

PROPOSED SEQUENCING

Below is the recommended sequencing of the major equipment systems that compose the contract documents. This sequencing was identified to minimize system outages during tie-ins and installation, as well as establishing locations for the new installations. These sequences should be incorporated into all project schedules.

1. VERTICAL RISERS:

- a. Connect new 6" HPS and 2 ½" Condensate Pump Discharge to existing mains in Basement Interstitial space and extend into new shaft and up to Mechanical Penthouse. Provide firestopping at penetrations where required.
- b. Connect new tee to existing mains in Basement Interstitial space and extend new 8" Chilled Water Supply and Return piping into new shaft and up to Mechanical Penthouse. Provide firestopping at penetrations where required.
- c. Install new 4" HWS & R in new shaft for perimeter heating hot water distribution from existing converters C-4A and C-4B in the Mechanical Penthouse to perimeter heating equipment on all floors. Provide ¾", 2" or 2 ½" branch piping with shut-off valves at each floor (See Riser Diagram) . Provide firestopping at penetrations where required.
- d. Connect new domestic cold water, hot water, and hot water return to existing mains in Basement Interstitial space and extend into new shaft and up to 6th Floor. Domestic cold water shall extend to the Mechanical Penthouse to serve existing plumbing fixtures and provide make-up water connections to mechanical systems. Provide new, accessible backflow preventer in the Mechanical Penthouse for isolation from non-potable water. Provide shut-off valves at each floor for future distribution. Provide firestopping at penetrations where required.

2. ELECTRIC SERVICE – NEW MCC:

- a. New Motor Control Center shall be installed prior to the demolition of the existing MCC to be removed
- b. Provide new circuit breakers sized to match existing motors to remain and provide new circuit breakers required for new motors
- c. Route new feeders for new and existing motors to remain from new MCC
- d. Disconnect feeders from existing motors to remain. Demo and remove existing MCC and all associated wiring, conduit, and buss work not being used

3. CHILLED WATER PUMPS:

- a. Install two (2) new base-mounted chilled water pumps on existing housekeeping pad adjacent to existing pumps.
- b. Extend and connect new primary chilled water supply and return piping from new risers to new pumps.

- c. Install new secondary CHWS&R piping toward new AC-20 with tee branches valved and capped for extension to new AC-20. Through-piping also valved and capped for future extension to new AC-19.
 - d. New 4" chilled water secondary piping shall be connected to existing AC-18-CD. Also temporarily connect new chilled water secondary piping to existing secondary piping to serve existing AC-19 and 20.
 - e. Demolish existing chilled water return piping between AC-18-CD and AC-19.
 - f. Demolish existing pumps and primary chilled water piping
 - g. Cut and cap existing risers at Mechanical Shaft No. 8 and in Basement Interstitial Space.
4. HEATING WATER PUMPS:
- a. Install two (2) new base-mounted hot water pumps on existing housekeeping pad adjacent to new chilled water pumps. New pumps shall be rated for 100% flow each and shall be controlled with alternating lead/lag, stand-by strategy.
 - b. Install new distribution piping toward new AC-20 with tee branches valved and capped for extension to new AC-20. Through-piping also valved and capped for future extension to new AC-19. 4" tees with valves shall be installed for temporary connection and service to existing AC-18-HD, AC-19, and AC-20. Through-piping of 4" tee shall be set up with valves and caps for future extension and permanent connection to existing AC-18-HD.
 - c. Connect new hot water supply and return from new pumps to existing converters C-3A and C-3B with shut-off valves installed for future connection to new converter C-3C.
 - d. Activate new pumps serving temporary and existing piping to existing AC-18-HD, AC-19, and AC-20.
 - e. Demolish hot water piping around existing heating water pumps P-11 and P-12.
5. PERIMETER HEATING EQUIPMENT:
- a. Relocate and re-assign existing heating water pumps P-11 and P-12 to perimeter heating system where pumps become P-13 and P-14 (one (1) pump operates at any time alternating lead/lag, the other is stand-by).
 - b. Install temporary connection of re-assigned pumps to existing perimeter heating water piping.
 - c. Existing Converters C-4A and C-4B in their current location shall continue to serve the perimeter heating loop.
 - d. Provide shut-off valves in piping for temporary perimeter heating hot water connection to new converter C-3C
 - e. Demolish existing perimeter heating pumps, suction and discharge piping
6. NEW CONVERTER C-3C:
- a. Install new steam-to-hot water converter C-3C parallel to existing converters C-3A and B and with service clearance all around.
 - b. New converter to be located where perimeter pumps discharge piping was previously
 - c. Connect temporary perimeter heating hot water piping to new converter C-3C
7. STEAM PRESSURE REDUCING STATIONS:
- a. Connect new 6" HPS and new 2" PC to new risers and extend to new PRV station No. 10

- b. Install new pressure reducing station PRV-10 in new location, including flash tank and condensate pump
 - c. Extend new 6" MPS to C3 converters. Provide 4" valved outlet for each converter (3-total)
 - d. Connect new 4" MPS to new converter C-3C and (2) 1" MPR from new converter to existing 3" MPR (Note: MPR connections to existing 3" main are temporary).
 - e. Demolish existing steam and condensate piping from existing converter C-3A
 - f. Connect new steam and condensate piping to existing converter C-3A
 - g. Demolish existing steam and condensate piping from existing converter C-3B
 - h. Connect new steam and condensate piping to existing converter C-3B
 - i. Demolish existing PRV station PRV-10A and B and all associated downstream medium pressure steam piping.
 - j. Existing PRV-9 and MPS piping serving existing Pre-Heat coils and unit heaters shall remain active until new PRV-9 station is activated
 - k. Connect new 4" HPS to new 6" main at new riser and extend to new PRV-9 location.
 - l. Install PRV station in old PRV-10 location , including traps, flash tank, relief valves, etc.
 - m. Extend new 6" MPS from new PVR-9 to existing 4" MPS riser in corner at columns 7-F and provide temporary connection to existing 4" riser. New 6" MPS shall have 3" outlets available for connection to perimeter heat converters C-4A and C-4B and new 1" connection to existing unit heater UH-10. Temporary connection shall support existing Pre-heat coils at AC units and existing unit heaters in south end of mechanical room.
 - n. Demolish original PRV station PRV-9
 - o. Cut and cap High Pressure Steam supply at Mechanical Shaft No. 8 and in Basement Interstitial Space.
8. RELOCATE EXISTING CONVERTERS C-4A AND C-4B:
- a. Demo and remove existing steam and condensate piping from existing converters
 - b. Relocate existing converters parallel to hot deck (C-3) converters
 - c. Connect new 3" MPS to new 6" MPS and extend to relocated C-4 converters
 - d. Connect new 1" MPR to relocated converters and extend to existing 3" MPR (temporary).
9. NEW CONDENSATE PUMPS AND RETURN:
- a. Install new main receiver and condensate pumps where converters C-4 were previously located
 - b. Extend condensate drainage from PRV-9 (2" MPR) and from all converters (3" MPR) to new condensate pump
 - c. Connect all condensate drainage from converters, steam mains and risers, etc. to new 3" MPR.
 - d. Extend new 2" pumped condensate to new mechanical shaft
 - e. Demolish existing 3" MPR at north end of MER from converters to Mechanical Shaft
 - f. Cut and cap condensate return piping at floor level at existing Mechanical Shaft No. 8
10. NEW PIPING CONNECTIONS:

- a. Extend and connect new 4" perimeter heating HWS&R mains from new risers to relocated pumps (P-13, 14) and convertors (C-4A, B). Demolish temporary perimeter heating piping connection to new converter C-3C.
- b. Connect new 4" HWS&R mains to pumps P-13, 14 and converters C-4A, B.
- c. Demolish old 4" HWS&R mains, Cut and cap 4" perimeter heating piping at Mechanical Shaft No. 8.
- d. Connect hot deck hot water supply and return piping to new converter C-3C
- e. Extend new stainless steel clean steam piping from Clean Steam Generator to AC-18-HD
- f. Replace existing black steel condensate drain with 316 stainless steel at H-18.

11. MAKE-UP WATER/BACKFLOW PREVENTER:

- a. Install new backflow preventer at new domestic water riser
- b. Extend and connect new non-potable water supply to fill connections for the hot deck and perimeter heating piping systems
- c. Back-feed potable water to existing hand sink and hose bibb

12. NEW ROOFTOP UNIT:

- a. Install new AC-20 rooftop unit on structural steel dunnage
- b. Extend new 4" CHWS&R and 4" HWS&R and 2" clean steam piping to new AC-20
- c. Extend and connect new hot deck, cold deck, and return air ductwork from new AC-20 to existing ductwork in Mechanical Penthouse

13. DEMOLISH EXISTING AC-20:

- a. Cut and cap existing 3" MPS and MPR serving existing AC-20 pre-heat coil and humidifier
- b. Cut and cap existing 4" CHS&R serving existing AC-20 Cold Deck
- c. Cut and cap existing 2 ½" HWS&R serving existing AC-20 Hot Deck
- d. Demo and remove existing air handler AC-20
- e. Demo and remove existing exhaust fan RF-19

14. New AC-19 & RF-18:

- a. Install new AC-19 at location previously occupied by the original AC-20.
- b. Extend and connect new 4" CHWS&R, 4" HWS&R, and 2" Clean Steam to new AC-19.
- c. Install new ceiling hung, inline, tubular centrifugal return fan RF-18 along with relief air duct, dampers, and return connection to AC-19.
- d. Connect new hot deck, cold deck, and return air ductwork from new AC-19 to existing ductwork.
- e. Demolish existing AC-19 and RF-18.

15. DEMOLITION OF TEMPORARY PIPING and FINAL PIPING:

- a. Demolish old, reverse return, secondary chilled water piping and any temporary chilled water piping used during the interim.
- b. Demolish temporary connection and old hot water mains serving AC-18, 19, and 20 hot decks.
- c. Extend and connect new 2 ½" HWS&R to existing piping serving AC-18-HD.

- d. Demolish temporary connection and old Medium Pressure Steam piping serving AC-19 and AC-20 Pre-heat Coils, unit heaters UH-11, 12, and 13, and unit heaters UH-1, and 2 (AC-18-HD Penthouse).
- e. Connect new 1" MPS to 6" MPS from PRV-9 and extend to all existing unit heaters to remain.

16. ELEVATOR MACHINE ROOM WALLS:

- a. Replace existing rooftop centrifugal exhaust fans EF-55 and EF-56 in kind. Interlock thermostatic control of new fans with new motor operated dampers at existing exterior penthouse walls.
- b. Architectural walls and ceiling to be installed
- c. Several new wall-mounted ductless split air conditioning indoor units and a common, roof mounted outdoor unit shall be installed for cooling the elevator machine room
- d. Timing of new machine room envelope installation has no impact on the installation of AC-20 and associated systems.

17. AIR COMPRESSORS:

- a. Existing air compressors to be replaced
- b. Timing of new compressor installation has no impact on the installation of AC-20 and associated systems.

18. INTERSTITIAL SPACES:

- a. Timing of new Interstitial HVAC installation has no impact on the installation of AC-20, AC-19, and associated systems.