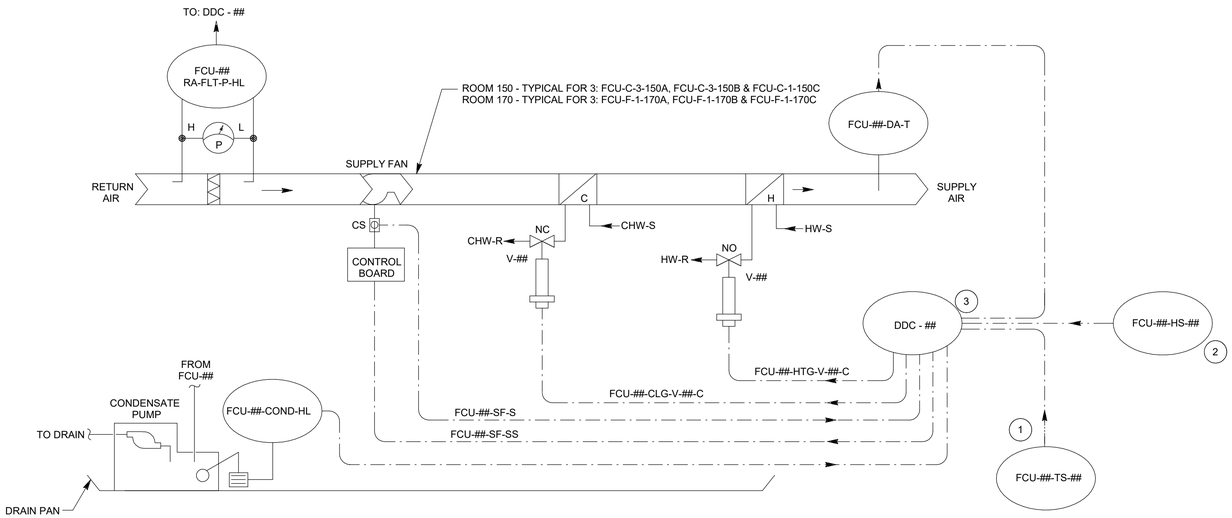
JACOBS / EWING COLE A Joint Venture

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

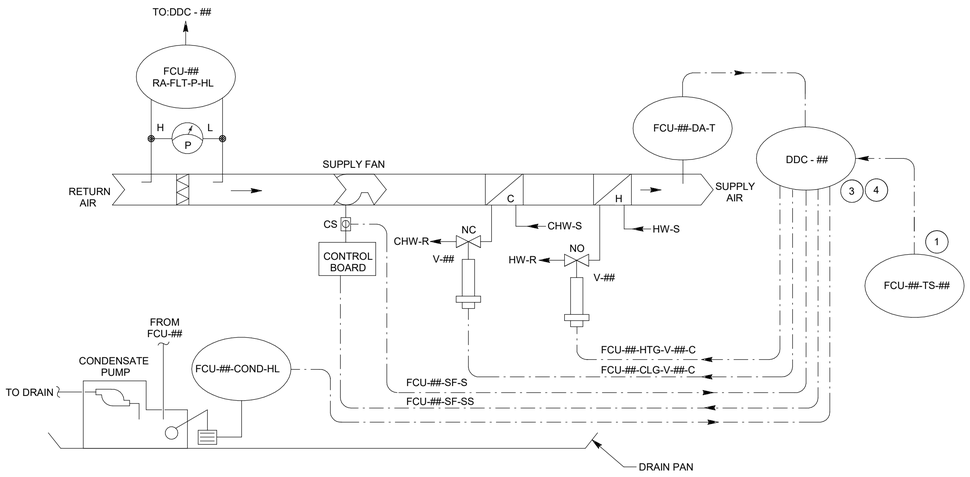
HVAC CONTROL DIAGRAM

SHEET ID
M-810

REVISED RTA SUBMISSION 03/01/2023



C1 4-PIPE FAN COIL UNITS (ROOMS 150 & 170) - CONTROL DIAGRAM
NTS



C4 4-PIPE FAN COIL UNIT (RESTROOMS) - CONTROL DIAGRAM
NTS

4-PIPE FAN COIL UNITS (ROOMS 150 & 170) SEQUENCES OF OPERATION

1. GENERAL:
   - A. THE FOUR-PIPE FAN COIL UNITS (FCUs) MUST BE CONTROLLED BY BAS AS SHOWN ON THE CONTROL DIAGRAM AND OPERATE AS ONE SYSTEM.
   - B. THE BAS MUST COMMAND THE SYSTEM IN OCCUPIED/UNOCCUPIED MODE OF OPERATION VIA A TIME SCHEDULING PROGRAM. SCHEDULE MUST BE THE SAME AS THE PARENT DOAS.
   - C. ZONE TEMPERATURE AND HUMIDITY SENSORS MUST TRANSMIT SPACE TEMPERATURE AND HUMIDITY INFORMATION TO THE BAS.
   - D. SET POINTS (ADJUSTABLE):
     HEATING: OCCUPIED - 68°F, UNOCCUPIED - 60°F
     COOLING: OCCUPIED - 75°F, UNOCCUPIED - 80°F
2. OCCUPIED MODE:
   - A. THE BAS MUST SEND A COMMAND SIGNAL TO EACH FAN COIL UNIT SPEED CONTROLLER AND THE FAN MUST RUN CONTINUOUSLY AT SPEED INDICATED ON FAN COIL UNIT SCHEDULE.
   - B. COOLING MODE: WHEN AVERAGE SPACE TEMPERATURE IN THE AREA SERVED BY THE FAN COIL UNITS RISES ABOVE THE SPACE TEMPERATURE COOLING SETPOINT, THE BAS MUST COMMAND FCU COOLING COIL CONTROL VALVES TO MODULATE OPEN TO MAINTAIN THE SPACE TEMPERATURE COOLING SETPOINT. WHEN AVERAGE SPACE TEMPERATURE IS SATISFIED, THE FCU COOLING COIL CONTROL VALVES MUST MODULATE TOWARD THE CLOSED POSITION.
   - C. DEHUMIDIFICATION MODE: DURING COOLING MODE, IF THE AVERAGE SPACE HUMIDITY IN THE AREA SERVED BY THE FAN COIL UNITS RISES ABOVE THE SPACE HUMIDITY SET POINT, INITIALLY SET AT 50 %RH (ADJUSTABLE), DEHUMIDIFICATION MODE MUST BE ENABLED. THE BAS MUST INCREASE COOLING TO 100% AND MODULATE THE REHEAT COIL VALVES TO HELP WITH SPACE OVER COOLING DUE TO THE DEHUMIDIFICATION PROCESS. WHEN AVERAGE SPACE HUMIDITY FALLS BELOW THE SET POINT, REHEAT COIL VALVES MUST CLOSE AND CONTROL OF THE CHILLED WATER VALVES MUST RETURN TO NORMAL OPERATION.
   - D. HEATING MODE: WHEN AVERAGE SPACE TEMPERATURE IN THE AREA SERVED BY THE FAN COIL UNITS DROPS BELOW THE SPACE TEMPERATURE HEATING SETPOINT, THE BAS MUST MODULATE FAN COIL UNIT HOT WATER VALVES AS REQUIRED TO MAINTAIN THE SPACE AIR TEMPERATURE AT THE SPACE HEATING SET POINT. WHEN AVERAGE SPACE TEMPERATURE IS SATISFIED, THE FCU HEATING COIL CONTROL VALVES MUST MODULATE TOWARD THE CLOSED POSITION.
   - E. THE FCU COOLING AND HEATING VALVES MUST NOT MODULATE UNTIL THE FAN OPERATION HAS BEEN PROVED.
   - F. THE HEATING AND COOLING CONTROL VALVES MUST MODULATE IN SEQUENCE WITHOUT OVERLAP AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.
   - G. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 80°F (ADJUSTABLE) OR DROPS BELOW 63°F (ADJUSTABLE).
3. UNOCCUPIED MODE:
   - A. THE FAN COIL UNIT MUST BE OFF AND THE COOLING VALVE AND HEATING VALVE MUST BE CLOSED, UNLESS THE SPACE TEMPERATURE FALLS OUTSIDE OF THE UNOCCUPIED MODE TEMPERATURE RANGE.
   - B. WHEN THE AVERAGE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED COOLING SETPOINT, THE FAN COIL UNITS MUST BE ENERGIZED AND THE COOLING VALVES MUST OPEN. WHEN THE AVERAGE SPACE TEMPERATURE DROPS BELOW THE UNOCCUPIED COOLING SETPOINT, THE FAN COIL UNITS MUST BE DE-ENERGIZED AND THE COOLING VALVES MUST CLOSE.
   - C. WHEN THE AVERAGE SPACE TEMPERATURE DROPS BELOW THE UNOCCUPIED HEATING SETPOINT, THE FAN COIL UNITS MUST BE ENERGIZED AND THE HEATING VALVES MUST OPEN. WHEN THE AVERAGE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED HEATING SETPOINT, THE FAN COIL UNITS MUST BE DE-ENERGIZED AND THE HEATING VALVES MUST CLOSE.
   - D. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 85°F (ADJUSTABLE) OR DROPS BELOW 55°F (ADJUSTABLE).
4. OCCUPANCY OVERRIDE:
   - A. IT MUST BE POSSIBLE, THROUGH THE FAN COIL UNIT SPACE TEMPERATURE SENSOR BY PRESSING THE PUSH BUTTON, TO INITIATE AN AFTER-HOUR OVERRIDE DURING THE UNOCCUPIED PERIOD. WHEN THE OCCUPANCY OVERRIDE BUTTON ON THE SPACE TEMPERATURE IS DEPRESSED MOMENTARILY DURING THE UNOCCUPIED PERIOD, THE FAN COIL UNIT MUST BE INDEXED TO THE OCCUPIED PERIOD FOR 60 MINUTES (ADJ.).
5. FAN STATUS:
   - A. A CURRENT SENSOR MUST BE USED TO MONITOR THE STATUS OF THE FAN. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM MUST BE GENERATED AND SENT TO THE BAS AND THE FAN START COMMAND MUST BE CANCELED.
6. CONDENSATE HIGH LEVEL ALARM:
   - A. THE CONDENSATE PUMP MUST RUN WHENEVER A DEFINED AMOUNT OF CONDENSATE IS SENSED. IF THE HIGH LIMIT FLOAT DEVICE DETECTS THAT THE CONDENSATE REACHES OR EXCEEDS THE PUMP OPERATING LEVEL, AN ALARM MUST BE GENERATED AT THE BAS AND THE BAS MUST DE-ENERGIZE THE FCU FAN AND CLOSE THE COOLING VALVE.

4-PIPE FAN COIL UNIT (RESTROOMS) SEQUENCES OF OPERATION

1. GENERAL:
   - A. THE FOUR-PIPE FAN COIL UNIT (FCU) MUST BE CONTROLLED BY BAS AS SHOWN ON THE CONTROL DIAGRAM.
   - B. THE BAS MUST COMMAND THE FCU IN OCCUPIED/UNOCCUPIED MODE OF OPERATION VIA A TIME SCHEDULING PROGRAM. SCHEDULE MUST BE THE SAME AS THE PARENT DOAS.
   - C. AN INDIVIDUAL ZONE TEMPERATURE SENSOR MUST TRANSMIT SPACE TEMPERATURE INFORMATION TO THE BAS.
   - D. SET POINTS (ADJUSTABLE):
     HEATING: OCCUPIED - 68°F, UNOCCUPIED - 60°F
     COOLING: OCCUPIED - 75°F, UNOCCUPIED - 80°F
2. OCCUPIED MODE:
   - A. THE BAS MUST SEND A COMMAND SIGNAL TO THE FAN COIL UNIT SPEED CONTROLLER AND THE FAN MUST RUN CONTINUOUSLY AT SPEED INDICATED ON FAN COIL UNIT SCHEDULE.
   - B. COOLING MODE: WHEN SPACE TEMPERATURE IN THE AREA SERVED BY THE FAN COIL UNIT RISES ABOVE THE SPACE TEMPERATURE COOLING SETPOINT, THE BAS MUST COMMAND FCU COOLING COIL CONTROL VALVE TO MODULATE OPEN TO MAINTAIN THE SPACE TEMPERATURE COOLING SETPOINT. WHEN SPACE TEMPERATURE IS SATISFIED, THE FCU COOLING COIL CONTROL VALVES MUST MODULATE TOWARD THE CLOSED POSITION.
   - C. HEATING MODE: WHEN SPACE TEMPERATURE IN THE AREA SERVED BY THE FAN COIL UNIT DROPS BELOW THE SPACE TEMPERATURE HEATING SETPOINT, THE BAS MUST MODULATE FAN COIL UNIT HOT WATER VALVE AS REQUIRED TO MAINTAIN THE SPACE AIR TEMPERATURE AT THE SPACE HEATING SET POINT. WHEN AVERAGE SPACE TEMPERATURE IS SATISFIED, THE FCU HEATING COIL CONTROL VALVE MUST MODULATE TOWARD THE CLOSED POSITION.
   - D. THE FCU COOLING AND HEATING VALVES MUST NOT MODULATE UNTIL THE FAN OPERATION HAS BEEN PROVED.
   - E. THE HEATING AND COOLING CONTROL VALVES MUST MODULATE IN SEQUENCE WITHOUT OVERLAP AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.
   - F. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 80°F (ADJUSTABLE) OR DROPS BELOW 63°F (ADJUSTABLE).
3. UNOCCUPIED MODE:
   - A. THE FAN COIL UNIT MUST BE OFF AND THE COOLING VALVE AND HEATING VALVE MUST BE CLOSED, UNLESS THE SPACE TEMPERATURE FALLS OUTSIDE OF THE UNOCCUPIED MODE TEMPERATURE RANGE.
   - B. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED COOLING SETPOINT, THE FAN COIL UNIT MUST BE ENERGIZED AND THE COOLING VALVE MUST OPEN. WHEN THE SPACE TEMPERATURE DROPS BELOW THE UNOCCUPIED COOLING SET-POINT, THE FAN MUST BE DE-ENERGIZED AND THE COOLING VALVE MUST CLOSE.
   - C. WHEN THE SPACE TEMPERATURE DROPS BELOW THE UNOCCUPIED HEATING SETPOINT, THE FAN MUST BE ENERGIZED AND THE HEATING VALVE MUST OPEN. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED HEATING SETPOINT, THE FAN MUST BE DE-ENERGIZED AND THE HEATING VALVE MUST CLOSE.
   - D. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 85°F (ADJUSTABLE) OR DROPS BELOW 55°F (ADJUSTABLE).
4. FAN STATUS:
   - A. A CURRENT SENSOR MUST BE USED TO MONITOR THE STATUS OF THE FAN. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM MUST BE GENERATED AND SENT TO THE BAS AND THE FAN START COMMAND MUST BE CANCELED.
5. CONDENSATE HIGH LEVEL ALARM:
   - A. THE CONDENSATE PUMP MUST RUN WHENEVER A DEFINED AMOUNT OF CONDENSATE IS SENSED. IF THE HIGH LIMIT FLOAT DEVICE DETECTS THAT THE CONDENSATE REACHES OR EXCEEDS THE PUMP OPERATING LEVEL, AN ALARM MUST BE GENERATED AT THE BAS AND THE BAS MUST DE-ENERGIZE THE FCU FAN AND CLOSE THE COOLING VALVE.

GENERAL NOTES

1. REFER TO SHEETS M-001 AND M-801 FOR LEGEND AND GENERAL NOTES.
2. REFER TO SHEET M-832 FOR 4-PIPE FAN COIL UNITS (ROOMS 150 & 170) POINTS SCHEDULE.
3. REFER TO SHEET M-832 FOR 4-PIPE FAN COIL UNITS (RESTROOMS) POINTS SCHEDULE.

KEYNOTES

1 PROVIDE SPACE TEMPERATURE SENSOR FOR SPACE TEMPERATURE CONTROL AND MONITORING. SEE MECHANICAL FLOOR PLANS FOR SPACE TEMPERATURE SENSOR'S LOCATION.

2 PROVIDE SPACE HUMIDITY SENSOR FOR SPACE HUMIDITY CONTROL AND MONITORING. SEE MECHANICAL FLOOR PLANS FOR SPACE HUMIDITY SENSOR'S LOCATION.

3 INSTALL DDC CONTROLLER IN FCU CONTROL ENCLOSURE. SEE MECHANICAL PIPING FLOOR PLANS FOR FCU LOCATIONS.

4 INSTALL DDC CONTROLLER IN WALL MOUNTED ENCLOSURE FOR FCU-G-1-### SYSTEMS (TYPICAL FOR 10). SEE MECHANICAL PIPING FLOOR PLANS FOR ENCLOSURE LOCATIONS.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-18-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

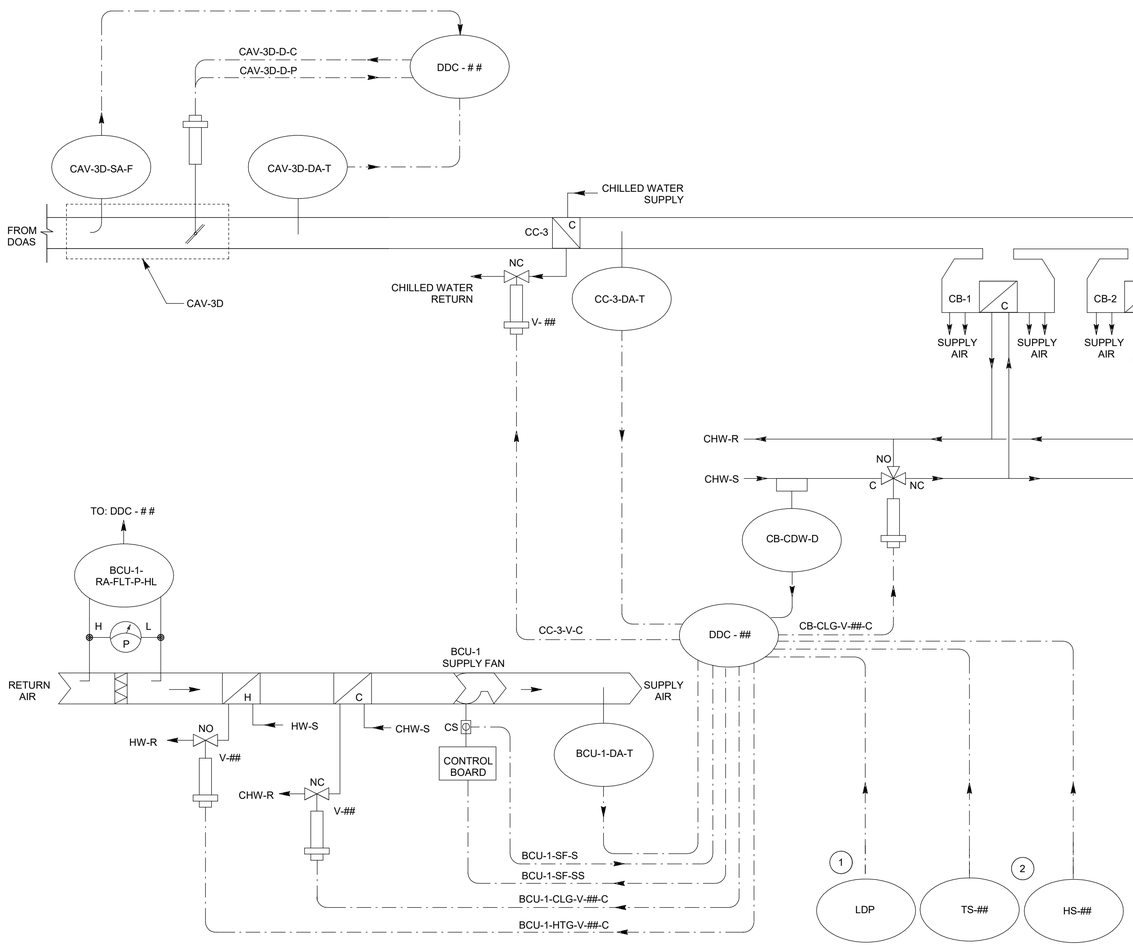
JACOBS / EWING COLE A Joint Venture

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL DIAGRAM

SHEET ID
M-811

REVISED RTA SUBMISSION 03/01/2023



B1 2-PIPE ACTIVE CHILLED BEAM (CB-1,2,3), 4-PIPE BLOWER COIL UNIT AND CONSTANT AIR VOLUME BOX (ROOM 317) - CONTROL DIAGRAM

NTS

2-PIPE ACTIVE CHILLED BEAM (CB-1,2,3), 4-PIPE BLOWER COIL UNIT AND CONSTANT AIR VOLUME BOX (ROOM 317) SEQUENCES OF OPERATION

1. GENERAL:
   - A. THE 2-PIPE ACTIVE CHILLED BEAM, 4-PIPE BLOWER COIL UNIT (BCU), DUCT COOLING COIL, AND CONSTANT AIR VOLUME (CAV) BOX MUST BE CONTROLLED BY BAS AS SHOWN ON THE CONTROL DIAGRAM AND OPERATE ACCORDING TO SEQUENCES DECRIBED BELOW.
   - B. SPACE TEMPERATURE AND HUMIDITY SENSORS MUST TRANSMIT SPACE TEMPERATURE AND HUMIDITY INFORMATION TO THE BAS. THE SPACE DEW POINT MUST BE CALCULATED BASED UPON THE SPACE TEMPERATURE AND RELATIVE HUMIDITY CONDITIONS. SPACE DEWPOINT MUST BE DISPLAYED AT BAS GRAPHIC.
   - C. THE CHILLED BEAM CONTROL VALVE MUST NOT OPEN DURING COOLING MODE UNTIL PROOF (BY CALCULATED SPACE DEWPOINT) THAT SPACE DEW POINT IS AT 56 DEGREES F OR LESS TO ALLOW FLOW OF CHILLED WATER THROUGH CHILLED BEAM COIL. IF UNACCEPTABLE DEWPOINT LEVEL IS SENSED DURING COOLING OPERATION, THE CHILLED BEAM CONTROL VALVES MUST CLOSE.
   - D. THE BAS MUST COMMAND THE HVAC EQUIPMENT TO THE OCCUPIED/ UNOCCUPIED MODE OF OPERATION VIA ITS TIME SCHEDULING PROGRAM. INITIAL OCCUPIED /UNOCCUPIED TIME SCHEDULE FOR THE HVAC EQUIPMENT AS FOLLOWS:
     OCCUPIED TIME: MON-FRIDAY: 0745 - 1630 / WEEKEND: ADJUSTABLE
     UNOCCUPIED TIME: MON-FRIDAY: 1630 - 0745 / WEEKEND: ADJUSTABLE
   - E. IT MUST BE POSSIBLE FOR AUTHORIZED USER(S) TO PLACE THE HVAC EQUIPMENT INTO PRE-RECORDING, RECORDING, OR LECTURE HALL MODES. EACH MODE OF OPERATION MUST BE INITIATED MANUALLY THROUGH A WALL-MOUNTED LOCAL DISPLAY PANEL (LDP) LOCATED IN THE TELEVISION STUDIO. THE LDP MUST BE CONNECTED TO THE BAS NETWORK AND EACH MODE OF OPERATION MUST BE COMMUNICATED TO THE BAS.
2. OCCUPIED MODE:
   - A. NORMAL OPERATION:
     - a. THE BAS MUST MODULATE THE CAV AIR DAMPER IN ORDER TO DELIVER A CONSTANT AMOUNT OF AIR TO THE SPACE, INDEPENDENT OF THE TEMPERATURE NEEDS OF THE ZONE. SEE CAV TERMINAL SCHEDULE ON THE MECHANICAL SHEETS FOR CAV BOX AIR FLOW SETPOINT.
     - b. WHEN ASSOCIATED DOAS IS IN COOLING MODE, THE BAS MUST COMMAND THE DUCT COOLING COIL CONTROL VALVE TO MODULATE OPEN TO MAINTAIN THE DISCHARGE TEMPERATURE COOLING SETPOINT, INITIALLY SET AT 50°F (ADJUSTABLE).
     - c. WHEN THE SPACE TEMPERATURE RISES ABOVE THE ACTIVE OCCUPIED COOLING SETPOINT, INITIALLY SET AT 75°F (ADJUSTABLE), THE 2-PIPE ACTIVE CHILLED BEAM COOLING CONTROL VALVE MUST MODULATE OPEN AS REQUIRED TO MAINTAIN THE SPACE AIR TEMPERATURE AT THE SPACE COOLING SET POINT.
     - d. WHEN SPACE TEMPERATURE DROPS BELOW ACTIVE OCCUPIED HEATING SET POINT, INITIALLY SET AT 68°F (ADJUSTABLE), THE BAS MUST ENABLE THE 4-PIPE BLOWER COIL UNIT AND MODULATE ASSOCIATED HEATING COIL CONTROL VALVE AS NEEDED TO MAINTAIN THE SPACE AIR TEMPERATURE AT THE SPACE HEATING SETPOINT.
     - e. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 78°F (ADJUSTABLE) OR DROPS BELOW 65°F (ADJUSTABLE).
     - f. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT SPACE DEW POINT IS ABOVE 56 DEGREES F.
   - B. PRE-RECORDING OPERATION:
     - a. WHEN THE PRE-RECORDING MODE IS MANUALLY INITIATED THROUGH LDP, THE BAS MUST CONTROL THE HVAC EQUIPMENT AS FOLLOWS:
       - THE BAS MUST SEND A COMMAND SIGNAL TO 4-PIPE BLOWER COIL UNIT FAN SPEED CONTROLLER AND THE FAN MUST RUN CONTINUOUSLY AT SPEED INDICATED ON 4-PIPE BLOWER COIL UNIT SCHEDULE.
       - WHEN THE UNIT STATUS IS ON, THE BAS MUST MODULATE THE UNIT COOLING COIL CONTROL VALVE AS REQUIRED TO MAINTAIN THE SPACE AIR TEMPERATURE AT THE SPACE COOLING SETPOINT, INITIALLY SET AT 70°F (ADJUSTABLE).
     - b. THE PRE-RECORDING MODE MUST BE CANCELLED AFTER A PREDETERMINED TIME, INITIALLY SET AT 30 MINUTES (ADJUSTABLE) OR MANUALLY DISABLED THROUGH LDP.
     - c. ONCE THE SYSTEM IS NO LONGER IN THIS MODE, THE SYSTEM MUST RETURN TO NORMAL OPERATION.
   - C. RECORDING OPERATION:
     - a. WHE THE RECORDING MODE IS MANUALLY INITIATED THROUGH LDP, THE BAS MUST CONTROL THE HVAC EQUIPMENT AS FOLLOWS:
       - THE 4-PIPE BLOWER COIL UNIT MUST BE OFF.
       - THE 2-PIPE ACTIVE CHILLED BEAM COOLING CONTROL VALVE MUST MODULATE OPEN AS REQUIRED TO MAINTAIN THE SPACE AIR TEMPERATURE AT THE SPACE COOLING SET POINT, INITIALLY SET AT 75°F (ADJUSTABLE).
     - b. THE RECORDING MODE MUST BE CANCELLED AFTER A PREDETERMINED TIME, INITIALLY SET AT 120 MINUTES (ADJUSTABLE) OR MANUALLY DISABLED THROUGH LDP.
     - c. WHEN THE SYSTEM IS NO LONGER IN THIS MODE, THE SYSTEM MUST RETURN TO NORMAL OPERATION.
   - D. LECTURE HALL OPERATION:
     - a. WHE THE LECTURE HALL MODE IS MANUALLY INITIATED THROUGH LDP, THE BAS MUST CONTROL THE HVAC EQUIPMENT AS FOLLOWS:
       - COOLING MODE: ON A CALL FOR COOLING, THE BAS MUST MODULATE THE 2-PIPE ACTIVE CHILLED BEAM COOLING CONTROL VALVE OPEN AS REQUIRED TO MAINTAIN THE SPACE AIR TEMPERATURE AT THE SPACE COOLING SET POINT, INITIALLY SET AT 75°F (ADJUSTABLE). IF THE SPACE TEMPERATURE CONTINUE TO RISE WHEN CHILLED BEAM COOLING CONTROL VALVE OUTPUT IS AT 100% OUTPUT, THE BAS MUST ENABLE THE 4-PIPE BLOWER COIL UNIT AND MODULATE ASSOCIATED COOLING COIL CONTROL VALVE AS NEEDED TO MAINTAIN THE SPACE AIR TEMPERATURE AT THE SPACE COOLING SET POINT. UPON A DROP IN SPACE TEMPERATURE, THE REVERSE MUST OCCUR.
       - HEATING MODE: ON A CALL FOR HEATING, THE BAS MUST ENABLE THE 4-PIPE BLOWER COIL UNIT AND MODULATE ASSOCIATED HEATING COIL CONTROL VALVE AS NEEDED TO MAINTAIN THE SPACE AIR TEMPERATURE AT THE SPACE HEATING SET POINT, INITIALLY SET AT 68°F (ADJUSTABLE). UPON A RISE IN SPACE TEMPERATURE, THE REVERSE MUST OCCUR.
     - b. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 78°F (ADJUSTABLE) OR DROPS BELOW 65°F (ADJUSTABLE).
     - c. THE LECTURE HALL MODE MUST BE CANCELLED AFTER A PREDETERMINED TIME, INITIALLY SET AT 240 MINUTES (ADJUSTABLE) OR MANUALLY DISABLED THROUGH LDP.
     - d. ONCE THE SYSTEM IS NO LONGER IN THIS MODE, THE SYSTEM MUST RETURN TO NORMAL OPERATION.
3. UNOCCUPIED MODE:
   - A. THE CAV PRIMARY AIR DAMPER MUST BE DRIVEN FULLY CLOSED.
   - B. THE DUCT COOLING COIL CONTROL VALVE MUST BE CLOSED.
   - C. THE CHILLED BEAM COOLING VALVE MUST BE CLOSED.
   - D. THE 4-PIPE BLOWER COIL UNIT MUST BE OFF AND THE COOLING VALVE AND HEATING VALVE MUST BE CLOSED, UNLESS THE SPACE TEMPERATURE FALLS OUTSIDE OF THE UNOCCUPIED MODE TEMPERATURE RANGE.
   - E. WHEN THE SPACE TEMPERATURE DROPS BELOW THE UNOCCUPIED HEATING SETPOINT, THE BAS MUST ENABLE THE 4-PIPE BLOWER COIL UNIT AND MODULATE ASSOCIATED HEATING COIL CONTROL VALVE AS REQUIRED TO MAINTAIN THE SPACE AIR TEMPERATURE AT THE UNOCCUPIED HEATING SETPOINT.
   - F. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED COOLING SETPOINT, THE BAS MUST ENABLE THE 4-PIPE BLOWER COIL UNIT AND MODULATE ASSOCIATED COOLING COIL CONTROL VALVE AS REQUIRED TO MAINTAIN THE SPACE AIR TEMPERATURE AT THE UNOCCUPIED COOLING SETPOINT.
   - G. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 85°F (ADJUSTABLE) OR DROPS BELOW 55°F (ADJUSTABLE).
4. CHILLED BEAM MOISTURE ALARM: A SURFACE MOUNTED MOISTURE SENSOR MUST BE PLACED ON THE CHILLED WATER SUPPLY PIPE FOR DETECTION OF CONDENSATION. WHEN MOISTURE IS DETECTED, THE CHILLED BEAM CONTROL VALVE MUST CLOSE AND MUST NOT BE RETURN TO NORMAL OPERATION UNTIL THE MOISTURE HAS BEEN EVAPORATED.

GENERAL NOTES

1. REFER TO SHEETS M-001 AND M-801 FOR LEGEND AND GENERAL NOTES.
2. REFER TO SHEET M-833 FOR BCU, CAV & CHILLED BEAM (ROOM 317) POINTS SCHEDULE.

KEYNOTES

1 PROVIDE LOCAL DISPLAY PANEL (LDP) FOR LOCAL CONTROL OF HVAC EQUIPMENT SERVING TELEVISION STUDIO. SEE MECHANICAL FLOOR PLAN MP106 FOR LDP LOCATION.

2 PROVIDE SPACE TEMPERATURE AND HUMIDITY SENSORS FOR CONTROL OF HVAC EQUIPMENT SERVING TELEVISION STUDIO. SEE MECHANICAL FLOOR PLAN MP106 FOR LOCATION OF SENSORS.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI D
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-18-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

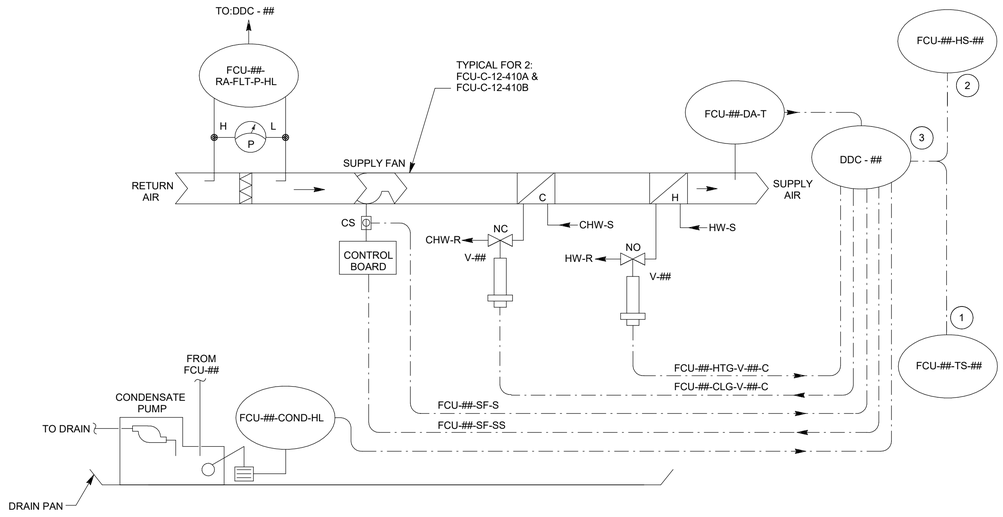
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

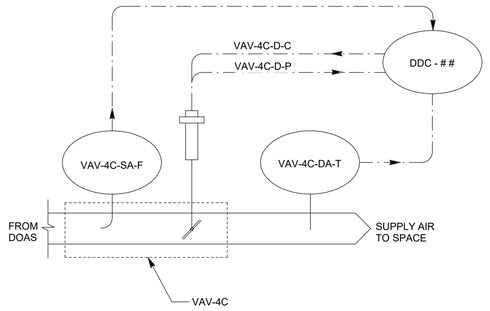
HVAC CONTROL DIAGRAM

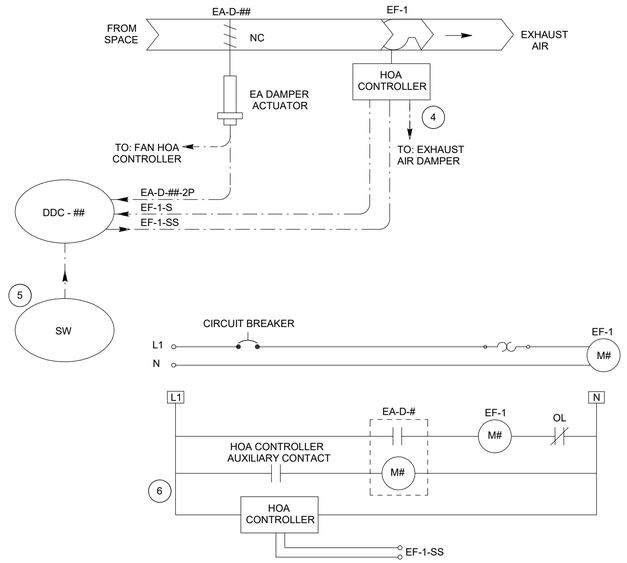
SHEET ID

M-812

REVISED RTA SUBMISSION 03/01/2023







C2 FAN COIL UNITS, EXHAUST FAN, & VARIABLE AIR VOLUME BOX (ROOM 410) - CONTROL DIAGRAM

NTS

FAN COIL UNITS, EXHAUST FAN, & VARIABLE AIR VOLUME BOX (ROOM 410) SEQUENCES OF OPERATION

1. GENERAL:
   - A. FOUR-PIPE FAN COIL UNITS (FCU) AND VARIABLE AIR VOLUME (VAV) BOX MUST BE CONTROLLED BY BAS AS SHOWN ON THE CONTROL DIAGRAM AND OPERATE AS ONE SYSTEM.
   - B. THE BAS MUST COMMAND THE SYSTEM IN OCCUPIED/UNOCCUPIED MODE OF OPERATION VIA A TIME SCHEDULING PROGRAM. SCHEDULE MUST BE THE SAME AS THE PARENT DOAS.
   - C. ZONE TEMPERATURE AND HUMIDITY SENSORS MUST TRANSMIT SPACE TEMPERATURE AND HUMIDITY INFORMATION TO THE BAS.
   - D. SET POINTS (ADJUSTABLE):
     HEATING: OCCUPIED - 68°F, UNOCCUPIED - 60°F
     COOLING: OCCUPIED - 75°F, UNOCCUPIED - 80°F
   - E. THE EXHAUST FAN (EF-1) MUST BE CONTROLLED BY A WALL-MOUNTED SWITCH LOCATED IN THE PRINTING/LAMINATING ROOM.
2. OCCUPIED MODE:
   - A. THE BAS MUST SEND A COMMAND SIGNAL TO EACH FAN COIL UNIT SPEED CONTROLLER AND THE FAN MUST RUN CONTINUOUSLY AT SPEED INDICATED ON FAN COIL UNIT SCHEDULE.
   - B. THE BAS MUST MODULATE THE VAV PRIMARY AIR DAMPER IN ORDER TO DELIVER A MINIMUM CONSTANT AMOUNT OF AIR TO THE SPACE, INDEPENDENT OF THE TEMPERATURE NEEDS OF THE ZONE.
     - a. WHEN THE EXHAUST FAN HAS BEEN PROVED ON BY THE ASSOCIATED CURRENT SENSOR, BAS MUST MODULATE THE VAV PRIMARY AIR DAMPER IN ORDER TO DELIVER A MAXIMUM CONSTANT AMOUNT OF AIR TO THE SPACE. WHEN THE EXHAUST FAN HAS BEEN PROVED OFF BY THE ASSOCIATED CURRENT SENSOR, BAS MUST MODULATE THE VAV PRIMARY AIR DAMPER IN ORDER TO DELIVER A MINIMUM CONSTANT AMOUNT OF AIR TO THE SPACE.
     - b. SEE VAV TERMINAL SCHEDULE ON THE MECHANICAL SHEETS FOR CAV BOX AIR FLOW SETPOINTS.
   - C. COOLING MODE: WHEN AVERAGE SPACE TEMPERATURE IN THE AREA SERVED BY THE FAN COIL UNITS RISES ABOVE THE SPACE TEMPERATURE COOLING SETPOINT, THE BAS MUST COMMAND FCU COOLING COIL CONTROL VALVES TO MODULATE OPEN TO MAINTAIN THE SPACE TEMPERATURE COOLING SETPOINT. WHEN AVERAGE SPACE TEMPERATURE IS SATISFIED, THE FCU COOLING COIL CONTROL VALVES MUST MODULATE TOWARD THE CLOSED POSITION.
   - D. DEHUMIDIFICATION MODE: DURING COOLING MODE, IF THE AVERAGE SPACE HUMIDITY IN THE AREA SERVED BY THE FAN COIL UNITS RISES ABOVE THE SPACE HUMIDITY SET POINT, INITIALLY SET AT 50 %RH (ADJUSTABLE), DEHUMIDIFICATION MODE MUST BE ENABLED. THE BAS MUST INCREASE COOLING TO 100% AND MODULATE THE REHEAT COIL VALVES TO HELP WITH SPACE OVER COOLING DUE TO THE DEHUMIDIFICATION PROCESS. WHEN AVERAGE SPACE HUMIDITY FALLS BELOW THE SET POINT, REHEAT COIL VALVES MUST CLOSE AND CONTROL OF THE CHILLED WATER VALVES MUST RETURN TO NORMAL OPERATION.
   - E. HEATING MODE: WHEN AVERAGE SPACE TEMPERATURE IN THE AREA SERVED BY THE FAN COIL UNITS DROPS BELOW THE SPACE TEMPERATURE HEATING SETPOINT, THE BAS MUST MODULATE FAN COIL UNIT HOT WATER VALVES AS REQUIRED TO MAINTAIN THE SPACE AIR TEMPERATURE AT THE SPACE HEATING SET POINT. WHEN AVERAGE SPACE TEMPERATURE IS SATISFIED, THE FCU HEATING COIL CONTROL VALVES MUST MODULATE TOWARD THE CLOSED POSITION.
   - F. THE FCU COOLING AND HEATING VALVES MUST NOT MODULATE UNTIL THE FAN OPERATION HAS BEEN PROVED.
   - G. THE HEATING AND COOLING CONTROL VALVES MUST MODULATE IN SEQUENCE WITHOUT OVERLAP AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.
   - H. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 80°F (ADJUSTABLE) OR DROPS BELOW 63°F (ADJ).
3. UNOCCUPIED MODE:
   - A. THE VAV PRIMARY AIR DAMPER MUST BE DRIVEN FULLY OPEN.
   - B. THE FAN COIL UNIT MUST BE OFF AND THE COOLING VALVE AND HEATING VALVE MUST BE CLOSED, UNLESS THE SPACE TEMPERATURE FALLS OUTSIDE OF THE UNOCCUPIED MODE TEMPERATURE RANGE.
   - C. WHEN THE AVERAGE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED COOLING SETPOINT, THE FAN COIL UNITS MUST BE ENERGIZED AND THE COOLING VALVES MUST OPEN. WHEN THE AVERAGE SPACE TEMPERATURE DROPS BELOW THE UNOCCUPIED COOLING SETPOINT, THE FAN COIL UNITS MUST BE DE-ENERGIZED AND THE COOLING VALVES MUST CLOSE.
   - D. WHEN THE AVERAGE SPACE TEMPERATURE DROPS BELOW THE UNOCCUPIED HEATING SETPOINT, THE FAN COIL UNITS MUST BE ENERGIZED AND THE HEATING VALVES MUST OPEN. WHEN THE AVERAGE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED HEATING SETPOINT, THE FAN COIL UNITS MUST BE DE-ENERGIZED AND THE HEATING VALVES MUST CLOSE.
   - E. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 85°F (ADJUSTABLE) OR DROPS BELOW 55°F (ADJ).
4. OCCUPANCY OVERRIDE:
   - A. IT MUST BE POSSIBLE, THROUGH THE FAN COIL UNIT SPACE TEMPERATURE SENSOR BY PRESSING THE PUSH BUTTON, TO INITIATE AN AFTER-HOUR OVERRIDE DURING THE UNOCCUPIED PERIOD. WHEN THE OCCUPANCY OVERRIDE BUTTON ON THE SPACE TEMPERATURE IS DEPRESSED MOMENTARILY DURING THE UNOCCUPIED PERIOD, THE FAN COIL UNIT MUST BE INDEXED TO THE OCCUPIED PERIOD FOR 60 MINUTES (ADJ.).
5. FCU FAN STATUS:
   - A. A CURRENT SENSOR MUST BE USED TO MONITOR THE STATUS OF THE FAN. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM MUST BE GENERATED AND SENT TO THE BAS AND THE FAN START COMMAND MUST BE CANCELED.
6. CONDENSATE HIGH LEVEL ALARM:
   - A. THE CONDENSATE PUMP MUST RUN WHENEVER A DEFINED AMOUNT OF CONDENSATE IS SENSED. IF THE HIGH LIMIT FLOAT DEVICE DETECTS THAT THE CONDENSATE REACHES OR EXCEEDS THE PUMP OPERATING LEVEL, AN ALARM MUST BE GENERATED AT THE BAS AND THE THERMOSTAT MUST DE-ENERGIZE THE FCU FAN AND CLOSE THE COOLING VALVE.
7. EXHAUST FAN (EF-1) OPERATION:
   - A. EXHAUST FAN HAND-OFF-AUTO OPERATION:
     - a. A HAND-OFF-AUTO (HOA) CONTROLLER IS PROVIDED WITH EC MOTOR. IN THE OFF MODE, THE ISOLATION DAMPER MUST BE CLOSED AND THE EXHAUST FAN MUST BE STOPPED. IN THE HAND MODE, THE ISOLATION DAMPER MUST OPEN. WHEN DAMPER IS FULLY OPEN, THE ASSOCIATED DAMPER POSITION SWITCH MUST START THE FAN. THE EXHAUST FAN MUST RUN AT THE SPEED SETPOINT MANUALLY SET AT HOA CONTROLLER. IN THE AUTO MODE, THE EXHAUST FAN MUST BE CONTROLLED BY THE BAS AS DESCRIBED BELOW.
   - B. AUTOMATIC MODE START/STOP CONTROL:
     - a. FAN START/STOP: WHEN THE SWITCH IS PLACED IN THE ON POSITION, THE BAS MUST SEND A START SIGNAL TO THE FAN HOA CONTROLLER. THIS MUST ENABLE THE HARD WIRE INTERLOCK THAT OPENS THE ISOLATION DAMPER. WHEN THE DAMPER IS FULLY OPEN, AS SENSED BY THE DAMPER POSITION SWITCH, THE FAN MUST BE ENERGIZED THROUGH THE HARD WIRE INTERLOCK, WHEN THE SWITCH IS PLACED IN THE OFF POSITION, THE BAS MUST SEND A STOP COMMAND TO THE FAN HOA CONTROLLER, WHICH MUST DE-ENERGIZE THE FAN AND CLOSE THE ISOLATION DAMPER.
     - b. FAN SPEED: THE FAN SPEED MUST BE COORDINATED WITH TAB CONTRACTOR AND MANUALLY SET AT THE HOA CONTROLLER AS NEEDED. WHEN THE FAN IS STARTED, THE FAN MUST MAINTAIN THIS CONSTANT SPEED.
   - C. FAN STATUS:
     - a. A CURRENT SENSOR MUST BE USED TO MONITOR THE STATUS OF THE FAN. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM MUST BE GENERATED AND SENT TO THE BAS AND THE FAN START COMMAND MUST BE CANCELED.
   - D. EMERGENCY AIR DISTRIBUTION SHUTDOWN:
     - a. WHENEVER EMERGENCY AIR DISTRIBUTION SHUT-OFF SWITCH IS ACTIVATED, THE BAS MUST STOP THE EXHAUST FAN MUST AND ASSOCIATED AIR DAMPER MUST CLOSE THROUGH THE HARD-WIRED INTERLOCK. WHEN THE EMERGENCY CONDITION HAS BEEN CLEARED, THE EXHAUST FAN MUST BE RETURNED TO NORMAL OPERATION.

GENERAL NOTES

1. REFER TO SHEETS M-001 AND M-801 FOR LEGEND AND GENERAL NOTES.
2. REFER TO SHEET M-834 FAN COIL UNITS & VARIABLE AIR VOLUME BOX (ROOM 410) POINTS SCHEDULE.

KEYNOTES

1 PROVIDE SPACE TEMPERATURE SENSOR FOR SPACE TEMPERATURE CONTROL AND MONITORING. SEE MECHANICAL FLOOR PLANS FOR SPACE TEMPERATURE SENSOR'S LOCATION.

2 PROVIDE SPACE HUMIDITY SENSOR FOR SPACE HUMIDITY CONTROL AND MONITORING. SEE MECHANICAL FLOOR PLANS FOR SPACE HUMIDITY SENSOR'S LOCATION.

3 INSTALL DDC CONTROLLER IN FCU CONTROL ENCLOSURE. SEE MECHANICAL PIPING FLOOR PLANS FOR FCU LOCATIONS.

4 PROVIDE INTERLOCK WIRING BETWEEN EXHAUST FAN AND ASSOCIATED ISOLATION DAMPER. WHEN ISOLATION DAMPER IS OPEN, THE FAN MUST BE STARTED BY THE DAMPER POSITION SWITCH. FAN MUST STOP IF ISOLATION DAMPER CLOSES.

5 PROVIDE SWITCH FOR EXHAUST FAN EF-1. SEE MECHANICAL FLOOR PLAN MP107 FOR EXHAUST FAN SWITCH LOCATION.

6 THE WIRING DIAGRAMS ARE SHOWN/PROVIDED AS A GUIDE TO THE BUILDING CONTROLS CONTRACTOR. THE CONTRACTOR MUST DEVELOP THE WIRING DIAGRAMS TO BE PROJECT SPECIFIC AND CONSISTENT WITH THE PROJECT SUBMITTALS.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
FILE NAME:
SIZE: ANSI 'D'

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

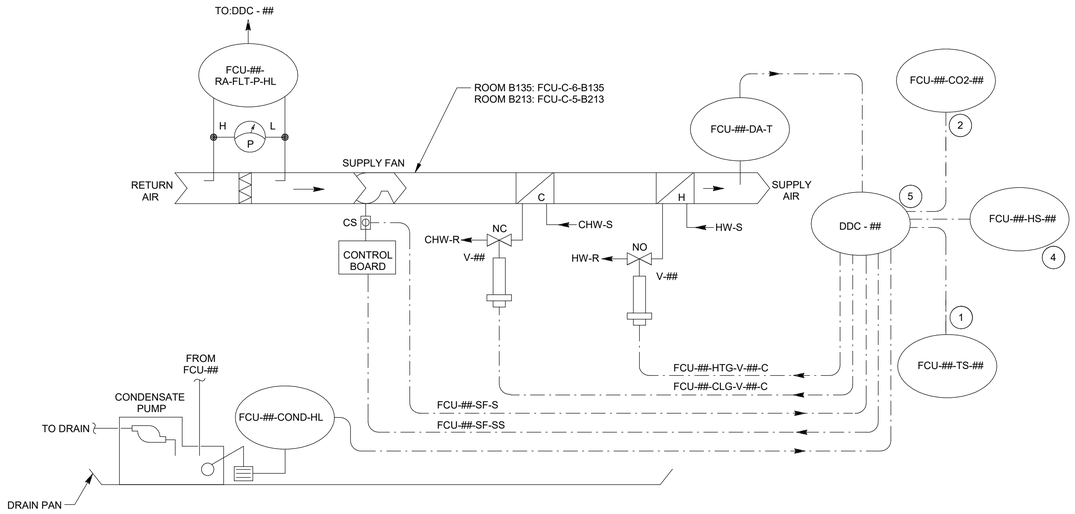
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL DIAGRAM

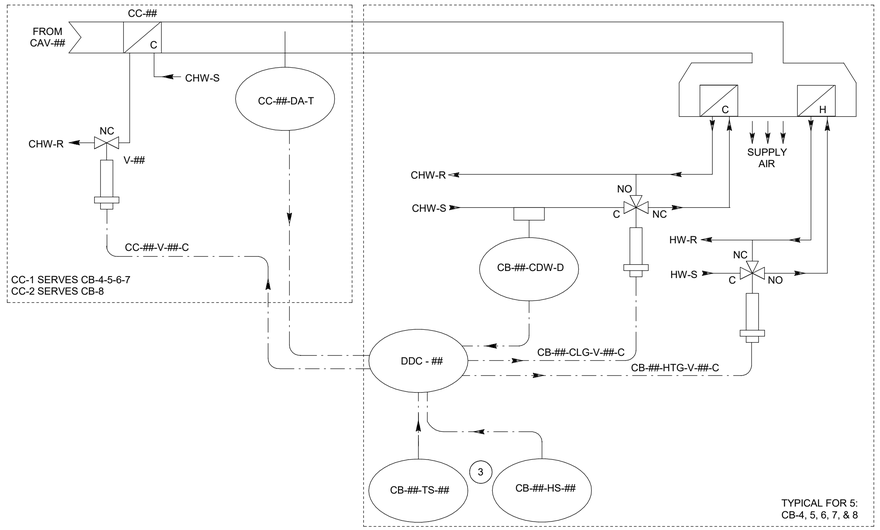
SHEET ID

M-813

REVISED RTA SUBMISSION 03/01/2023



C1 4-PIPE FAN COIL UNIT W/ CO2 SENSOR (ROOMS B135 & B213) - CONTROL DIAGRAM
NTS



C4 CHILLED BEAM (CB- 4, 5, 6, 7, 8) - CONTROL DIAGRAM
NTS

4-PIPE FAN COIL UNIT W/ CO2 SENSOR (ROOMS B213 & B135) SEQUENCES OF OPERATION

1. GENERAL:
   - A. THE FOUR-PIPE FAN COIL UNIT (FCU) MUST BE CONTROLLED BY BAS AS SHOWN ON THE CONTROL DIAGRAM AND OPERATE AS ONE SYSTEM.
   - B. THE BAS MUST COMMAND THE SYSTEM IN OCCUPIED/UNOCCUPIED MODE OF OPERATION VIA A TIME SCHEDULING PROGRAM. SCHEDULE MUST BE THE SAME AS THE PARENT DOAS.
   - C. ZONE TEMPERATURE, HUMIDITY, AND CO2 SENSORS MUST TRANSMIT SPACE TEMPERATURE, HUMIDITY AND CO2 INFORMATION TO THE BAS.
   - D. SET POINTS (ADJUSTABLE):
     HEATING: OCCUPIED - 68°F, UNOCCUPIED - 60°F
     COOLING: OCCUPIED - 75°F, UNOCCUPIED - 80°F
2. OCCUPIED MODE:
   - A. THE BAS MUST SEND A COMMAND SIGNAL TO THE FAN COIL UNIT SPEED CONTROLLER AND THE FAN MUST RUN CONTINUOUSLY AT SPEED INDICATED ON FAN COIL UNIT SCHEDULE.
   - B. COOLING MODE: WHEN SPACE TEMPERATURE IN THE AREA SERVED BY THE FAN COIL UNIT RISES ABOVE THE SPACE TEMPERATURE COOLING SETPOINT, THE BAS MUST COMMAND FCU COOLING COIL CONTROL VALVE TO MODULATE OPEN TO MAINTAIN THE SPACE TEMPERATURE COOLING SETPOINT. WHEN SPACE TEMPERATURE IS SATISFIED, THE FCU COOLING COIL CONTROL VALVES MUST MODULATE TOWARD THE CLOSED POSITION.
   - C. DEHUMIDIFICATION MODE: DURING COOLING MODE, IF THE SPACE HUMIDITY RISES ABOVE THE SPACE HUMIDITY SET POINT, INITIALLY SET AT 50 %RH (ADJUSTABLE), DEHUMIDIFICATION MODE MUST BE ENABLED. THE BAS MUST INCREASE COOLING TO 100% AND MODULATE THE REHEAT COIL TO HELP WITH SPACE OVER COOLING DUE TO THE DEHUMIDIFICATION PROCESS. WHEN THE SPACE HUMIDITY FALLS BELOW THE SET POINT, REHEAT COIL VALVE MUST CLOSE AND CONTROL OF THE CHILLED WATER VALVE MUST RETURN TO NORMAL OPERATION.
   - D. HEATING MODE: WHEN SPACE TEMPERATURE IN THE AREA SERVED BY THE FAN COIL UNIT DROPS BELOW THE SPACE TEMPERATURE HEATING SETPOINT, THE BAS MUST MODULATE FAN COIL UNIT HOT WATER VALVE AS REQUIRED TO MAINTAIN THE SPACE AIR TEMPERATURE AT THE SPACE HEATING SET POINT. WHEN AVERAGE SPACE TEMPERATURE IS SATISFIED, THE FCU HEATING COIL CONTROL VALVE MUST MODULATE TOWARD THE CLOSED POSITION.
   - E. THE FCU COOLING AND HEATING VALVES MUST NOT MODULATE UNTIL THE FAN OPERATION HAS BEEN PROVED.
   - F. THE HEATING AND COOLING CONTROL VALVES MUST MODULATE IN SEQUENCE WITHOUT OVERLAP AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.
   - G. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 80°F (ADJUSTABLE) OR DROPS BELOW 63°F (ADJUSTABLE).
3. UNOCCUPIED MODE:
   - A. THE FAN COIL UNIT MUST BE OFF AND THE COOLING VALVE AND HEATING VALVE MUST BE CLOSED, UNLESS THE SPACE TEMPERATURE FALLS OUTSIDE OF THE UNOCCUPIED MODE TEMPERATURE RANGE.
   - B. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED COOLING SETPOINT, THE FAN COIL UNIT MUST BE ENERGIZED AND THE COOLING VALVE MUST OPEN. WHEN THE SPACE TEMPERATURE DROPS BELOW THE UNOCCUPIED COOLING SET-POINT, THE FAN MUST BE DE-ENERGIZED AND THE COOLING VALVE MUST CLOSE.
   - C. WHEN THE SPACE TEMPERATURE DROPS BELOW THE UNOCCUPIED HEATING SETPOINT, THE FAN MUST BE ENERGIZED AND THE HEATING VALVE MUST OPEN. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED HEATING SETPOINT, THE FAN MUST BE DE-ENERGIZED AND THE HEATING VALVE MUST CLOSE.
   - D. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 85°F (ADJUSTABLE) OR DROPS BELOW 55°F (ADJUSTABLE).
4. OCCUPANCY OVERRIDE:
   - A. IT MUST BE POSSIBLE, THROUGH THE FAN COIL UNIT SPACE TEMPERATURE SENSOR BY PRESSING THE PUSH BUTTON, TO INITIATE AN AFTER-HOUR OVERRIDE DURING THE UNOCCUPIED PERIOD. WHEN THE OCCUPANCY OVERRIDE BUTTON ON THE SPACE TEMPERATURE IS DEPRESSED MOMENTARILY DURING THE UNOCCUPIED PERIOD, THE FAN COIL UNIT MUST BE INDEXED TO THE OCCUPIED PERIOD FOR 60 MINUTES (ADJ.).
5. FAN STATUS:
   - A. A CURRENT SENSOR MUST BE USED TO MONITOR THE STATUS OF THE FAN. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM MUST BE GENERATED AND SENT TO THE BAS AND THE FAN START COMMAND MUST BE CANCELED.
6. CONDENSATE HIGH LEVEL ALARM:
   - A. THE CONDENSATE PUMP MUST RUN WHENEVER A DEFINED AMOUNT OF CONDENSATE IS SENSED. IF THE HIGH LIMIT FLOAT DEVICE DETECTS THAT THE CONDENSATE REACHES OR EXCEEDS THE PUMP OPERATING LEVEL, AN ALARM MUST BE GENERATED AT THE BAS AND THE THERMOSTAT MUST DE-ENERGIZE THE FCU FAN AND CLOSE THE COOLING VALVE.
7. SPACE CO2 LEVEL ALARM:
   - A. IF SPACE CO2 LEVEL EXCEEDS OUTDOOR CO2 LEVEL BY MORE THAN 700 PPM (ADJUSTABLE), AN ALARM MUST BE ANNUNCIATED AT THE BAS.

CHILLED BEAM (CB- 4, 5, 6, 7, 8) SEQUENCES OF OPERATION

1. GENERAL:
   - A. THE 4-PIPE CHILLED BEAM MUST BE CONTROLLED BY BAS AS SHOWN ON THE CONTROL DIAGRAM AND OPERATE ACCORDING TO SEQUENCES DECRIBED BELOW.
   - B. SPACE TEMPERATURE AND HUMIDITY SENSORS MUST TRANSMIT SPACE TEMPERATURE AND HUMIDITY INFORMATION TO THE BAS. THE SPACE DEW POINT MUST BE CALCULATED BASED UPON THE SPACE TEMPERATURE AND RELATIVE HUMIDITY CONDITIONS. SPACE DEWPOINT MUST BE DISPLAYED AT BAS GRAPHIC.
   - C. THE CHILLED BEAM CONTROL VALVE MUST NOT OPEN DURING COOLING MODE UNTIL PROOF (BY CALCULATED SPACE DEWPOINT) THAT SPACE DEW POINT IS AT 56 DEGREES F OR LESS TO SUPPORT FLOW OF CHILLED WATER THROUGH CHILLED BEAM COIL. IF UNACCEPTABLE DEWPOINT LEVEL IS SENSED DURING COOLING OPERATION, THE CHILLED BEAM CONTROL VALVES MUST CLOSE.
   - D. WHEN ASSOCIATED DOAS IS IN COOLING MODE, THE BAS MUST COMMAND THE DUCT COOLING COIL CONTROL VALVE TO MODULATE OPEN TO MAINTAIN THE DISCHARGE TEMPERATURE COOLING SETPOINT, INITIALLY SET AT 50°F (ADJUSTABLE).
   - E. THE BAS MUST COMMAND THE 4-PIPE CHILLED BEAM CONTROLLER TO THE OCCUPIED/ UNOCCUPIED MODE OF OPERATION VIA ITS TIME SCHEDULING PROGRAM. INITIAL OCCUPIED /UNOCCUPIED TIME SCHEDULE FOR THE CHILLED BEAM AS FOLLOWS:
     OCCUPIED TIME: MON-FRIDAY: 0745 - 1630 / WEEKEND: ADJUSTABLE
     UNOCCUPIED TIME: MON-FRIDAY: 1630 - 0745 / WEEKEND: ADJUSTABLE
   - F. SET POINTS (ADJUSTABLE):
     HEATING: OCCUPIED - 68°F, UNOCCUPIED - 60°F
     COOLING: OCCUPIED - 75°F, UNOCCUPIED - 80°F
2. OCCUPIED MODE:
   - A. THE CHILLED BEAM MUST MAINTAIN THE SPACE TEMPERATURE AT THE ACTIVE OCCUPIED HEATING OR COOLING SETPOINT.
   - B. ON CALL FOR HEATING FROM THE SPACE TEMPERATURE SENSOR, THE CHILLED BEAM HOT WATER CONTROL VALVE MUST MODULATE OPEN AS REQUIRED TO MAINTAIN THE SPACE AIR TEMPERATURE AT THE SPACE HEATING SET POINT
   - C. ON CALL FOR COOLING FROM THE ZONE TEMPERATURE SENSOR, THE CHILLED BEAM COOLING CONTROL VALVE MUST MODULATE OPEN AS REQUIRED TO MAINTAIN THE SPACE AIR TEMPERATURE AT THE SPACE COOLING SET POINT.
   - D. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 78°F (ADJUSTABLE) OR DROPS BELOW 65°F (ADJUSTABLE).
3. UNOCCUPIED MODE:
   - A. THE CHILLED BEAM COOLING VALVE AND HEATING VALVE MUST BE CLOSED, UNLESS THE SPACE TEMPERATURE FALLS OUTSIDE OF THE UNOCCUPIED MODE TEMPERATURE RANGE.
   - B. WHEN THE SPACE TEMPERATURE DROPS BELOW THE ACTIVE UNOCCUPIED HEATING SETPOINT, THE CHILLED BEAM HOT WATER CONTROL VALVE MUST FULLY OPEN. ONCE THE SPACE AIR TEMPERATURE RISES ABOVE THE UNOCCUPIED HEATING SETPOINT, THE CHILLED BEAM HOT WATER CONTROL VALVE MUST CLOSE.
   - C. WHEN THE SPACE TEMPERATURE RISES ABOVE THE ACTIVE UNOCCUPIED COOLING SETPOINT, THE CHILLED BEAM COOLING CONTROL VALVE MUST FULLY OPEN. ONCE THE SPACE AIR TEMPERATURE DROPS BELOW THE UNOCCUPIED COOLING SETPOINT, THE CHILLED BEAM COOLING CONTROL VALVE MUST CLOSE.
   - D. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 85°F (ADJUSTABLE) OR DROPS BELOW 55°F (ADJUSTABLE).
4. CHILLED BEAM MOISTURE ALARM: A SURFACE MOUNTED MOISTURE SENSOR MUST BE PLACED ON THE CHILLED WATER SUPPLY PIPE FOR DETECTION OF CONDENSATION. WHEN MOISTURE IS DETECTED, THE CHILLED BEAM CONTROL VALVE MUST CLOSE AND MUST NOT BE RETURN TO NORMAL OPERATION UNTIL THE MOISTURE HAS BEEN EVAPORATED.

GENERAL NOTES

1. REFER TO SHEETS M-001 AND M-801 FOR LEGEND AND GENERAL NOTES.
2. REFER TO SHEET M-835 FOR 4-PIPE FAN COIL UNIT W/ CO2 SENSOR (ROOMS B135 & B213) POINTS SCHEDULE.
3. REFER TO SHEET M-835 FOR CHILLED BEAM POINTS SCHEDULE.

KEYNOTES

1. PROVIDE SPACE TEMPERATURE SENSOR FOR SPACE TEMPERATURE CONTROL AND MONITORING. SEE MECHANICAL FLOOR PLANS FOR SPACE TEMPERATURE SENSOR'S LOCATION.
2. PROVIDE CARBON DIOXIDE SENSOR. SEE MECHANICAL FLOOR PLANS FOR CARBON DIOXIDE SENSOR LOCATION.
3. PROVIDE SPACE TEMPERATURE AND HUMIDITY SENSORS FOR CONTROL OF CHILLED BEAM. SEE MECHANICAL FLOOR PLANS FOR LOCATION OF SENSORS.
4. PROVIDE SPACE HUMIDITY SENSOR FOR SPACE HUMIDITY CONTROL AND MONITORING. SEE MECHANICAL FLOOR PLANS FOR SPACE HUMIDITY SENSOR'S LOCATION.
5. INSTALL DDC CONTROLLER IN FCU CONTROL ENCLOSURE. SEE MECHANICAL PIPING FLOOR PLANS FOR FCU LOCATIONS.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
SIZE: ANSI D
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

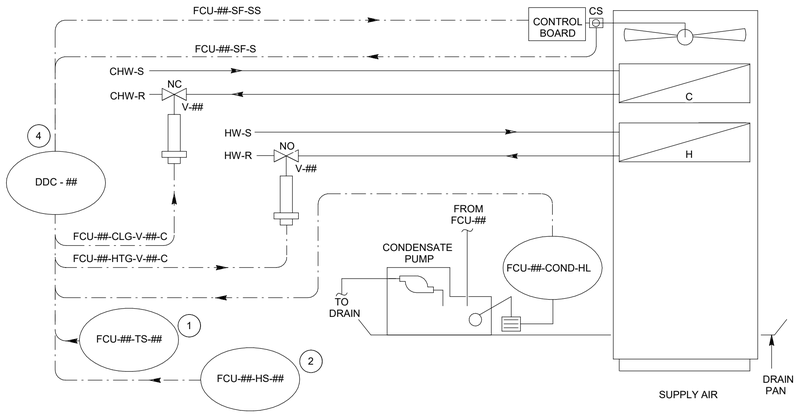
JACOBS / EWING COLE A Joint Venture

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

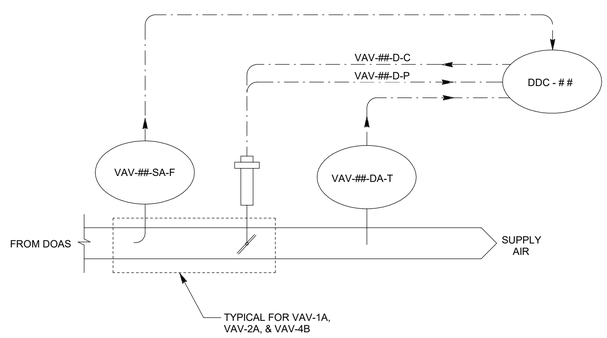
HVAC CONTROL DIAGRAM

SHEET ID
M-814

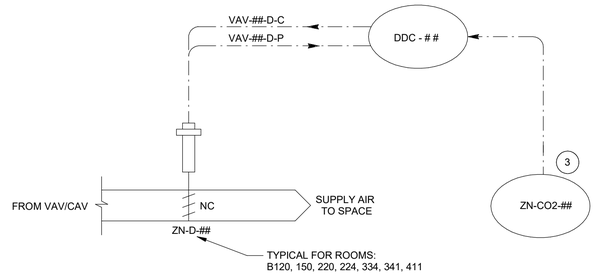
REVISED RTA SUBMISSION 03/01/2023



C1 CASSETTE 4-PIPE FAN COIL UNIT (TYPICAL) - CONTROL DIAGRAM
NTS



C3 VAV BOX (TYPICAL OF 3) - CONTROL DIAGRAM
NTS



C4 ZONE DAMPER W/ CO2 (TYPICAL) - CONTROL DIAGRAM
NTS

CASSETTE 4-PIPE FCU SEQUENCES OF OPERATION

1. GENERAL:
   - A. THE CASSETTE CEILING FOUR-PIPE FAN COIL UNIT (FCU) MUST BE CONTROLLED BY BAS AS SHOWN ON THE CONTROL DIAGRAM.
   - B. THE BAS MUST COMMAND THE SYSTEM IN OCCUPIED/UNOCCUPIED MODE OF OPERATION VIA A TIME SCHEDULING PROGRAM. SCHEDULE MUST BE THE SAME AS THE PARENT DOAS.
   - C. ZONE TEMPERATURE AND HUMIDITY SENSORS MUST TRANSMIT SPACE TEMPERATURE AND HUMIDITY INFORMATION TO THE BAS.
   - D. SET POINTS (ADJUSTABLE):
     HEATING: OCCUPIED - 68°F, UNOCCUPIED - 60°F
     COOLING: OCCUPIED - 75°F, UNOCCUPIED - 80°F
2. OCCUPIED MODE:
   - A. THE BAS MUST SEND A COMMAND SIGNAL TO THE FAN COIL UNIT SPEED CONTROLLER AND THE FAN MUST RUN CONTINUOUSLY AT SPEED INDICATED ON FAN COIL UNIT SCHEDULE.
   - B. COOLING MODE: WHEN SPACE TEMPERATURE IN THE AREA SERVED BY THE FAN COIL UNIT RISES ABOVE THE SPACE TEMPERATURE COOLING SETPOINT, THE BAS MUST COMMAND FCU COOLING COIL CONTROL VALVE TO MODULATE OPEN TO MAINTAIN THE SPACE TEMPERATURE COOLING SETPOINT. WHEN SPACE TEMPERATURE IS SATISFIED, THE FCU COOLING COIL CONTROL VALVES MUST MODULATE TOWARD THE CLOSED POSITION.
   - C. DEHUMIDIFICATION MODE: DURING COOLING MODE, IF THE SPACE HUMIDITY RISES ABOVE THE SPACE HUMIDITY SET POINT, INITIALLY SET AT 50 %RH (ADJUSTABLE), DEHUMIDIFICATION MODE MUST BE ENABLED. THE BAS MUST INCREASE COOLING TO 100% AND MODULATE THE REHEAT COIL TO HELP WITH SPACE OVER COOLING DUE TO THE DEHUMIDIFICATION PROCESS. WHEN THE SPACE HUMIDITY FALLS BELOW THE SET POINT, REHEAT COIL VALVE MUST CLOSE AND CONTROL OF THE CHILLED WATER VALVE MUST RETURN TO NORMAL OPERATION.
   - D. HEATING MODE: WHEN SPACE TEMPERATURE IN THE AREA SERVED BY THE FAN COIL UNIT DROPS BELOW THE SPACE TEMPERATURE HEATING SETPOINT, THE BAS MUST MODULATE FAN COIL UNIT HOT WATER VALVE AS REQUIRED TO MAINTAIN THE SPACE AIR TEMPERATURE AT THE SPACE HEATING SET POINT. WHEN AVERAGE SPACE TEMPERATURE IS SATISFIED, THE FCU HEATING COIL CONTROL VALVE MUST MODULATE TOWARD THE CLOSED POSITION.
   - E. THE FCU COOLING AND HEATING VALVES MUST NOT MODULATE UNTIL THE FAN OPERATION HAS BEEN PROVED.
   - F. THE HEATING AND COOLING CONTROL VALVES MUST MODULATE IN SEQUENCE WITHOUT OVERLAP AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.
   - G. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 80°F (ADJUSTABLE) OR DROPS BELOW 63°F (ADJUSTABLE).
3. UNOCCUPIED MODE:
   - A. THE FAN COIL UNIT MUST BE OFF AND THE COOLING VALVE AND HEATING VALVE MUST BE CLOSED, UNLESS THE SPACE TEMPERATURE FALLS OUTSIDE OF THE UNOCCUPIED MODE TEMPERATURE RANGE.
   - B. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED COOLING SETPOINT, THE FAN COIL UNIT MUST BE ENERGIZED AND THE COOLING VALVE MUST OPEN. WHEN THE SPACE TEMPERATURE DROPS BELOW THE UNOCCUPIED COOLING SET-POINT, THE FAN MUST BE DE-ENERGIZED AND THE COOLING VALVE MUST CLOSE.
   - C. WHEN THE SPACE TEMPERATURE DROPS BELOW THE UNOCCUPIED HEATING SETPOINT, THE FAN MUST BE ENERGIZED AND THE HEATING VALVE MUST OPEN. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED HEATING SETPOINT, THE FAN MUST BE DE-ENERGIZED AND THE HEATING VALVE MUST CLOSE.
   - D. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 85°F (ADJUSTABLE) OR DROPS BELOW 55°F (ADJUSTABLE).
4. OCCUPANCY OVERRIDE:
   - A. IT MUST BE POSSIBLE, THROUGH THE FAN COIL UNIT SPACE TEMPERATURE SENSOR BY PRESSING THE PUSH BUTTON, TO INITIATE AN AFTER-HOUR OVERRIDE DURING THE UNOCCUPIED PERIOD. WHEN THE OCCUPANCY OVERRIDE BUTTON ON THE SPACE TEMPERATURE IS DEPRESSED MOMENTARILY DURING THE UNOCCUPIED PERIOD, THE FAN COIL UNIT MUST BE INDEXED TO THE OCCUPIED PERIOD FOR 60 MINUTES (ADJ.). REFER TO THERMOSTAT SCHEDULE ON SHEET M-846 FOR SPACES WITH OCCUPANCY OVERRIDE.
5. FAN STATUS:
   - A. A CURRENT SENSOR MUST BE USED TO MONITOR THE STATUS OF THE FAN. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM MUST BE GENERATED AND SENT TO THE BAS AND THE FAN START COMMAND MUST BE CANCELED.
6. CONDENSATE HIGH LEVEL ALARM:
   - A. THE CONDENSATE PUMP MUST RUN WHENEVER A DEFINED AMOUNT OF CONDENSATE IS SENSED. IF THE HIGH LIMIT FLOAT DEVICE DETECTS THAT THE CONDENSATE REACHES OR EXCEEDS THE PUMP OPERATING LEVEL, AN ALARM MUST BE GENERATED AT THE BAS AND THE BAS MUST DE-ENERGIZE THE FCU FAN AND CLOSE THE COOLING VALVE.

VAV BOX (TYPICAL OF 3) SEQUENCES OF OPERATION

1. GENERAL: THE VAV BOX MUST BE CONTROLLED BY BAS AS DESCRIBED BELOW. THE CONTROL OF THE VAV BOX SHALL BE LINKED WITH THE OPERATION OF ASSOCIATED DOAS AND ZONE CONTROL DAMPER THROUGH BAS. TO FACILITATE THE CONTROL INTERLOCK, THE VAV BOX CONTROLLER SHALL BE NETWORKED TO THE SAME BUS WHICH MUST COMMUNICATE WITH THE DOAS CONTROLLER AND ZONE CONTROL DAMPER CONTROLLER. OCCUPANCY SCHEDULE MUST BE THE SAME AS THE PARENT DOAS.
2. VAV BOX DAMPER CONTROL:
   - A. UNOCCUPIED MODE: WHEN THE PARENT DOAS IS IN UNOCCUPIED MODE, THE VAV BOX DAMPER MUST BE FULLY CLOSED.
   - B. OCCUPIED MODE: WHEN THE PARENT DOAS IS IN OCCUPIED MODE, THE BAS MUST CONTROL THE VAV BOX DAMPER TO MAINTAIN THE VAV AIRFLOW BASED ON ZONE CONTROL DAMPER POSITION AS SHOWN ON THE SCHEDULE BELOW. ALL LISTED VALUES ARE INITIAL SETTINGS ONLY. THE FINAL VALUE FOR AIRFLOWS MUST BE DETERMINED IN CONSULTING WITH AIR BALANCING CONTRACTOR DURING THE SYSTEM BALANCING AND COMMISSIONING.

ZONE CONTROL DAMPER POSITION	FAIL POS	MIN POS	50%OPEN	75%OPEN	100%OPEN
VAV-1A AIRFLOW (CFM)	745 CFM	895 CFM	1065 CFM	1235 CFM	1405 CFM
VAV-2A AIRFLOW (CFM)	665 CFM	800 CFM	910 CFM	1020 CFM	1125 CFM
VAV-4B AIRFLOW (CFM)	80 CFM	135 CFM	225 CFM	315 CFM	410 CFM

ZONE DAMPER SEQUENCES OF OPERATION

1. GENERAL: ZONE CONTROL DAMPER MUST BE CONTROLLED BY BAS AS DESCRIBED BELOW. OCCUPANCY SCHEDULE MUST BE THE SAME AS THE PARENT DOAS.
2. ZONE DAMPER CONTROL:
   - A. UNOCCUPIED MODE: WHEN THE PARENT DOAS IS IN UNOCCUPIED MODE, THE ZONE DAMPER MUST BE CLOSED.
   - B. OCCUPIED MODE: WHEN THE PARENT DOAS IS IN OCCUPIED MODE, THE ZONE DAMPER MUST BE CONTROLLED AS FOLLOWS:
     a. MINIMUM ZONE DAMPER POSITION: BAS MUST MODULATE THE ZONE DAMPER TO IT'S MINIMUM POSITION. DAMPER POSITION MUST BE DETERMINED IN CONSULTING WITH AIR BALANCING CONTRACTOR DURING SYSTEM BALANCING AND COMMISSIONING.
     b. SPACE CO2 SETPOINT: DURING OCCUPIED PERIODS, THE BAS MUST CONTINUOUSLY MONITOR SPACE CO2 CONCENTRATION AND MODULATE THE ZONE DAMPER TO MAINTAIN THE SPACE CO2 CONCENTRATION AT THE SPACE CO2 SET POINT, INITIALLY SET AT 700 PPM (ADJUSTABLE). WHEN CO2 LEVEL DROPS BELOW SPACE CO2 SETPOINT, THE BAS MUST RETURN THE DAMPER TO IT'S MINIMUM POSITION.
3. SPACE CO2 ALARM: AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE SPACE CO2 RISES 1000 PPM (ADJUSTABLE).

GENERAL NOTES

1. REFER TO SHEETS M-001 AND M-801 FOR LEGEND AND GENERAL NOTES.
2. REFER TO M-836 FOR CASSETTE 4-PIPE FAN COIL UNIT (TYPICAL) POINTS SCHEDULE.
3. REFER TO M-836 FOR VAV BOX POINTS SCHEDULE.
4. REFER TO M-837 FOR ZONE DAMPER W/ CO2 POINTS SCHEDULE.

KEYNOTES

1 PROVIDE SPACE TEMPERATURE SENSOR FOR SPACE TEMPERATURE CONTROL AND MONITORING. SEE MECHANICAL FLOOR PLANS FOR SPACE TEMPERATURE SENSOR'S LOCATION.

2 PROVIDE SPACE HUMIDITY SENSOR FOR SPACE HUMIDITY CONTROL AND MONITORING. SEE MECHANICAL FLOOR PLANS FOR SPACE HUMIDITY SENSOR'S LOCATION.

3 PROVIDE CARBON DIOXIDE SENSOR. SEE MECHANICAL FLOOR PLANS FOR CARBON DIOXIDE SENSOR LOCATION.

4 INSTALL DDC CONTROLLER IN WALL MOUNTED ENCLOSURE. SEE MECHANICAL PIPING FLOOR PLANS FOR ENCLOSURE LOCATIONS.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
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FILE NAME: Signature

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

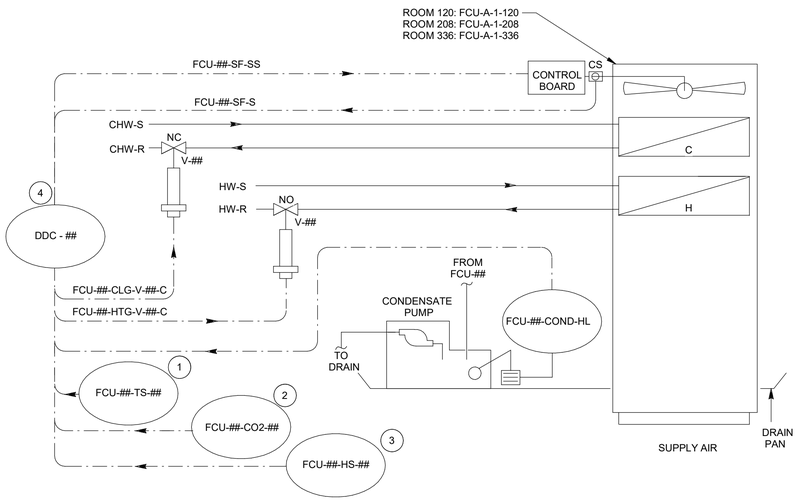
JACOBS / EWING COLE A Joint Venture

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL DIAGRAM

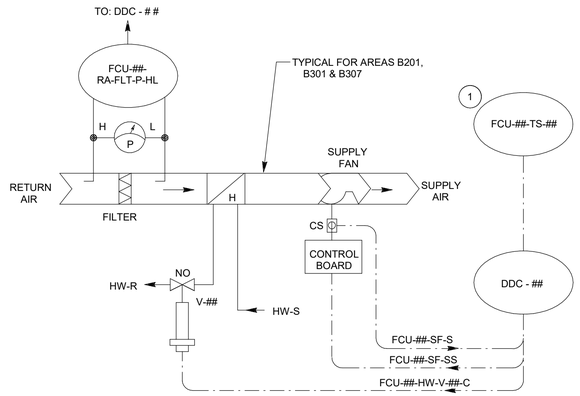
SHEET ID
M-815

REVISED RTA SUBMISSION 03/01/2023



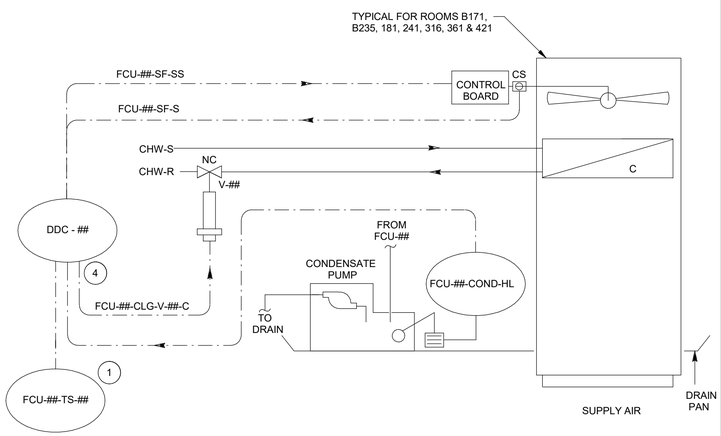
C1 CASSETTE 4-PIPE FCU W/ CO2 SENSOR (ROOMS 120, 208 & 336) - CONTROL DIAGRAM

NTS



C3 2-PIPE FCU (HEATING ONLY) - CONTROL DIAGRAM

NTS



C4 CASSETTE 2-PIPE FCU (COOLING ONLY) - CONTROL DIAGRAM

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CASSETTE 4-PIPE FCU W/ CO2 SENSOR (ROOMS 120, 208, 336) SEQUENCES OF OPERATION

1. GENERAL:
   - A. THE CASSETTE CEILING FOUR-PIPE FAN COIL UNIT (FCU) MUST BE CONTROLLED BY BAS AS SHOWN ON THE CONTROL DIAGRAM.
   - B. THE BAS MUST COMMAND THE SYSTEM IN OCCUPIED/UNOCCUPIED MODE OF OPERATION VIA A TIME SCHEDULING PROGRAM. SCHEDULE MUST BE THE SAME AS THE PARENT DOAS.
   - C. ZONE TEMPERATURE, HUMIDITY, AND CO2 SENSORS MUST TRANSMIT SPACE TEMPERATURE, HUMIDITY AND CO2 INFORMATION TO THE BAS.
   - D. SET POINTS (ADJUSTABLE): HEATING: OCCUPIED - 68°F, UNOCCUPIED - 60°F COOLING: OCCUPIED - 75°F, UNOCCUPIED - 80°F
2. OCCUPIED MODE:
   - A. THE BAS MUST SEND A COMMAND SIGNAL TO THE FAN COIL UNIT SPEED CONTROLLER AND THE FAN MUST RUN CONTINUOUSLY AT SPEED INDICATED ON FAN COIL UNIT SCHEDULE.
   - B. COOLING MODE: WHEN SPACE TEMPERATURE IN THE AREA SERVED BY THE FAN COIL UNIT RISES ABOVE THE SPACE TEMPERATURE COOLING SETPOINT, THE BAS MUST COMMAND FCU COOLING COIL CONTROL VALVE TO MODULATE OPEN TO MAINTAIN THE SPACE TEMPERATURE COOLING SETPOINT. WHEN SPACE TEMPERATURE IS SATISFIED, THE FCU COOLING COIL CONTROL VALVES MUST MODULATE TOWARD THE CLOSED POSITION.
   - C. DEHUMIDIFICATION MODE: DURING COOLING MODE, IF THE SPACE HUMIDITY RISES ABOVE THE SPACE HUMIDITY SET POINT, INITIALLY SET AT 50 %RH (ADJUSTABLE), DEHUMIDIFICATION MODE MUST BE ENABLED. THE BAS MUST INCREASE COOLING TO 100% AND MODULATE THE REHEAT COIL TO HELP WITH SPACE OVER COOLING DUE TO THE DEHUMIDIFICATION PROCESS. WHEN THE SPACE HUMIDITY FALLS BELOW THE SET POINT, REHEAT COIL VALVE MUST CLOSE AND CONTROL OF THE CHILLED WATER VALVE MUST RETURN TO NORMAL OPERATION.
   - D. HEATING MODE: WHEN SPACE TEMPERATURE IN THE AREA SERVED BY THE FAN COIL UNIT DROPS BELOW THE SPACE TEMPERATURE HEATING SETPOINT, THE BAS MUST MODULATE FAN COIL UNIT HOT WATER VALVE AS REQUIRED TO MAINTAIN THE SPACE AIR TEMPERATURE AT THE SPACE HEATING SET POINT. WHEN AVERAGE SPACE TEMPERATURE IS SATISFIED, THE FCU HEATING COIL CONTROL VALVE MUST MODULATE TOWARD THE CLOSED POSITION.
   - E. THE FCU COOLING AND HEATING VALVES MUST NOT MODULATE UNTIL THE FAN OPERATION HAS BEEN PROVED.
   - F. THE HEATING AND COOLING CONTROL VALVES MUST MODULATE IN SEQUENCE WITHOUT OVERLAP AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.
   - G. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 80°F (ADJUSTABLE) OR DROPS BELOW 63°F (ADJUSTABLE).
3. UNOCCUPIED MODE:
   - A. THE FAN COIL UNIT MUST BE OFF AND THE COOLING VALVE AND HEATING VALVE MUST BE CLOSED, UNLESS THE SPACE TEMPERATURE FALLS OUTSIDE OF THE UNOCCUPIED MODE TEMPERATURE RANGE.
   - B. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED COOLING SETPOINT, THE FAN COIL UNIT MUST BE ENERGIZED AND THE COOLING VALVE MUST OPEN. WHEN THE SPACE TEMPERATURE DROPS BELOW THE UNOCCUPIED COOLING SET-POINT, THE FAN MUST BE DE-ENERGIZED AND THE COOLING VALVE MUST CLOSE.
   - C. WHEN THE SPACE TEMPERATURE DROPS BELOW THE UNOCCUPIED HEATING SETPOINT, THE FAN MUST BE ENERGIZED AND THE HEATING VALVE MUST OPEN. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED HEATING SETPOINT, THE FAN MUST BE DE-ENERGIZED AND THE HEATING VALVE MUST CLOSE.
   - D. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 85°F (ADJUSTABLE) OR DROPS BELOW 55°F (ADJUSTABLE).
4. OCCUPANCY OVERRIDE:
   - A. IT MUST BE POSSIBLE, THROUGH THE FAN COIL UNIT SPACE TEMPERATURE SENSOR BY PRESSING THE PUSH BUTTON, TO INITIATE AN AFTER-HOUR OVERRIDE DURING THE UNOCCUPIED PERIOD. WHEN THE OCCUPANCY OVERRIDE BUTTON ON THE SPACE TEMPERATURE IS DEPRESSED MOMENTARILY DURING THE UNOCCUPIED PERIOD, THE FAN COIL UNIT MUST BE INDEXED TO THE OCCUPIED PERIOD FOR 60 MINUTES (ADJ.).
5. FAN STATUS:
   - A. A CURRENT SENSOR MUST BE USED TO MONITOR THE STATUS OF THE FAN. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM MUST BE GENERATED AND SENT TO THE BAS AND THE FAN START COMMAND MUST BE CANCELED.
6. CONDENSATE HIGH LEVEL ALARM:
   - A. THE CONDENSATE PUMP MUST RUN WHENEVER A DEFINED AMOUNT OF CONDENSATE IS SENSED. IF THE HIGH LIMIT FLOAT DEVICE DETECTS THAT THE CONDENSATE REACHES OR EXCEEDS THE PUMP OPERATING LEVEL, AN ALARM MUST BE GENERATED AT THE BAS AND THE BAS MUST DE-ENERGIZE THE FCU FAN AND CLOSE THE COOLING VALVE.
7. SPACE CO2 LEVEL ALARM (TYPICAL FOR ROOMS 120, 208, AND 336):
   - A. IF SPACE CO2 LEVEL EXCEEDS OUTDOOR CO2 LEVEL BY MORE THAN 700 PPM (ADJUSTABLE), AN ALARM MUST BE ANNUNCIATED AT THE BAS.

2-PIPE FCU (HEATING ONLY) SEQUENCES OF OPERATION

1. GENERAL:
   - A. THE FAN COIL UNIT MUST BE CONTROLLED BY BAS AS SHOWN ON THE CONTROL DIAGRAM.
   - B. AN INDIVIDUAL ZONE TEMPERATURE SENSOR MUST TRANSMIT SPACE TEMPERATURE INFORMATION TO THE BAS.
2. SPACE TEMPERATURE CONTROL:
   - A. THE BAS MUST SEND A COMMAND SIGNAL TO THE FAN COIL UNIT SPEED CONTROLLER AND THE FAN MUST RUN CONTINUOUSLY AT SPEED INDICATED ON FAN COIL UNIT SCHEDULE.
   - B. ON A CALL FOR HEATING, THE BAS MUST COMMAND THE HOT WATER CONTROL VALVE TO MODULATE OPEN TO MAINTAIN THE SPACE TEMPERATURE HEATING SETPOINT, INITIALLY SET AT 68°F (ADJUSTABLE). WHEN THE ROOM TEMPERATURE IS SATISFIED, THE HOT WATER CONTROL VALVE MUST MODULATE TOWARD THE CLOSED POSITION.
   - C. THE FCU HOT WATER VALVE MUST NOT MODULATE UNTIL THE FAN OPERATION HAS BEEN PROVED.
   - D. WHEN THE SPACE TEMPERATURE RISES ABOVE HEATING TEMPERATURE SET POINT, THE FAN MUST BE DE-ENERGIZED AND HOT WATER VALVE MUST CLOSE.
3. SPACE TEMPERATURE ALARM:
   - A. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE DROPS BELOW 63°F (ADJUSTABLE).
4. FAN STATUS:
   - A. A CURRENT SENSOR MUST BE USED TO MONITOR THE STATUS OF THE FAN. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM MUST BE GENERATED AND SENT TO THE BAS AND THE FAN START COMMAND MUST BE CANCELED.

CASSETTE 2-PIPE FCU (COOLING ONLY) SEQUENCES OF OPERATION

1. GENERAL:
   - A. THE FAN COIL UNIT MUST BE CONTROLLED BY BAS AS SHOWN ON THE CONTROL DIAGRAM.
   - B. AN INDIVIDUAL ZONE TEMPERATURE SENSOR MUST TRANSMIT SPACE TEMPERATURE INFORMATION TO THE BAS.
2. SPACE TEMPERATURE CONTROL:
   - A. THE BAS MUST SEND A COMMAND SIGNAL TO THE FAN COIL UNIT SPEED CONTROLLER AND THE FAN MUST RUN CONTINUOUSLY AT SPEED INDICATED ON FAN COIL UNIT SCHEDULE.
   - B. ON A CALL FOR COOLING, THE BAS MUST COMMAND THE COOLING COIL CONTROL VALVE TO MODULATE OPEN TO MAINTAIN THE SPACE TEMPERATURE COOLING SETPOINT, INITIALLY SET AT 75°F (ADJUSTABLE). WHEN THE ROOM TEMPERATURE IS SATISFIED, THE COOLING COIL CONTROL VALVE MUST MODULATE TOWARD THE CLOSED POSITION.
   - C. THE FCU COOLING VALVE MUST NOT MODULATE UNTIL THE FAN OPERATION HAS BEEN PROVED.
   - D. WHEN THE SPACE TEMPERATURE FALLS BELOW COOLING TEMPERATURE SET POINT, THE FAN MUST BE DE-ENERGIZED AND CHILLED WATER VALVE MUST CLOSE.
3. SPACE TEMPERATURE ALARM:
   - A. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 80°F (ADJUSTABLE).
4. FAN STATUS:
   - A. A CURRENT SENSOR MUST BE USED TO MONITOR THE STATUS OF THE FAN. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM MUST BE GENERATED AND SENT TO THE BAS AND THE FAN START COMMAND MUST BE CANCELED.
5. CONDENSATE HIGH LEVEL ALARM:
   - A. THE CONDENSATE PUMP MUST RUN WHENEVER A DEFINED AMOUNT OF CONDENSATE IS SENSED. IF THE HIGH LIMIT FLOAT DEVICE DETECTS THAT THE CONDENSATE REACHES OR EXCEEDS THE PUMP OPERATING LEVEL, AN ALARM MUST BE GENERATED AT THE BAS AND THE BAS MUST DE-ENERGIZE THE FCU FAN AND CLOSE THE COOLING VALVE.

GENERAL NOTES

1. REFER TO SHEETS M-001 AND M-801 FOR LEGEND AND GENERAL NOTES.
2. REFER TO SHEET M-837 FOR CASSETTE 4-PIPE FCU W/ CO2 SENSOR POINTS SCHEDULE.
3. REFER TO SHEET M-838 FOR CASSETTE 2-PIPE FCU (COOLING ONLY) AND 2-PIPE FCU (HEATING ONLY) POINTS SCHEDULE.

KEYNOTES

1 PROVIDE SPACE TEMPERATURE SENSOR FOR SPACE TEMPERATURE CONTROL AND MONITORING. SEE MECHANICAL FLOOR PLANS FOR SPACE TEMPERATURE SENSOR'S LOCATION.

2 PROVIDE CARBON DIOXIDE SENSOR. SEE MECHANICAL FLOOR PLANS FOR CARBON DIOXIDE SENSOR LOCATION.

3 PROVIDE SPACE HUMIDITY SENSOR FOR SPACE HUMIDITY CONTROL AND MONITORING. SEE MECHANICAL FLOOR PLANS FOR SPACE HUMIDITY SENSOR'S LOCATION.

4 INSTALL DDC CONTROLLER IN WALL MOUNTED ENCLOSURE. SEE MECHANICAL PIPING FLOOR PLANS FOR ENCLOSURE LOCATIONS.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

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CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
FILE NAME:
SIZE: ANSI 'D'

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE A Joint Venture

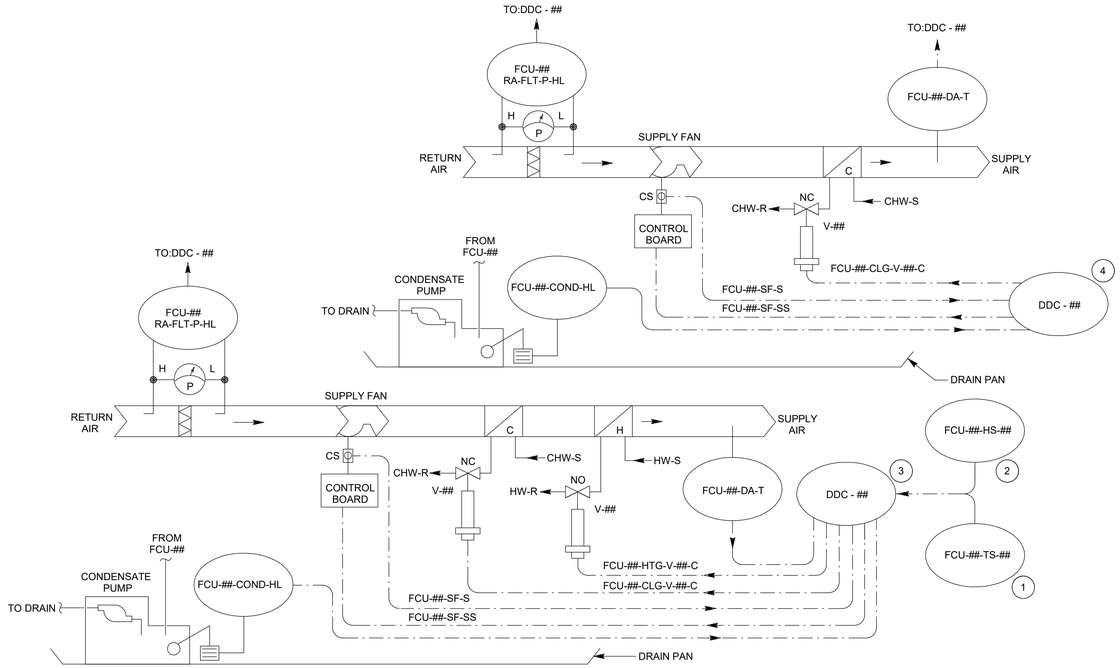
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL DIAGRAM

SHEET ID

M-816

REVISED RTA SUBMISSION 03/01/2023



C1 4-PIPE & 2-PIPE FAN COIL UNITS (ROOMS 160 & 311) - CONTROL DIAGRAM
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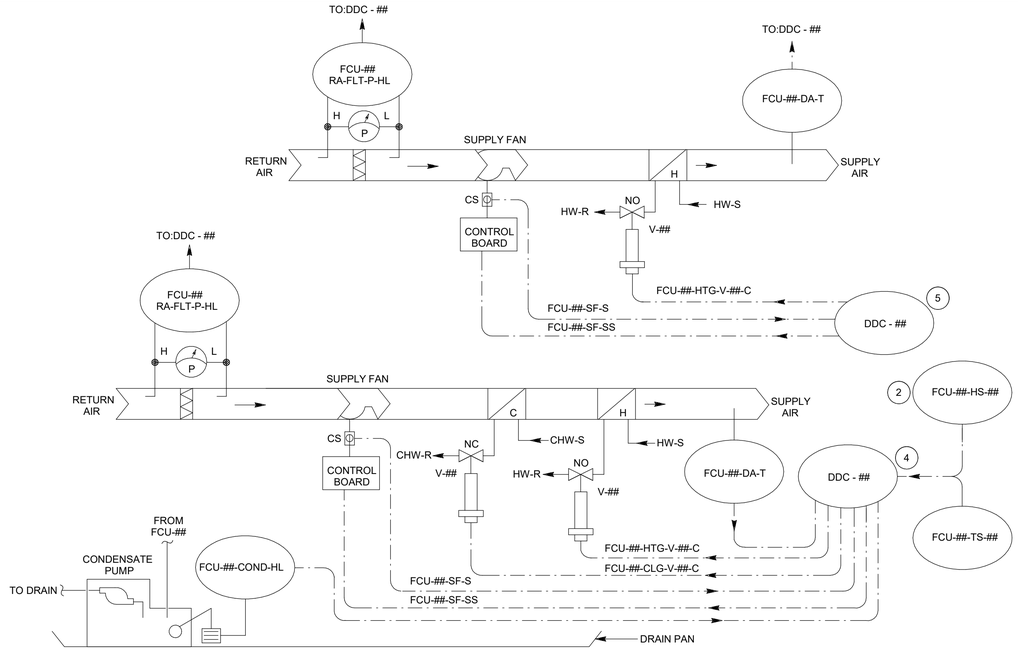

C3 4-PIPE & 2-PIPE FAN COIL UNITS (ENTRY 101/ WAITING AREA 102) - CONTROL DIAGRAM
NTS

4-PIPE FCU & 2-PIPE FCUS (ROOMS 160 & 311) SEQUENCES OF OPERATION

1. GENERAL:
   - A. THE FOUR-PIPE FAN COIL UNIT AND TWO-PIPE FAN COIL UNIT MUST BE CONTROLLED BY BAS AS SHOWN ON THE CONTROL DIAGRAM AND OPERATE AS ONE SYSTEM.
   - B. THE FOUR-PIPE FAN COIL UNIT MUST SERVE AS THE LEAD UNIT AND TWO-PIPE FAN COIL UNIT MUST SERVE AS LAG UNIT.
   - C. THE BAS MUST COMMAND THE SYSTEM IN OCCUPIED/UNOCCUPIED MODE OF OPERATION VIA A TIME SCHEDULING PROGRAM. SCHEDULE MUST BE THE SAME AS THE PARENT DOAS.
   - D. ZONE TEMPERATURE AND HUMIDITY SENSORS MUST TRANSMIT SPACE TEMPERATURE AND HUMIDITY INFORMATION TO THE BAS.
   - E. SET POINTS (ADJUSTABLE):
     HEATING: OCCUPIED - 68°F, UNOCCUPIED - 60°F
     COOLING: OCCUPIED - 75°F, UNOCCUPIED - 80°F
2. OCCUPIED MODE:
   - A. THE BAS MUST SEND A COMMAND SIGNAL TO THE LEAD FAN COIL UNIT SPEED CONTROLLER AND THE FAN MUST RUN CONTINUOUSLY AT SPEED INDICATED ON FAN COIL UNIT SCHEDULE.
   - B. COOLING MODE (FCUs ONLY): ON A CALL FOR COOLING, THE BAS MUST COMMAND THE LEAD FCU COOLING COIL CONTROL VALVE TO MODULATE OPEN TO MAINTAIN THE SPACE TEMPERATURE COOLING SETPOINT. IF THE SPACE TEMPERATURE CONTINUES TO RISE WHEN THE LEAD FCU CHILLED WATER VALVE OUTPUT IS AT 100% OUTPUT, THE BAS MUST SEND A COMMAND SIGNAL TO THE LAG FAN COIL UNIT SPEED CONTROLLER AND THE FAN MUST RUN CONTINUOUSLY AT SPEED INDICATED ON FAN COIL UNIT SCHEDULE. ONCE ENABLED, THE BAS MUST MODULATE THE LAG FCU CHILLED WATER VALVE AS REQUIRED TO MAINTAIN THE SPACE AIR TEMPERATURE AT THE SPACE COOLING SET POINT. UPON A DROP IN SPACE TEMPERATURE, THE REVERSE MUST OCCUR.
   - C. DEHUMIDIFICATION MODE (LEAD FCU ONLY): DURING COOLING MODE, IF THE SPACE HUMIDITY RISES ABOVE THE SPACE HUMIDITY SET POINT, INITIALLY SET AT 50 %RH (ADJUSTABLE), DEHUMIDIFICATION MODE MUST BE ENABLED. THE BAS MUST INCREASE COOLING TO 100% AND MODULATE THE REHEAT COIL TO HELP WITH SPACE OVER COOLING DUE TO THE DEHUMIDIFICATION PROCESS. WHEN THE SPACE HUMIDITY FALLS BELOW THE SET POINT, REHEAT COIL VALVE MUST CLOSE AND CONTROL OF THE CHILLED WATER VALVE MUST RETURN TO NORMAL OPERATION.
   - D. HEATING MODE (LEAD FCU ONLY): ON A CALL FOR HEATING, THE BAS MUST COMMAND THE LEAD FCU HEATING COIL CONTROL VALVE TO MODULATE OPEN TO MAINTAIN THE SPACE TEMPERATURE HEATING SETPOINT. UPON A RISE IN SPACE TEMPERATURE, THE REVERSE MUST OCCUR.
   - E. THE FCU COOLING AND HEATING VALVES MUST NOT MODULATE UNTIL THE FAN OPERATION HAS BEEN PROVED.
   - A. THE HEATING AND COOLING CONTROL VALVES MUST MODULATE IN SEQUENCE WITHOUT OVERLAP AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.
   - B. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 80°F (ADJUSTABLE) OR DROPS BELOW 63°F (ADJUSTABLE).
3. UNOCCUPIED MODE:
   - A. THE FAN COIL UNITS MUST BE OFF AND THE COOLING VALVE AND HEATING VALVE MUST BE CLOSED, UNLESS THE SPACE TEMPERATURE FALLS OUTSIDE OF THE UNOCCUPIED MODE TEMPERATURE RANGE.
   - B. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED COOLING SETPOINT, THE LEAD FCU FAN MUST BE ENERGIZED AND THE COOLING VALVE MUST OPEN. WHEN THE SPACE TEMPERATURE DROPS BELOW THE UNOCCUPIED COOLING SET-POINT, THE FAN MUST BE DE-ENERGIZED AND THE COOLING VALVE MUST CLOSE.
   - C. WHEN THE SPACE TEMPERATURE DROPS BELOW THE UNOCCUPIED HEATING SETPOINT, THE LEAD FCU FAN MUST BE ENERGIZED AND THE HEATING VALVE MUST OPEN. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED HEATING SETPOINT, THE FAN MUST BE DE-ENERGIZED AND THE HEATING VALVE MUST CLOSE.
   - D. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 85°F (ADJUSTABLE) OR DROPS BELOW 55°F (ADJUSTABLE).
4. OCCUPANCY OVERRIDE:
   - A. IT MUST BE POSSIBLE, THROUGH THE FAN COIL UNIT SPACE TEMPERATURE SENSOR BY PRESSING THE PUSH BUTTON, TO INITIATE AN AFTER-HOUR OVERRIDE DURING THE UNOCCUPIED PERIOD. WHEN THE OCCUPANCY OVERRIDE BUTTON ON THE SPACE TEMPERATURE IS DEPRESSED MOMENTARILY DURING THE UNOCCUPIED PERIOD, THE FAN COIL UNIT MUST BE INDEXED TO THE OCCUPIED PERIOD FOR 60 MINUTES (ADJ.).
5. FAN STATUS:
   - A. A CURRENT SENSOR MUST BE USED TO MONITOR THE STATUS OF THE FAN. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM MUST BE GENERATED AND SENT TO THE BAS AND THE FAN START COMMAND MUST BE CANCELED.
6. CONDENSATE HIGH LEVEL ALARM:
   - A. THE CONDENSATE PUMP MUST RUN WHENEVER A DEFINED AMOUNT OF CONDENSATE IS SENSED. IF THE HIGH LIMIT FLOAT DEVICE DETECTS THAT THE CONDENSATE REACHES OR EXCEEDS THE PUMP OPERATING LEVEL, AN ALARM MUST BE GENERATED AT THE BAS AND THE BAS MUST DE-ENERGIZE THE FCU FAN AND CLOSE THE COOLING VALVE.

4-PIPE FCU & 2-PIPE FCUS (ENTRY 101/ WAITING AREA 102) SEQUENCES OF OPERATION

1. GENERAL:
   - A. THE FOUR-PIPE FAN COIL UNIT AND TWO-PIPE FAN COIL UNIT MUST BE CONTROLLED BY BAS AS SHOWN ON THE CONTROL DIAGRAM AND OPERATE AS ONE SYSTEM.
   - B. THE FOUR-PIPE FAN COIL UNIT MUST SERVE AS THE LEAD UNIT AND TWO-PIPE FAN COIL UNIT MUST SERVE AS LAG UNIT.
   - C. THE BAS MUST COMMAND THE SYSTEM IN OCCUPIED/UNOCCUPIED MODE OF OPERATION VIA A TIME SCHEDULING PROGRAM. SCHEDULE MUST BE THE SAME AS THE PARENT DOAS.
   - D. ZONE TEMPERATURE AND HUMIDITY SENSORS MUST TRANSMIT SPACE TEMPERATURE AND HUMIDITY INFORMATION TO THE BAS.
   - E. SET POINTS (ADJUSTABLE):
     HEATING: OCCUPIED - 68°F, UNOCCUPIED - 60°F
     COOLING: OCCUPIED - 75°F, UNOCCUPIED - 80°F
2. OCCUPIED MODE:
   - A. THE BAS MUST SEND A COMMAND SIGNAL TO THE LEAD FAN COIL UNIT SPEED CONTROLLER AND THE FAN MUST RUN CONTINUOUSLY AT SPEED INDICATED ON FAN COIL UNIT SCHEDULE.
   - B. HEATING MODE (FCUs ONLY): ON A CALL FOR HEATING, THE BAS MUST COMMAND THE LEAD FCU HEATING COIL CONTROL VALVE TO MODULATE OPEN TO MAINTAIN THE SPACE TEMPERATURE HEATING SETPOINT. IF THE SPACE TEMPERATURE CONTINUES TO FALL WHEN THE LEAD FCU HOT WATER VALVE OUTPUT IS AT 100% OUTPUT, THE BAS MUST SEND A COMMAND SIGNAL TO THE LAG FAN COIL UNIT SPEED CONTROLLER AND THE FAN MUST RUN CONTINUOUSLY AT SPEED INDICATED ON FAN COIL UNIT SCHEDULE. ONCE ENABLED, THE BAS MUST MODULATE THE LAG FCU HOT WATER VALVE AS REQUIRED TO MAINTAIN THE SPACE AIR TEMPERATURE AT THE SPACE HEATING SET POINT. UPON A RISE IN SPACE TEMPERATURE, THE REVERSE MUST OCCUR.
   - C. COOLING MODE (LEAD FCU ONLY): ON A CALL FOR COOLING, THE BAS MUST COMMAND THE LEAD FCU COOLING COIL CONTROL VALVE TO MODULATE OPEN TO MAINTAIN THE SPACE TEMPERATURE COOLING SETPOINT. UPON A FALL IN SPACE TEMPERATURE, THE REVERSE MUST OCCUR.
   - D. DEHUMIDIFICATION MODE (LEAD FCU ONLY): DURING COOLING MODE, IF THE SPACE HUMIDITY RISES ABOVE THE SPACE HUMIDITY SET POINT, INITIALLY SET AT 50 %RH (ADJUSTABLE), DEHUMIDIFICATION MODE MUST BE ENABLED. THE BAS MUST INCREASE COOLING TO 100% AND MODULATE THE REHEAT COIL TO HELP WITH SPACE OVER COOLING DUE TO THE DEHUMIDIFICATION PROCESS. WHEN THE SPACE HUMIDITY FALLS BELOW THE SET POINT, REHEAT COIL VALVE MUST CLOSE AND CONTROL OF THE CHILLED WATER VALVE MUST RETURN TO NORMAL OPERATION.
   - E. THE FCU COOLING AND HEATING VALVES MUST NOT MODULATE UNTIL THE FAN OPERATION HAS BEEN PROVED.
   - F. THE HEATING AND COOLING CONTROL VALVES MUST MODULATE IN SEQUENCE WITHOUT OVERLAP AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.
   - G. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 80°F (ADJUSTABLE) OR DROPS BELOW 63°F (ADJUSTABLE).
4. UNOCCUPIED MODE:
   - A. THE FAN COIL UNITS MUST BE OFF AND THE COOLING VALVE AND HEATING VALVE MUST BE CLOSED, UNLESS THE SPACE TEMPERATURE FALLS OUTSIDE OF THE UNOCCUPIED MODE TEMPERATURE RANGE.
   - B. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED COOLING SETPOINT, THE LEAD FCU FAN MUST BE ENERGIZED AND THE COOLING VALVE MUST OPEN. WHEN THE SPACE TEMPERATURE DROPS BELOW THE UNOCCUPIED COOLING SET-POINT, THE FAN MUST BE DE-ENERGIZED AND THE COOLING VALVE MUST CLOSE.
   - C. WHEN THE SPACE TEMPERATURE DROPS BELOW THE UNOCCUPIED HEATING SETPOINT, THE LEAD FCU FAN MUST BE ENERGIZED AND THE HEATING VALVE MUST OPEN. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED HEATING SETPOINT, THE FAN MUST BE DE-ENERGIZED AND THE HEATING VALVE MUST CLOSE.
   - D. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 85°F (ADJUSTABLE) OR DROPS BELOW 55°F (ADJUSTABLE).
5. OCCUPANCY OVERRIDE:
   - A. IT MUST BE POSSIBLE, THROUGH THE FAN COIL UNIT SPACE TEMPERATURE SENSOR BY PRESSING THE PUSH BUTTON, TO INITIATE AN AFTER-HOUR OVERRIDE DURING THE UNOCCUPIED PERIOD. WHEN THE OCCUPANCY OVERRIDE BUTTON ON THE SPACE TEMPERATURE IS DEPRESSED MOMENTARILY DURING THE UNOCCUPIED PERIOD, THE FAN COIL UNIT MUST BE INDEXED TO THE OCCUPIED PERIOD FOR 60 MINUTES (ADJ.).
6. FAN STATUS:
   - A. A CURRENT SENSOR MUST BE USED TO MONITOR THE STATUS OF THE FAN. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM MUST BE GENERATED AND SENT TO THE BAS AND THE FAN START COMMAND MUST BE CANCELED.
7. CONDENSATE HIGH LEVEL ALARM:
   - A. THE CONDENSATE PUMP MUST RUN WHENEVER A DEFINED AMOUNT OF CONDENSATE IS SENSED. IF THE HIGH LIMIT FLOAT DEVICE DETECTS THAT THE CONDENSATE REACHES OR EXCEEDS THE PUMP OPERATING LEVEL, AN ALARM MUST BE GENERATED AT THE BAS AND THE BAS MUST DE-ENERGIZE THE FCU FAN AND CLOSE THE COOLING VALVE.

GENERAL NOTES

1. REFER TO M-001 AND M-801 FOR LEGEND AND GENERAL NOTES.
2. REFER TO M-839 FOR 4-PIPE & 2-PIPE FCUS (ROOMS 160 & 311) POINTS SCHEDULE.
3. REFER TO M-840 FOR 4-PIPE & 2-PIPE FCUS (ENTRY 101/ WAITING 102) POINTS SCHEDULE.

KEYNOTES

1 PROVIDE SPACE TEMPERATURE SENSOR FOR SPACE TEMPERATURE CONTROL AND MONITORING. SEE MECHANICAL FLOOR PLANS FOR SPACE TEMPERATURE SENSOR'S LOCATION.

2 PROVIDE SPACE HUMIDITY SENSOR FOR SPACE HUMIDITY CONTROL AND MONITORING. SEE MECHANICAL FLOOR PLANS FOR SPACE HUMIDITY SENSOR'S LOCATION.

3 ROOM 160: INSTALL DDC CONTROLLER IN WALL MOUNTED ENCLOSURE. SEE MECHANICAL PIPING FLOOR PLANS FOR ENCLOSURE LOCATIONS LOCATIONS. ROOM 311: INSTALL DDC CONTROLLER IN FCU CONTROL ENCLOSURE. SEE MECHANICAL PIPING FLOOR PLANS FOR FCU LOCATIONS.

4 INSTALL DDC CONTROLLER IN FCU CONTROL ENCLOSURE. SEE MECHANICAL PIPING FLOOR PLANS FOR FCU LOCATIONS.

5 INSTALL DDC CONTROLLER IN WALL MOUNTED ENCLOSURE. SEE MECHANICAL PIPING FLOOR PLANS FOR ENCLOSURE LOCATIONS.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

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CHECKED BY: D. GORDON
SUBMITTED BY:
FILE NAME:
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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE A Joint Venture

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL DIAGRAM

SHEET ID

M-817

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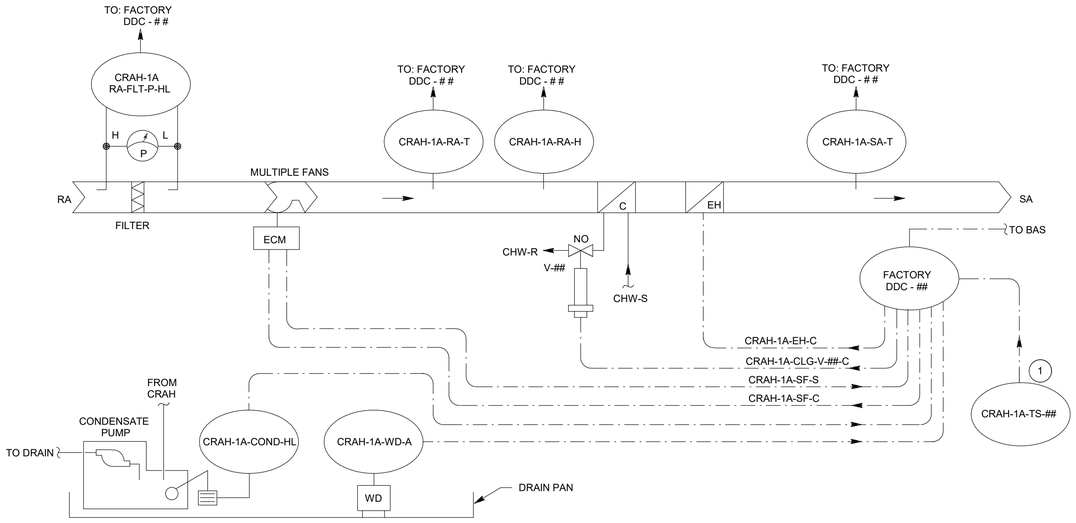

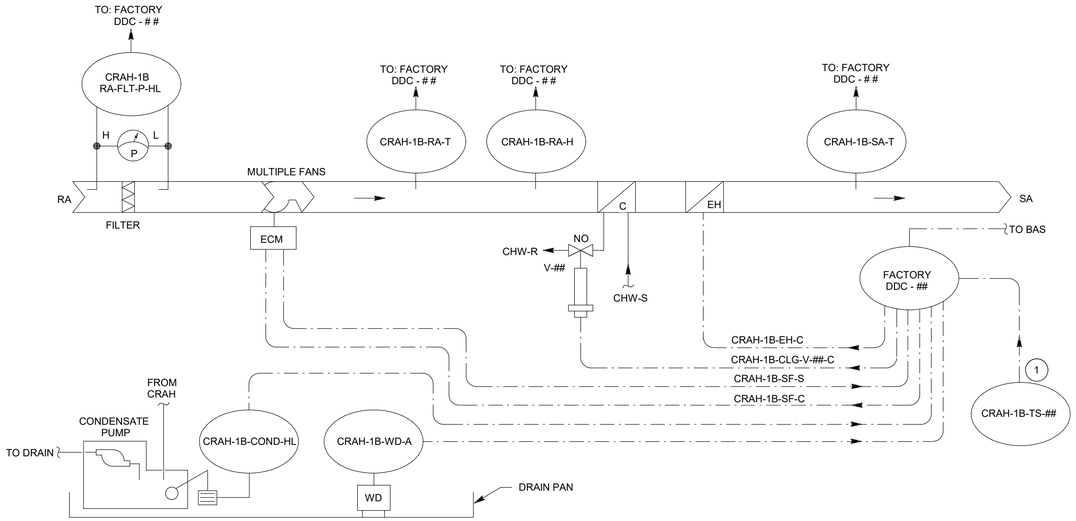

A1 CRAH-1A & CRAH-1B CONTROL DIAGRAM
NTS

CRAH-1A & CRAH-1B SEQUENCES OF OPERATION

1. GENERAL:
   - A. THE BAS MUST PROVIDE ENABLE AND DISABLE CONTROL OF THE COMPUTER ROOM AIR HANDLER (CRAH) AND PROVIDE MONITORING AND DIAGNOSTIC INFORMATION FOR MANAGEMENT PURPOSES. THE BAS MUST MONITOR THE COMPUTER ROOM AIR CONDITIONER UNIT THROUGH A COMMUNICATION INTERFACE. THE RS-485 MODBUS COMMUNICATION CARD PROVIDED WITH CRAC UNIT MUST BE INTERFACED WITH BAS. THE CONTROLS CONTRACTOR MUST COORDINATE WITH UNIT PROVIDER AND PROVIDE NECESSARY CONTROL POINT MAPPING AND SOFTWARE MODIFICATION TO THE BAS FOR REMOTE CONTROL AND MONITORING.
2. CRAH-1 & CRAH-1B OPERATION:
   - A. UNDER NORMAL OPERATION BOTH CRAH UNITS ARE REQUIRED TO OPERATE AT ALL TIMES. IF ONE UNIT BECOMES DISABLED, AN ALARM MUST BE GENERATED AT THE BAS AND THE OTHER UNIT MUST INCREASE ITS OUTPUT TO SATISFY THE LOAD REQUIREMENTS.
3. CRAH CONTROL:
   - A. WHEN THE CRAH IS COMMANDED TO RUN, THE SELF CONTAINED CRAH CONTROLS SHALL SEND A START COMMAND TO THE FANS AND CONTROL THE SPEED OF FANS BASED ON REMOTE RACK TEMPERATURE SENSOR(S) TO ENSURE THAT THE COOL AIR IS BEING DELIVERED TO THE INLET OF THE RACKS.
   - B. THE CRAH CONTROLLER MUST MONITOR THE SUPPLY AIR TEMPERATURE SENSOR, WHICH IS FACTORY MOUNTED IN THE UNIT, TO MODULATE THE CHILLED WATER VALVE AS REQUIRED TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT SETPOINT RECOMMENDED BY MANUFACTURER. WHEN THE UNIT SUPPLY FAN IS OFF, THE COOLING CONTROL VALVE MUST CLOSE.
   - C. WHEN THE SYSTEM HAS BEEN ENABLED FOR MORE THAN 15 MINUTES (ADJ.) AND THE SUPPLY AIR TEMPERATURE IS MORE THAN 5° F (ADJ.) ABOVE SETPOINT, A CRITICAL ALARM MUST BE GENERATED AT THE BAS.
4. DEHUMIDIFICATION CONTROL:
   - A. WHEN THE RETURN HUMIDITY RISES ABOVE THE RETURN HUMIDITY SET POINT, INITIALLY SET AT 55 %RH (ADJUSTABLE), DEHUMIDIFICATION MODE MUST BE ENABLED. THE UNIT CONTROLLER MUST INCREASE COOLING TO 100% AND RAMP DOWN THE SPEED OF FANS AND ENABLE THE REHEAT COIL TO HELP WITH OVER COOLING DUE TO THE DEHUMIDIFICATION PROCESS. WHEN THE RETURN HUMIDITY FALLS BELOW THE RETURN HUMIDITY SET POINT, REHEAT COIL MUST BE DISABLED AND CONTROL OF THE CHILLED WATER VALVE AND FANS MUST RETURN TO NORMAL OPERATION.
5. CONDENSATE PUMP ALARM:
   - A. THE CONDENSATE PUMP MUST RUN WHENEVER A DEFINED AMOUNT OF CONDENSATE IS SENSED. IF THE HIGH LIMIT FLOAT DEVICE DETECTS THAT THE CONDENSATE REACHES OR EXCEEDS THE PUMP OPERATING LEVEL, AN ALARM MUST BE GENERATED AND SENT TO THE CRAH CONTROLLER. THE BAS MUST RECEIVE A CRITICAL ALARM VIA NETWORK INTERFACE.
6. LEAK DETECTOR ALARM:
   - A. THE CRAH CONTROLLER MUST MONITOR THE LEAK DETECTOR PROVIDED WITH THE UNIT AND ANNUNCIATE AN ALARM UPON DETECTION OF WATER. THE BAS MUST RECEIVE A CRITICAL ALARM VIA NETWORK INTERFACE.
7. FILTER ALARM:
   - A. THE CRAH CONTROLLER MUST MONITOR THE FILTER FOR AN ALARM CONDITION. UPON DETECTION BY DIFFERENTIAL PRESSURE SWITCH AN ALARM MUST BE SENT TO THE CRAH CONTROLLER AND THE BAS.
8. SUPPLY FAN FAILURE ALARM:
   - A. AN AUXILIARY CONTACT MUST BE USED TO MONITOR THE STATUS OF THE UNIT SUPPLY FAN. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM MUST BE SENT TO THE BAS.
9. LOSS OF COMMUNICATION:
   - A. UPON LOSS OF COMMUNICATIONS BETWEEN BAS AND CRAH CONTROLLER, CRAH MUST OPERATE INDEPENDENTLY TO MAINTAIN THE SPACE TEMPERATURE AT SET POINT.

GENERAL NOTES

1. REFER TO SHEETS M-001 AND M-801 FOR LEGEND AND GENERAL NOTES.
2. REFER TO SHEET M-841 FOR CRAH-1A & CRAH-1B POINTS SCHEDULE.

KEYNOTES

1 RACK TEMPERATURE SENSOR(S) ARE PROVIDED BY CRAH MANUFACTURER FOR INSTALLATION IN THE FIELD. INSTALL AND CONNECT SENSORS IN ACCORDANCE WITH THE REQUIREMENTS AND INSTRUCTIONS PROVIDED BY CRAH MANUFACTURER.

US Army Corps of Engineers ®

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CHECKED BY: D. GORDON
SUBMITTED BY:
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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL DIAGRAM

SHEET ID

M-818

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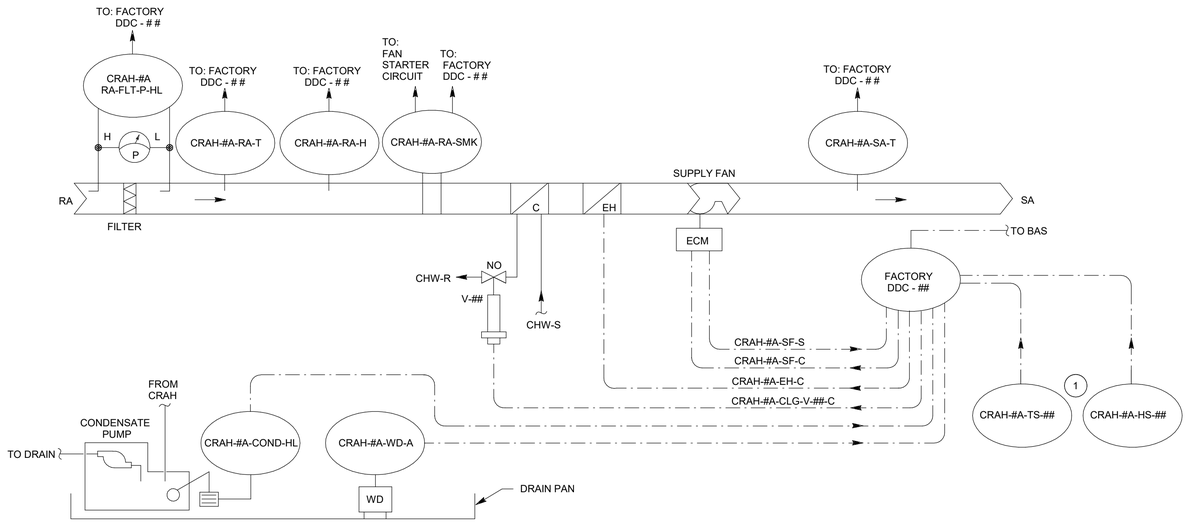

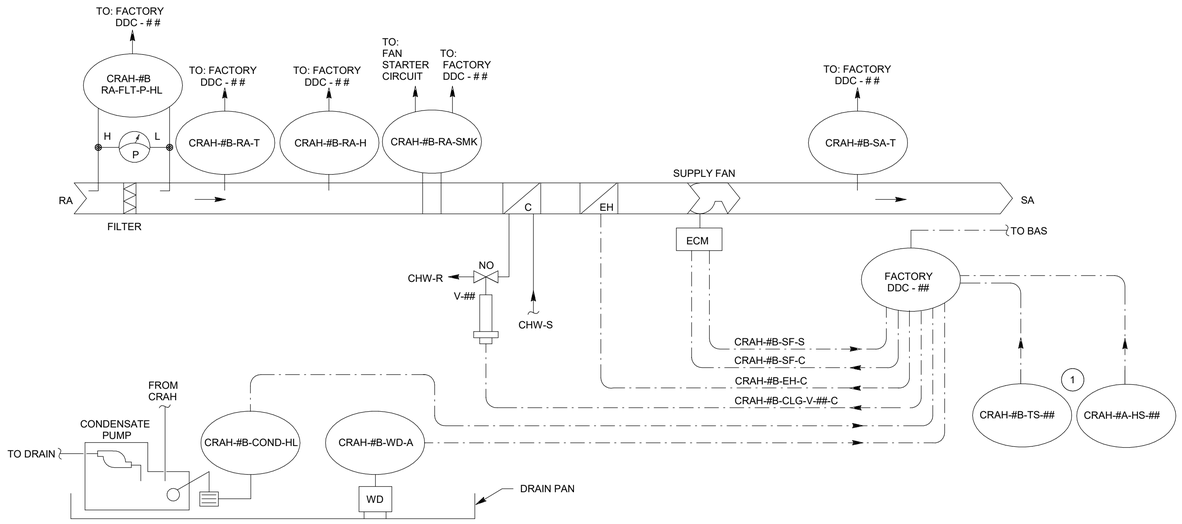

A1 CRAH-5A/5B, CRAH-6A/6B, CRAH-8A/8B, CRAH-9A/9B, CRAH-10A/10B & CRAH-11A/11B CONTROL DIAGRAM

NTS

CRAH-XA/XB SEQUENCES OF OPERATION

1. GENERAL:
   A. THE BAS MUST PROVIDE ENABLE AND DISABLE CONTROL OF THE COMPUTER ROOM AIR HANDLER (CRAH) AND PROVIDE MONITORING AND DIAGNOSTIC INFORMATION FOR MANAGEMENT PURPOSES. THE BAS MUST MONITOR THE COMPUTER ROOM AIR CONDITIONER UNIT THROUGH A COMMUNICATION INTERFACE. THE RS-485 MODBUS COMMUNICATION CARD PROVIDED WITH CRAC UNIT MUST BE INTERFACED WITH BAS. THE CONTROLS CONTRACTOR MUST COORDINATE WITH UNIT PROVIDER AND PROVIDE NECESSARY CONTROL POINT MAPPING AND SOFTWARE MODIFICATION TO THE BAS FOR REMOTE CONTROL AND MONITORING.
2. LEAD/STANDBY OPERATION:
   A. ONE CRAH IS REQUIRED TO OPERATE AT ALL TIMES AND MUST SERVE AS LEAD UNIT. THE OTHER CRAH MUST SERVE AS STANDBY UNIT WHICH MUST BE TURNED ON AUTOMATICALLY IN THE EVENT OF FAILURE OF LEAD UNIT. IF BAS RECEIVES A FAULT SIGNAL FROM CRAH CONTROLLER, THE BAS MUST AUTOMATICALLY START THE STANDBY UNIT.
3. LEAD/STANDBY ROTATION:
   A. PROVIDE AN AUTOMATIC PROGRAM TO ALTERNATE THE LEAD AND STANDBY UNITS WEEKLY TO MAINTAIN EVEN USE OF THE EQUIPMENT.
4. CRAH CONTROL:
   A. WHEN THE CRAH IS COMMANDED TO RUN, THE SELF CONTAINED CRAH CONTROLS MUST RAMP THE SUPPLY FAN SPEED TO 100%.
   B. THE UNIT CONTROLLER MUST MODULATE THE CHILLED WATER VALVE AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE, AS SENSED BY SPACE TEMPERATURE SENSOR AT OR BELOW THE SPACE COOLING SET POINT WHICH MUST BE INITIALLY SET AT 75° F (ADJ.). ON A CALL FOR COOLING, THE CHILLED WATER VALVE MUST MODULATE OPEN AND THE FAN SPEED MUST RAMP UP OR DOWN TO FOLLOW THE VALVE POSITION. MINIMUM FAN SPEED MUST BE COORDINATED WITH CRAH'S MANUFACTURER AND INITIALLY SET AT 40% FAN SPEED. WHEN THE UNIT SUPPLY FAN IS OFF, THE COOLING CONTROL VALVE MUST CLOSE.
   C. WHEN THE SYSTEM HAS BEEN ENABLED FOR MORE THAN 15 MINUTES (ADJ.) AND THE ZONE TEMPERATURE IS MORE THAN 5° F (ADJ.) ABOVE SETPOINT, A CRITICAL ALARM MUST BE SENT TO THE BAS.
5. DEHUMIDIFICATION CONTROL:
   A. WHEN THE RETURN HUMIDITY RISES ABOVE THE RETURN HUMIDITY SET POINT, INITIALLY SET AT 55 %RH (ADJUSTABLE), DEHUMIDIFICATION MODE MUST BE ENABLED. THE UNIT CONTROLLER MUST INCREASE COOLING TO 100% AND RAMP DOWN THE FAN SPEED AND ENABLE THE REHEAT COIL TO HELP WITH SPACE OVER COOLING DUE TO THE DEHUMIDIFICATION PROCESS. WHEN THE RETURN HUMIDITY FALLS BELOW THE RETURN HUMIDITY SET POINT, REHEAT COIL MUST BE DISABLED AND CONTROL OF THE CHILLED WATER VALVE AND FAN MUST RETURN TO NORMAL OPERATION.
6. CONDENSATE PUMP ALARM:
   A. THE CONDENSATE PUMP MUST RUN WHENEVER A DEFINED AMOUNT OF CONDENSATE IS SENSED. IF THE HIGH LIMIT FLOAT DEVICE DETECTS THAT THE CONDENSATE REACHES OR EXCEEDS THE PUMP OPERATING LEVEL, AN ALARM MUST BE GENERATED AND SENT TO THE CRAH CONTROLLER. THE BAS MUST RECEIVE A CRITICAL ALARM VIA NETWORK INTERFACE.
7. LEAK DETECTOR ALARM:
   A. THE CRAH CONTROLLER MUST MONITOR THE LEAK DETECTOR PROVIDED WITH THE UNIT AND ANNUNCIATE AN ALARM UPON DETECTION OF WATER. THE BAS MUST RECEIVE A CRITICAL ALARM VIA NETWORK INTERFACE.
8. FILTER ALARM:
   A. THE CRAH CONTROLLER MUST MONITOR THE FILTER FOR AN ALARM CONDITION. UPON DETECTION BY DIFFERENTIAL PRESSURE SWITCH AN ALARM MUST BE SENT TO THE CRAH CONTROLLER AND THE BAS.
9. SUPPLY FAN FAILURE ALARM:
   A. AN AUXILIARY CONTACT MUST BE USED TO MONITOR THE STATUS OF THE UNIT SUPPLY FAN. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM MUST BE SENT TO THE BAS.
10. SMOKE DETECTOR ALARM:
   A. WHEN PARTICLES OF COMBUSTION ARE SENSED BY THE RETURN AIR SMOKE DETECTOR, THE SMOKE DETECTOR MUST STOP THE FAN VIA A HARDWIRE INTERLOCK AND A SMOKE ALARM SIGNAL MUST BE SENT TO THE UNIT CONTROLLER. WHEN THE SMOKE ALARM CONDITION HAS BEEN CLEARED THE UNIT MUST BE RETURNED TO NORMAL OPERATION.
11. LOSS OF COMMUNICATION:
   A. UPON LOSS OF COMMUNICATIONS BETWEEN BAS AND CRAH CONTROLLER, CRAH MUST OPERATE INDEPENDENTLY TO MAINTAIN THE SPACE TEMPERATURE AT SET POINT.

GENERAL NOTES

1. REFER TO SHEETS M-001 AND M-801 FOR LEGEND AND GENERAL NOTES.
2. REFER TO SHEET M-841 FOR CRAH-XA/XB POINTS SCHEDULE.

KEYNOTES

1 SPACE TEMPERATURE AND HUMIDITY SENSORS ARE PROVIDED BY UNIT MANUFACTURER FOR INSTALLATION IN FIELD. INSTALL AND CONNECT SENSORS IN ACCORDANCE WITH REQUIREMENTS AND INSTRUCTIONS PROVIDED BY UNIT MANUFACTURER. SEE MECHANICAL FLOOR PLANS SHEETS FOR LOCATIONS OF SPACE TEMPERATURE AND HUMIDITY SENSORS.

US Army Corps of Engineers ®

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DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
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LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL DIAGRAM

SHEET ID

M-819

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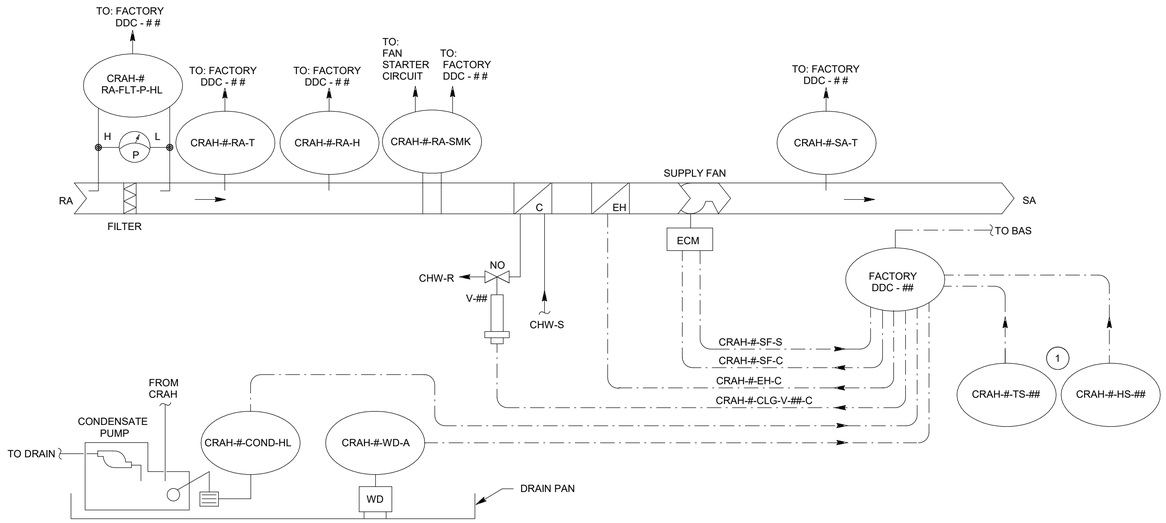
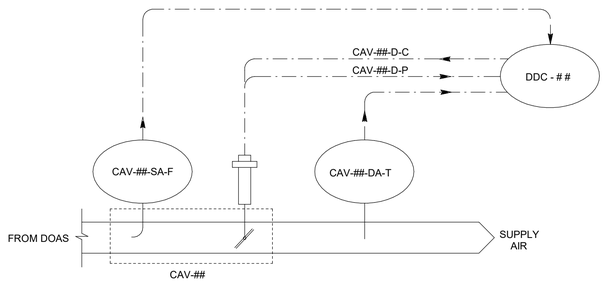


C1 CRAH-3,-4 & -7 CONTROL DIAGRAM
NTS



C3 CAV BOX (TYPICAL) - CONTROL DIAGRAM
NTS

CRAH-3, -4 & -7 SEQUENCES OF OPERATION

1. GENERAL:
   - A. THE BAS MUST PROVIDE ENABLE AND DISABLE CONTROL OF THE COMPUTER ROOM AIR HANDLER (CRAH) AND PROVIDE MONITORING AND DIAGNOSTIC INFORMATION FOR MANAGEMENT PURPOSES. THE BAS MUST MONITOR THE COMPUTER ROOM AIR CONDITIONER UNIT THROUGH A COMMUNICATION INTERFACE. THE RS-485 MODBUS COMMUNICATION CARD PROVIDED WITH CRAC UNIT MUST BE INTERFACED WITH BAS. THE CONTROLS CONTRACTOR MUST COORDINATE WITH UNIT PROVIDER AND PROVIDE NECESSARY CONTROL POINT MAPPING AND SOFTWARE MODIFICATION TO THE BAS FOR REMOTE CONTROL AND MONITORING.
2. CRAH CONTROL:
   - A. WHEN THE CRAH IS COMMANDED TO RUN, THE SELF CONTAINED CRAH CONTROLS MUST RAMP THE SUPPLY FAN SPEED TO 100%.
   - B. THE UNIT CONTROLLER MUST MODULATE THE CHILLED WATER VALVE AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE, AS SENSED BY SPACE TEMPERATURE SENSOR AT OR BELOW THE SPACE COOLING SET POINT WHICH MUST BE INITIALLY SET AT 75° F (ADJ.). ON A CALL FOR COOLING, THE CHILLED WATER VALVE MUST MODULATE OPEN AND THE FAN SPEED MUST RAMP UP OR DOWN TO FOLLOW THE VALVE POSITION. MINIMUM FAN SPEED MUST BE COORDINATED WITH CRAH'S MANUFACTURER AND INITIALLY SET AT 40% FAN SPEED. WHEN THE UNIT SUPPLY FAN IS OFF, THE COOLING CONTROL VALVE MUST CLOSE.
   - C. WHEN THE SYSTEM HAS BEEN ENABLED FOR MORE THAN 15 MINUTES (ADJ.) AND THE ZONE TEMPERATURE IS MORE THAN 5° F (ADJ.) ABOVE SETPOINT, A CRITICAL ALARM MUST BE GENERATED AT THE BAS..
3. DEHUMIDIFICATION CONTROL:
   - A. WHEN THE RETURN HUMIDITY RISES ABOVE THE RETURN HUMIDITY SET POINT, INITIALLY SET AT 55 %RH (ADJUSTABLE), DEHUMIDIFICATION MODE MUST BE ENABLED. THE UNIT CONTROLLER MUST INCREASE COOLING TO 100% AND RAMP DOWN THE FAN SPEED AND ENABLE THE REHEAT COIL TO HELP WITH SPACE OVER COOLING DUE TO THE DEHUMIDIFICATION PROCESS. WHEN THE RETURN HUMIDITY FALLS BELOW THE RETURN HUMIDITY SET POINT, REHEAT COIL MUST BE DISABLED AND CONTROL OF THE CHILLED WATER VALVE AND FAN MUST RETURN TO NORMAL OPERATION.
4. CONDENSATE PUMP ALARM:
   - A. THE CONDENSATE PUMP MUST RUN WHENEVER A DEFINED AMOUNT OF CONDENSATE IS SENSED. IF THE HIGH LIMIT FLOAT DEVICE DETECTS THAT THE CONDENSATE REACHES OR EXCEEDS THE PUMP OPERATING LEVEL, AN ALARM MUST BE GENERATED AND SENT TO THE CRAH CONTROLLER. THE BAS MUST RECEIVE A CRITICAL ALARM VIA NETWORK INTERFACE.
5. LEAK DETECTOR ALARM:
   - A. THE CRAH CONTROLLER MUST MONITOR THE LEAK DETECTOR PROVIDED WITH THE UNIT AND ANNUNCIATE AN ALARM UPON DETECTION OF WATER. THE BAS MUST RECEIVE A CRITICAL ALARM VIA NETWORK INTERFACE.
6. FILTER ALARM:
   - A. THE CRAH CONTROLLER MUST MONITOR THE FILTER FOR AN ALARM CONDITION. UPON DETECTION BY DIFFERENTIAL PRESSURE SWITCH AN ALARM MUST BE SENT TO THE CRAH CONTROLLER AND THE BAS.
7. SUPPLY FAN FAILURE ALARM:
   - A. AN AUXILIARY CONTACT MUST BE USED TO MONITOR THE STATUS OF THE UNIT SUPPLY FAN. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM MUST BE SENT TO THE BAS.
8. SMOKE DETECTOR ALARM:
   - A. WHEN PARTICLES OF COMBUSTION ARE SENSED BY THE RETURN AIR SMOKE DETECTOR, THE SMOKE DETECTOR MUST STOP THE FAN VIA A HARDWIRE INTERLOCK AND A SMOKE ALARM SIGNAL MUST BE SENT TO THE UNIT CONTROLLER. WHEN THE SMOKE ALARM CONDITION HAS BEEN CLEARED THE UNIT MUST BE RETURNED TO NORMAL OPERATION.
9. LOSS OF COMMUNICATION:
   - A. UPON LOSS OF COMMUNICATIONS BETWEEN BAS AND CRAH CONTROLLER, CRAH MUST OPERATE INDEPENDENTLY TO MAINTAIN THE SPACE TEMPERATURE AT SET POINT.

CAV BOX (TYPICAL) SEQUENCES OF OPERATION

1. GENERAL: THE CAV BOX MUST BE CONTROLLED BY BAS AS DESCRIBED BELOW. THE CONTROL OF THE CAV BOX SHALL BE LINKED WITH THE OPERATION OF ASSOCIATED DOAS THROUGH BAS. TO FACILITATE THE CONTROL INTERLOCK, THE VAV BOX CONTROLLER SHALL BE NETWORKED TO THE SAME BUS WHICH MUST COMMUNICATE WITH THE DOAS CONTROLLER. OCCUPANCY SCHEDULE MUST BE THE SAME AS THE PARENT DOAS.
2. CAV BOX DAMPER CONTROL:
   - A. UNOCCUPIED MODE: WHEN THE PARENT DOAS IS IN UNOCCUPIED MODE, THE CAV BOX DAMPER MUST BE FULLY CLOSED.
   - B. OCCUPIED MODE: WHEN THE PARENT DOAS IS IN OCCUPIED MODE, THE CAV TERMINAL UNIT MUST PROVIDE A CONSTANT VOLUME OF OUTSIDE AIR FROM THE ASSOCIATED DOAS TO THE RESPECTIVE SPACES. REFER TO CAV SCHEDULE FOR AIR FLOW SETPOINT.

GENERAL NOTES

1. REFER TO SHEETS M-001 AND M-801 FOR LEGEND AND GENERAL NOTES.
2. REFER TO SHEET M-841 FOR CRAH- 3, -4 & -7 POINTS SCHEDULE.
3. REFER TO SHEET M-842 FOR CAV BOX NO REHEAT (TYPICAL) POINTS SCHEDULE.

KEYNOTES

1 SPACE TEMPERATURE AND HUMIDITY SENSORS ARE PROVIDED BY UNIT MANUFACTURER FOR INSTALLATION IN FIELD. INSTALL AND CONNECT SENSORS IN ACCORDANCE WITH REQUIREMENTS AND INSTRUCTIONS PROVIDED BY UNIT MANUFACTURER. SEE MECHANICAL FLOOR PLANS SHEETS FOR LOCATIONS OF SPACE TEMPERATURE AND HUMIDITY SENSORS.

US Army Corps of Engineers ®

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LINCOLN HALL
WEST POINT, NEW YORK

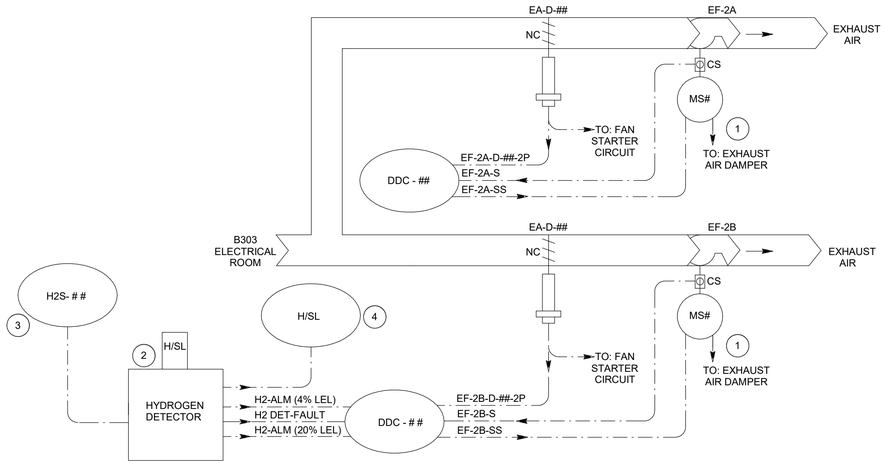
JACOBS / EWING COLE A Joint Venture

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

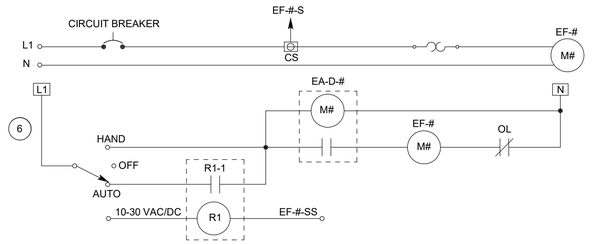
HVAC CONTROL DIAGRAM

SHEET ID
M-820

REVISED RTA SUBMISSION 03/01/2023

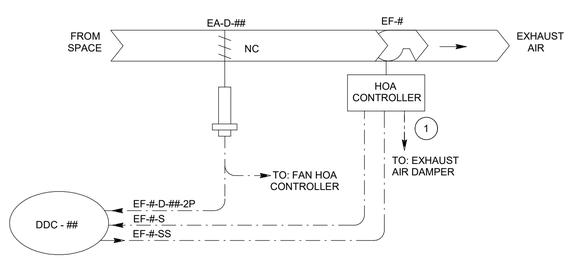


C1 EF-2A AND EF-2B - CONTROL DIAGRAM
NTS

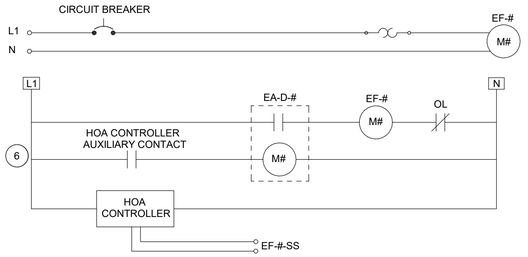


EF-2A AND EF-2B SEQUENCES OF OPERATION

1. GENERAL:
   - A. THE B303 ELECTRICAL ROOM MUST BE SERVED BY TWO REDUNDANT EXHAUST FANS OPERATING IN A LEAD/STANDBY MODE AND COMPLETELY CONTROLLED BY THE BAS. UNDER NORMAL OPERATION ONE EXHAUST FAN IS REQUIRED TO OPERATE AT ALL TIMES AND MUST BE DESIGNATED AS "LEAD" EXHAUST FAN. THE OTHER EXHAUST FAN MUST SERVE AS "STANDBY" EXHAUST FAN WHICH MUST BE ENABLED AUTOMATICALLY WHEN IN THE EVENT OF FAILURE OF "LEAD" EXHAUST FAN.
   - B. PROVIDE AN AUTOMATIC PROGRAM TO ALTERNATE THE LEAD AND STANDBY EXHAUST FANS WEEKLY TO MAINTAIN EVEN USE OF THE EQUIPMENT. WHEN THIS IS DONE THE "LEAD" EXHAUST FAN MUST BECOME THE "STANDBY" EXHAUST FAN AND THE "STANDBY" EXHAUST FAN MUST BECOME THE "LEAD" EXHAUST FAN.
2. EXHAUST FAN CONTROL
   - A. EXHAUST FAN HAND-OFF-AUTO OPERATION: PROVIDE A HAND-OFF-AUTO OPERATION SWITCH AT THE MOTOR STARTER. IN THE OFF MODE, THE ISOLATION DAMPER MUST BE CLOSED AND THE EXHAUST FAN MUST BE STOPPED. IN THE HAND MODE, THE ISOLATION DAMPER MUST BE OPENED AND THE DAMPER POSITION END SWITCH MUST START THE EXHAUST FAN THROUGH A HARDWIRED INTERLOCK AFTER DAMPER IS FULLY OPENED. IN THE AUTO MODE, THE EXHAUST FAN MUST BE STARTED AND STOPPED BY THE BAS AS DESCRIBED BELOW.
   - B. "LEAD" EXHAUST FAN AUTOMATIC MODE START/STOP CONTROL: TO START THE "LEAD" EXHAUST FAN, THE BAS MUST SEND A START SIGNAL TO THE MOTOR STARTER. THIS MUST ENABLE THE HARD WIRE INTERLOCK THAT OPENS THE ISOLATION DAMPER. WHEN THE DAMPER IS FULLY OPENED, AS SENSED BY THE DAMPER POSITION SWITCH, THE FAN MUST BE ENERGIZED THROUGH THE HARD WIRE INTERLOCK AND RUN CONTINUOUSLY. TO STOP THE EXHAUST FAN, THE BAS MUST SEND A STOP COMMAND TO THE MOTOR STARTER ASSOCIATED WITH "LEAD" EXHAUST FAN WHICH WILL DE-ENERGIZE THE FAN AND CLOSE THE ISOLATION DAMPER.
   - C. "LEAD" EXHAUST FAN FAILURE: A CURRENT SWITCH MUST BE USED TO MONITOR THE STATUS OF THE FAN. IF "LEAD" EXHAUST FAN SHOULD FAIL OR THE FAN STATUS INDICATED DOES NOT MATCH WITH THE COMMANDED OUTPUT, THE BAS MUST AUTOMATICALLY START THE "STANDBY" EXHAUST FAN TO REPLACE THE FAILED FAN AND AN ALARM MUST BE GENERATED AT THE BAS.
3. HYDROGEN ROOM MONITORING: THE DDC MUST MONITOR THE HYDROGEN LEVEL ALARMS FROM THE HYDROGEN GAS DETECTOR SERVING ELECTRICAL ROOM.
   - A. UPON HYDROGEN DETECTOR SENSING A LEVEL OF HYDROGEN IN THE SPACE (4% LEL), AN ALARM MUST BE ACTIVATED AND TRANSMITTED TO THE BAS.
   - B. UPON HYDROGEN DETECTOR SENSING A LEVEL OF HYDROGEN IN THE SPACE (20% LEL), A CRITICAL ALARM MUST BE ACTIVATED AND TRANSMITTED TO THE BAS.
4. EMERGENCY AIR DISTRIBUTION SHUTDOWN:
   - A. WHENEVER EMERGENCY AIR DISTRIBUTION SHUTOFF IS ACTIVATED, THE BAS MUST NOT SHUT DOWN EF-2A OR EF-2B. EXHAUST FAN MUST CONTINUE TO OPERATE TO AVOID POTENTIAL EXPLOSIVE HAZARDS.

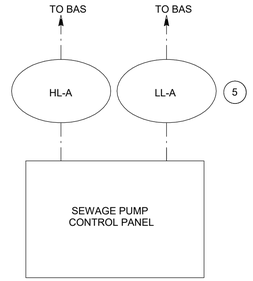


C3 EF-4 AND EF-5 - CONTROL DIAGRAM
NTS



EF-4 AND EF-5 SEQUENCES OF OPERATION

1. GENERAL:
   - A. THE EXHAUST FAN IS CONTROLLED BY THE BAS AS DESCRIBED BELOW. THE EXHAUST FAN MUST BE SOFTWARE INTERLOCKED WITH THE OPERATION OF THE MAKE-UP AIR UNIT THROUGH BACNET NETWORK.
2. EXHAUST FAN HAND-OFF-AUTO OPERATION:
   - A. A HAND-OFF-AUTO (HOA) CONTROLLER IS PROVIDED WITH EC MOTOR. IN THE OFF MODE, THE ISOLATION DAMPER MUST BE CLOSED AND THE EXHAUST FAN MUST BE STOPPED. IN THE HAND MODE, THE ISOLATION DAMPER MUST OPEN. WHEN DAMPER IS FULLY OPEN, THE ASSOCIATED DAMPER POSITION SWITCH MUST START THE FAN. THE EXHAUST FAN MUST RUN AT THE SPEED SETPOINT MANUALLY SET AT HOA CONTROLLER. IN THE AUTO MODE, THE EXHAUST FAN MUST BE CONTROLLED BY THE BAS AS DESCRIBED BELOW.
3. AUTOMATIC MODE START/STOP CONTROL:
   - A. FAN START/STOP: THE BAS MUST SEND A START SIGNAL TO THE FAN HOA CONTROLLER. THIS MUST ENABLE THE HARD WIRE INTERLOCK THAT OPENS THE ISOLATION DAMPER. WHEN THE DAMPER IS FULLY OPEN, AS SENSED BY THE DAMPER POSITION SWITCH, THE FAN MUST BE ENERGIZED THROUGH THE HARD WIRE INTERLOCK, THE BAS MUST SEND A STOP COMMAND TO THE FAN HOA CONTROLLER, WHICH MUST DE-ENERGIZE THE FAN AND CLOSE THE ISOLATION DAMPER.
   - B. FAN SPEED: THE FAN SPEED MUST BE COORDINATED WITH TAB CONTRACTOR AND MANUALLY SET AT THE HOA CONTROLLER AS NEEDED. WHEN THE FAN IS STARTED, THE FAN MUST MAINTAIN THIS CONSTANT SPEED.
4. FAN STATUS:
   - A. A CURRENT SENSOR MUST BE USED TO MONITOR THE STATUS OF THE FAN. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM MUST BE GENERATED AND SENT TO THE BAS AND THE FAN START COMMAND MUST BE CANCELED.
5. EMERGENCY AIR DISTRIBUTION SHUTDOWN:
   - A. WHENEVER EMERGENCY AIR DISTRIBUTION SHUTOFF IS ACTIVATED, THE BAS MUST NOT SHUT DOWN EF-4 OR EF-5. EXHAUST FAN MUST CONTINUE TO OPERATE.



C4 SANITARY SEWAGE SUMP PUMP SYSTEM
NTS

SEQUENCE OF OPERATION

1. GENERAL:
   - A. SANITARY SEWAGE SUMP PUMP CONTROL PANEL INCLUDES HIGH AND LOW LEVEL ALARMS. THE BAS MUST MONITOR ALARMS FROM THE SEWAGE SUMP PUMP CONTROL PANEL. UPON RECEIVING AN ALARM SIGNAL FROM PANEL, THE BAS MUST GENERATE AN ALARM AT THE OPERATOR'S WORKSTATION.

GENERAL NOTES

1. REFER TO SHEETS M-001 AND M-801 FOR LEGEND AND GENERAL NOTES.
2. REFER TO SHEET M-842 FOR EF-2A AND EF-2B, AND EF-4 AND EF-5 POINTS SCHEDULE.
3. REFER TO SHEET M-842 FOR SANITARY SEWAGE SUMP PUMP SYSTEM POINTS SCHEDULE.

KEYNOTES

1 PROVIDE INTERLOCK WIRING BETWEEN EXHAUST FAN AND ASSOCIATED ISOLATION DAMPER. WHEN ISOLATION DAMPER IS OPEN, THE FAN MUST BE STARTED BY THE DAMPER POSITION SWITCH. FAN MUST STOP IF ISOLATION DAMPER CLOSES.

2 PROVIDE HYDROGEN DETECTOR WITH VISUAL AND AUDIBLE ALARMS FOR ELECTRICAL ROOM B303. SEE SHEET MP101 FOR HYDROGEN DETECTOR'S LOCATION.

3 PROVIDE HYDROGEN GAS SENSOR AND CABLE AS REQUIRED. THE SENSOR MUST BE INSTALLED AT THE HIGHEST, DRAFT-FREE LOCATION IN THE ROOM WHERE HYDROGEN GAS WOULD ACCUMULATE. SEE SHEET MP101 FOR SENSOR LOCATION.

4 PROVIDE HORN AND STROBE LIGHT FOR ROOM HYDROGEN LEVEL ALARM. SEE SHEET MP101 FOR HORN AND STROBE LIGHT LOCATIONS.

5 PROVIDE CONTROL WIRING AND CONNECT ELEVATOR SUMP PUMP SYSTEM ALARM POINTS TO THE BAS. COORDINATE WORK WITH DIVISION 22.

6 THE WIRING DIAGRAMS ARE SHOWN/PROVIDED AS A GUIDE TO THE BUILDING CONTROLS CONTRACTOR. THE CONTRACTOR MUST DEVELOP THE WIRING DIAGRAMS TO BE PROJECT SPECIFIC AND CONSISTENT WITH THE PROJECT SUBMITTALS.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

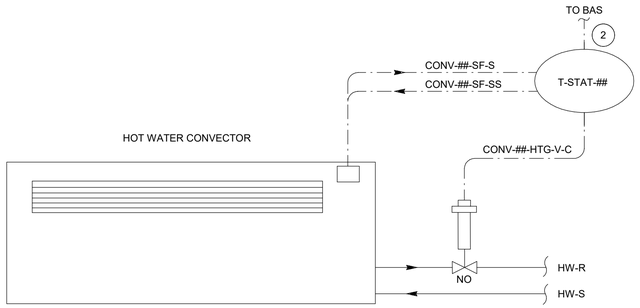
BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL DIAGRAM

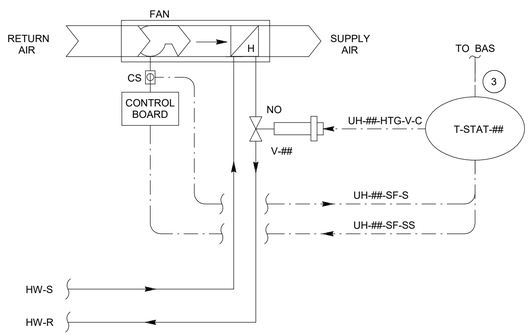
SHEET ID

M-821

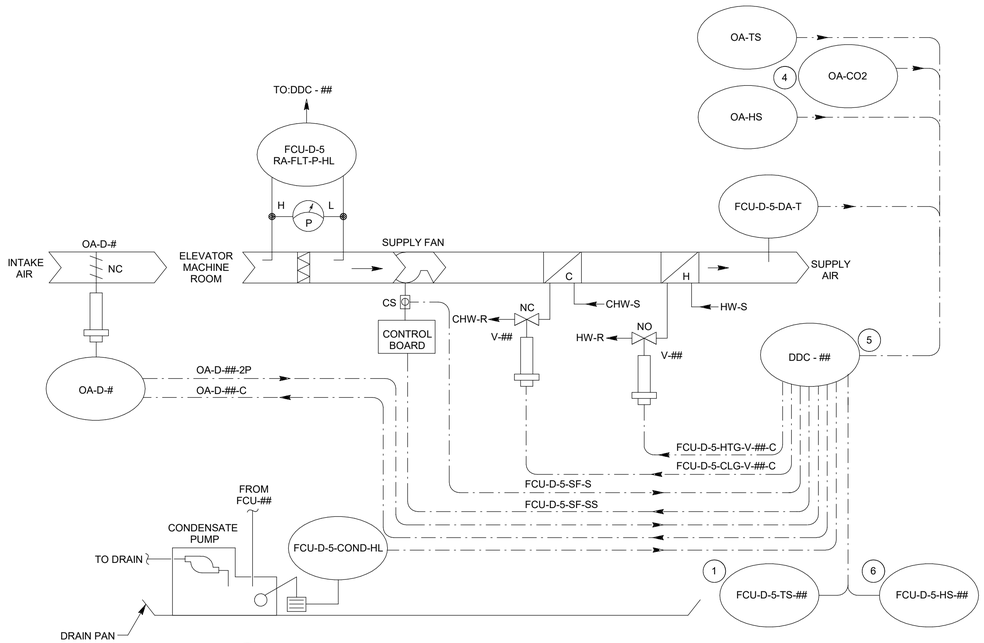
REVISED RTA SUBMISSION 03/01/2023



C1 HW CONVECTOR (TYPICAL) - CONTROL DIAGRAM
NTS



C2 HW UNIT HEATER (TYPICAL) - CONTROL DIAGRAM
NTS



C4 ELEVATOR MACHINE FCU - CONTROL DIAGRAM
NTS

HW CONVECTOR SEQUENCES OF OPERATION

1. GENERAL:
   - A. THE HOT WATER CONVECTOR MUST BE CONTROLLED BY A LONWORKS NETWORKED THERMOSTAT. THE THERMOSTAT MUST HAVE THE ABILITY TO COMMUNICATE WITH THE BAS THROUGH LONWORK NETWORK AND MUST INCLUDE THE READING AND WRITING OF DATA TO ALLOW UNIT MONITORING AND CONTROL.
2. HOT WATER CONVECTOR CONTROL:
   - A. IF THE SPACE TEMPERATURE FALLS 2 DEGREES F (ADJUSTABLE) BELOW THE TEMPERATURE SET POINT, INITIALLY SET AT 60 DEGREES F (ADJUSTABLE), THE THERMOSTAT MUST START THE HW CONVECTOR FAN AND OPEN THE TWO-WAY CONTROL VALVE TO MAINTAIN THE SPACE TEMPERATURE SET POINT. THE VALVE MUST NOT OPEN UNTIL THE FAN OPERATION HAS BEEN PROVED. WHEN THE SPACE TEMPERATURE RISES ABOVE SPACE TEMPERATURE SET POINT, THE THERMOSTAT MUST CLOSE THE TWO-WAY CONTROL VALVE AND STOP THE HW CONVECTOR FAN.
3. FAN STATUS:
   - A. A CURRENT SENSOR MUST BE USED TO MONITOR THE STATUS OF THE FAN. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM MUST BE GENERATED AND SENT TO THE BAS AND THE FAN START COMMAND MUST BE CANCELED.
4. SPACE TEMPERATURE ALARM:
   - A. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE DROPS BELOW 55°F (ADJUSTABLE).

HW UNIT HEATER SEQUENCES OF OPERATION

1. GENERAL:
   - A. THE UNIT HEATER (UH) MUST BE CONTROLLED BY A LONWORKS NETWORKED THERMOSTAT. THE THERMOSTAT MUST HAVE THE ABILITY TO COMMUNICATE WITH THE BAS THROUGH LONWORK NETWORK AND MUST INCLUDE THE READING AND WRITING OF DATA TO ALLOW UNIT MONITORING AND CONTROL.
2. UNIT HEATER CONTROL:
   - A. IF THE SPACE TEMPERATURE FALLS 2 DEGREES F (ADJUSTABLE) BELOW THE TEMPERATURE SET POINT, INITIALLY SET AT 60 DEGREES F (ADJUSTABLE), THE THERMOSTAT MUST START THE UNIT HEATER FAN AND OPEN THE TWO-WAY CONTROL VALVE TO MAINTAIN THE SPACE TEMPERATURE SET POINT. THE VALVE MUST NOT OPEN UNTIL THE FAN OPERATION HAS BEEN PROVED. WHEN THE SPACE TEMPERATURE RISES ABOVE SPACE TEMPERATURE SET POINT, THE THERMOSTAT MUST CLOSE THE TWO-WAY CONTROL VALVE AND STOP UNIT HEATER FAN.
3. FAN STATUS:
   - A. A CURRENT SENSOR MUST BE USED TO MONITOR THE STATUS OF THE FAN. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM MUST BE GENERATED AND SENT TO THE BAS AND THE FAN START COMMAND MUST BE CANCELED.
4. SPACE TEMPERATURE ALARM:
   - A. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE DROPS BELOW 55°F (ADJUSTABLE).

ELEVATOR MACHINE FAN COIL UNIT SEQUENCES OF OPERATION

1. GENERAL:
   - A. THE FOUR-PIPE FAN COIL UNIT (FCU) AND OUTSIDE AIR INTAKE DAMPER MUST BE CONTROLLED BY BAS AS SHOWN ON THE CONTROL DIAGRAM.
   - B. AN INDIVIDUAL ZONE TEMPERATURE SENSOR MUST TRANSMIT SPACE TEMPERATURE AND ZONE SETPOINT INFORMATION TO THE BAS.
2. SPACE TEMPERATURE AND HUMIDITY CONTROL:
   - A. WHEN THE ROOM TEMPERATURE EXCEEDS 78°F (ADJUSTABLE), THE BAS MUST START THE FAN AND MODULATE THE CHILLED WATER VALVE AS REQUIRED. THE VALVE MUST NOT MODULATE UNTIL FAN OPERATION HAS BEEN PROVEN. WHEN THE SPACE TEMPERATURE FALLS BELOW COOLING TEMPERATURE SET POINT, THE FAN MUST BE DE-ENERGIZED AND CHILLED WATER VALVE MUST CLOSE.
   - B. DEHUMIDIFICATION MODE: DURING COOLING MODE, IF THE SPACE HUMIDITY RISES ABOVE THE SPACE HUMIDITY SET POINT, INITIALLY SET AT 60 %RH (ADJUSTABLE), DEHUMIDIFICATION MODE MUST BE ENABLED. THE BAS MUST INCREASE COOLING TO 100% AND MODULATE THE REHEAT COIL TO HELP WITH SPACE OVER COOLING DUE TO THE DEHUMIDIFICATION PROCESS. WHEN THE SPACE HUMIDITY FALLS BELOW THE SET POINT, REHEAT COIL VALVE MUST CLOSE AND CONTROL OF THE CHILLED WATER VALVE MUST RETURN TO NORMAL OPERATION.
   - C. WHEN THE ROOM TEMPERATURE DROPS BELOW 60°F (ADJUSTABLE), THE BAS MUST START THE FAN AND MODULATE THE HOT WATER VALVE AS REQUIRED. THE VALVE MUST NOT MODULATE UNTIL FAN OPERATION HAS BEEN PROVEN. WHEN THE SPACE TEMPERATURE RISES ABOVE HEATING TEMPERATURE SET POINT, THE FAN MUST BE DE-ENERGIZED AND HOT WATER VALVE MUST CLOSE.
   - A. THE FCU COOLING AND HEATING VALVES MUST NOT MODULATE UNTIL THE FAN OPERATION HAS BEEN PROVED.
   - B. THE HEATING AND COOLING CONTROL VALVES MUST MODULATE IN SEQUENCE WITHOUT OVERLAP AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.
   - C. AN ALARM MUST BE ANNUNCIATED TO THE BAS IN THE EVENT THAT THE ROOM TEMPERATURE RISES ABOVE 80°F (ADJUSTABLE) OR DROPS BELOW 55°F (ADJUSTABLE).
4. OUTSIDE AIR INTAKE DAMPER CONTROL:
   - A. OUTSIDE AIR INTAKE DAMPER MUST BE CONTROLLED BY BAS BASED ON OUTDOOR AIR TEMPERATURE.
   - B. WHEN OUTDOOR AIR TEMPERATURE IS BELOW 40°F (ADJ.), THE BAS MUST CLOSE THE OUTSIDE AIR INTAKE DAMPER.
   - C. WHEN OUTDOOR AIR TEMPERATURE IS ABOVE 40°F (ADJ.), THE BAS MUST OPEN THE OUTSIDE AIR INTAKE DAMPER.
5. FAN STATUS:
   - A. A CURRENT SENSOR MUST BE USED TO MONITOR THE STATUS OF THE FAN. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM MUST BE GENERATED AND SENT TO THE BAS AND THE FAN START COMMAND MUST BE CANCELED.
6. CONDENSATE HIGH LEVEL ALARM:
   - A. THE CONDENSATE PUMP MUST RUN WHENEVER A DEFINED AMOUNT OF CONDENSATE IS SENSED. IF THE HIGH LIMIT FLOAT DEVICE DETECTS THAT THE CONDENSATE REACHES OR EXCEEDS THE PUMP OPERATING LEVEL, AN ALARM MUST BE GENERATED AT THE BAS AND THE BAS MUST DE-ENERGIZE THE FCU FAN AND CLOSE THE COOLING VALVE.

GENERAL NOTES

1. REFER TO M-001 AND M-801 FOR LEGEND AND GENERAL NOTES.
2. REFER TO M-843 FOR HW CONVECTOR, HW UNIT HEATER, AND ELEVATOR MACHINE FCU POINTS SCHEDULE.

KEYNOTES

1 PROVIDE SPACE TEMPERATURE SENSOR FOR SPACE TEMPERATURE CONTROL AND MONITORING. SEE MECHANICAL FLOOR PLANS FOR SPACE TEMPERATURE SENSOR'S LOCATION.

2 PROVIDE LONWORKS NETWORKED THERMOSTAT FOR CONVECTION HEATER. SEE MECHANICAL FLOOR PLAN FOR THERMOSTAT LOCATION.

3 PROVIDE LONWORKS NETWORKED THERMOSTAT FOR UNIT HEATER. SEE MECHANICAL FLOOR PLAN FOR THERMOSTAT LOCATION.

4 PROVIDE OUTSIDE AIR TEMPERATURE, HUMIDITY, AND CARBON DIOXIDE SENSORS. SEE MECHANICAL FLOOR PLAN MP107 FOR SENSOR LOCATIONS.

5 INSTALL DDC CONTROLLER IN FCU CONTROL ENCLOSURE. SEE MECHANICAL PIPING FLOOR PLANS FOR FCU LOCATIONS.

6 PROVIDE SPACE HUMIDITY SENSOR FOR SPACE HUMIDITY CONTROL AND MONITORING. SEE MECHANICAL FLOOR PLANS FOR SPACE HUMIDITY SENSOR'S LOCATION.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

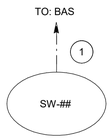
JACOBS / EWING COLE A Joint Venture

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL DIAGRAM

SHEET ID
M-822

REVISED RTA SUBMISSION 03/01/2023

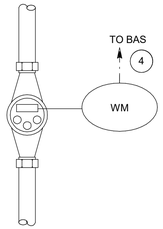


D1 AIR DISTRIBUTION EMERGENCY SHUT OFF SWITCH (TYPICAL)

NTS

SEQUENCES OF OPERATION

1. GENERAL:
   A. THE EMERGENCY AIR DISTRIBUTION SHUTOFF SWITCHES MUST BE MONITORED FOR ACTIVATION BY THE BAS. UPON RECEIPT OF SWITCH STATUS FROM ANY SWITCH INDICATING THAT THE EMERGENCY AIR DISTRIBUTION SHUTOFF SWITCH HAS BEEN ACTIVATED, THE BAS MUST SEND A SHUTDOWN COMMAND SIGNAL TO MECHANICAL EQUIPMENT (DOAS-1, DOAS-2 & EF-1). WHEN THE EMERGENCY CONDITION HAS BEEN CLEARED, THE BAS MUST RETURN MECHANICAL EQUIPMENT TO NORMAL OPERATION. PROGRAM A TIME DELAY SEQUENCE INTO THE BAS TO STAGGER THE RESTART OF MECHANICAL EQUIPMENT AFTER AN EMERGENCY SHUTDOWN TO PREVENT CREATING A SPIKE IN THE FACILITY ELECTRICAL POWER.

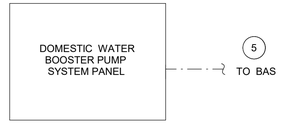


D2 WATER METER CONTROL DIAGRAM

NTS

SEQUENCES OF OPERATION

1. WATER METER:
   A. THE BAS MUST MONITOR THE WATER METER FOR WATER CONSUMPTION ON A CONTINUAL BASIS VIA A PULSE INITIATOR INTEGRAL TO THE METER. THESE VALUES MUST BE MADE AVAILABLE TO THE SYSTEM AT ALL TIMES.
2. USAGE HISTORY:
   B. THE BAS MUST MONITOR AND RECORD WATER METER READINGS SO AS TO PROVIDE A WATER CONSUMPTION HISTORY. USAGE READINGS MUST BE RECORDED ON A DAILY, MONTH-TO-DATE, AND YEAR-TO-DATE BASIS.

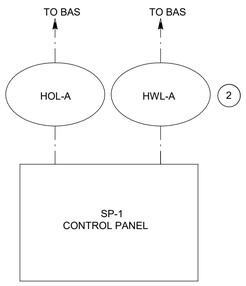


D4 DOMESTIC WATER BOOSTER PUMP SYSTEM

NTS

SEQUENCE OF OPERATION

1. GENERAL:
   A. THE PACKAGED DOMESTIC WATER BOOSTER PUMP MUST BE CONTROLLED BY CONTROL PANEL PROVIDED BY THE SYSTEM MANUFACTURER TO SATISFY SYSTEM DEMAND. THE SYSTEM CONTROLLER MUST COMMUNICATE WITH THE BAS VIA A BACNET MS/TP COMMUNICATION PROTOCOL. THE CONTROLS CONTRACTOR MUST COORDINATE WITH SYSTEM PROVIDER AND PROVIDE NECESSARY CONTROL POINT MAPPING AND SOFTWARE MODIFICATION TO THE BAS FOR REMOTE CONTROL AND MONITORING.
2. SYSTEM ENABLE/DISABLE:
   A. THE PACKAGED DOMESTIC WATER BOOSTER PUMP SYSTEM MUST BE MANUALLY ENABLED AND DISABLED AT THE SYSTEM CONTROLLER. THE CONTROL PANEL PROVIDED WITH PACKAGED DOMESTIC WATER BOOSTER PUMP SYSTEM MUST CONTROL THE PUMPS WHEN ENABLED.
3. SYSTEM PUMP CONTROL:
   A. THE DOMESTIC WATER BOOSTER PUMPS MUST BE CONTROLLED THROUGH VFDS AND MUST BE AUTOMATICALLY ENABLED, MODULATED, AND DISABLED BY THE BOOSTER PUMP SYSTEM CONTROLPANEL TO SATISFY THE SYSTEM PRESSURE SETPOINT. THE PUMPS MUST OPERATE IN A LEAD/LAG/STANDBY CONFIGURATION AND MUST ROTATE WEEKLY TO ACHIEVE EQUAL RUN TIME ON EQUIPMENT.
4. SYSTEM PUMP SPEED CONTROL:
   A. WHEN THE SYSTEM IS ENABLED, BOOSTER PUMP SYSTEM CONTROL PANEL MUST START THE LEAD PUMP AND CONTROL THE SPEED OF THE PUMP TO MAINTAIN THE SYSTEM PRESSURE AT THE SETPOINT. IF THE LEAD PUMP CANNOT MAINTAIN THE SYSTEM PRESSURE, THE LAG PUMP MUST START AND BOTH PUMPS MUST OPERATE IN UNISON TO SATISFY SYSTEM DEMAND. AS DEMAND IS SATISFIED, THE CONTROLLER MUST AUTOMATICALLY STOP THE LAG PUMP AS NECESSARY.
5. SYSTEM PUMP FAILURE:
   A. IN THE EVENT OF A PUMP FAILURE OR A VFD FAULT, THE PUMP CONTROLLER MUST AUTOMATICALLY START THE STANDBY PUMP/VFD TO REPLACE THE FAILED PUMP OR VFD.
6. SYSTEM TRANSMITTER FAILURE:
   A. ON LOSS OF SIGNAL OR TRANSMITTER FAILURE, THE CONTROLLER MUST RUN THE SYSTEM PUMP AT A DEFAULT SPEED RECOMMENDED BY THE BOOSTER PUMP MANUFACTURER.

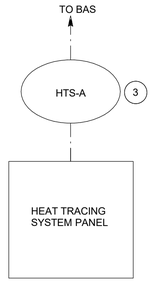


B1 ELEVATOR SUMP PUMP SYSTEM

NTS

SEQUENCE OF OPERATION

1. GENERAL:
   A. ELEVATOR SUMP PUMP CONTROL PANEL INCLUDES HIGH WATER AND HIGH OIL ALARMS. THE BAS MUST MONITOR ALARMS FROM THE SUMP PUMP CONTROL PANEL. UPON RECEIVING AN ALARM SIGNAL FROM PANEL, THE BAS MUST GENERATE AN ALARM AT THE OPERATOR'S WORKSTATION.

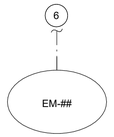


B2 HEAT TRACING SYSTEM

NTS

SEQUENCE OF OPERATION

1. GENERAL:
   A. THE BAS MUST MONITOR ALARMS FROM THE HEAT TRACING SYSTEM PANEL. UPON RECEIVING AN ALARM SIGNAL FROM HEAT TRACING SYSTEM PANEL, THE BAS MUST GENERATE AN ALARM AT THE OPERATOR'S WORKSTATION.

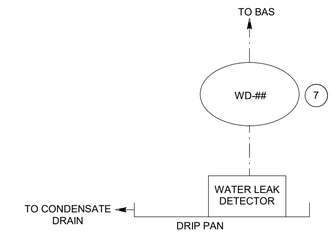


B4 ELECTRIC METER CONTROL DIAGRAM

NTS

SEQUENCE OF OPERATION

1. ELECTRIC METER:
   A. THE BAS MUST MONITOR THE ELECTRIC METER VIA COMMUNICATION INTERFACE. THE METER MONITORING POINTS LISTED IN THE POINTS SCHEDULE MUST BE MADE AVAILABLE TO THE SYSTEM AT ALL TIMES.
2. USAGE HISTORY:
   B. THE BAS MUST MONITOR AND RECORD ELECTRICAL METER READINGS. USAGE READINGS MUST BE RECORDED ON A DAILY, MONTH-TO-DATE, AND YEAR-TO-DATE BASIS.



B5 WATER LEAK DETECTOR

NTS

SEQUENCE OF OPERATION

1. GENERAL:
   A. THE BAS MUST MONITOR THE LEAK DETECTION SYSTEM AND ACTIVATE AN ALARM AT THE OPERATOR'S WORKSTATION IF WATER IS DETECTED BY THE LEAK DETECTION SYSTEM.

GENERAL NOTES

1. REFER TO M-001 AND M-801 FOR LEGEND AND GENERAL NOTES.
2. REFER TO M-844 FOR MISCELLANOUS POINTS AND DOMESTIC WATER BOOSTER PUMP SYSTEM POINTS SCHEDULE.

KEYNOTES

1 PROVIDE AIR DISTRIBUTION EMERGENCY SHUT-OFF SWITCHES TO SHUTDOWN THE BUILDING HVAC EQUIPMENT IN THE EVENT OF AN EMERGENCY. SEE MECHANICAL PIPING FLOOR PLANS FOR SWITCH LOCATIONS.

2 PROVIDE CONTROL WIRING AND CONNECT ELEVATOR SUMP PUMP SYSTEM ALARM POINTS TO THE BAS. COORDINATE WORK WITH DIVISION 22.

3 PROVIDE CONTROL WIRING AND CONNECT HEAT TRACE SYSTEM ALARM POINT TO BAS. COORDINATE WORK WITH DIVISION 26.

4 PROVIDE CONTROL WIRING AND CONNECT PULSE OUTPUT SIGNAL FROM WATER METER TO BAS. REFER TO PLUMBING FLOOR PLANS FOR WATER METER LOCATION.

5 CONNECT DOMESTIC WATER BOOSTER PUMP SYSTEM CONTROLLER TO THE BAS NETWORK AND PROVIDE MONITORING AND CONTROL POINTS INDICATED IN THE POINTS SCHEDULE THROUGH THE LONWORK NETWORK.

6 PROVIDE COMMUNICATION WIRING AND CONNECT ELECTRICAL METER INTERFACE TO BAS. PROVIDE METER MONITORING POINTS INDICATED IN THE POINTS SCHEDULE.

7 PROVIDE DRIP PAN AND WATER LEAK DETECTOR FOR ELECTRICAL AND TELECOM ROOMS AND CONNECT ALARM POINT TO BAS.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL DIAGRAM

SHEET ID

M-823

REVISED RTA SUBMISSION 03/01/2023

HEATING HOT WATER SYSTEM POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: DATA FROM	PRIMARY POINT INFORMATION: DATA TO	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	HHWP-1-S	HOT WATER PUMP 1 STATUS	<__>	~	ON/OFF	BI	N/A	~	V	Y	HOT WATER PUMP 1 PROOF FAILED	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	HHWP-2-S	HOT WATER PUMP 2 STATUS	<__>	~	ON/OFF	BI	N/A	~	V	Y	HOT WATER PUMP 2 PROOF FAILED	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	CP-#-A	CONDENSATE PUMP # LEVEL ALARM (TYPICAL OF 2)	<__>	~	ON/OFF	BI	N/A	~	V	Y	CONDENSATE PUMP # ALARM	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
START/STOP	SYS-ENA	SYSTEM ENABLE	~	~	ENABLE/DISABLE	NET-IN	N/A	OC	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	HHWP-1-SS	HOT WATER PUMP 1 START/STOP	<__>	~	ON/OFF	BO	Y	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	HHWP-2-SS	HOT WATER PUMP 2 START/STOP	<__>	~	ON/OFF	BO	Y	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
STEAM VALVE CONTROL	STM(1/3)-V-01-C	1/3 STEAM VAVLVE COMMAND	<__>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	STM(1/3)-V-01-POS	1/3 STEAM VAVLVE POSITION	<__>	~	0-100%	AI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	STEAM VALVE 1 PID LOOP SETTING	PROPORTIONAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	STM(2/3)-V-02-C	2/3 STEAM VALVE COMMAND	<__>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	STM(2/3)-V-02-POS	2/3 STEAM VALVE POSITION	<__>	~	0-100%	AI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	STEAM VALVE 2 PID LOOP SETTING	PROPORTIONAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	STM(1/3)-V-03-C	1/3 STEAM VALVE COMMAND	<__>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	STM(1/3)-V-03-POS	1/3 STEAM VALVE POSITION	<__>	~	0-100%	AI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	STEAM VALVE 3 PID LOOP SETTING	PROPORTIONAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	<__>	~	N/A	C	~	Y	~...	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	STM(2/3)-V-04-C	2/3 STEAM VALVE COMMAND	<__>	~	0-100%	AO	N/A	C	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	STM(2/3)-V-04-POS	2/3 STEAM VALVE POSITION	<__>	~	0-100%	AI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	STEAM VALVE 4 PID LOOP SETTING	PROPORTIONAL CONSTANT	~	<__>	<__>	~	N/A	~	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
HOT WATER VALVE CONTROL	HWS-T-SP	HOT WATER SUPPLY TEMPERATURE SET POINT	<__>	<0 - __DEG F>	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	HWS-T-3	HOT WATER SUPPLY TEMPERATURE	<__>	~	<0 - __DEG F>	AI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	HWS-T-1	HEAT EXCHANGER 1 HOT WATER SUPPLY TEMPERATURE	<__>	~	<0 - __DEG F>	AI	N/A	~	V	Y	ALM	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	HWR-V-05-C	HOT WATER RETURN VALVE COMMAND	<__>	~	OPEN/CLOSE	BO	N/A	C	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	HWR-V-05-2P	HOT WATER RETURN VALVE POSITION	<__>	~	OPEN/CLOSE	BI	N/A	C	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	HOT WATER RETURN VALVE 5 PID LOOP SETTING	PROPORTIONAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	HWS-T-2	HEAT EXCHANGER 2 HOT WATER SUPPLY TEMPERATURE	<__>	~	<0 - __DEG F>	AI	N/A	~	V	Y	ALM	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	HWR-V-06-C	HOT WATER RETURN VALVE COMMAND	<__>	~	OPEN/CLOSE	BO	N/A	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	HWR-V-06-2P	HOT WATER RETURN VALVE POSITION	<__>	~	OPEN/CLOSE	BI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	HOT WATER RETURN VALVE 6 PID LOOP SETTING	PROPORTIONAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
HOT WATER PUMP CONTROL	HW-SYS-DPS	HOT WATER SYSTEM PRESSURE	<__>	~	<0 - __PSI>	AI, NET-OUT	N/A	~	V	Y	HOT WATER SYSTEM HAS BEEN ENABLED FOR MORE THAN 15 MIN (ADJ.) AND HHW-SYS-P IS MORE THAN 20% (ADJ.) ABOVE OR BELOW HHW-SYS-P-SP	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	HW-SYS-P-SP	HOT WATER SYSTEM PRESSURE SETPOINT	~	25 PSI	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	HHWP-1-C	HOT WATER PUMP 1 COMMAND	<__>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	HOT WATER PUMP PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	HHWP-2-C	HOT WATER PUMP 2 COMMAND	<__>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	HOT WATER PUMP PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>

HEATING HOT WATER SYSTEM POINTS SCHEDULE CONTINUE TO M-825

POINTS SCHEDULE LEGEND

"<__>"	INDICATES ENTRY MADE BY BUILDING CONTRACTOR.	C	CONFIGURABLE	INFO	INFORMATIONAL ALARM	NET-OUT	NETWORK OUTPUT POINT	V	VIEWABLE
" ~ "	INDICATES NO ENTRY REQUIRED.	CRIT	CRITICAL ALARM	N/A	INDICATES NO VALID ENTRY AVAILABLE	O	OVERRIDABLE	VO	VIEWABLE AND OVERRIDABLE
"[___]"	INDICATES INFORMATION WILL BE PROVIDED AS PART OF INTEGRATION.	H	HARDWARE	NET-IN	NETWORK INPUT POINT	OC	OPERATOR CONFIGURABLE	Y	REQUIRED

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-18-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL POINTS SCHEDULE

SHEET ID

M-824

HEATING HOT WATER SYSTEM POINTS SCHEDULE (CONTINUED FROM M-824)

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: DATA FROM	PRIMARY POINT INFORMATION: DATA TO	PRIMARY POINT INFORMATION: NIAGRA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
HEATING HOT WATER BYPASS VALVE CONTROL	HHW-SYS-P	HEATING HOT WATER SYSTEM PRESSURE	~	~	<0 - __PSI>	NET-IN	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	HHW-BYP-V-07-C	HEATING HOT WATER BYPASS VALVE COMMAND	<__>	~	0-100%	AO	N/A	~	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	HHW-BYP-V-07-POS	HEATING HOT WATER BYPASS VALVE POSITION	<__>	~	0-100%	AI	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	HEATING HOT WATER BYPASS VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
STEAM BTU METER	STM-FM	STEAM SUPPLY FLOW RATE	~	~	<__LB/HR>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	STM-TOT-F	STEAM TOTALIZED FLOW	~	~	<__LB>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	ENERGY	ENERGY RATE	~	~	<__BTU/HR>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	TOT-ENERGY	TOTALIZED ENERGY	~	~	<__BTU>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	STM-T	STEAM SUPPY TEMPERATURE	~	~	<0 - __DEG F>	NET-OUT	N/A	~	V	Y	ALM	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	STM-P	STEAM SUPPLY PRESSURE	~	~	<0 - __PSI>	NET-OUT	N/A	~	V	Y	ALM	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
HOT WATER SUPPLY BTU METER	HWS-FM	HEATING HOT WATER SUPPLY FLOW RATE	~	~	__GAL/MIN	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	HWS-TOT-F	HEATING HOT WATER SUPPLY TOTALIZED FLOW	~	~	<__GAL>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	ENERGY	ENERGY RATE	~	~	<__BTU/HR>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	TOT-ENERGY	TOTALIZED ENERGY	~	~	<__BTU>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	HWS-T	HEATING HOT WATER SUPPLY TEMPERATURE	~	~	<0 - __DEG F>	NET-OUT	N/A	~	V	Y	ALM	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	HWR-T	HEATING HOT WATER RETURN TEMPERATURE	~	~	<0 - __DEG F>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
CONDENSATE RETURN FLOW METER	CDWR-F	CONDENSATE WATER RETURN FLOW RATE	~	~	<__GAL/MIN>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	CDWR-TOT-F	CONDENSATE WATER RETURN TOTALIZED FLOW	~	~	<__GAL>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	CDWR-T	CONDENSATE WATER RETURN TEMPERATURE	~	~	<0 - __DEG F>	NET-OUT	N/A	~	V	Y	ALM	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
MINIMUM HOT WATER PUMP VFD NETWORK POINTS (TYPICAL OF 2)	VFD MODE	VFD RUN MODE	~	~	HAND/AUTO	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD ALM	VFD ALARM	~	~	ALM/NORMAL	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD OUT-SPEED	VFD OUTPUT SPEED	~	~	<__RPM>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD OUT-FREQ	VFD OUTPUT FREQUENCY	~	~	<__HZ>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD OUT-CURR	VFD OUTPUT CURRENT	~	~	<__AMPS>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD OUT-PWR	VFD OUTPUT POWER	~	~	<__KW>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD KW-HOURS	VFD ENERGY USAGE	~	~	<__KWH>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD COMM ERROR	VFD COMMUNICATION LOSS	~	~	ALM/NORMAL	NET-OUT	N/A	~	V	Y	ALM	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
OTHER POINTS	WM	WATER METER	<__>	~	<0 - __GPM>	AI	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	HHWR-T	HEATING HOT WATER RETURN TEMPERATURE	<__>	~	<0 - __DEG F>	AI	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>

POINTS SCHEDULE LEGEND

"<__>" INDICATES ENTRY MADE BY BUILDING CONTRACTOR.
" ~ " INDICATES NO ENTRY REQUIRED.
"[__]" INDICATES INFORMATION WILL BE PROVIDED AS PART OF INTEGRATION.

C CONFIGURABLE
CRIT CRITICAL ALARM
H HARDWARE
INFO INFORMATIONAL ALARM
N/A INDICATES NO VALID ENTRY AVAILABLE
NET-IN NETWORK INPUT POINT
NET-OUT NETWORK OUTPUT POINT
O OVERRIDABLE
OC OPERATOR CONFIGURABLE
V VIEWABLE
VO VIEWABLE AND OVERRIDABLE
Y REQUIRED

US Army Corps of Engineers ®

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI 'D'
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-18-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
FILE NAME:

DATE | DESCRIPTION | MARK

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE A Joint Venture

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL POINTS SCHEDULE

SHEET ID

M-825

REVISED RTA SUBMISSION 03/01/2023

CHILLED WATER SYSTEM POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: DATA FROM	PRIMARY POINT INFORMATION: DATA TO	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS &...	CHWP-1-S	CHILLED WATER PUMP 1 STATUS	<__>	~	ON/OFF	BI	N/A	~	V	Y	CHILLED WATER PUMP 1 PROOF FAILED	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	CHWP-2-S	CHILLED WATER PUMP 2 STATUS	<__>	~	ON/OFF	BI	N/A	~	V	Y	CHILLED WATER PUMP 2 PROOF FAILED	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
START/STOP	SYS-ENA	SYSTEM ENABLE	~	~	ENABLE/DISABLE	NET-IN	N/A	OC	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	CHWP-1-SS	CHILLED WATER PUMP 1 START/STOP	<__>	~	ON/OFF	BO	N/A	~	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	CHWP-2-SS	CHILLED WATER PUMP 2 START/STOP	<__>	~	ON/OFF	BO	N/A	~	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
CHILLED WATER PUMP CONTROL	CHW-SYS-DPS-2	CHILLED WATER SYSTEM PRESSURE 2	<__>	~	<0 - __PSI>	AI, NET-OUT	N/A	~	V	Y	ALM	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	CHW-SYS-P-SP	CHILLED WATER SYSTEM PRESSURE SETPOINT	~	_15_PSI	~	NET-IN	N/A	OC	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	CHWP-1-C	CHILLED WATER PUMP 1 COMMAND	<__>	~	0-100%	AO	N/A	~	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	CHILLED WATER PUMP PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	CHWP-2-C	CHILLED WATER PUMP 2 COMMAND	<__>	~	0-100%	AO	N/A	~	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	CHILLED WATER PUMP PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
TERTIARY LOOP CHILLED WATER TEMPERATURE CONTROL	CHWS-T-1	CHILLED WATER SUPPLY TEMPERATURE 1	<__>	~	<0 - __DEG F>	AI	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	CHWS-T-SP	CHILLED WATER SUPPLY TEMPERATURE SET POINT	~	43 DEG F	~	NET-IN	N/A	~	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	CHWR-V-02-C	CHILLED WATER RETURN VALVE COMMAND	<__>	~	0-100%	AO	N/A	~	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	CHWR-V-02-POS	CHILLED WATER RETURN VALVE POSITION	<__>	~	0-100%	AI	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	CHILLED WATER RETURN VALVE PID LOOP SETTING	PROPORTIONAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
CHILLED WATER BYPASS VALVE CONTROL	CHW-SYS-DPS	CHILLED WATER SYSTEM PRESSURE	~	~	<0 - __PSI>	NET-IN	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	CHW-SYS-P-SP	CHILLED WATER SYSTEM PRESSURE SETPOINT	~	_15_PSI	~	NET-IN	N/A	OC	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	MIN-CHWP-#-SPE...	MINIMUM CHWP SPEED	~	<__>	0-100%	NET-IN	N/A	C	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	CHW-BYP-V-1-C	CHILLED WATER BYPASS VALVE COMMAND	<__>	~	0-100%	AO	N/A	~	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	CHW-BYP-V-1-POS	CHILLED WATER BYPASS VALVE POSITION	<__>	~	0-100%	AI	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	CHILLED WATER BYPASS VALVE PID LOOP SETTING	PROPORTIONAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
CHILLED WATER SUPPLY BTU METER	CHWS-F	CHILLED WATER SUPPLY FLOW RATE	~	~	<__GAL/MIN>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	CHWS-TOT-F	CHILLED WATER SUPPLY TOTALIZED FLOW	~	~	<__GAL>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	ENERGY	ENERGY RATE	~	~	<__BTU/HR>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	TOT-ENERGY	TOTALIZED ENERGY	~	~	<__BTU>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	CHWS-T	CHILLED WATER SUPPLY TEMPERATURE	~	~	<0 - __DEG F>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	CHWR-T	CHILLED WATER RETURN TEMPERATURE	~	~	<0 - __DEG F>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
MINIMUM CHILLED WATER PUMP VFD NETWORK POINTS	VFD MODE	VFD RUN MODE	~	~	HAND/AUTO	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD ALM	VFD ALARM	~	~	ALM/NORMAL	NET-OUT	N/A	~	V	Y	ALM	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD OUT-SPEED	VFD OUTPUT SPEED	~	~	<__RPM>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD OUT-FREQ	VFD OUTPUT FREQUENCY	~	~	<__HZ>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD OUT-CURR	VFD OUTPUT CURRENT	~	~	<__AMPS>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD OUT-PWR	VFD OUTPUT POWER	~	~	<__KW>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD KW-HOURS	VFD ENERGY USAGE	~	~	<__KWH>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD COMM ERROR	VFD COMMUNICATION LOSS	~	~	ALM/NORMAL	NET-OUT	N/A	~	V	Y	ALM	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>

POINTS SCHEDULE LEGEND

"<__>"	INDICATES ENTRY MADE BY BUILDING CONTRACTOR.	C	CONFIGURABLE	INFO	INFORMATIONAL ALARM	NET-OUT	NETWORK OUTPUT POINT	V	VIEWABLE
" ~ "	INDICATES NO ENTRY REQUIRED.	CRIT	CRITICAL ALARM	N/A	INDICATES NO VALID ENTRY AVAILABLE	O	OVERRIDABLE	VO	VIEWABLE AND OVERRIDABLE
"[__]"	INDICATES INFORMATION WILL BE PROVIDED AS PART OF INTEGRATION.	H	HARDWARE	NET-IN	NETWORK INPUT POINT	OC	OPERATOR CONFIGURABLE	Y	REQUIRED

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-18-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

SIZE: ANSI D
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL POINTS SCHEDULE

SHEET ID

M-826

REVISED RTA SUBMISSION 03/01/2023

CHILLED BEAM CHILLED WATER SYSTEM POINTS SCHEDULE (TYPICAL OF 2)

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: DATA FROM	PRIMARY POINT INFORMATION: DATA TO	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	CBP-##-S	CHILLED BEAM CHILLED WATER PUMP ## STATUS	<__>	~	ON/OFF	BI	N/A	~	V	Y	CHILLED BEAM PUMP ## PROOF FAILED	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
START/STOP	SYS-ENA	SYSTEM ENABLE	~	~	ENABLE/DISABLE	NET-IN	N/A	OC	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	CBP-##-SS	CHILLED BEAM PUMP ## START/STOP	<__>	~	ON/OFF	BO	N/A	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
CHILLED BEAM CHILLED WATER SYSTEM CONTROL	CHWS-T-SP	CHILLED WATER SUPPLY TEMPERATURE SET POINT	~	58 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	CHWS-T-##	CHILLED WATER SUPPLY TEMPERATURE	<__>	~	<0 - __DEG F>	AI	N/A	~	V	Y	ALM	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	CHWS-V-##-C	CHILLED WATER SUPPLY VALVE ## COMMAND	<__>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	CHWS-V-##-POS	CHILLED WATER SUPPLY VALVE ## POSITION	<__>	~	0-100%	AI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	CHILLED WATER SUPPLY VALVE PID LOOP SETTING	PROPORTIONAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>

CHILLED BEAM HEATING HOT WATER SYSTEM POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: DATA FROM	PRIMARY POINT INFORMATION: DATA TO	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	CBP-3-S	CHILLED BEAM HEATING HOT WATER PUMP 3 STATUS	<__>	~	ON/OFF	BI	N/A	~	V	Y	CHILLED BEAM PUMP ## PROOF FAILED	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
START/STOP	SYS-ENA	SYSTEM ENABLE	~	~	ENABLE/DISABLE	NET-IN	N/A	OC	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	CBP-3-SS	CHILLED BEAM HEATING HOT WATER PUMP 3 START/STOP	<__>	~	ON/OFF	BO	N/A	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
CHILLED BEAM HEATING HOT WATER SYSTEM CONTROL	HHWS-T-SP	HEATING HOT WATER SUPPLY TEMPERATURE SET POINT	~	120 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	HHWS-T	HEATING HOT SUPPLY TEMPERATURE	<__>	~	<0 - __DEG F>	AI	N/A	~	V	Y	ALM	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	HHWS-V-##-C	HEATING HOT WATER WATER SUPPLY VALVE ## COMMAND	<__>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	HHWS-V-##-P	HEATING HOT WATER SUPPLY VALVE ## POSITION	<__>	~	0-100%	AI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	HEATING HOT WATER SUPPLY VALVE PID LOOP SETTING	PROPORTIONAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>

POINTS SCHEDULE LEGEND

"<__>"	INDICATES ENTRY MADE BY BUILDING CONTRACTOR.	C	CONFIGURABLE	INFO	INFORMATIONAL ALARM	NET-OUT	NETWORK OUTPUT POINT	V	VIEWABLE
" ~ "	INDICATES NO ENTRY REQUIRED.	CRIT	CRITICAL ALARM	N/A	INDICATES NO VALID ENTRY AVAILABLE	O	OVERRIDABLE	VO	VIEWABLE AND OVERRIDABLE
"[___]"	INDICATES INFORMATION WILL BE PROVIDED AS PART OF INTEGRATION.	H	HARDWARE	NET-IN	NETWORK INPUT POINT	OC	OPERATOR CONFIGURABLE	Y	REQUIRED

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI D
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL POINTS SCHEDULE

SHEET ID

M-827

REVISED RTA SUBMISSION 03/01/2023

DOAS-1 AND DOAS-2 POINTS SCHEDULE (TYPICAL OF 2)

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: DATA FROM	PRIMARY POINT INFORMATION: DATA TO	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	SF-##-S	SUPPLY FAN STATUS (TYPICAL OF 2)	<__>	~	ON/OFF	BI	N/A	~	V	Y	SUPPLY AIR FAN PROOF FAILED	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	EF-##-S	EXHAUST FAN STATUS (TYPICAL OF 2)	<__>	~	ON/OFF	BI	N/A	~	V	Y	EXHAUST AIR FAN PROOF FAILED	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	OA-D-##-2P	OUTSIDE AIR DAMPER POSITION	<__>	~	OPEN/CLOSE	BI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	EA-D-##-2P	EXHAUST AIR DAMPER POSITION	<__>	~	OPEN/CLOSE	BI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	ERW-##-S	ENERGY RECOVERY WHEEL STATUS	<__>	~	ON/OFF	BI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	SA-FSD-##-2P	SUPPLY FIRE SMOKE DAMPER POSITION	<__>	~	OPEN/CLOSE	BI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	RA-FSD-##-2P	RETURN FIRE SMOKE DAMPER POSITION	<__>	~	OPEN/CLOSE	BI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	CP-##-S	CIRCULATION PUMP STATUS	<__>	~	ON/OFF	BI	N/A	~	V	Y	CIRCULATION PUMP FAILED	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	SA-P-HL	SUPPLY AIR HIGH STATIC PRESSURE...	<__>	2 IN WC	ALM/NORMAL	BI	N/A	H	V	Y	SUPPLY AIR HIGH STATIC PRESSURE ALARM	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	RA-P-LL	RETURN AIR LOW STATIC PRESSURE...	<__>	- 2 IN WC	ALM/NORMAL	BI	N/A	H	V	Y	RETURN AIR LOW STATIC PRESSURE ALARM	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	FZ	FREEZESTAT	<__>	38 DEG F	ALM/NORMAL	BI	N/A	H	V	Y	FREEZESTAT ALARM	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	SA-SMK	SUPPLY AIR SMOKE DETECTOR	<__>	~	ALM/NORMAL	BI	N/A	~	V	Y	SUPPLY AIR SMOKE ALARM	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	RA-SMK	RETURN AIR SMOKE DETECTOR	<__>	~	ALM/NORMAL	BI	N/A	~	V	Y	RETURN AIR SMOKE ALARM	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
SCHEDULING	SYS-OCC-SCHED	SYSTEM OCCUPANCY SCHEDULE	~	~	OCCUPIED/...	NET-IN	N/A	OC	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
START/STOP	SYS-OCC-C	OCCUPANCY COMMAND	~	~	OCCUPIED/...	NET-IN	N/A	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	SYS-OCC	SYSTEM OCCUPANCY (ACTUAL)	~	~	OCCUPIED/...	NET-OUT	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	SW-##	EMERGENCY AIR VENTILATION SHUTDOWN SWITCH STATUS	~	~	EMERGENCY/NORMAL	NET-IN	N/A	~	V	Y	ALM	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	EF-##-SS	EXHAUST FAN START/STOP (TYPICAL O...	<__>	~	ON/OFF	BO	Y	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	SF-##-SS	SUPPLY FAN START/STOP (TYPICAL OF...	<__>	~	ON/OFF	BO	Y	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
													[___]			<__>		<__>	
SUPPLY FAN CONTROL	SF-##-C	SUPPLY FAN COMMAND (TYPICAL OF 2)	<__>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	SA-##-F	SUPPLY AIR FLOW (TYPICAL OF 2)	<__>	~	<0 - __CFM>	AI, NET-IN	N/A	~	V	Y	SYSTEM HAS BEEN IN OCCUPIED MODE FOR MORE THAN 15 MIN (ADJ.) AND SA-##-F IS MORE THAN 10% (ADJ.) ABOVE OR BELOW SA-F-SP	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	SA-F-SP	SUPPLY AIR FLOW SETPOINT	~	<__CFM>	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	SUPPLY FAN PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<__>	~	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	~	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	~	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	~	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	~	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
EXHAUST FAN CONTROL	EF-##-C	EXHAUST FAN COMMAND (TYPICAL OF 2)	<__>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	SA-##-F	SUPPLY AIR FLOW (TYPICAL OF 2)	~	~	<0 - __CFM>	NET-IN	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	EA-##-F	EXHAUST AIR FLOW (TYPICAL OF 2)	<__>	~	<0 - __CFM>	AI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	OFFSET	OFFSET	~	<__CFM>	~	NET-IN	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	EA-F-SP	EXHAUST AIR FLOW SETPOINT	~	<__CFM>	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	EXHAUST FAN PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<__>	~	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	~	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	~	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	~	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	~	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
MINIMUM UNIT FAN VFD NETWORK POINTS (TYPICAL)	VFD MODE	VFD RUN MODE	~	~	HAND/AUTO	NET-OUT	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD ALM	VFD ALARM	~	~	ALM/NORMAL	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD OUT-SPEED	VFD OUTPUT SPEED	~	~	<__RPM>	NET-OUT	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD OUT-FREQ	VFD OUTPUT FREQUENCY	~	~	<__HZ>	NET-OUT	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD OUT-CURR	VFD OUTPUT CURRENT	~	~	<__AMPS>	NET-OUT	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD OUT-PWR	VFD OUTPUT POWER	~	~	<__KW>	NET-OUT	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD KW-HOURS	VFD ENERGY USAGE	~	~	<__KWH>	NET-OUT	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD COMM ERROR	VFD COMMUNICATION LOSS	~	~	ALM/NORMAL	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
ENERGY RECOVERY WHEEL CONTROL	UNIT-MODE	UNIT MODE	~	~	HTG, CLG, AND/OR...	NET-OUT	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	OA-T	OUTSIDE AIR TEMPERATURE	~	~	~	NET-IN	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	EA-RH	EXHAUST AIR RELATIVE HUMIDITY	<__>	~	<0 - ___RH%>	AI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	EA-T	EXHAUST AIR TEMPERATURE	<__>	~	<0 - __DEG F>	AI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	ERW-LEV-T	ENERGY RECOVERY WHEEL LEAVING AIR TEMPERATURE	<__>	~	<0 - __DEG F>	AI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	ERW-LEV-RH	ENERGY RECOVERY WHEEL LEAVING AIR RELATIVE HUMIDITY	<__>	~	<0 - ___RH%>	AI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	RA-T	RETURN AIR TEMPERATURE	<__>	~	<0 - __DEG F>	AI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	RA-H	RETURN AIR RELATIVE HUMIDITY	<__>	~	<0 - ___RH%>	AI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	ERW-##-SS	ENERGY RECOVERY WHEEL...	<__>	~	ON/OFF	BO	Y	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	ERW-##-C	ENERGY RECOVERY WHEEL COMMAND	<__>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	ENERGY RECOVERY WHEEL PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<__>	~	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	~	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	~	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	~	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	~	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>

DOAS-1 AND DOAS-2 POINTS SCHEDULE CONTINUE TO M-829

POINTS SCHEDULE LEGEND

"<__>" INDICATES ENTRY MADE BY BUILDING CONTRACTOR.
" ~ " INDICATES NO ENTRY REQUIRED.
"[___]" INDICATES INFORMATION WILL BE PROVIDED AS PART OF INTEGRATION.

C CONFIGURABLE
CRIT CRITICAL ALARM
H HARDWARE
INFO INFORMATIONAL ALARM
N/A INDICATES NO VALID ENTRY AVAILABLE
NET-IN NETWORK INPUT POINT
NET-OUT NETWORK OUTPUT POINT
O OVERRIDABLE
OC OPERATOR CONFIGURABLE
V VIEWABLE
VO VIEWABLE AND OVERRIDABLE
Y REQUIRED

US Army Corps of Engineers ®

DESCRIPTION | DATE | MARK

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-18-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE A Joint Venture

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL POINTS SCHEDULE

SHEET ID

M-828

DOAS-1 AND DOAS-2 POINTS SCHEDULE (CONTINUED FROM M-828)

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING			PRIMARY POINT INFORMATION			OVERRIDES		CONFIGURATION INFORMATION
											ALARM CONDITION	ALARM PRIORITY	M&C ROUTING	DATA FROM	DATA TO	NIAGARA ID	SNVT NAME	SNVT TYPE	
DISCHARGE AIR TEMPERATURE SETPOINT RESET CONTROL	SA-T-SP	SUPPLY AIR TEMPERATURE SETPOINT	~	RESET SCHEDULE	55-65 DEG F	NET-IN	N/A	OC	V	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
	SA-T	SUPPLY AIR TEMPERATURE	<__>	~	<0 - __DEG F>	AI, NET-OUT	N/A	~	V	Y	SYSTEM HAS BEEN IN OCCUPIED MODE FOR MORE THAN 5 MIN (ADJ.) AND SA-T IS MORE THAN 5 DEG F (ADJ.) ABOVE OR BELOW SETPOINT	CRIT	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
	OA-T-SP	OUTDOOR TEMPERATURE SETPOINT	~	RESET SCHEDULE	50-60 DEG F	NET-IN	N/A	~	V	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
	OA-T	OUTDOOR TEMPERATURE	~	~	<0- __DEG F>	NET-IN	N/A	~	V	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
	HWS-P-T	HEATING HOT PIPE DISCHARE AIR TEMPERATURE	<__>	~	<0- __DEG F>	AI	N/A	~	V	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
	CLG-T	COOLING COIL DISCHARGE AIR TEMPERATURE	<__>	~	<0- __DEG F>	AI	N/A	~	V	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
	PH-T	PRE-HEAT COIL DISCHARGE AIR TEMPERATURE	<__>	~	<0- __DEG F>	AI	N/A	~	V	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
	PH-V-C	PRE-HEAT VALVE COMMAND	<__>	~	0-100%	AO	N/A	~	VO	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
	PH-V-POS	PRE-HEAT VALVE POSITION	<__>	~	0-100%	AI	N/A	~	~	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
	PRE-HEAT COIL VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	~	~	~	N/A	C	~	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	~	~	~	N/A	C	~	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	~	~	~	N/A	C	~	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	~	~	~	N/A	C	~	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	~	~	~	N/A	C	~	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
	CLV-V-C	COOLING COIL VALVE COMMAND	<__>	~	0-100%	AO	N/A	~	VO	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
	CLG-V-POS	COOLING COIL VALVE POSITION	<__>	~	0-100%	AI	N/A	~	~	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
	COOLING COIL VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	~	~	~	N/A	C	~	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	~	~	~	N/A	C	~	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	~	~	~	N/A	C	~	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	~	~	~	N/A	C	~	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	~	~	~	N/A	C	~	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
HEATING HOT WATER CIRCULATION...	UNIT STATUS	UNIT STATUS	~	~	ON/OFF	~	N/A	~	~	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
	OA-T	OUTDOOR TEMPERATURE	~	~	<0- __DEG F>	NET-IN	N/A	~	~	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
	CP-##-SS	CIRCULATION PUMP START/STOP	<__>	~	ON/OFF	BO	N/A	~	~	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
OTHER POINTS	PRE-FLT-P-HL	OUTSIDE AIR PRE-FILTER PRESSURE HIGH LIMIT	<__>	~	ALM/NORMAL	BI	N/A	~	V	Y	ALM	INFO	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
	F-FLT-P-HL	OUTSIDE AIR FINAL FILTER PRESSURE HIGH LIMIT	<__>	~	ALM/NORMAL	BI	N/A	~	V	Y	ALM	INFO	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
	RA-FLT-P-HL	RETURN AIR FILTER PRESSURE HIGH LIMIT	<__>	~	ALM/NORMAL	BI	N/A	~	V	Y	ALM	INFO	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
	SA-RH	SUPPLY AIR RELATIVE HUMIDITY	<__>	~	<0- __% RH>	AI	N/A	~	V	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>
	RA-CO2	RETURN AIR CARBON DIOXIDE	<__>	~	<0- __PPM>	AI	N/A	~	V	Y	~	~	[ ]	<__>	<__>	<__>	<__>	<__>	<__>

POINTS SCHEDULE LEGEND

"<__>" INDICATES ENTRY MADE BY BUILDING CONTRACTOR.
" ~ " INDICATES NO ENTRY REQUIRED.
"[ ]" INDICATES INFORMATION WILL BE PROVIDED AS PART OF INTEGRATION.

C	CONFIGURABLE	INFO	INFORMATIONAL ALARM	NET-OUT	NETWORK OUTPUT POINT	V	VIEWABLE
CRIT	CRITICAL ALARM	N/A	INDICATES NO VALID ENTRY AVAILABLE	O	OVERRIDABLE	VO	VIEWABLE AND OVERRIDABLE
H	HARDWARE	NET-IN	NETWORK INPUT POINT	OC	OPERATOR CONFIGURABLE	Y	REQUIRED

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

SIZE: ANSI D
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL POINTS SCHEDULE

SHEET ID

M-829

REVISED RTA SUBMISSION 03/01/2023

MAU-1 POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	SF-1-S	SUPPLY FAN STATUS	<__>	~	ON/OFF	BI	N/A	~	V	Y	SUPPLY AIR FAN PROOF FAILED	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	OA-D-##-2P	OUTSIDE AIR DAMPER POSITION	<__>	~	0-100%	AI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	CP-3-S	CIRCULATION PUMP STATUS	<__>	~	ON/OFF	BI	N/A	~	V	Y	CIRCULATION PUMP FAILED	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	SA-P-LL	SUPPLY AIR LOW STATIC PRESSURE SWITCH	<__>	- 2 IN WC	ALM/NORMAL	BI	N/A	H	V	Y	SUPPLY AIR LOW STATIC PRESSURE ALARM	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	FZ	FREEZESTAT	<__>	37 DEG F	ALM/NORMAL	BI	N/A	H	V	Y	FREEZESTAT ALARM	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
SCHEDULING	SYS-OCC-SCHED	SYSTEM OCCUPANCY SCHEDULE	~	~	OCC/UNOCC	NET-IN	N/A	OC	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
START/STOP	SYS-OCC-C	OCCUPANCY COMMAND	~	~	OCC/UNOCC	NET-IN	N/A	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	SYS-OCC	SYSTEM OCCUPANCY (ACTUAL)	~	~	OCC/UNOCC	NET-OUT	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	SF-1-SS	SUPPLY FAN START/STOP	<__>	~	ON/OFF	BO	Y	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
SUPPLY FAN CONTROL	SF-1-C	SUPPLY FAN COMMAND	<__>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	OA-F	OUTSIDE AIR FLOW	<__>	~	<0 - __CFM>	AI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	SUPPLY FAN PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<__>	~	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	~	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	~	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	~	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	~	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
SPACE TEMPERATURE CONTROL	TS-##	SPACE TEMPERATURE	<__>	~	<0 -__DEG F>	AI	N/A	~	V	Y	SYSTEM HAS BEEN IN OCCUPIED MODE FOR MORE THAN 15 MIN (ADJ.) AND SPACE TEMPERATURE IS MORE THAN 5 DEG F (ADJ.) ABOVE COOLING SETPOINT OR BELOW HEATING SETPOINT	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	TS-SP	SPACE AIR TEMPERATURE SETPOINT	~	HTG-SP = 60 DEG F CLG-SP = 85 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	CLG-T	COOLING COIL DISCHARE AIR TEMPERATURE	<__>	~	<0 -__DEG F>	AI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	PH-T	PRE-HEAT COIL DISCHARGE AIR TEMPERATURE	<__>	~	<0 -__DEG F>	AI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	PH-V-C	PRE-HEAT VALVE COMMAND	<__>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	PH-V-POS	PRE-HEAT VALVE POSITION	<__>	~	0-100%	AI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	PRE-HEAT COIL VALVE PID LOOP SETTING	PROPORTIONAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	CLV-V-C	COOLING COIL VALVE COMMAND	<__>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	CLG-V-POS	COOLING COIL VALVE POSITION	<__>	~	0-100%	AI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	COOLING COIL VALVE PID LOOP SETTING	PROPORTIONAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
HEATING HOT WATER CIRCULATION PUMP	OA-T	OUTDOOR TEMPERATURE	~	~	<0- __DEG F>	NET-IN	N/A	~	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	CP-3-SS	CIRCULATION PUMP START/STOP	<__>	~	ON/OFF	BO	N/A	~	~	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	HWS-T	HOT WATER SUPPLY TEMPERATURE	<__>	~	<0 -__DEG F>	AI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
MINIMUM UNIT FAN VFD NETWORK POINTS	VFD MODE	VFD RUN MODE	~	~	HAND/AUTO	NET-OUT	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD ALM	VFD ALARM	~	~	ALM/NORMAL	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD OUT-SPEED	VFD OUTPUT SPEED	~	~	<__RPM>	NET-OUT	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD OUT-FREQ	VFD OUTPUT FREQUENCY	~	~	<__HZ>	NET-OUT	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD OUT-CURR	VFD OUTPUT CURRENT	~	~	<__AMPS>	NET-OUT	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD OUT-PWR	VFD OUTPUT POWER	~	~	<__KW>	NET-OUT	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD KW-HOURS	VFD ENERGY USAGE	~	~	<__KWH>	NET-OUT	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	VFD COMM ERROR	VFD COMMUNICATION LOSS	~	~	ALM/NORMAL	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
OTHER POINTS	OA-PFLT-P-HL	OUTSIDE AIR PRE- FILTER PRESSURE HIGH LIMIT	<__>	~	ALM/NORMAL	BI	N/A	~	V	Y	ALM	INFO	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	OA-FFLT-P-HL	OUTSIDE AIR FINAL FILTER PRESSURE HIGH LIMIT	<__>	~	ALM/NORMAL	BI	N/A	~	V	Y	ALM	INFO	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	SA-T	SUPPLY AIR TEMPERATURE	<__>	~	<0 -__DEG F>	AI	N/A	~	V	Y	~	~	[___]	<__>	<__>	<__>	<__>	<__>	<__>

POINTS SCHEDULE LEGEND

"<__>" INDICATES ENTRY MADE BY BUILDING CONTRACTOR.
" ~ " INDICATES NO ENTRY REQUIRED.
"[___]" INDICATES INFORMATION WILL BE PROVIDED AS PART OF INTEGRATION.

C CONFIGURABLE
CRIT CRITICAL ALARM
H HARDWARE
INFO INFORMATIONAL ALARM
N/A INDICATES NO VALID ENTRY AVAILABLE
NET-IN NETWORK INPUT POINT
NET-OUT NETWORK OUTPUT POINT
O OVERRIDABLE
OC OPERATOR CONFIGURABLE
V VIEWABLE
VO VIEWABLE AND OVERRIDABLE
Y REQUIRED

US Army Corps of Engineers ®

DESCRIPTION / DATE / MARK

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
SIZE: ANSI D
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL POINTS SCHEDULE

SHEET ID

M-830

REVISED RTA SUBMISSION 03/01/2023

4-PIPE FAN COIL UNIT (TYPICAL) POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	FCU-##-COMM	COMMUNICATION STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-SF-S	SUPPLY FAN STATUS	<___>	~	ON/OFF	BI	N/A	~	V	Y	FAN PROOF FAILED	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-COND-HL	CONDENSATE HIGH LEVEL	<___>	~	ALM/NORMAL	BI	N/A	~	V	Y	CONDENSATE HIGH LEVEL ALARM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
SCHEDULING	FCU-##-SYS-OCC	OCCUPANCY INPUT (FROM SYSTEM SCHEDULER)	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-SYS-OCC-C	OCCUPANCY COMMAND	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-EFF-OCC	EFFECTIVE OCCUPANCY	~	~	OCC/UNOCC	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
START/STOP	FCU-##-SF-SS	SUPPLY FAN START/STOP	<___>	~	ON/OFF	BO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
TEMPERATURE & HUMIDITY CONTROL	FCU-##-UNIT-MODE	UNIT MODE SETUP	~	~	HTG/CLG/OFF	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-TS-##	SPACE TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	SPACE TEMPERATURE IS MORE THAN 5 DEG F (ADJ.) ABOVE OR BELOW SET POINT DURING OCCUPIED OR UNOCCUPIED MODE	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-T-SP	OCCUPIED HEATING TEMPERATURE SET POINT	~	68 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-T-SP-UNOCC	UNOCCUPIED HEATING TEMPERATURE SET POINT	~	60 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-T-SP	OCCUPIED COOLING TEMPERATURE SET POINT	~	75 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-T-SP-UNOCC	UNOCCUPIED COOLING TEMPERATURE SET POINT	~	80 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-V-##-C	HEATING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	HEATING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-V-##-C	COOLING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	COOLING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HS-##	SPACE HUMIDITY	<___>	~	<0-___% RH>	AI	N/A	~	V	Y	SPACE HUMIDITY IS MORE THAN 5% RH (ADJ.) ABOVE SET POINT DURING OCCUPIED MODE	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HS-##-SP	SPACE HUMIDITY SET POINT	~	50% RH	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
OTHER POINTS	FCU-##-RA-FLT-P-HL	RETURN AIR FILTER PRESSURE HIGH LIMIT	<___>	~	ALM/NORMAL	BI	N/A	~	V	Y	ALM	INFO	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-DA-T	DISCHARGE AIR TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>

4-PIPE FAN COIL UNITS (ROOM 230) POINTS SCHEDULE (TYPICAL OF 2)

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	FCU-##-COMM	COMMUNICATION STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-SF-S	SUPPLY FAN STATUS	<___>	~	ON/OFF	BI	N/A	~	V	Y	FAN PROOF FAILED	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-COND-HL	CONDENSATE HIGH LEVEL	<___>	~	ALM/NORMAL	BI	N/A	~	V	Y	CONDENSATE HIGH LEVEL ALARM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
SCHEDULING	FCU-##-SYS-OCC	OCCUPANCY INPUT (FROM SYSTEM SCHEDULER)	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-SYS-OCC-C	OCCUPANCY COMMAND	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-EFF-OCC	EFFECTIVE OCCUPANCY	~	~	OCC/UNOCC	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
START/STOP	FCU-##-SF-SS	SUPPLY FAN START/STOP	<___>	~	ON/OFF	BO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
TEMPERATURE & HUMIDITY CONTROL	FCU-##-UNIT-MODE	UNIT MODE SETUP	~	~	HTG/CLG/OFF	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-TS-##	SPACE TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	SPACE TEMPERATURE IS MORE THAN 5 DEG F (ADJ.) ABOVE OR BELOW SET POINT DURING OCCUPIED OR UNOCCUPIED MODE	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-T-SP	OCCUPIED HEATING TEMPERATURE SET POINT	~	68 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-T-SP-UNOCC	UNOCCUPIED HEATING TEMPERATURE SET POINT	~	60 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-T-SP	OCCUPIED COOLING TEMPERATURE SET POINT	~	75 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-T-SP-UNOCC	UNOCCUPIED COOLING TEMPERATURE SET POINT	~	80 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-V-##-C	HEATING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	HEATING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-V-##-C	COOLING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	COOLING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HS-##	SPACE HUMIDITY	<___>	~	<0-___% RH>	AI	N/A	~	V	Y	SPACE HUMIDITY IS MORE THAN 5% RH (ADJ.) ABOVE SET POINT DURING OCCUPIED MODE	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HS-##-SP	SPACE HUMIDITY SET POINT	~	50% RH	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
OTHER POINTS	FCU-##-RA-FLT-P-HL	RETURN AIR FILTER PRESSURE HIGH LIMIT	<___>	~	ALM/NORMAL	BI	N/A	~	V	Y	ALM	INFO	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-DA-T	DISCHARGE AIR TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>

POINTS SCHEDULE LEGEND

"<___>"	INDICATES ENTRY MADE BY BUILDING CONTRACTOR.	C	CONFIGURABLE	INFO	INFORMATIONAL ALARM	NET-OUT	NETWORK OUTPUT POINT	V	VIEWABLE
" ~ "	INDICATES NO ENTRY REQUIRED.	CRIT	CRITICAL ALARM	N/A	INDICATES NO VALID ENTRY AVAILABLE	O	OVERRIDABLE	VO	VIEWABLE AND OVERRIDABLE
"[___]"	INDICATES INFORMATION WILL BE PROVIDED AS PART OF INTEGRATION.	H	HARDWARE	NET-IN	NETWORK INPUT POINT	OC	OPERATOR CONFIGURABLE	Y	REQUIRED

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI D
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL POINTS SCHEDULE

SHEET ID

M-831

REVISED RTA SUBMISSION 03/01/2023

4-PIPE FAN COIL UNITS (ROOMS 150 & 170) POINTS SCHEDULE (TYPICAL OF 3 FOR EACH ROOM)

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	FCU-##-COMM	COMMUNICATION STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-SF-S	SUPPLY FAN STATUS	<___>	~	ON/OFF	BI	N/A	~	V	Y	FAN PROOF FAILED	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-COND-HL	CONDENSATE HIGH LEVEL	<___>	~	ALM/NORMAL	BI	N/A	~	V	Y	CONDENSATE HIGH LEVEL ALARM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
SCHEDULING	FCU-##-SYS-OCC	OCCUPANCY INPUT (FROM SYSTEM SCHEDULER)	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-SYS-OCC-C	OCCUPANCY COMMAND	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-EFF-OCC	EFFECTIVE OCCUPANCY	~	~	OCC/UNOCC	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
START/STOP	FCU-##-SF-SS	SUPPLY FAN START/STOP	<___>	~	ON/OFF	BO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
TEMPERATURE & HUMIDITY CONTROL	FCU-##-UNIT-MODE	UNIT MODE SETUP	~	~	HTG/CLG/OFF	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-TS-##	SPACE TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	SPACE TEMPERATURE IS MORE THAN 5 DEG F (ADJ.) ABOVE OR BELOW SET POINT DURING OCCUPIED OR UNOCCUPIED MODE	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-T-SP	OCCUPIED HEATING TEMPERATURE SET POINT	~	68 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-T-SP-UNOCC	UNOCCUPIED HEATING TEMPERATURE SET POINT	~	60 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-T-SP	OCCUPIED COOLING TEMPERATURE SET POINT	~	75 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-T-SP-UNOCC	UNOCCUPIED COOLING TEMPERATURE SET POINT	~	80 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-V-##-C	HEATING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	HEATING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-V-##-C	COOLING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	COOLING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HS-##	SPACE HUMIDITY	<___>	~	<0-___% RH>	AI	N/A	~	V	Y	SPACE HUMIDITY IS MORE THAN 5% RH (ADJ.) ABOVE SET POINT DURING OCCUPIED MODE	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HS-##-SP	SPACE HUMIDITY SET POINT	~	50% RH	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
OTHER POINTS	FCU-##-RA-FLT-P-HL	RETURN AIR FILTER PRESSURE HIGH LIMIT	<___>	~	ALM/NORMAL	BI	N/A	~	V	Y	ALM	INFO	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-DA-T	DISCHARGE AIR TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>

4-PIPE FAN COIL UNIT (RESTROOMS) POINTS SCHEDULE (TYPICAL)

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	FCU-##-COMM	COMMUNICATION STATE	~	~	NORMAL/ABNORMAL	NET-OUT	N/A	~	V	Y	ALM	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	FCU-##-SF-S	FAN STATUS	<__>	~	ON/OFF	BI	N/A	~	V	Y	FAN PROOF FAILURE	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	FCU-##-COND-HL	CONDENSATE HIGH LEVEL	<__>	~	ALM/NORMAL	BI	N/A	~	V	Y	CONDENSATE HIGH LEVEL ALARM	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
SCHEDULING	FCU-##-SYS-OCC	OCCUPANCY INPUT (FROM SYSTEM SCHEDULER)	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	FCU-##-EFF-OCC	EFFECTIVE OCCUPANCY	~	~	OCC/UNOCC	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
START/STOP	FCU-##-SF-SS	FAN START/STOP	<__>	~	ON/OFF	BO	N/A	~	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
TEMPERATURE CONTROL	FCU-##-UNIT-MODE	UNIT MODE SETUP	~	~	HTG/CLG/OFF	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	FCU-##-TS-##	SPACE TEMPERATURE SENSOR	<__>	~	<0 -__DEG F>	AI	N/A	~	V	Y	SPACE TEMPERATURE IS MORE THAN 5 DEG F (ADJ.) ABOVE OR BELOW SET POINT DURING OCCUPIED OR UNOCCUPIED MODE	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	FCU-##-HTG-T-SP	OCCUPIED HEATING TEMPERATURE SET POINT	~	68 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	FCU-##-HTG-T-SP-UNOCC	UNOCCUPIED HEATING TEMPERATURE SET POINT	~	60 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	FCU-##-CLG-T-SP	OCCUPIED COOLING TEMPERATURE SET POINT	~	75 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	FCU-##-CLG-T-SP-UNOCC	UNOCCUPIED COOLING TEMPERATURE SET POINT	~	80 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	FCU-##-HTG-V-##-C	HEATING VALVE ## COMMAND	<__>	~	0 - 100%	AO	N/A	~	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	HEATING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<__>	<__>	NET-IN	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	<__>	NET-IN	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	<__>	NET-IN	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	<__>	NET-IN	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	<__>	NET-IN	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	FCU-##-CLG-V-##-C	COOLING VALVE ## COMMAND	<__>	~	0 - 100%	AO	N/A	~	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	COOLING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<__>	<__>	NET-IN	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	<__>	NET-IN	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	<__>	NET-IN	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	<__>	NET-IN	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	<__>	NET-IN	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
OTHER POINTS	FCU-##-DA-T	DISCHARGE AIR TEMPERATURE	<__>	~	<0 -__DEG F>	AI	N/A	~	V	Y	ALM	INFO	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	FCU-##-RA-FLT-P-HL	RETURN AIR FILTER PRESSURE HIGH LIMIT	<__>	~	ALM/NORMAL	BI	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>

POINTS SCHEDULE LEGEND

"<__>" INDICATES ENTRY MADE BY BUILDING CONTRACTOR.
" ~ " INDICATES NO ENTRY REQUIRED.
"[__]" INDICATES INFORMATION WILL BE PROVIDED AS PART OF INTEGRATION.

C CONFIGURABLE
CRIT CRITICAL ALARM
H HARDWARE
INFO INFORMATIONAL ALARM
N/A INDICATES NO VALID ENTRY AVAILABLE
NET-IN NETWORK INPUT POINT
NET-OUT NETWORK OUTPUT POINT
O OVERRIDABLE
OC OPERATOR CONFIGURABLE
V VIEWABLE
VO VIEWABLE AND OVERRIDABLE
Y REQUIRED

US Army Corps of Engineers ®

DATE | DESCRIPTION | MARK

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL POINTS SCHEDULE

SHEET ID

M-832

REVISED RTA SUBMISSION 03/01/2023

2-PIPE ACTIVE CHILLED BEAM (CB-1,2,3), 4-PIPE BLOWER COIL UNIT AND CONSTANT AIR VOLUME BOX (ROOM 317) POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	CAV-3D-COMM	COMMUNICATION STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	ALM	CRIT	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	BCU-1-SF-S	SUPPLY FAN STATUS	<___>	~	ON/OFF	BI	N/A	~	V	Y	FAN PROOF FAILED	CRIT	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	CB-CDW-D	CONDENSATE WATER DETECTOR	<___>	~	ALM/NORMAL	BI	N/A	~	V	Y	ALM	CRIT	[__]	<___>	<___>	<___>	<___>	<___>	<___>
SCHEDULING	SYS-OCC	OCCUPANCY INPUT (FROM SYSTEM SCHEDULER)	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	EFF-OCC	EFFECTIVE OCCUPANCY	~	~	OCC/UNOCC	NET-OUT	N/A	~	V	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	SYS-PRE-REC	SYSTEM PRE-RECORDING	~	~	ON/OFF	NET-IN	N/A	~	VO	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	SYS-REC	SYSTEM RECORDING	~	~	ON/OFF	NET-IN	N/A	~	VO	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	SYS-LECT	SYSTEM LECTURE	~	~	ON/OFF	NET-IN	N/A	~	VO	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
START/STOP	BCU-1-UNIT-MODE	BCU UNIT MODE SETUP	~	~	HTG/CLG/OFF	NET-OUT	N/A	~	V	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	CB-##-UNIT-MODE	CB ## UNIT MODE SETUP	~	~	CLG/OFF	NET-OUT	N/A	~	V	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	BCU-1-SF-SS	SUPPLY FAN START/STOP	<___>	~	ON/OFF	BO	N/A	~	VO	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
ZONE TEMPERATURE & HUMIDITY CONTROL	TS-##	SPACE TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	SPACE TEMPERATURE IS MORE THAN 5 DEG F (ADJ.) ABOVE OR BELOW SET POINT DURING OCCUPIED OR UNOCCUPIED MODE	CRIT	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	BCU-1-HTG-T-SP	OCCUPIED HEATING TEMPERATURE SET POINT	~	68 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	BCU-1-HTG-T-SP-UNOCC	UNOCCUPIED HEATING TEMPERATURE SET POINT	~	60 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	BCU-1-CLG-T-SP	OCCUPIED COOLING TEMPERATURE SET POINT	~	75 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	BCU-1-CLG-T-SP-UNOCC	UNOCCUPIED COOLING TEMPERATURE SET POINT	~	80 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	BCU-1-HTG-V-##-C	BCU-1 HEATING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	BCU-1 HEATING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	BCU-1-CLG-V-##-C	BCU-1 COOLING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	BCU-1 COOLING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	HS-##	SPACE HUMIDITY	<___>	~	<0-___% RH>	AI	N/A	~	V	Y	SPACE HUMIDITY IS MORE THAN 5% RH (ADJ.) ABOVE SET POINT DURING OCCUPIED MODE	CRIT	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	HS-##-SP	SPACE HUMIDITY SET POINT	~	50% RH	~	NET-IN	N/A	OC	VO	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	ZN-DWPNT-T	ZONE DEW POINT TEMPERATURE (CALCULATED)	~	~	<0-___ DEG F>	NET-OUT	N/A	~	V	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	ZN-DWPNT-T-SP	ZONE DEW POINT TEMPERATURE SET POINT	~	56 DEG F	~	NET-IN	N/A	OC	VO	Y		CRIT	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	CB-CLG-V-##-C	CB COOLING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	CB COOLING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
DUCT COOLING COIL CONTROL	CC3-DA-T	COOLING COIL DISCHARGE AIR TEMPERATURE	<___>	~	<0-__ CFM>	AI	N/A	~	V	Y	ALM	CRIT	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	CC3-DA-T-SP	COOLING COIL DISCHARGE AIR TEMPERATURE SET POINT	~	50 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	CC3-V-##-C	COOLING COIL VALVE 3 COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	COOLING COIL VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
OTHER POINTS	BCU-1-RA-FLT-P-HL	RETURN AIR FILTER PRESSURE HIGH LIMIT	<___>	~	ALM/NORMAL	BI	N/A	~	V	Y	ALM	INFO	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	BCU-1-DA-T	BCU DISCHARGE AIR TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>

CAV

ZONE DAMPER CONTROL	CAV-3D-SA-F	SUPPLY AIR FLOW	<___>	~	<0-__ CFM>	AI	N/A	~	V	Y	DISCHARGE AIR TEMPERATURE IS MORE THAN 5 DEG F (ADJ.) ABOVE OR BELOW SET POINT DURING OCCUPIED OR UNOCCUPIED MODE	CRIT	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	CAV-3D-SA-F-SP	SUPPLY AIR FLOW SET POINT	~	0-__ CFM	~	NET-IN	N/A	OC	VO	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	CAV-3D-D-C	DAMPER COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	CAV-3D-D-P	DAMPER POSITION	<___>	~	0-100%	AI	N/A	~	V	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	CAV DAMPER PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>
	CAV-3D-DA-T	CAV DISCHARGE AIR TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	~	~	[__]	<___>	<___>	<___>	<___>	<___>	<___>

POINTS SCHEDULE LEGEND

"<___>"	INDICATES ENTRY MADE BY BUILDING CONTRACTOR.	C	CONFIGURABLE	INFO	INFORMATIONAL ALARM	NET-OUT	NETWORK OUTPUT POINT	V	VIEWABLE
" ~ "	INDICATES NO ENTRY REQUIRED.	CRIT	CRITICAL ALARM	N/A	INDICATES NO VALID ENTRY AVAILABLE	O	OVERRIDABLE	VO	VIEWABLE AND OVERRIDABLE
"[__]"	INDICATES INFORMATION WILL BE PROVIDED AS PART OF INTEGRATION.	H	HARDWARE	NET-IN	NETWORK INPUT POINT	OC	OPERATOR CONFIGURABLE	Y	REQUIRED

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-18-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI D
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL POINTS SCHEDULE

SHEET ID

M-833

REVISED RTA SUBMISSION 03/01/2023

FAN COIL UNITS, EXHAUST FAN, & VARIABLE AIR VOLUME BOX (ROOM 410) POINTS SCHEDULE

											ALARMING			PRIMARY POINT INFORMATION			OVERRIDES		CONFIGURATION INFORMATION
FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARM CONDITION	ALARM PRIORITY	M&C ROUTING	SNVT NAME	SNVT TYPE	NIAGARA ID	SNVT NAME	SNVT TYPE	
PROOFS & SAFETIES	FCU-##-COMM	COMMUNICATION STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	VAV-4C-COMM	COMMUNICATION STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-SF-S	SUPPLY FAN STATUS	<___>	~	ON/OFF	BI	N/A	~	V	Y	FAN PROOF FAILED	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	EF-1-SF-S	EXHAUST FAN STATUS	<___>	~	ON/OFF	BI	N/A	~	V	Y	FAN PROOF FAILED	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-COND-HL	CONDENSATE HIGH LEVEL	<___>	~	ALM/NORMAL	BI	N/A	~	V	Y	CONDENSATE HIGH LEVEL ALARM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	SW -##	EMERGENCY AIR VENTILATION SHUTDOWN SWITCH STATUS	~	~	EMERGENCY/NORMAL	NET-IN	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
SCHEDULING	FCU-##-SYS-OCC	OCCUPANCY INPUT (FROM SYSTEM SCHEDULER)	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-SYS-OCC-C	OCCUPANCY COMMAND	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-EFF-OCC	EFFECTIVE OCCUPANCY	~	~	OCC/UNOCC	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	VAV-4C-SYS-OCC	OCCUPANCY INPUT (FROM SYSTEM SCHEDULER)	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	VAV-4C-EFF-OCC	EFFECTIVE OCCUPANCY	~	~	OCC/UNOCC	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
START/STOP	FCU-##-SF-SS	SUPPLY FAN START/STOP	<___>	~	ON/OFF	BO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	EF-1-SF-SS	EXHAUST FAN START/STOP	<___>	~	ON/OFF	BO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
TEMPERATURE & HUMIDITY CONTROL	FCU-##-UNIT-MODE	FCU UNIT MODE SETUP	~	~	HTG/CLG/OFF	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-TS-##	SPACE TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	SPACE TEMPERATURE IS MORE THAN 5 DEG F (ADJ.) ABOVE OR BELOW SET POINT DURING OCCUPIED OR UNOCCUPIED MODE	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-T-SP	OCCUPIED HEATING TEMPERATURE SET POINT	~	68 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-T-SP-UNOCC	UNOCCUPIED HEATING TEMPERATURE SET POINT	~	60 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-T-SP	OCCUPIED COOLING TEMPERATURE SET POINT	~	75 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-T-SP-UNOCC	UNOCCUPIED COOLING TEMPERATURE SET POINT	~	80 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-V-##-C	HEATING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	HEATING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-V-##-C	COOLING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	COOLING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HS-##	SPACE HUMIDITY	<___>	~	<0-___% RH>	AI	N/A	~	V	Y	SPACE HUMIDITY IS MORE THAN 5% RH (ADJ.) ABOVE SET POINT DURING OCCUPIED MODE	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HS-##-SP	SPACE HUMIDITY SET POINT	~	50% RH	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
OTHER POINTS	FCU-##-RA-FLT-P-HL	RETURN AIR FILTER PRESSURE HIGH LIMIT	<___>	~	ALM/NORMAL	BI	N/A	~	V	Y	ALM	INFO	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-DA-T	DISCHARGE AIR TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	VAV-4C-DA-T	DISCHARGE AIR TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
VAV																			
VAV BOX DAMPER CONTROL	VAV-4C-UNIT-MODE	VAV UNIT MODE SETUP	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	VAV-4C-SA-F	SUPPLY AIR FLOW	<___>	~	<0-__ CFM>	AI	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	VAV-4C-SA-F-SP	SUPPLY AIR FLOW SET POINT	~	SEE SCHEDULE	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	VAV-4C-D-C	DAMPER COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	VAV-4C-D-P	DAMPER POSITION	<___>	~	0-100%	AI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	VAV DAMPER PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	EA-D-##-2P	EXHAUST AIR DAMPER POSITION	<___>	~	OPEN/CLOSE	BI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>

POINTS SCHEDULE LEGEND

"<___>"	INDICATES ENTRY MADE BY BUILDING CONTRACTOR.	C	CONFIGURABLE	INFO	INFORMATIONAL ALARM	NET-OUT	NETWORK OUTPUT POINT	V	VIEWABLE
" ~ "	INDICATES NO ENTRY REQUIRED.	CRIT	CRITICAL ALARM	N/A	INDICATES NO VALID ENTRY AVAILABLE	O	OVERRIDABLE	VO	VIEWABLE AND OVERRIDABLE
"[___]"	INDICATES INFORMATION WILL BE PROVIDED AS PART OF INTEGRATION.	H	HARDWARE	NET-IN	NETWORK INPUT POINT	OC	OPERATOR CONFIGURABLE	Y	REQUIRED

US Army Corps of Engineers ®

DATE	DESCRIPTION	MARK

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
SIZE: ANSI D
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL POINTS SCHEDULE

SHEET ID

M-834

REVISED RTA SUBMISSION 03/01/2023

4-PIPE FAN COIL UNIT W/ CO2 SENSOR (ROOMS B135 & B213) POINTS SCHEDULE (TYPICAL OF 2)

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	FCU-##-COMM	COMMUNICATION STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-SF-S	SUPPLY FAN STATUS	<___>	~	ON/OFF	BI	N/A	~	V	Y	FAN PROOF FAILED	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-COND-HL	CONDENSATE HIGH LEVEL	<___>	~	ALM/NORMAL	BI	N/A	~	V	Y	CONDENSATE HIGH LEVEL ALARM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
SCHEDULING	FCU-##-SYS-OCC	OCCUPANCY INPUT (FROM SYSTEM SCHEDULER)	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-SYS-OCC-C	OCCUPANCY COMMAND	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-EFF-OCC	EFFECTIVE OCCUPANCY	~	~	OCC/UNOCC	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
START/STOP	FCU-##-SF-SS	SUPPLY FAN START/STOP	<___>	~	ON/OFF	BO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
TEMPERATURE & HUMIDITY CONTROL	FCU-##-UNIT-MODE	UNIT MODE SETUP	~	~	HTG/CLG/OFF	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-TS-##	SPACE TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	SPACE TEMPERATURE IS MORE THAN 5 DEG F (ADJ.) ABOVE OR BELOW SET POINT DURING OCCUPIED OR UNOCCUPIED MODE	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-T-SP	OCCUPIED HEATING TEMPERATURE SET POINT	~	68 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-T-SP-UNOCC	UNOCCUPIED HEATING TEMPERATURE SET POINT	~	60 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-T-SP	OCCUPIED COOLING TEMPERATURE SET POINT	~	75 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-T-SP-UNOCC	UNOCCUPIED COOLING TEMPERATURE SET POINT	~	80 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-V-##-C	HEATING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	HEATING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-V-##-C	COOLING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	COOLING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HS-##	SPACE HUMIDITY	<___>	~	<0-___% RH>	AI	N/A	~	V	Y	SPACE HUMIDITY IS MORE THAN 5% RH (ADJ.) ABOVE SET POINT DURING OCCUPIED MODE	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HS-##-SP	SPACE HUMIDITY SET POINT	~	50% RH	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
OTHER POINTS	FCU-##-RA-FLT-P-HL	RETURN AIR FILTER PRESSURE HIGH LIMIT	<___>	~	ALM/NORMAL	BI	N/A	~	V	Y	ALM	INFO	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-DA-T	DISCHARGE AIR TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CO2-##	SPACE CARBON DIOXIDE	<___>	~	<0-___ PPM>	AI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>

CHILLED BEAM (CB- 4,5,6,7,8) POINTS SCHEDULE (TYPICAL OF 5)

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	CB-##-COMM	COMMUNICATION STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CB-##-CDW-D	CONDENSATE WATER DETECTOR	<___>	~	ALM/NORMAL	BI	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
SCHEDULING	CB-##-SYS-OCC	OCCUPANCY INPUT (FROM SYSTEM SCHEDULER)	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CB-##-EFF-OCC	EFFECTIVE OCCUPANCY	~	~	OCC/UNOCC	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
TEMPERATURE & HUMIDITY CONTROL	CB-##-UNIT-MODE	UNIT MODE SETUP	~	~	HTG/CLG/OFF	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CB-##-TS-##	SPACE TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	SPACE TEMPERATURE IS MORE THAN 5 DEG F (ADJ.) ABOVE OR BELOW SET POINT DURING OCCUPIED OR UNOCCUPIED MODE	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CB-##-HTG-T-SP	OCCUPIED HEATING TEMPERATURE SET POINT	~	68 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CB-##-HTG-T-SP-UNOCC	UNOCCUPIED HEATING TEMPERATURE SET POINT	~	60 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CB-##-CLG-T-SP	OCCUPIED COOLING TEMPERATURE SET POINT	~	75 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CB-##-CLG-T-SP-UNOCC	UNOCCUPIED COOLING TEMPERATURE SET POINT	~	80 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CB-##-HS-##	SPACE HUMIDITY	<___>	~	<0-___% RH>	AI	N/A	~	V	Y	SPACE HUMIDITY IS MORE THAN 5% RH (ADJ.) ABOVE SET POINT DURING OCCUPIED MODE	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CB-##-HS-##-SP	SPACE HUMIDITY SET POINT	~	50% RH	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CB-##-DWPNT-T	SPACE DEW POINT TEMPERATURE (CALCULATED)	~	~	<0-___ DEG F>	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CB-##-DWPNT-T-SP	SPACE DEW POINT TEMPERATURE SET POINT	~	56 DEG F	~	NET-IN	N/A	OC	VO	Y		CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CB-##-HTG-V-##-C	HEATING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CB HEATING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CB-##-CLG-V-##-C	COOLING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CB COOLING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
COOLING COIL CONTROL (TYPICAL FOR 2)	CC-##-DA-T	COOLING COIL DISCHARGE AIR TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CC-##-DA-T-SP	COOLING COIL DISCHARGE AIR TEMP SET POINT	~	50 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CC-##-CLG-V-##-C	COOLING COIL VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	COOLING COIL VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>

POINTS SCHEDULE LEGEND

"<___>" INDICATES ENTRY MADE BY BUILDING CONTRACTOR.
" ~ " INDICATES NO ENTRY REQUIRED.
"[___]" INDICATES INFORMATION WILL BE PROVIDED AS PART OF INTEGRATION.

C CONFIGURABLE
CRIT CRITICAL ALARM
H HARDWARE
INFO INFORMATIONAL ALARM
N/A INDICATES NO VALID ENTRY AVAILABLE
NET-IN NETWORK INPUT POINT
NET-OUT NETWORK OUTPUT POINT
O OVERRIDABLE
OC OPERATOR CONFIGURABLE
V VIEWABLE
VO VIEWABLE AND OVERRIDABLE
Y REQUIRED

US Army Corps of Engineers ®

DATE | DESCRIPTION | MARK

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE A Joint Venture

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL POINTS SCHEDULE

SHEET ID
M-835

REVISED RTA SUBMISSION 03/01/2023

CASSETTE 4-PIPE FAN COIL UNIT (TYPICAL) POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	FCU-##-COMM	COMMUNICATION STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-SF-S	SUPPLY FAN STATUS	<___>	~	ON/OFF	BI	N/A	~	V	Y	FAN PROOF FAILED	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-COND-HL	CONDENSATE HIGH LEVEL	<___>	~	ALM/NORMAL	BI	N/A	~	V	Y	CONDENSATE HIGH LEVEL ALARM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
SCHEDULING	FCU-##-SYS-OCC	OCCUPANCY INPUT (FROM SYSTEM SCHEDULER)	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-SYS-OCC-C	OCCUPANCY COMMAND	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-EFF-OCC	EFFECTIVE OCCUPANCY	~	~	OCC/UNOCC	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
START/STOP	FCU-##-UNIT-MODE	UNIT MODE SETUP	~	~	HTG/CLG/OFF	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-SF-SS	SUPPLY FAN START/STOP	<___>	~	ON/OFF	BO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
TEMPERATURE & HUMIDITY CONTROL	FCU-##-TS-##	SPACE TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	SPACE TEMPERATURE IS MORE THAN 5 DEG F (ADJ.) ABOVE OR BELOW SET POINT DURING OCCUPIED OR UNOCCUPIED MODE	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-T-SP	OCCUPIED HEATING TEMPERATURE SET POINT	~	68 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-T-SP-UNOCC	UNOCCUPIED HEATING TEMPERATURE SET POINT	~	60 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-T-SP	OCCUPIED COOLING TEMPERATURE SET POINT	~	75 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-T-SP-UNOCC	UNOCCUPIED COOLING TEMPERATURE SET POINT	~	80 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-V-##-C	HEATING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	HEATING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-V-##-C	COOLING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	COOLING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HS-##	SPACE HUMIDITY	<___>	~	<0-___% RH>	AI	N/A	~	V	Y	SPACE HUMIDITY IS MORE THAN 5% RH (ADJ.) ABOVE SET POINT DURING OCCUPIED MODE	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HS-##-SP	SPACE HUMIDITY SET POINT	~	50% RH	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>

VAV BOX POINTS SCHEDULE (TYPICAL OF 3)

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	VAV-##-COMM	COMMUNICATION STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
SCHEDULING	VAV-##-SYS-OCC	OCCUPANCY INPUT (FROM SYSTEM SCHEDULER)	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	VAV-##-EFF-OCC	EFFECTIVE OCCUPANCY	~	~	OCC/UNOCC	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
DAMPER CONTROL	VAV-##-SA-F	SUPPLY AIR FLOW	<___>	~	<0-___ CFM>	AI	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	VAV-##-SA-F-SP	SUPPLY AIR FLOW SET POINT	~	SEE SCHEDULE	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	VAV-##-D-C	DAMPER COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	VAV-##-D-P	DAMPER POSITION	<___>	~	0-100%	AI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	VAV DAMPER PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
OTHER POINTS	VAV-##-DA-T	DISCHARGE AIR TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>

POINTS SCHEDULE LEGEND

"<___>"	INDICATES ENTRY MADE BY BUILDING CONTRACTOR.	C	CONFIGURABLE	INFO	INFORMATIONAL ALARM	NET-OUT	NETWORK OUTPUT POINT	V	VIEWABLE
" ~ "	INDICATES NO ENTRY REQUIRED.	CRIT	CRITICAL ALARM	N/A	INDICATES NO VALID ENTRY AVAILABLE	O	OVERRIDABLE	VO	VIEWABLE AND OVERRIDABLE
"[___]"	INDICATES INFORMATION WILL BE PROVIDED AS PART OF INTEGRATION.	H	HARDWARE	NET-IN	NETWORK INPUT POINT	OC	OPERATOR CONFIGURABLE	Y	REQUIRED

US Army Corps of Engineers ®

DESCRIPTION | DATE | MARK

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL POINTS SCHEDULE

SHEET ID

M-836

REVISED RTA SUBMISSION 03/01/2023

ZONE DAMPER W/ CO2 (TYPICAL) POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
SCHEDULING	VAV-##-SYS-OCC	OCCUPANCY INPUT (FROM SYSTEM SCHEDULER)	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	VAV-##-EFF-OCC	EFFECTIVE OCCUPANCY	~	~	OCC/UNOCC	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
ZONE CO2 CONTROL	ZN-CO2-##	ZONE CARBON DIOXIDE	~	700 PPM	<0-___ PPM>	AI	N/A	~	V	Y	ROOM CO2 LEVEL RISES 10% ABOVE ROOM CO2 SETPOINT DURING OCCUPIED MODE	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	ZN-CO2-##-SP	ZONE CARBON DIOXIDE SET POINT	~	SEE SCHEDULE	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	VAV-##-D-C	DAMPER COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	VAV-##-D-P	DAMPER POSITION	<___>	~	0-100%	AI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	VAV DAMPER PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>

CASSETTE 4-PIPE FCU W/ CO2 SENSOR (ROOMS 120, 208, 336) POINTS SCHEDULE (TYPICAL OF 3)

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	FCU-##-COMM	COMMUNICATION STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-SF-S	SUPPLY FAN STATUS	<___>	~	ON/OFF	BI	N/A	~	V	Y	FAN PROOF FAILED	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-COND-HL	CONDENSATE HIGH LEVEL	<___>	~	ALM/NORMAL	BI	N/A	~	V	Y	CONDENSATE HIGH LEVEL ALARM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
SCHEDULING	FCU-##-SYS-OCC	OCCUPANCY INPUT (FROM SYSTEM SCHEDULER)	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-SYS-OCC-C	OCCUPANCY COMMAND	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-EFF-OCC	EFFECTIVE OCCUPANCY	~	~	OCC/UNOCC	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
START/STOP	FCU-##-SF-SS	SUPPLY FAN START/STOP	<___>	~	ON/OFF	BO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
TEMPERATURE & HUMIDITY CONTROL	FCU-##-UNIT-MODE	UNIT MODE SETUP	~	~	HTG/CLG/OFF	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-TS-##	SPACE TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	SPACE TEMPERATURE IS MORE THAN 5 DEG F (ADJ.) ABOVE OR BELOW SET POINT DURING OCCUPIED OR UNOCCUPIED MODE	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-T-SP	OCCUPIED HEATING TEMPERATURE SET POINT	~	68 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-T-SP-UNOCC	UNOCCUPIED HEATING TEMPERATURE SET POINT	~	60 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-T-SP	OCCUPIED COOLING TEMPERATURE SET POINT	~	75 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-T-SP-UNOCC	UNOCCUPIED COOLING TEMPERATURE SET POINT	~	80 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-V-##-C	HEATING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	HEATING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-V-##-C	COOLING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	COOLING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HS-##	SPACE HUMIDITY	<___>	~	<0-___% RH>	AI	N/A	~	V	Y	SPACE HUMIDITY IS MORE THAN 5% RH (ADJ.) ABOVE SET POINT DURING OCCUPIED MODE	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HS-##-SP	SPACE HUMIDITY SET POINT	~	50% RH	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
OTHER POINTS	FCU-##-CO2-##	SPACE CARBON DIOXIDE	<___>	~	<0-___ PPM>	AI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>

POINTS SCHEDULE LEGEND

"<___>"	INDICATES ENTRY MADE BY BUILDING CONTRACTOR.	C	CONFIGURABLE	INFO	INFORMATIONAL ALARM	NET-OUT	NETWORK OUTPUT POINT	V	VIEWABLE
" ~ "	INDICATES NO ENTRY REQUIRED.	CRIT	CRITICAL ALARM	N/A	INDICATES NO VALID ENTRY AVAILABLE	O	OVERRIDABLE	VO	VIEWABLE AND OVERRIDABLE
"[___]"	INDICATES INFORMATION WILL BE PROVIDED AS PART OF INTEGRATION.	H	HARDWARE	NET-IN	NETWORK INPUT POINT	OC	OPERATOR CONFIGURABLE	Y	REQUIRED

US Army Corps of Engineers ®

DATE | DESCRIPTION | MARK

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE A Joint Venture

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL POINTS SCHEDULE

SHEET ID

M-837

REVISED RTA SUBMISSION 03/01/2023

2-PIPE FCU (HEATING ONLY) POINTS SCHEDULE (TYPICAL OF 4)

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	FCU-##-COMM	COMMUNICATION STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-SF-S	SUPPLY FAN STATUS	<___>	~	ON/OFF	BI	N/A	~	V	Y	FAN PROOF FAILED	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
START/STOP	FCU-##-SF-SS	SUPPLY FAN START/STOP	<___>	~	ON/OFF	BO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
TEMPERATURE CONTROL	FCU-##-UNIT-MODE	UNIT MODE SETUP	~	~	HTG//OFF	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-TS-##	SPACE TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	SPACE TEMPERATURE IS MORE THAN 5 DEG F (ADJ.) BELOW SET POINT	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-T-SP	SPACE TEMPERATURE SET POINT	~	68 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HW-V-##-C	HEATING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	HEATING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
OTHER POINTS	FCU-##-RA-FLT-P-HL	RETURN AIR FILTER PRESSURE HIGH LIMIT	<___>	~	CLEAN/DIRTY	BI	N/A	~	V	Y	ALM	INFO	[___]	<___>	<___>	<___>	<___>	<___>	<___>

CASSETTE 2-PIPE FCU (COOLING ONLY) POINTS SCHEDULE (TYPICAL OF 7)

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	FCU-##-COMM	COMMUNICATION STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-SF-S	SUPPLY FAN STATUS	<___>	~	ON/OFF	BI	N/A	~	V	Y	FAN PROOF FAILED	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-COND-HL	CONDENSATE HIGH LEVEL	<___>	~	ALM/NORMAL	BI	N/A	~	V	Y	CONDENSATE HIGH LEVEL ALARM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
START/STOP	FCU-##-SF-SS	SUPPLY FAN START/STOP	<___>	~	ON/OFF	BO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
TEMPERATURE CONTROL	FCU-##-UNIT-MODE	UNIT MODE SETUP	~	~	CLG/OFF	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-TS-##	SPACE TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	SPACE TEMPERATURE IS MORE THAN 5 DEG F (ADJ.) ABOVE SET POINT	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-T-SP	SPACE TEMPERATURE SET POINT	~	75 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-V-##-C	COOLING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	COOLING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>

POINTS SCHEDULE LEGEND

"<___>"	INDICATES ENTRY MADE BY BUILDING CONTRACTOR.	C	CONFIGURABLE	INFO	INFORMATIONAL ALARM	NET-OUT	NETWORK OUTPUT POINT	V	VIEWABLE
" ~ "	INDICATES NO ENTRY REQUIRED.	CRIT	CRITICAL ALARM	N/A	INDICATES NO VALID ENTRY AVAILABLE	O	OVERRIDABLE	VO	VIEWABLE AND OVERRIDABLE
"[___]"	INDICATES INFORMATION WILL BE PROVIDED AS PART OF INTEGRATION.	H	HARDWARE	NET-IN	NETWORK INPUT POINT	OC	OPERATOR CONFIGURABLE	Y	REQUIRED

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
SIZE: ANSI D
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL POINTS SCHEDULE

SHEET ID

M-838

REVISED RTA SUBMISSION 03/01/2023

4-PIPE & 2-PIPE FCUS (ROOMS 160 & 311) POINTS SCHEDULE (TYPICAL OF 2)

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	FCU-##-COMM	COMMUNICATION STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-SF-S (TYPICAL FOR 2)	SUPPLY FAN STATUS	<___>	~	ON/OFF	BI	N/A	~	V	Y	FAN PROOF FAILED	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-COND-HL (TYPICAL FOR 2)	CONDENSATE HIGH LEVEL	<___>	~	ALM/NORMAL	BI	N/A	~	V	Y	CONDENSATE HIGH LEVEL ALARM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
SCHEDULING	FCU-##-SYS-OCC	OCCUPANCY INPUT (FROM SYSTEM SCHEDULER)	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-SYS-OCC-C	OCCUPANCY COMMAND	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-EFF-OCC	EFFECTIVE OCCUPANCY	~	~	OCC/UNOCC	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
START/STOP	FCU-##-SF-SS (TYPICAL FOR 2)	SUPPLY FAN START/STOP	<___>	~	ON/OFF	BO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
TEMPERATURE & HUMIDITY CONTROL	FCU-##-UNIT-MODE	UNIT MODE SETUP	~	~	HTG/CLG/OFF	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-TS-##	SPACE TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	SPACE TEMPERATURE IS MORE THAN 5 DEG F (ADJ.) ABOVE OR BELOW SET POINT DURING OCCUPIED OR UNOCCUPIED MODE	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-T-SP	OCCUPIED HEATING TEMPERATURE SET POINT	~	68 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-T-SP-UNOCC	UNOCCUPIED HEATING TEMPERATURE SET POINT	~	60 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-T-SP	OCCUPIED COOLING TEMPERATURE SET POINT	~	75 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-T-SP-UNOCC	UNOCCUPIED COOLING TEMPERATURE SET POINT	~	80 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-V-##-C	HEATING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	HEATING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-V-##-C (TYPICAL FOR 2)	COOLING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	COOLING VALVE PID LOOP SETTINGS (TYPICAL FOR 2)	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HS-##	SPACE HUMIDITY	<___>	~	<0-___% RH>	AI	N/A	~	V	Y	SPACE HUMIDITY IS MORE THAN 5% RH (ADJ.) ABOVE SET POINT DURING OCCUPIED MODE	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HS-##-SP	SPACE HUMIDITY SET POINT	~	50% RH	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
OTHER POINTS	FCU-##-RA-FLT-P-HL (TYPICAL FOR 2)	RETURN AIR FILTER PRESSURE HIGH LIMIT	<___>	~	ALM/NORMAL	BI	N/A	~	V	Y	ALM	INFO	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-DA-T (TYPICAL FOR 2)	DISCHARGE AIR TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>

POINTS SCHEDULE LEGEND

"<___>"	INDICATES ENTRY MADE BY BUILDING CONTRACTOR.	C	CONFIGURABLE	INFO	INFORMATIONAL ALARM	NET-OUT	NETWORK OUTPUT POINT	V	VIEWABLE
" ~ "	INDICATES NO ENTRY REQUIRED.	CRIT	CRITICAL ALARM	N/A	INDICATES NO VALID ENTRY AVAILABLE	O	OVERRIDABLE	VO	VIEWABLE AND OVERRIDABLE
"[___]"	INDICATES INFORMATION WILL BE PROVIDED AS PART OF INTEGRATION.	H	HARDWARE	NET-IN	NETWORK INPUT POINT	OC	OPERATOR CONFIGURABLE	Y	REQUIRED

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
SIZE: ANSI D
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL POINTS SCHEDULE

SHEET ID

M-839

REVISED RTA SUBMISSION 03/01/2023

4-PIPE & 2-PIPE FCUS (WAITING AREA 102) POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING			PRIMARY POINT INFORMATION			OVERRIDES		CONFIGURATION INFORMATION
											ALARM CONDITION	ALARM PRIORITY	M&C ROUTING	SNVT NAME	SNVT TYPE	NIAGARA ID	SNVT NAME	SNVT TYPE	
PROOFS & SAFETIES	FCU-##-COMM	COMMUNICATION STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-SF-S (TYPICAL FOR 2)	SUPPLY FAN STATUS	<___>	~	ON/OFF	BI	N/A	~	V	Y	FAN PROOF FAILED	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-COND-HL	CONDENSATE HIGH LEVEL	<___>	~	ALM/NORMAL	BI	N/A	~	V	Y	CONDENSATE HIGH LEVEL ALARM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
SCHEDULING	FCU-##-SYS-OCC	OCCUPANCY INPUT (FROM SYSTEM SCHEDULER)	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-SYS-OCC-C	OCCUPANCY COMMAND	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-EFF-OCC	EFFECTIVE OCCUPANCY	~	~	OCC/UNOCC	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
START/STOP	FCU-##-SF-SS (TYPICAL FOR 2)	SUPPLY FAN START/STOP	<___>	~	ON/OFF	BO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
TEMPERATURE & HUMIDITY CONTROL	FCU-##-UNIT-MODE	UNIT MODE SETUP	~	~	HTG/CLG/OFF	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-TS-##	SPACE TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	SPACE TEMPERATURE IS MORE THAN 5 DEG F (ADJ.) ABOVE OR BELOW SET POINT DURING OCCUPIED OR UNOCCUPIED MODE	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-T-SP	OCCUPIED HEATING TEMPERATURE SET POINT	~	68 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-T-SP-UNOCC	UNOCCUPIED HEATING TEMPERATURE SET POINT	~	60 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-T-SP	OCCUPIED COOLING TEMPERATURE SET POINT	~	75 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-T-SP-UNOCC	UNOCCUPIED COOLING TEMPERATURE SET POINT	~	80 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HTG-V-##-C (TYPICAL FOR 2)	HEATING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	HEATING VALVE PID LOOP SETTINGS (TYPICAL FOR 2)	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-CLG-V-##-C	COOLING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	COOLING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HS-##	SPACE HUMIDITY	<___>	~	<0-___% RH>	AI	N/A	~	V	Y	SPACE HUMIDITY IS MORE THAN 5% RH (ADJ.) ABOVE SET POINT DURING OCCUPIED MODE	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-HS-##-SP	SPACE HUMIDITY SET POINT	~	50% RH	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
OTHER POINTS	FCU-##-RA-FLT-P-HL (TYPICAL FOR 2)	RETURN AIR FILTER PRESSURE HIGH LIMIT	<___>	~	ALM/NORMAL	BI	N/A	~	V	Y	ALM	INFO	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-##-DA-T (TYPICAL FOR 2)	DISCHARGE AIR TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>

POINTS SCHEDULE LEGEND

"<___>"	INDICATES ENTRY MADE BY BUILDING CONTRACTOR.	C	CONFIGURABLE	INFO	INFORMATIONAL ALARM	NET-OUT	NETWORK OUTPUT POINT	V	VIEWABLE
"~"	INDICATES NO ENTRY REQUIRED.	CRIT	CRITICAL ALARM	N/A	INDICATES NO VALID ENTRY AVAILABLE	O	OVERRIDABLE	VO	VIEWABLE AND OVERRIDABLE
"[___]"	INDICATES INFORMATION WILL BE PROVIDED AS PART OF INTEGRATION.	H	HARDWARE	NET-IN	NETWORK INPUT POINT	OC	OPERATOR CONFIGURABLE	Y	REQUIRED

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.:
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL POINTS SCHEDULE

SHEET ID

M-840

REVISED RTA SUBMISSION 03/01/2023

CRAH-1A & CRAH-1B POINTS SCHEDULE (TYPICAL OF 2)

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	CRAH-1#-COMM	COMMUNICATION STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-1#-SF-S	SUPPLY FAN STATUS	~	~	ON/OFF	NET-IN	N/A	~	V	Y	FAN PROOF FAILED	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-1#-COND-HL	CONDENSATE HIGH LEVEL	~	~	ALM/NORMAL	NET-IN	N/A	~	V	Y	CONDENSATE HIGH LEVEL ALARM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-1#-WD-A	WATER LEAK DETECTOR ALARM	~	~	ALM/NORMAL	NET-IN	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
START/STOP	CRAH-1#-SF-C	SUPPLY FAN COMMAND	~	~	ON/OFF	NET-IN	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
TEMPERATURE & HUMIDITY CONTROL	CRAH-1#-TS-##	RACK TEMPERATURE	~	~	<0-___ DEG F>	NET-OUT	N/A	~	V	Y	WHEN SYSTEM IS ENABLED FOR MORE THAN 15 MIN AND RACK TEMPERATURE IS MORE THAN 5 DEG F(ADJ) ABOVE SET POINT	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-1#-RA-T	RETURN AIR TEMPERATURE	~	~	<0-___ DEG F>	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-1#-SA-T	SUPPLY AIR TEMPERATURE	~	~	<0-___ DEG F>	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-1#-RA-H	RETURN AIR HUMIDITY	~	~	<0-___% RH>	NET-OUT	N/A	~	V	Y	WHEN SYSTEM IS ENABLED FOR MORE THAN 15 MIN AND RETURN HUMIDITY IS MORE THAN 5% RH (ADJ.) ABOVE SET POINT	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-1#-RA-H-##-SP	RETURN AIR HUMIDITY SET POINT	~	55% RH	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-1#-SA-T-SP	SUPPLY AIR TEMPERATURE SET POINT	~	___ DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-1#-T-SP	RACK TEMPERATURE SET POINT	~	___ DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-1#-EH-C	ELECTRIC HEAT COMMAND	~	~	0-100%	NET-IN	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-1#-CLG-V-##-C	COOLING VALVE ## COMMAND	~	~	0-100%	NET-IN	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
OTHER POINTS	CRAH-1#-RA-FLT-P-HL	RETURN AIR FILTER PRESSURE HIGH LIMIT	~	~	ALM/NORMAL	NET-OUT	N/A	~	V	Y	ALM	INFO	[___]	<___>	<___>	<___>	<___>	<___>	<___>

CRAH-XA & CRAH-XB POINTS SCHEDULE (TYPICAL OF 12)

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	CRAH-##-COMM	COMMUNICATION STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-##-RA-SMK	RETURN AIR SMOKE ALARM	~	~	ALM/NORMAL	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-##-SF-S	SUPPLY FAN STATUS	~	~	ON/OFF	NET-IN	N/A	~	V	Y	FAN PROOF FAILED	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-##-COND-HL	CONDENSATE HIGH LEVEL	~	~	ALM/NORMAL	NET-IN	N/A	~	V	Y	CONDENSATE HIGH LEVEL ALARM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-##-WD-A	WATER LEAK DETECTOR ALARM	~	~	ALM/NORMAL	NET-IN	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
START/STOP	CRAH-##-SF-C	SUPPLY FAN COMMAND	~	~	ON/OFF	NET-IN	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
TEMPERATURE & HUMIDITY CONTROL	CRAH-##-TS-##	SPACE TEMPERATURE	~	~	<0-___ DEG F>	NET-OUT	N/A	~	V	Y	WHEN SYSTEM IS ENABLED FOR MORE THAN 15 MIN AND SPACE TEMPERATURE IS MORE THAN 5 DEG F(ADJ) ABOVE SET POINT	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-##-RA-T	RETURN AIR TEMPERATURE	~	~	<0-___ DEG F>	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-##-SA-T	SUPPLY AIR TEMPERATURE	~	~	<0-___ DEG F>	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-##-RA-H	RETURN AIR HUMIDITY	~	~	<0-___% RH>	NET-OUT	N/A	~	V	Y		CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-##-HS-##	SPACE HUMIDITY	~	~	<0-___% RH>	NET-OUT	N/A	~	V	Y	WHEN SYSTEM IS ENABLED FOR MORE THAN 15 MIN AND SPACE HUMIDITY IS MORE THAN 5% RH (ADJ.) ABOVE SET POINT	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-##-HS-##-SP	SPACE HUMIDITY SET POINT	~	55% RH	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-##-CLG-T-SP	SPACE COOLING TEMPERATURE SET POINT	~	75 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-##-EH-C	ELECTRIC HEAT COMMAND	~	~	0-100%	NET-IN	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-##-CLG-V-##-C	COOLING VALVE ## COMMAND	~	~	0-100%	NET-IN	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
OTHER POINTS	CRAH-##-RA-FLT-P-HL	RETURN AIR FILTER PRESSURE HIGH LIMIT	~	~	ALM/NORMAL	NET-OUT	N/A	~	V	Y	ALM	INFO	[___]	<___>	<___>	<___>	<___>	<___>	<___>

CRAH-3, 4, 7 POINTS SCHEDULE (TYPICAL OF 3)

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	CRAH-#-COMM	COMMUNICATION STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-#-RA-SMK	RETURN AIR SMOKE ALARM	~	~	ALM/NORMAL	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-#-SF-S	SUPPLY FAN STATUS	~	~	ON/OFF	NET-IN	N/A	~	V	Y	FAN PROOF FAILED	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-#-COND-HL	CONDENSATE HIGH LEVEL	~	~	ALM/NORMAL	NET-IN	N/A	~	V	Y	CONDENSATE HIGH LEVEL ALARM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-#-WD-A	WATER LEAK DETECTOR ALARM	~	~	ALM/NORMAL	NET-IN	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
START/STOP	CRAH-#-SF-C	SUPPLY FAN COMMAND	~	~	ON/OFF	NET-IN	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
TEMPERATURE & HUMIDITY CONTROL	CRAH-#-TS-##	SPACE TEMPERATURE	~	~	<0-___ DEG F>	NET-OUT	N/A	~	V	Y	WHEN SYSTEM IS ENABLED FOR MORE THAN 15 MIN AND SPACE TEMPERATURE IS MORE THAN 5 DEG F(ADJ) ABOVE SET POINT	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-#-RA-T	RETURN AIR TEMPERATURE	~	~	<0-___ DEG F>	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-#-SA-T	SUPPLY AIR TEMPERATURE	~	~	<0-___ DEG F>	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-#-RA-H	RETURN AIR HUMIDITY	~	~	<0-___% RH>	NET-OUT	N/A	~	V	Y		CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-#-HS-##	SPACE HUMIDITY	~	~	<0-___% RH>	NET-OUT	N/A	~	V	Y	WHEN SYSTEM IS ENABLED FOR MORE THAN 15 MIN AND SPACE HUMIDITY IS MORE THAN 5% RH (ADJ.) ABOVE SET POINT	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-#-HS-##-SP	SPACE HUMIDITY SET POINT	~	55% RH	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-#-CLG-T-SP	SPACE COOLING TEMPERATURE SET POINT	~	75 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-#-EH-C	ELECTRIC HEAT COMMAND	~	~	0-100%	NET-IN	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CRAH-#-CLG-V-##-C	COOLING VALVE ## COMMAND	~	~	0-100%	NET-IN	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
OTHER POINTS	CRAH-#-RA-FLT-P-HL	RETURN AIR FILTER PRESSURE HIGH LIMIT	~	~	ALM/NORMAL	NET-OUT	N/A	~	V	Y	ALM	INFO	[___]	<___>	<___>	<___>	<___>	<___>	<___>

POINTS SCHEDULE LEGEND

"<___>"	INDICATES ENTRY MADE BY BUILDING CONTRACTOR.	C	CONFIGURABLE	INFO	INFORMATIONAL ALARM	NET-OUT	NETWORK OUTPUT POINT	V	VIEWABLE
" ~ "	INDICATES NO ENTRY REQUIRED.	CRIT	CRITICAL ALARM	N/A	INDICATES NO VALID ENTRY AVAILABLE	O	OVERRIDABLE	VO	VIEWABLE AND OVERRIDABLE
"[___]"	INDICATES INFORMATION WILL BE PROVIDED AS PART OF INTEGRATION.	H	HARDWARE	NET-IN	NETWORK INPUT POINT	OC	OPERATOR CONFIGURABLE	Y	REQUIRED

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE A Joint Venture

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL POINTS SCHEDULE

SHEET ID

M-841

REVISED RTA SUBMISSION 03/01/2023

CAV BOX (TYPICAL) POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	CAV-##-COMM	COMMUNICATION STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
SCHEDULING	CAV-##-SYS-OCC	OCCUPANCY INPUT (FROM SYSTEM SCHEDULER)	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CAV-##-EFF-OCC	EFFECTIVE OCCUPANCY	~	~	OCC/UNOCC	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
DAMPER CONTROL	CAV-##-SA-F	SUPPLY AIR FLOW	<___>	~	<0-___ CFM>	AI	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CAV-##-SA-F-SP	SUPPLY AIR FLOW SET POINT	~	SEE SCHEDULE	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CAV-##-D-C	DAMPER COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CAV-##-D-P	DAMPER POSITION	<___>	~	0-100%	AI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	VAV DAMPER PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
OTHER POINTS	CAV-##-DA-T	DISCHARGE AIR TEMPERATURE	<___>	~	<0-___ DEG F>	AI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>

EF-2A AND EF-2B POINTS SCHEDULE (TYPICAL OF 2)

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	EF-##-SF-S	EXHAUST FAN STATUS	<___>	~	ON/OFF	BI	N/A	~	V	Y	FAN PROOF FAILED	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	EF-##-D-##-2P	EXHAUST AIR DAMPER POSITION	<___>	~	OPEN/CLOSE	BI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	H2-ALM (4% LEL)	HYDROGEN LEVEL ALARM (4% LEL)	~	0- 100% LEL	ALM/NORMAL	BI	N/A	~	VO	Y	HYDROGEN LOW LEVEL ALARM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	H2-ALM (20% LEL)	HYDROGEN LEVEL ALARM (20% LEL)	~	0- 100% LEL	ALM/NORMAL	BI	N/A	~	VO	Y	HYDROGEN HIGH LEVEL ALARM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	H2 DET-FAULT	FAULT STATUS	<___>	~	ALM/NORMAL	BI	N/A	~	V	Y	FAULT STATUS ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
START/STOP	EF-##-SS	EXHAUST FAN START/STOP	<___>	~	ON/OFF	BO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>

EF-4 AND EF-5 POINTS SCHEDULE (TYPICAL OF 2)

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	EF-#-SF-S	EXHAUST FAN STATUS	<___>	~	ON/OFF	BI	N/A	~	V	Y	FAN PROOF FAILED	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	EF-#-D-##-2P	EXHAUST AIR DAMPER POSITION	<___>	~	OPEN/CLOSE	BI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
START/STOP	EF-#-SS	EXHAUST FAN START/STOP	<___>	~	ON/OFF	BO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>

SANITARY SEWAGE SUMP PUMP SYSTEM POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
ALARMS	HL-A	SANITARY SEWAGE SUMP PUMP HIGH LEVEL ALARM	<__>	~	ALM/NORMAL	BI	N/A	~	V	Y	HIGH LEVEL ALARM	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>
	LL-A	SANITARY SEWAGE SUMP PUMP LOW LEVEL ALARM	<__>	~	ALM/NORMAL	BI	N/A	~	V	Y	LOW LEVEL ALARM	CRIT	[___]	<__>	<__>	<__>	<__>	<__>	<__>

POINTS SCHEDULE LEGEND

"<__>"	INDICATES ENTRY MADE BY BUILDING CONTRACTOR.	C	CONFIGURABLE	INFO	INFORMATIONAL ALARM	NET-OUT	NETWORK OUTPUT POINT	V	VIEWABLE
" ~ "	INDICATES NO ENTRY REQUIRED.	CRIT	CRITICAL ALARM	N/A	INDICATES NO VALID ENTRY AVAILABLE	O	OVERRIDABLE	VO	VIEWABLE AND OVERRIDABLE
"[___]"	INDICATES INFORMATION WILL BE PROVIDED AS PART OF INTEGRATION.	H	HARDWARE	NET-IN	NETWORK INPUT POINT	OC	OPERATOR CONFIGURABLE	Y	REQUIRED

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI 'D'
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US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL POINTS SCHEDULE

SHEET ID

M-842

REVISED RTA SUBMISSION 03/01/2023

HOT WATER CONVECTOR (TYPICAL) POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	T-STAT-##-COMM	COMMUNICATION STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CONV-##-SF-S	FAN STATUS	<___>	~	ON/OFF	BI	N/A	~	V	Y	HOT WATER CONVECTOR HEATER FAN ALARM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
START/STOP	CONV-##-SF-SS	FAN START/STOP	<___>	~	ON/OFF	BO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
TEMPERATURE CONTROL	T-STAT-##	THERMOSTAT TEMPERATURE	<___>	~	<0-___ DEG F>	NET-OUT	N/A	~	V	Y	SPACE TEMPERATURE IS MORE THAN 5 DEG F (ADJ.) BELOW SET POINT	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	T-STAT-##-SP	THERMOSTAT TEMPERATURE SET POINT	~	60 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	CONV-##-HTG-V-##-C	HEATING VALVE ## COMMAND	<___>	~	OPEN/CLOSE	BO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>

HOT WATER UNIT HEATER (TYPICAL) POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	T-STAT-##-COMM	COMMUNICATION STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	UH-##-SF-S	FAN STATUS	<___>	~	ON/OFF	BI	N/A	~	V	Y	HOT WATER UNIT HEATER FAN ALARM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
START/STOP	UH-##-SF-SS	FAN START/STOP	<___>	~	ON/OFF	BO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
TEMPERATURE CONTROL	T-STAT-##	THERMOSTAT TEMPERATURE	<___>	~	<0-___ DEG F>	NET-OUT	N/A	~	V	Y	SPACE TEMPERATURE IS MORE THAN 5 DEG F (ADJ.) BELOW SET POINT	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	T-STAT-##-SP	THERMOSTAT TEMPERATURE SET POINT	~	60 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	UH-##-HTG-V-##-C	HEATING VALVE ## COMMAND	<___>	~	OPEN/CLOSE	BO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>

ELEVATOR MACHINE FCU POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	FCU-5-COMM	COMMUNICATION STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	ALM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-5-SF-S	SUPPLY FAN STATUS	<___>	~	ON/OFF	BI	N/A	~	V	Y	FAN PROOF FAILED	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-5-COND-HL	CONDENSATE HIGH LEVEL	<___>	~	ALM/NORMAL	BI	N/A	~	V	Y	CONDENSATE HIGH LEVEL ALARM	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
START/STOP	FCU-5-UNIT-MODE	UNIT MODE SETUP	~	~	HTG/CLG/OFF	NET-OUT	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-5-SF-SS	SUPPLY FAN START/STOP	<___>	~	ON/OFF	BO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
TEMPERATURE & HUMIDITY CONTROL	FCU-5-TS-##	SPACE TEMPERATURE	<___>	~	<___ DEG F>	AI	N/A	~	V	Y	SPACE TEMPERATURE IS MORE THAN 5 DEG F (ADJ.) ABOVE OR BELOW SET POINT	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-5-HTG-T-SP	HEATING TEMPERATURE SET POINT	~	60 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-5-CLG-T-SP	COOLING TEMPERATURE SET POINT	~	78 DEG F	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-5-HS-##	SPACE HUMIDITY	<___>	~	<___% RH>	AI	N/A	~	V	Y	SPACE HUMIDITY IS MORE THAN 5% RH (ADJ.) ABOVE OR BELOW SET POINT	CRIT	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-5-HS-##-SP	SPACE HUMIDITY SET POINT	~	60% RH	~	NET-IN	N/A	OC	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-5-HTG-V-##-C	HEATING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	HEATING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-5-CLG-V-##-C	COOLING VALVE ## COMMAND	<___>	~	0-100%	AO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	COOLING VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		INTEGRAL CONSTANT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		BIAS	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MAXIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
		MINIMUM OUTPUT	~	<___>	<___>	NET-IN	N/A	C	~	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
OA DAMPER CONTROL	OA-D-##-C	DAMPER COMMAND	<___>	~	OPEN/CLOSE	BO	N/A	~	VO	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	OA-D-##-2P	DAMPER POSITION	<___>	~	OPEN/CLOSE	BI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	OA-T	OUTSIDE AIR TEMPERATURE	<___>	~	<___ DEG F>	NET-IN	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
OTHER POINTS	FCU-5-RA-FLT-P-HL	RETURN AIR FILTER PRESSURE HIGH LIMIT	<___>	~	ALM/NORMAL	BI	N/A	~	V	Y	ALM	INFO	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	FCU-5-DA-T	DISCHARGE AIR TEMPERATURE	<___>	~	<___ DEG F>	AI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	OA-TS	OUTSIDE AIR TEMPERATURE	<___>	~	<___ DEG F>	AI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	OA-HS	OUTSIDE AIR HUMIDITY	<___>	~	<___% RH>	AI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>
	OA-CO2	OUTSIDE AIR CO2	<___>	~	<___ PPM>	AI	N/A	~	V	Y	~	~	[___]	<___>	<___>	<___>	<___>	<___>	<___>

POINTS SCHEDULE LEGEND

"<___>"	INDICATES ENTRY MADE BY BUILDING CONTRACTOR.	C	CONFIGURABLE	INFO	INFORMATIONAL ALARM	NET-OUT	NETWORK OUTPUT POINT	V	VIEWABLE
" ~ "	INDICATES NO ENTRY REQUIRED.	CRIT	CRITICAL ALARM	N/A	INDICATES NO VALID ENTRY AVAILABLE	O	OVERRIDABLE	VO	VIEWABLE AND OVERRIDABLE
"[___]"	INDICATES INFORMATION WILL BE PROVIDED AS PART OF INTEGRATION.	H	HARDWARE	NET-IN	NETWORK INPUT POINT	OC	OPERATOR CONFIGURABLE	Y	REQUIRED

US Army Corps of Engineers ®

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BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL POINTS SCHEDULE

SHEET ID

M-843

REVISED RTA SUBMISSION 03/01/2023

DOMESTIC WATER BOOSTER PUMP SYSTEM POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
PROOFS & SAFETIES	PMP-1-S	PUMP 1 STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	PUMP 1 ALARM	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PMP-2-S	PUMP 2 STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	PUMP 2 ALARM	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PMP-3-S	PUMP 3 STATUS	~	~	ON/OFF	NET-OUT	N/A	~	V	Y	PUMP 3 ALARM	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PMP-1-FLR	PUMP 1 FAILURE	~	~	FAILURE/NORM...	NET-OUT	N/A	~	V	Y	PUMP 1 FAILED	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PMP-2-FLR	PUMP 2 FAILURE	~	~	FAILURE/NORM...	NET-OUT	N/A	~	V	Y	PUMP 2 FAILED	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PMP-3-FLR	PUMP 3 FAILURE	~	~	FAILURE/NORM...	NET-OUT	N/A	~	V	Y	PUMP 3 FAILED	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PMP-1-VFD-FLR	PUMP 1 VFD FAILURE	~	~	FAILURE/NORM...	NET-OUT	N/A	~	V	Y	PUMP 1 VFD FAILED	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PMP-2-VFD-FLR	PUMP 2 VFD FAILURE	~...	~	FAILURE/NORM...	NET-OUT	N/A	~	V	Y	PUMP 2 VFD FAILED	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PMP-3-VFD-FLR	PUMP 2 VFD FAILURE	~	~	FAILURE/NORM...	NET-OUT	N/A	~	V	Y	PUMP 2 VFD FAILED	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	GEN-ALM	GENERAL ALARM	~	~	ALARM/NORMAL	NET-OUT	N/A	~	V	Y	GENERAL SYSTEM ALARM	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
START/STOP	SYS MODE	SYSTEM MODE	~	~	HAND/AUTO	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	SYS-SS	SYSTEM START/STOP	~	~	ON/OFF	NET-IN	N/A	~	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PMP-1-SS	PUMP 1 START/STOP	~	~	ON/OFF	NET-IN	N/A	~	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PMP-2-SS	PUMP 2 START/STOP	~	~	ON/OFF	NET-IN	N/A	~	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PMP-3-SS	PUMP 3 START/STOP	~	~	ON/OFF	NET-IN	N/A	~	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
BOOSTER PUMP CONTROL	SYS-P-SP	SYSTEM PRESSURE SETPOINT	~	12 PSI	~	NET-IN	N/A	OC	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	SYS-P	SYSTEM PRESSURE	~	~	<0-__PSI>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PMP-1-VFD-C	PUMP 1 VFD COMMAND	~	~	0% - 100%	NET-IN	N/A	~	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PUMP-1 PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PMP-2-VFD-C	PUMP 2 VFD COMMAND	~	~	0% - 100%	NET-IN	N/A	~	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PUMP-2 PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PMP-3-VFD-C	PUMP 3 VFD COMMAND	~	~	0% - 100%	NET-IN	N/A	~	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PUMP-3 PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		INTEGRAL CONSTANT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		BIAS	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		MAXIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
		MINIMUM OUTPUT	~	<__>	<__>	~	N/A	C	~	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
ADDITIONAL VFD NETWORK POINTS	LEAD-PMP-NUMBER	LEAD PUMP NUMBER	~	<__>	1 - 3	NET-IN	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PMP-SEQ-ALT	PUMP SEQUENCE ALTERNATION	~	<__>	YES/NO	NET-OUT	N/A	~	VO	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	SYS-PWR	SYSTEM POWER	~	<__>	<0-__KW>	NET-IN	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	SYS-RESET-REQ	SYSTEM RESET REQUIRED	~	<__>	YES/NO	NET-IN	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	SUC-P	SUCTION PRESSURE	~	<__>	<0-__PSI>	NET-IN	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PMP-1-VFD OUT-CURR	PUMP 1 VFD OUTPUT CURRENT	~	<__>	<0-__AMPS>	NET-IN	NA	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PMP-2-VFD OUT-CURR	PUMP 2 VFD OUTPUT CURRENT	~	<__>	<0-__AMPS>	NET-IN	NA	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PMP-3-VFD OUT-CURR	PUMP 3 VFD OUTPUT CURRENT	~	<__>	<0-__AMPS>	NET-IN	NA	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PMP-1-VFD OUT-PWR	PUMP 1 VFD OUTPUT POWER	~	<__>	<0-__KW>	NET-IN	NA	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PMP-2-VFD OUT-PWR	PUMP 2 VFD OUTPUT POWER	~	<__>	<0-__KW>	NET-IN	NA	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PMP-2-VFD OUT-PWR	PUMP 3 VFD OUTPUT POWER	~	<__>	<0-__KW>	NET-IN	NA	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>

MISCELLANEOUS POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
MISCELLANEOUS POINTS	SW	EMERGENCY AIR DISTRIBUTION SHUT OFF SWITCH (TYPICAL)	<__>	~	ALM/NORMAL	BI	N/A	~	V	Y	EMERGENCY SHUTDOWN ALARM	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	HTS-A	HEAT TRACE SYSTEM	<__>	~	ALM/NORMAL	BI	N/A	~	V	Y	HEAT TRACE ALARM	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	HOL-A	ELEVATOR SUMP PUMP HIGH OIL ALARM	<__>	~	ALM/NORMAL	BI	N/A	~	V	Y	HIGH OIL ALARM	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	HWL-A	ELEVATOR SUMP PUMP HIGH WATER ALARM	<__>	~	ALM/NORMAL	BI	N/A	~	V	Y	HIGH WATER ALARM	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	WM	WATER CONSUMPTION	<__>	~	<__GPM>	PULSE	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	WD-##	WATER LEAK DETECTOR (TYPICAL)	<__>	~	ALM/NORMAL	BI	N/A	~	V	Y	WATER ALARM	CRIT	[__]	<__>	<__>	<__>	<__>	<__>	<__>

ELECTRIC METER POINTS SCHEDULE (TYPICAL)

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	CONFIGURATION INFORMATION
ELECTRIC POWER METER	VOLT-#	VOLTAGE	~	~	<__VOLTS>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	AMP-#	CURRENT	~	~	<__AMPS>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PWR-DEMAND	DEMAND POWER	~	~	<__kW>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	KWH-TOT	TOTAL ENERGY	~	~	<__kWh>	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>
	PF-#	POWER FACTOR	~	~	~	NET-OUT	N/A	~	V	Y	~	~	[__]	<__>	<__>	<__>	<__>	<__>	<__>

POINTS SCHEDULE LEGEND

"<__>"	INDICATES ENTRY MADE BY BUILDING CONTRACTOR.	C	CONFIGURABLE	INFO	INFORMATIONAL ALARM	NET-OUT	NETWORK OUTPUT POINT
" ~ "	INDICATES NO ENTRY REQUIRED.	CRIT	CRITICAL ALARM	N/A	INDICATES NO VALID ENTRY AVAILABLE	O	OVERRIDABLE
"[___]"	INDICATES INFORMATION WILL BE PROVIDED AS PART OF INTEGRATION.	H	HARDWARE	NET-IN	NETWORK INPUT POINT	OC	OPERATOR CONFIGURABLE

V	VIEWABLE		
VO	VIEWABLE AND OVERRIDABLE		
Y	REQUIRED		

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
SIZE: ANSI D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

HVAC CONTROL POINTS SCHEDULE

SHEET ID

M-844

REVISED RTA SUBMISSION 03/01/2023

ALARM ROUTING GROUP SCHEDULE

ROUTING NAME	EMAIL TO	TEXT MESSAGE TO	POP-UP	PRINT TO...	NOTES
[ ]	[ ]	[ ]	[ ]	[ ]	1
[ ]	[ ]	[ ]	[ ]	[ ]	1
[ ]	[ ]	[ ]	[ ]	[ ]	1
[ ]	[ ]	[ ]	[ ]	[ ]	1
[ ]	[ ]	[ ]	[ ]	[ ]	1
[ ]	[ ]	[ ]	[ ]	[ ]	1
[ ]	[ ]	[ ]	[ ]	[ ]	1
[ ]	[ ]	[ ]	[ ]	[ ]	1
[ ]	[ ]	[ ]	[ ]	[ ]	1

NOTES:

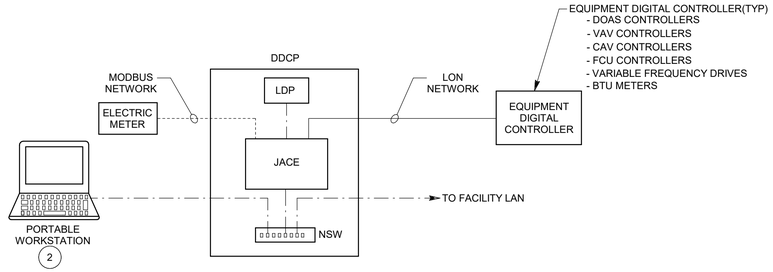
1. ALARM ROUTING GROUP INFORMATION MUST BE COMPLETED BY BUILDING CONTRACTOR WITH FACILITY PERSONNEL GUIDANCE.
2. ADD OR REMOVE ROWS AS DIRECTED BY USACE COR.

ALARM CONTACT SCHEDULE

PERSONS NAME	EMAIL ADDRESS	TEXT MESSAGE ADDRESS	DESCRIPTION	NOTES
[ ]	[ ]	[ ]	[ ]	1
[ ]	[ ]	[ ]	[ ]	1
[ ]	[ ]	[ ]	[ ]	1
[ ]	[ ]	[ ]	[ ]	1
[ ]	[ ]	[ ]	[ ]	1
[ ]	[ ]	[ ]	[ ]	1
[ ]	[ ]	[ ]	[ ]	1
[ ]	[ ]	[ ]	[ ]	1
[ ]	[ ]	[ ]	[ ]	1
[ ]	[ ]	[ ]	[ ]	1

NOTES:

1. ALARM CONTACT INFORMATION MUST BE COMPLETED BY BUILDING CONTRACTOR WITH FACILITY PERSONNEL GUIDANCE.
2. ADD OR REMOVE ROWS AS DIRECTED BY USACE COR.



C1 SYSTEM ARCHITECTURE DIAGRAM 1

NTS

UMCS EQUIPMENT SCHEDULE

REFERENCE	HARDWARE	HARDWARE PROVIDED BY	HARDWARE LOCATION (BLDG & RM)	NETWORK NAME	IP ADRESS	MEDIA SIZE OR MONITOR SIZE	LNS NETWORK CONFIGURATION TOOL	REFERENCE SHEET NO.	NOTES
[ ]	[ ]	[ ]	[ ]	< >	< >	[ ]	[ ]	< >	1, 2
[ ]	[ ]	[ ]	[ ]	< >	< >	[ ]	[ ]	< >	1, 2
[ ]	[ ]	[ ]	[ ]	< >	< >	[ ]	[ ]	< >	1, 2
[ ]	[ ]	[ ]	[ ]	< >	< >	[ ]	[ ]	< >	1, 2
[ ]	[ ]	[ ]	[ ]	< >	< >	[ ]	[ ]	< >	1, 2
[ ]	[ ]	[ ]	[ ]	< >	< >	[ ]	[ ]	< >	1, 2
[ ]	[ ]	[ ]	[ ]	< >	< >	[ ]	[ ]	< >	1, 2
[ ]	[ ]	[ ]	[ ]	< >	< >	[ ]	[ ]	< >	1, 2
[ ]	[ ]	[ ]	[ ]	< >	< >	[ ]	[ ]	< >	1, 2
[ ]	[ ]	[ ]	[ ]	< >	< >	[ ]	[ ]	< >	1, 2
[ ]	[ ]	[ ]	[ ]	< >	< >	[ ]	[ ]	< >	1, 2

NOTES:

1. UMCS EQUIPMENT SCHEDULE MUST BE COMPLETED BY BUILDING CONTRACTOR.
2 FACILITY PERSONNEL MUST PROVIDE NECESSARY INFORMATION TO BUILDING CONTRACTOR FOR COMPLETION.
3. ADD OR REMOVE ROWS AS DIRECTED BY USACE COR.

GENERAL NOTES

1. REFER TO SHEETS M-001 AND M-801 FOR LEGEND AND GENERAL NOTES.

KEYNOTES

1 THE INTENT OF THIS DIAGRAM IS TO DEFINE NETWORK COMMUNICATION. THIS DIAGRAM IS NOT INTENDED TO DEFINE ALL HARDWARE AND NETWORK REQUIREMENTS INDICATED IN SPECIFICATIONS.

2 PROVIDE PORTABLE WORKSTATION (LAPTOP) FOR DIRECT LOCAL CONNECTION TO THE BUILDING BAS. THE LAPTOP MUST BE STORED IN A SECURE LOCATION WITHIN THE BUILDING. COORDINATE LOCATION WITH THE GOVERNMENT.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

UMCS SCHEDULES

SHEET ID

M-845

REVISED RTA SUBMISSION 03/01/2023

THERMOSTAT AND OCCUPANCY SENSOR SCHEDULE (FAN COIL UNITS)

THERMOSTAT SCHEDULE									OCCUPANCY SCHEDULE			
									OCCUPIED		UNOCCUPIED	
SYSTEM SERVICE	TERMINAL UNIT IDENTIFIER	LOCATION	THERMOSTAT LOCATION	ZN-T	ZN-T-SP ADJUSTABLE	UNOCC OVERRIDE PUSHBUTTON	UNOCC OVERRIDE TIME (MINUTE)	OCC SENSOR	MON-FRI	WEEKEND/HOLIDAY	MON-FRI	WEEKEND/HOLIDAY
	FCU-A-1-413		142 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-111	111 INTERVIEW ROOM	111 INTERVIEW ROOM	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-112	112 INTERVIEW ROOM	112 INTERVIEW ROOM	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-113	113 INTERVIEW ROOM	113 INTERVIEW ROOM	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-120	120 BREAKROOM	120 BREAKROOM	X	~	~	~	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-131	131 OFFICE	131 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-132	132 OFFICE	132 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-133	133 OFFICE	133 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-134	134 OFFICE	134 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-135	135 OFFICE	135 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-141	141 OFFICE	141 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-142	142 OFFICE	142 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-205	205 STORAGE	205 STORAGE	X	~	~	~	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-208	208 BREAKROOM	208 BREAKROOM	X	~	~	~	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-211	211 OFFICE	211 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-212	212 OFFICE	212 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-213	213 OFFICE	213 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-214	214 OFFICE	214 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-215	215 OFFICE	215 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-216	216 OFFICE	216 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-218	218 EXECUTIVE OPEN OFFICE	218 EXECUTIVE OPEN OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-222	222 OFFICE	222 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-223	223 OFFICE	223 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-226	226 OFFICE	226 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-321	321 OFFICE	321 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-322	322 OFFICE	322 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-323	323 OFFICE	323 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-331	331 HUDDLE ROOM	331 HUDDLE ROOM	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-332	332 OFFICE	332 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-333	333 OFFICE	333 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-334	334 COPY/PRINT/MAILROOM	334 COPY/PRINT/MAILROOM	X	~	~	~	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-336	336 BREAKROOM	336 BREAKROOM	X	~	~	~	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B111	B111 OFFICE	B111 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B112	B112 OFFICE	B112 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B113	B113 OFFICE	B113 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B114	B114 OFFICE	B114 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B115	B115 OFFICE	B115 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B116	B116 OFFICE	B116 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B131	B131 OFFICE	B131 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B132	B132 OFFICE	B132 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B133	B133 OFFICE	B133 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B134	B134 OFFICE	B134 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B141	B141 OFFICE	B141 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B142	B142 OFFICE	B142 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B143	B143 OFFICE	B143 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B144	B144 OFFICE	B144 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B151	B151 OFFICE	B151 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B152	B152 OFFICE	B152 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B153	B153 OFFICE	B153 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B154	B154 AD LAW OPEN OFFICE	B154 AD LAW OPEN OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B155	B155 OFFICE	B155 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B221	B221 OFFICE	B221 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B222	B222 OFFICE	B222 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B223	B223 OFFICE	B223 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B224	B224 OFFICE	B224 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B225	B225 OFFICE	B225 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-1-B226	B226 OFFICE	B226 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-1	FCU-A-2-316	316 ELECTRICAL	316 ELECTRICAL	X	~	~	~	~	~	~	~	~
DOAS-2	FCU-A-1-174	174 OFFICE	174 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-2	FCU-A-1-234	234 MANAGER'S OFFICE	234 MANAGER'S OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-2	FCU-A-1-236	236 OFFICE	236 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-2	FCU-A-1-340	340 GREEN ROOM	340 GREEN ROOM	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-2	FCU-A-1-350	350 DIVISION CHIEF	350 DIVISION CHIEF	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-2	FCU-A-1-351	351 TEAM MEETING AREA	351 TEAM MEETING AREA	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-2	FCU-A-1-B157	B157 OFFICE	B157 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
DOAS-2	FCU-A-1-B158	B158 OFFICE	B158 OFFICE	X	X	X	60	~	0630-1800	[ ]	1800-0630	[ ]
~	FCU-A-2-181	181 ELECTRICAL CLOSET	181 ELECTRICAL CLOSET	X	~	~	~	~	~	~	~	~
~	FCU-A-2-241	241 ELECTRICAL CLOSET	241 ELECTRICAL CLOSET	X	~	~	~	~	~	~	~	~
~	FCU-A-2-361	361 ELECTRICAL CLOSET	361 ELECTRICAL CLOSET	X	~	~	~	~	~	~	~	~
~	FCU-A-2-421	421 ELECTRICAL CLOSET	421 ELECTRICAL CLOSET	X	~	~	~	~	~	~	~	~
~	FCU-A-2-B171	B171 ELECTRICAL CLOSET	B171 ELECTRICAL CLOSET	X	~	~	~	~	~	~	~	~
~	FCU-A-2-B235	B235 ELECTRICAL CLOSET	B235 ELECTRICAL CLOSET	X	~	~	~	~	~	~	~	~

THERMOSTAT AND OCCUPANCY SENSOR SCHEDULE (CHILLED BEAMS)

THERMOSTAT SCHEDULE									OCCUPANCY SCHEDULE			
									OCCUPIED		UNOCCUPIED	
SYSTEM SERVICE	TERMINAL UNIT IDENTIFIER	LOCATION	THERMOSTAT LOCATION	ZN-T	ZN-T-SP ADJUSTABLE	UNOCC OVERRIDE PUSHBUTTON	UNOCC OVERRIDE TIME (MINUTE)	OCC SENSOR	MON-FRI	WEEKEND/HOLIDAY	MON-FRI	WEEKEND/HOLIDAY
DOAS-1	CB-1, 2, 3	317 TELEVISION STUDIO	317 TELEVISION STUDIO	X	~	~	~	~	0745 - 1630	[ ]	1630 - 0745	[ ]
DOAS-2	CB-4	342 VIDEO EDITING SUITE	342 VIDEO EDITING SUITE	X	~	~	~	~	0745 - 1630	[ ]	1630 - 0745	[ ]
DOAS-2	CB-5	343 VIDEO EDITING SUITE	343 VIDEO EDITING SUITE	X	~	~	~	~	0745 - 1630	[ ]	1630 - 0745	[ ]
DOAS-2	CB-6	345 VIDEO EDITING SUITE	345 VIDEO EDITING SUITE	X	~	~	~	~	0745 - 1630	[ ]	1630 - 0745	[ ]
DOAS-2	CB-7	344 VIDEO EDITING SUITE	344 VIDEO EDITING SUITE	X	~	~	~	~	0745 - 1630	[ ]	1630 - 0745	[ ]
DOAS-2	CB-8	362 VIDEO EDITING SUITE	362 VIDEO EDITING SUITE	X	~	~	~	~	0745 - 1630	[ ]	1630 - 0745	[ ]

THERMOSTAT AND OCCUPANCY SENSOR SCHEDULE (HW CONVECTORS)

THERMOSTAT SCHEDULE									OCCUPANCY SCHEDULE			
									OCCUPIED		UNOCCUPIED	
SYSTEM SERVICE	TERMINAL UNIT IDENTIFIER	LOCATION	THERMOSTAT LOCATION	ZN-T	ZN-T-SP ADJUSTABLE	UNOCC OVERRIDE PUSHBUTTON	UNOCC OVERRIDE TIME (MINUTE)	OCC SENSOR	MON-FRI	WEEKEND/HOLIDAY	MON-FRI	WEEKEND/HOLIDAY
~	CVR-1	STAIR A - LEVEL B2	STAIR A - LEVEL B2	X	~	~	~	~	~	~	~	~
~	CVR-2	STAIR A - LEVEL B1	STAIR A - LEVEL B1	X	~	~	~	~	~	~	~	~
~	CVR-3	STAIR A - LEVEL 1	STAIR A - LEVEL 1	X	~	~	~	~	~	~	~	~
~	CVR-4	STAIR A - LEVEL 2	STAIR A - LEVEL 2	X	~	~	~	~	~	~	~	~
~	CVR-5	STAIR A - LEVEL 4	STAIR A - LEVEL 4	X	~	~	~	~	~	~	~	~
~	CVR-6	STAIR B - LEVEL B2	STAIR B - LEVEL B2	X	~	~	~	~	~	~	~	~
~	CVR-7	STAIR B - LEVEL B1	STAIR B - LEVEL B1	X	~	~	~	~	~	~	~	~
~	CVR-8	STAIR B - LEVEL 1	STAIR B - LEVEL 1	X	~	~	~	~	~	~	~	~
~	CVR-9	STAIR B - LEVEL 2	STAIR B - LEVEL 2	X	~	~	~	~	~	~	~	~
~	CVR-10	STAIR B - LEVEL 3	STAIR B - LEVEL 3	X	~	~	~	~	~	~	~	~
~	CVR-11	STAIR B - LEVEL 4	STAIR B - LEVEL 4	X	~	~	~	~	~	~	~	~

NOTES:

" ~ " INDICATES NO ENTRY REQUIRED.

" [ ] " INDICATES ENTRY MADE BY BUILDING CONTRACTOR.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-18-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

THERMOSTAT SCHEDULE

SHEET ID

M-846

REVISED RTA SUBMISSION 03/01/2023

THERMOSTAT AND OCCUPANCY SENSOR SCHEDULE (FAN COIL UNITS)

THERMOSTAT SCHEDULE									OCCUPANCY SCHEDULE			
									OCCUPIED		UNOCCUPIED	
SYSTEM SERVICE	TERMINAL UNIT IDENTIFIER	UNIT LOCATION	THERMOSTAT LOCATION	ZN-T	ZN-T-SP ADJUSTABLE	UNOCC OVERRIDE PUSHBUTTON	UNOCC OVERRIDE TIME (MINUTE)	OCC SENSOR	MON-FRI	WEEKEND/HOLIDAY	MON-FRI	WEEKEND/HOLIDAY
DOAS-1	FCU-C-2-B214	B214 STORAGE	B214 STORAGE	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
DOAS-1	FCU-C-3-150	150 VISITOR BRIEFING ROOM	150 VISITOR BRIEFING ROOM	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-1	FCU-C-3-B220	B220 CLIENT SERVICES OPEN OFFICE	B220 CLIENT SERVICES OPEN OFFICE	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-1	FCU-C-4-130	130 ADMISSIONS OPEN OFFICE	130 ADMISSIONS OPEN OFFICE	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-1	FCU-C-4-210	210 OUTREACH OPEN OFFICE	210 OUTREACH OPEN OFFICE	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-1	FCU-C-5-B130	B130 MIL JUSTICE OPEN OFFICE	B130 MIL JUSTICE OPEN OFFICE	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-1	FCU-C-5-B140	B140 OPEN OFFICE	B140 OPEN OFFICE	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-1	FCU-C-5-B213	B213 BREAKROOM	B213 BREAKROOM	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
DOAS-1	FCU-C-6-320	320 OUTREACH OPEN OFFICE	320 OUTREACH OPEN OFFICE	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-1	FCU-C-6-330	330 IT OPEN OFFICE	330 IT OPEN OFFICE	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-1	FCU-C-6-B135	B135 BREAKROOM	B135 BREAKROOM	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
DOAS-1	FCU-C-7-140	140 ADMISSIONS OPEN OFFICE	140 ADMISSIONS OPEN OFFICE	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-1	FCU-C-13-224	224 EXECUTIVE CONFERENCE ROOM	224 EXECUTIVE CONFERENCE ROOM	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-1	FCU-D-2-B211	B211 WOMEN'S RESTROOM	B211 WOMEN'S RESTROOM	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
DOAS-1	FCU-D-2-B212	B212 MEN'S RESTROOM	B212 MEN'S RESTROOM	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
DOAS-1	FCU-D-5-220	220 CONFERENCE ROOM	220 CONFERENCE ROOM	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-1	FCU-D-7-311	311 PCR	311 PCR	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-1	FCU-D-8-311	311 PCR	311 PCR	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-1	FCU-D-9-313	313 CCR	313 CCR	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-1	FCU-F-2-B201	B201 CENTRAL STAIR/ENTRANCE	B201 CENTRAL STAIR/ENTRANCE	X	~	~	~	~	~	~	~	~
DOAS-2	FCU-C-1-B159	B159 A/V STAFF & PHOTO EDITING SUITE	B159 A/V STAFF & PHOTO EDITING SUITE	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-C-3-230A	230 RETAIL STORE	230 RETAIL STORE	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-C-3-230B	230 RETAIL STORE	230 RETAIL STORE	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-C-5-235	235 RETAIL OPEN OFFICE	235 RETAIL OPEN OFFICE	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-C-6-172	172 OPEN OFFICE	172 OPEN OFFICE	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-C-6-B156	B156 A/V STAFF & PHOTO EDITING SUITE	B156 A/V STAFF & PHOTO EDITING SUITE	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-C-6-B238	B238 STORAGE	B238 STORAGE	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-C-9-412	412 EQUIPMENT LOAN	412 EQUIPMENT LOAN	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-C-9-B164	B164 STORAGE	B164 STORAGE	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-C-9-B165	B165 AV/EVENT STORAGE	B165 AV/EVENT STORAGE	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-C-12-410A	410 PRINTING/LAMINATING	410 PRINTING/LAMINATING	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-C-12-410B	410 PRINTING/LAMINATING	410 PRINTING/LAMINATING	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-C-14-160	160 CAFE	160 CAFE	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-D-1-B102	B174 MEN'S RESTROOM	B174 MEN'S RESTROOM	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-D-3-244	244 MEN'S RESTROOM	LEVEL 2 CENTRAL STAIR	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-D-3-364	364 MEN'S RESTROOM	LEVEL 3 CENTRAL STAIR	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-D-3-401	424 MEN'S RESTROOM	LEVEL 4 CENTRAL STAIR	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-D-4-184	184 MEN'S RESTROOM	LEVEL 1 CENTRAL STAIR	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-D-5-411	411 SHARED CONFERENCE ROOM	411 SHARED CONFERENCE ROOM	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-F-1-170A	170 RETAIL STORE	170 RETAIL STORE	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-F-1-170B	170 RETAIL STORE	170 RETAIL STORE	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-F-1-170C	170 RETAIL STORE	170 RETAIL STORE	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-G-1-183	183 WOMEN'S RESTROOM	183 WOMEN'S RESTROOM	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-G-1-184	184 MEN'S RESTROOM	184 MEN'S RESTROOM	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-G-1-243	NORTH RESTROOMS	NORTH RESTROOMS	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-G-1-244	244 MEN'S RESTROOM	244 MEN'S RESTROOM	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-G-1-363	NORTH RESTROOMS	NORTH RESTROOMS	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-G-1-364	364 MEN'S RESTROOM	364 MEN'S RESTROOM	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-G-1-423	NORTH RESTROOMS	NORTH RESTROOMS	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-G-1-424	424 MEN'S RESTROOM	424 MEN'S RESTROOM	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-G-1-B173	NORTH RESTROOMS	NORTH RESTROOMS	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-G-1-B174	174 MEN'S RESTROOM	B174 MEN'S RESTROOM	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
DOAS-2	FCU-H-1-341	341 PHOTO STUDIO	341 PHOTO STUDIO	X	X	X	60	~	0630-1800	[___]	1800-0630	[___]
MAU-1	FCU-E-2-B236	B236 STORAGE	B236 STORAGE	X	~	~	~	~	0630-1800	[___]	1800-0630	[___]
MAU-1	FCU-F-2-B301	B301 LOADING AREA	B301 LOADING AREA	X	~	~	~	~	~	~	~	~
~	FCU-D-5-R101	R101 ELEVATOR MACHINE ROOM	R101 ELEVATOR MACHINE ROOM	X	~	~	~	~	~	~	~	~
~	FCU-F-3-100A	100A CORRIDOR	100A CORRIDOR	X	~	~	~	~	~	~	~	~
~	FCU-F-3-B307	B307	B307	X	~	~	~	~	~	~	~	~

THERMOSTAT AND OCCUPANCY SENSOR SCHEDULE (HW UNIT HEATERS)

THERMOSTAT SCHEDULE									OCCUPANCY SCHEDULE			
									OCCUPIED		UNOCCUPIED	
SYSTEM SERVICE	TERMINAL UNIT IDENTIFIER	LOCATION	THERMOSTAT LOCATION	ZN-T	ZN-T-SP ADJUSTABLE	UNOCC OVERRIDE PUSHBUTTON	UNOCC OVERRIDE TIME (MINUTE)	OCC SENSOR	MON-FRI	WEEKEND/HOLIDAY	MON-FRI	WEEKEND/HOLIDAY
DOAS-1	UH-6	B106 FIRE PROTECTION	B106 FIRE PROTECTION	X	~	~	~	~	~	~	~	~
DOAS-2	UH-1	B233 MECHANICAL	B233 MECHANICAL	X	~	~	~	~	~	~	~	~
DOAS-2	UH-2	B231 CUSTODIAL	B231 CUSTODIAL	X	~	~	~	~	~	~	~	~
MAU-1	UH-3	B302 PRINTING/LAMINATING STORAGE	B302 PRINTING/LAMINATING STORAGE	X	~	~	~	~	~	~	~	~
MAU-1	UH-4	B304 AV/EVENT STORAGE	B304 AV/EVENT STORAGE	X	~	~	~	~	~	~	~	~
MAU-1	UH-7	XB301 MECHANICAL	XB301 MECHANICAL	X	~	~	~	~	~	~	~	~
MAU-1	UH-8	B301 LOADING AREA	B301 LOADING AREA	X	~	~	~	~	~	~	~	~
~	UH-5	ROOF ACCESS AREA	ROOF ACCESS AREA	X	~	~	~	~	~	~	~	~

NOTES:
" ~ " INDICATES NO ENTRY REQUIRED.
" [___] " INDICATES ENTRY MADE BY BUILDING CONTRACTOR.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

THERMOSTAT SCHEDULE

SHEET ID

M-847

REVISED RTA SUBMISSION 03/01/2023

CONTROL VALVE SCHEDULE

SYSTEM/EQUIPMENT SERVED	DESIGN PIPE (INCHES)	DESIGN FLOW		MAXIMUM PRESSURE DROP (PSI)	SERVICE	CONFIGURATION	ACTION
		LB/HR	GPM				
HX-1	3	686	~	8	1/3 STEAM	2-WAY	MODULATING
HX-1	4	1374	~	8	2/3 STEAM	2-WAY	MODULATING
HX-1	3	~	200	1	HOT WATER	2-WAY	2-POSITION
HX-2	3	686	~	8	1/3 STEAM	2-WAY	MODULATING
HX-2	4	1374	~	8	2/3 STEAM	2-WAY	MODULATING
HX-2	3	~	200	1	HOT WATER	2-WAY	2-POSITION
HOT WATER SYSTEM BYPASS VALVE	2	~	60	6	HOT WATER	2-WAY	MODULATING
CHILLED WATER SYSTEM BYPASS VALVE	2 1/2	~	80	6	CHILLED WATER	2-WAY	MODULATING
CHILLED WATER RETURN VALVE	6	~	380	6	CHILLED WATER	2-WAY	MODULATING
CHILLED BEAM CHILLED WATER SYSTEM 1	1	~	12	4	CHILLED WATER	2-WAY	MODULATING
CHILLED BEAM CHILLED WATER SYSTEM 2	1	~	12	4	CHILLED WATER	2-WAY	MODULATING
CHILLED BEAM HEATING HOT WATER SYSTEM	1	~	12	4	HOT WATER	2-WAY	MODULATING
DOAS-1	2	~	40.4	5	HOT WATER	2-WAY	MODULATING
DOAS-1	2 1/2	~	70	5	CHILLED WATER	2-WAY	MODULATING
DOAS-2	2	~	43.8	5	HOT WATER	2-WAY	MODULATING
DOAS-2	2 /12	~	67	5	CHILLED WATER	2-WAY	MODULATING
BCU-1	3/4	~	2.5	3	HOT WATER	2-WAY	MODULATING
BCU-1	1	~	8.3	4	CHILLED WATER	2-WAY	MODULATING
FCU-A-1	3/4	~	0.6	3	HOT WATER	2-WAY	MODULATING
FCU-A-1	3/4	~	1.2	3	CHILLED WATER	2-WAY	MODULATING
FCU-C-1	3/4	~	0.6	3	HOT WATER	2-WAY	MODULATING
FCU-C-1	3/4	~	2.7	3	CHILLED WATER	2-WAY	MODULATING
FCU-C-2	3/4	~	4.5	3	HOT WATER	2-WAY	MODULATING
FCU-C-2	3/4	~	1.6	3	CHILLED WATER	2-WAY	MODULATING
FCU-C-3	3/4	~	2.2	3	HOT WATER	2-WAY	MODULATING
FCU-C-3	3/4	~	3.1	3	CHILLED WATER	2-WAY	MODULATING
FCU-C-4	3/4	~	2.8	3	HOT WATER	2-WAY	MODULATING
FCU-C-4	3/4	~	4.1	3	CHILLED WATER	2-WAY	MODULATING
FCU-C-5	3/4	~	1.1	3	HOT WATER	2-WAY	MODULATING
FCU-C-5	3/4	~	1.6	3	CHILLED WATER	2-WAY	MODULATING
FCU-C-6	3/4	~	1.1	3	HOT WATER	2-WAY	MODULATING
FCU-C-6	3/4	~	2.9	3	CHILLED WATER	2-WAY	MODULATING
FCU-C-7	3/4	~	1.7	3	HOT WATER	2-WAY	MODULATING
FCU-C-7	3/4	~	2.9	3	CHILLED WATER	2-WAY	MODULATING
MAU-1	1	~	6.9	4	HOT WATER	2-WAY	MODULATING
MAU-1	1	~	10.4	4	CHILLED WATER	2-WAY	MODULATING
FCU-C-9	3/4	~	1.6	3	HOT WATER	2-WAY	MODULATING
FCU-C-9	3/4	~	1.9	3	CHILLED WATER	2-WAY	MODULATING
FCU-C-12	3/4	~	1.8	3	HOT WATER	2-WAY	MODULATING
FCU-C-12	3/4	~	3.4	3	CHILLED WATER	2-WAY	MODULATING
FCU-C-13	3/4	~	1.0	3	HOT WATER	2-WAY	MODULATING
FCU-C-13	3/4	~	2	3	CHILLED WATER	2-WAY	MODULATING
FCU-D-1	3/4	~	1	3	HOT WATER	2-WAY	MODULATING
FCU-D-1	3/4	~	1	3	CHILLED WATER	2-WAY	MODULATING
FCU-D-2	3/4	~	0.5	3	HOT WATER	2-WAY	MODULATING
FCU-D-2	3/4	~	0.5	3	CHILLED WATER	2-WAY	MODULATING
FCU-D-3	3/4	~	1.1	3	HOT WATER	2-WAY	MODULATING
FCU-D-3	3/4	~	2.9	3	CHILLED WATER	2-WAY	MODULATING
FCU-D-5	5/8	~	2.5	3	HOT WATER	2-WAY	MODULATING
FCU-D-5	5/8	~	5	3	CHILLED WATER	2-WAY	MODULATING
FCU-D-7	3/4	~	2.1	3	CHILLED WATER	2-WAY	MODULATING
FCU-D-7	3/4	~	1.3	3	HOT WATER	2-WAY	MODULATING
FCU-D-8	3/4	~	3.3	3	CHILLED WATER	2-WAY	MODULATING
FCU-D-9	3/4	~	1.5	3	HOT WATER	2-WAY	MODULATING
FCU-D-9	3/4	~	3.3	3	CHILLED WATER	2-WAY	MODULATING
FCU-E-1	3/4	~	1.5	3	HOT WATER	2-WAY	MODULATING
FCU-E-1	3/4	~	2.8	3	CHILLED WATER	2-WAY	MODULATING
FCU-E-2	3/4	~	0.7	3	HOT WATER	2-WAY	MODULATING
FCU-E-2	3/4	~	1.1	3	CHILLED WATER	2-WAY	MODULATING
FCU-F-1	3/4	~	1.1	3	HOT WATER	2-WAY	MODULATING
FCU-F-1	3/4	~	1.3	3	CHILLED WATER	2-WAY	MODULATING
FCU-G-1	3/4	~	0.5	3	HOT WATER	2-WAY	MODULATING
FCU-G-1	3/4	~	0.8	3	CHILLED WATER	2-WAY	MODULATING
FCU-H-1	3/4	~	3.2	3	HOT WATER	2-WAY	MODULATING
FCU-H-1	1	~	7.4	3	CHILLED WATER	2-WAY	MODULATING
FCU-A-2	3/4	~	2.3	3	CHILLED WATER	2-WAY	MODULATING
FCU-C-14	3/4	~	3.3	3	CHILLED WATER	2-WAY	MODULATING
CC-1	3/4	~	3.0	3	CHILLED WATER	2-WAY	MODULATING
CC-2	3/4	~	1.5	3	CHILLED WATER	2-WAY	MODULATING
CC-3	3/4	~	3.0	3	CHILLED WATER	2-WAY	MODULATING
FCU-D-5	3/4	~	1.0	3	HOT WATER	2-WAY	MODULATING
FCU-F-2	3/4	~	1.0	3	HOT WATER	2-WAY	MODULATING
FCU-F-3	3/4	~	1.3	3	HOT WATER	2-WAY	MODULATING
FCU-G-2	3/4	~	0.9	3	HOT WATER	2-WAY	MODULATING

" ~ " INDICATES NO ENTRY IS REQUIRED

CONTROL VALVE SCHEDULE

SYSTEM/EQUIPMENT SERVED	DESIGN PIPE (INCHES)	DESIGN FLOW		MAXIMUM PRESSURE DROP (PSI)	SERVICE	CONFIGURATION	ACTION
		LB/HR	GPM				
CB-4	3/4	~	0.5	3	HOT WATER	3-WAY	MODULATING
CB-4	3/4	~	2.5	3	CHILLED WATER	3-WAY	MODULATING
CB-5	1/2	~	0.5	3	HOT WATER	3-WAY	MODULATING
CB-5	1/2	~	2.5	3	CHILLED WATER	3-WAY	MODULATING
CB-6	1/2	~	0.5	3	HOT WATER	3-WAY	MODULATING
CB-6	1/2	~	2.5	3	CHILLED WATER	3-WAY	MODULATING
CB-7	1/2	~	0.5	3	HOT WATER	3-WAY	MODULATING
CB-7	1/2	~	2.5	3	CHILLED WATER	3-WAY	MODULATING
CB-8	3/4	~	1.5	3	HOT WATER	3-WAY	MODULATING
CB-8	3/4	~	2.5	3	CHILLED WATER	3-WAY	MODULATING
CB-1/2/3	1	~	7.5	3	CHILLED WATER	3-WAY	MODULATING
UH-1	3/4	~	2.70	3	HOT WATER	2-WAY	2-POSITION
UH-2	1 1/4	~	1.30	3	HOT WATER	2-WAY	2-POSITION
UH-3	3/4	~	1.30	3	HOT WATER	2-WAY	2-POSITION
UH-4	3/4	~	1.30	3	HOT WATER	2-WAY	2-POSITION
UH-5	3/4	~	2.70	3	HOT WATER	2-WAY	2-POSITION
UH-6	1	~	1.30	3	HOT WATER	2-WAY	2-POSITION
UH-7	3/4	~	1.30	3	HOT WATER	2-WAY	2-POSITION
UH-8	3/4	~	1.30	3	HOT WATER	2-WAY	2-POSITION
CVR-1	3/4	~	0.52	3	HOT WATER	2-WAY	2-POSITION
CVR-2	3/4	~	0.52	3	HOT WATER	2-WAY	2-POSITION
CVR-3	3/4	~	0.52	3	HOT WATER	2-WAY	2-POSITION
CVR-4	3/4	~	0.52	3	HOT WATER	2-WAY	2-POSITION
CVR-5	3/4	~	0.52	3	HOT WATER	2-WAY	2-POSITION
CVR-6	3/4	~	0.30	3	HOT WATER	2-WAY	2-POSITION
CVR-7	3/4	~	0.30	3	HOT WATER	2-WAY	2-POSITION
CVR-8	3/4	~	0.30	3	HOT WATER	2-WAY	2-POSITION
CVR-9	3/4	~	0.30	3	HOT WATER	2-WAY	2-POSITION
CVR-10	3/4	~	0.30	3	HOT WATER	2-WAY	2-POSITION
CVR-11	3/4	~	0.30	3	HOT WATER	2-WAY	2-POSITION

" ~ " INDICATES NO ENTRY IS REQUIRED

DAMPER SCHEDULE

SERVICE	DESCRIPTION	DESIGN DUCT SIZE		AIRSIDE		BLADE ACTION	FAIL POSITION	CONTROL ACTUATOR			NOTES
		WIDTH (INCHES)	HEIGHT (INCHES)	MIN (CFM)	MAX (CFM)			CONTROL SIGNAL	CONTROL VOLTAGE	POSITION FEEDBACK	
DOAS-1	OUTSIDE AIR DAMPER	30	60	---	5,400	OPPOSED	CLOSE	2-POSITION	120 VAC	YES	1
DOAS-1	EXHAUST AIR DAMPER	16	60	---	5,400	OPPOSED	CLOSE	2-POSITION	120 VAC	YES	1
DOAS-1	RETURN AIR FIRE/SMOKE DAMPER	20	20	---	5,400	PARALLEL	CLOSE	2-POSITION	120 VAC	YES	
DOAS-1	SUPPLY AIR FIRE/SMOKE DAMPER	32	14	---	5,400	PARALLEL	CLOSE	2-POSITION	120 VAC	YES	
DOAS-2	OUTSIDE AIR DAMPER	78	40	---	5,900	OPPOSED	CLOSE	2-POSITION	120 VAC	YES	1
DOAS-2	EXHAUST AIR DAMPER	24	18	---	5,900	OPPOSED	CLOSE	2-POSITION	120 VAC	YES	1
DOAS-2	RETURN AIR FIRE/SMOKE DAMPER	60	36	---	5,900	PARALLEL	CLOSE	2-POSITION	120 VAC	YES	
DOAS-2	SUPPLY AIR FIRE/SMOKE DAMPER	34	18	---	5,900	PARALLEL	CLOSE	2-POSITION	120 VAC	YES	
MAU-1	OUTSIDE AIR DAMPER	16	40	---	865	PARALLEL	CLOSE	2-POSITION	120 VAC	YES	
EF-1	EXHAUST AIR DAMPER	10	10	---	450	PARALLEL	CLOSE	2-POSITION	120 VAC	YES	2
EF-2A	EXHAUST AIR DAMPER	10	10	---	400	PARALLEL	CLOSE	2-POSITION	120 VAC	YES	2
EF-2B	EXHAUST AIR DAMPER	10	10	---	400	PARALLEL	CLOSE	2-POSITION	120 VAC	YES	2
EF-4	EXHAUST AIR DAMPER	10	10	---	160	PARALLEL	CLOSE	2-POSITION	120 VAC	YES	2
EF-5	EXHAUST AIR DAMPER	8	8	---	165	PARALLEL	CLOSE	2-POSITION	120 VAC	YES	2
B120 COLLABORATIVE SPACE	OUTSIDE AIR DAMPER	6	6	50	100	PARALLEL	CLOSE	MODULATING	24 VAC	YES	
L150 VISITOR BRIEFING ROOM	OUTSIDE AIR DAMPER	22	9	150	660	OPPOSED	CLOSE	MODULATING	24 VAC	YES	
L220 CONFERENCE ROOM	OUTSIDE AIR DAMPER	14	9	85	375	OPPOSED	CLOSE	MODULATING	24 VAC	YES	
L224 EXECUTIVE CONFERENCE ROOM	OUTSIDE AIR DAMPER	6	5	50	90	PARALLEL	CLOSE	MODULATING	24 VAC	YES	
L334 COPY/PRINT/MAILROOM	OUTSIDE AIR DAMPER	6	6	90	105	PARALLEL	CLOSE	MODULATING	24 VAC	YES	
L341 PHOTO STUDIO	OUTSIDE AIR DAMPER	8	6	65	125	PARALLEL	CLOSE	MODULATING	24 VAC	YES	
L411 SHARED CONFERENCE ROOM	OUTSIDE AIR DAMPER	10	10	95	375	OPPOSED	CLOSE	MODULATING	24 VAC	YES	
R101 ELEVATOR MACHINE ROOM	OUTSIDE AIR DAMPER	10.5	10.5	---	50	PARALLEL	CLOSE	2-POSITION	24 VAC	YES	

NOTES:

1. DAMPER PROVIDED WITH THE UNIT .
2. DAMPER PROVIDED WITH THE EXHAUST FAN.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: N. SLEEM
DRAWN BY: M. PAUN
CHECKED BY: D. GORDON
SUBMITTED BY:

US ARMY CORPS OF ENGINEERS
LINCOLN HALL
WEST POINT, NEW YORK

JACOBS / EWING COLE *A Joint Venture*

ISSUE DATE: 01 MARCH 2023
SOLICITATION NO.: W912DS-18-R-0014
CONTRACT NO.: W912DS-19-C-0031-L
FILE NUMBER:
SIZE: ANSI 'D'
FILE NAME:

BUILDINGS 605/607 RENOVATION - LINCOLN HALL

VALVE & DAMPER SCHEDULES

SHEET ID

M-848

REVISED RTA SUBMISSION 03/01/2023