Sequence of Operation for AHU-5 and AHU-6

System Description

The HVAC system consists of a packaged roof-top air handling unit (AHU), variable air volume (VAV) terminal units and fan powered variable air volume (FPVAV) units.

The AHUs consist of a variable air volume supply fan, variable air volume return fan, hot water heating coil with a three-way control valve, chilled water cooling coil with a three-way control valve, outdoor/return mixing dampers and relief dampers.

The VAV terminal unit will have a hot water reheat coil with a two-way control valve.

The FPVAV terminal unit will have a hot water reheat coil with a two-way control valve.

AHU Sequence

Occupied/Unoccupied Mode

The system shall switch from occupied to unoccupied mode based on a time of day schedule that resides in the DDC controller

Unoccupied Mode

In the unoccupied:

Supply and return fans shall be "OFF"
Relief and outdoor air damper "CLOSED"
Chilled water valve full bypass position
Hot water valve full flow position

Occupied Mode

The supply fan and return fan shall be "ON"

The outdoor air damper shall open to minimum position, field set by test and balance contractor to maintain minimum ventilation requirements.

The relief damper shall open to minimum position, field set by test and balance contractor to maintain slightly positive building pressure.

Supply Air Temperature Control

Chilled water and hot water valves shall sequence to maintain unit discharge air set point. Set point shall be 55°F (adj.) and reset based on critical zone reset control.

Economizer Control

When the outdoor air enthalpy is less than the return air enthalpy, the AHU shall operate in economizer mode. In economizer mode, the outdoor air and relief dampers shall sequence to maintain supply air temperature set point. Set point shall reset based on critical zone reset control.

Building Pressure Control

The return fan volume shall modulate to maintain slightly positive building pressure (0.05" w.c., adj.)

Critical Zone Reset Control

The critical zone is defined as any terminal unit with a primary air damper full open. For purposes of this control strategy, wide open is defined as 85 to 100% open). The critical zone used to implement the following strategy will change from multiple terminal units throughout the cooling and heating season. The Control system shall determine with terminal unit is the critical zone.

At design flow, the supply air temperature is at set point, duct static pressure at fan discharge is at set point, supply fan volume is 100%, terminal units are open to various positions and the critical zone terminal unit is wide open.

As the critical zone load decreases, the duct static pressure set point is reset to a slightly lower value. This should result in a slower fan speed and the critical zone primary air damper opening.

Further decrease in the critical zone load prompts a similar system response until the supply fan is operating a predetermined minimum flow (duct static set point). Any further decrease in the critical zone load will result in the primary air damper on the terminal unit closing. At this condition, the supply air temperature shall reset slightly higher. The slightly higher supply air temperature should result in the critical zone primary air damper opening.

Additional load decreases in the critical zone will result in the maximum supply air temperature set point (65°F), at this condition, the AHU is at its minimum operating condition with no further control system response.

When the critical zone load increases, the supply air temperature is reset slightly down, while duct static pressure set point is held constant.

Further increase in the critical zone load will result in the supply air temperature set point at design condition (55°F). If the critical zone load continues to increase, the duct static pressure set point shall reset up slightly.

Additional load increase will eventually result in the AHU operating at design airflow and at maximum duct static pressure set point.

Safeties, Alarms and Monitoring Points

Activation of the AHU freeze-stat shall de-energize all fans, close relief and exhaust dampers, and place both hot water and chilled water valves at full flow though coil.

Activation of the unit duct detector(s) shall de-energize all fans and close the relief and exhaust dampers.

Controls Contractor shall coordinate all alarms and monitoring points with Owner.

FPVAV Sequence

Occupied/Unoccupied Mode:

When the AHU in "ON" the FPVAV terminal unit shall operate in the occupied mode.

Unoccupied Mode

The primary air damper shall be closed and the two-way hot water valve shall be closed.

The FPVAV fan shall cycle "ON/OFF" at full coil water flow to maintain a reduced night temperature set point (65°F, adj.)

Occupied Mode

In cooling mode, the primary air damper shall sequence from minimum position (field set) to maximum position to maintain cooling temperature set point (76°F, adj.) The fan shall remain "OFF" in the cooling mode.

In the heating mode, the primary air damper shall be in minimum position, fan shall be "ON" and the two-way hot water control valve shall modulate to maintain heating temperature set point (72°F, adj.)

VAV Sequence

Occupied/Unoccupied Mode:

When the AHU in "ON" the VAV terminal unit shall operate in the occupied mode.

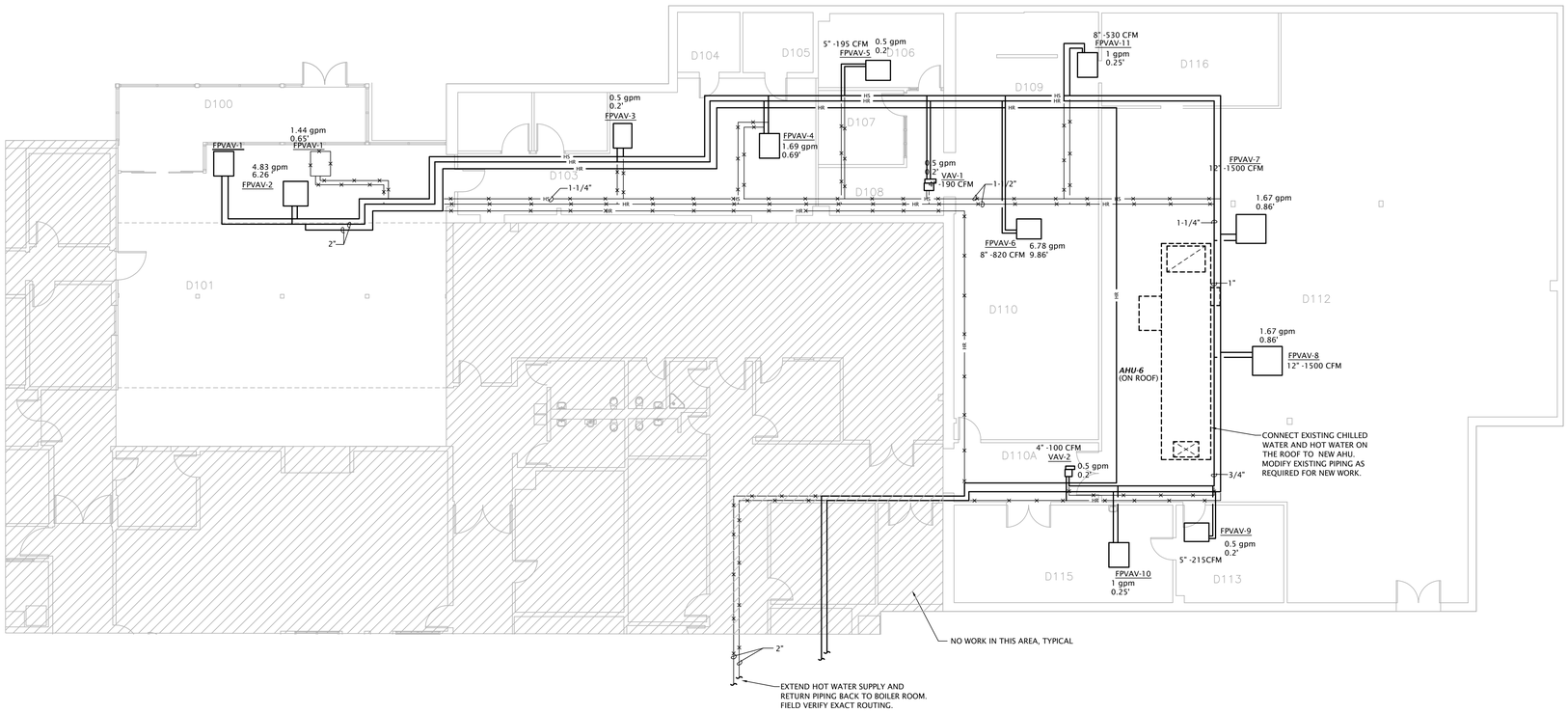
Unoccupied Mode

The primary air damper shall be closed and the two-way hot water valve shall be closed.

Occupied Mode

In cooling mode, the primary air damper shall sequence from minimum position (field set) to maximum position to maintain cooling temperature set point (76°F, adj.).

In the heating mode, the primary air damper shall be in minimum position and the two-way hot water control valve shall modulate to maintain heating temperature set point (72°F, adj.)

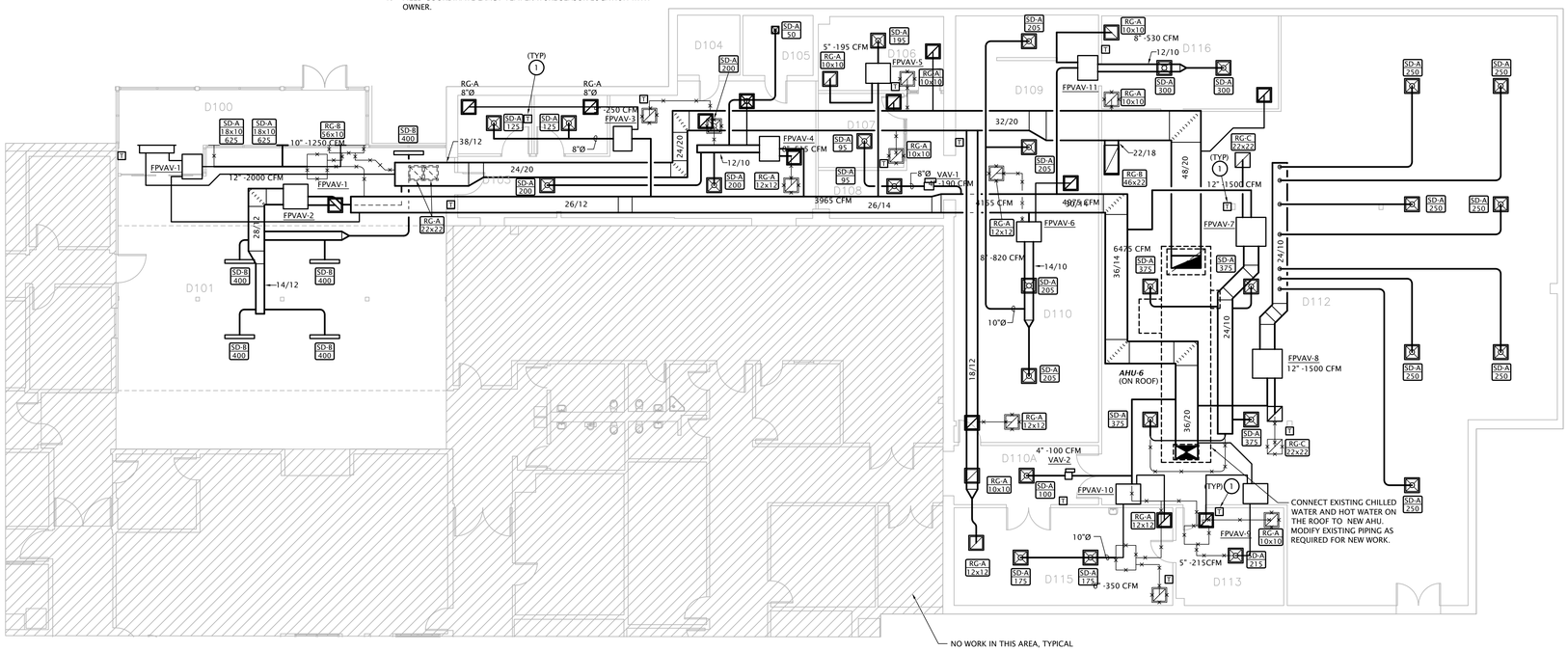


1 PARTIAL FIRST FLOOR HVAC PLAN

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

HVAC NOTES BY SYMBOL

1. FIELD COORDINATE EXACT TEMPERATURE SENSOR LOCATION WITH OWNER.



2 PARTIAL FIRST FLOOR HVAC PLAN

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

US Army Corps of Engineers
Little Rock District

MARK	DESCRIPTION	DATE	APPR.	MARK	DESCRIPTION	DATE	APPR.
	RECORD DRAWING AS-BUILT	01 AUG 2016					
	95% REVIEW	10 DEC 2015					

DATE: DECEMBER 2015
SOLICITATION NO.: W912ES-15-B-6005
CONTRACT NO.: W912ES-16-C-0002
FILE NUMBER:

DESIGNED BY: JPLS
DWN BY: LST
CKD BY: JPLS
SUBMITTED BY: Ziesion Architects, PA
PLOT SCALE: 1/8" = 1'-0"
PLOT DATE: 10 DEC 2015
FILE NAME: ASCE_E1

U.S. ARMY CORPS OF ENGINEERS
LITTLE ROCK DISTRICT

ZIESION

REPAIR OF BUILDING INFRASTRUCTURE SYSTEMS
19th MEDICAL GROUP
(WORKSPACE 1)
LITTLE ROCK AIR FORCE BASE, AR 72099-5057

PARTIAL 1ST FLOOR MECHANICAL PLAN

SHEET IDENTIFICATION
M-101
SHEET OF

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