Department of General Services

PROJECT ANNOUNCEMENT

Post Date: 09.08.2020

Submittal Deadline: 09.22.2020

Project Title: Middle TN MHI Mechanical Equipment Replacement

Facility Name: Middle Tenn MHI

City: Nashville County: Davidson

SBC Project No.:

Agency: DEPARTMENT OF MENTAL HEALTH & SUBSTANCE ABUSE SERVICES

Maximum Allowable Construction Cost (MACC): $3,861,000.00

Development Manager: Freeman, Doug

Agency Representative: Oziminski, Jay

Project Description:
Replacement of mechanical equipment, expansion of the building control system at the main hospital and forensic buildings, and all required related work.

Additional information about the project can be found in the project's program document included as a part of this announcement.

Special Design or Submission Requirements:
N/A

Note: All information previously made available to consultants, by the State, and all information supplied by consultants to the State, relating to the subject project, will be made available to any potential respondents. Potential respondents desiring to review these documents can submit a request to STREAMDesigner.Interest@TN.gov.

Anticipated SBC Approval Date: 10.08.2020

Anticipated ESC Designer Selection Date: 10.19.2020

Anticipated Designer NTP Date: 01.25.2021

Anticipated Project Bid Date: 11.30.2021

Middle Tennessee Mental Health Institute

Mechanical Systems Upgrade

SBC Project No. 529/000-08-2012-19
Pre-Planning #321706
Task Authorization #19-016-N

Prepared for

The State of Tennessee
Department of General Services
Real Estate Asset Management

Prepared By:

Smith Seckman Reid, Inc.

2995 Sidco Drive
Nashville, TN 37204
(615) 383-1113

SSR Project No. 1742045.0
Aug 18, 2017

Middle Tennessee Mental Health Institute

Mechanical System Upgrades

August 18, 2017

MECHANICAL

I. INTRODUCTION

A. The scope of this report is to provide the total scope and budget for a project consisting of the replacement of the existing 23 year old mechanical systems for only the Main Hospital building and Forensics building at the referenced campus.

B. The Middle TN Mental Health Institute, Clover Bottom Campus, is located at 221 Stewarts Ferry Pike in Nashville, TN. Mechanical equipment needing replacement consists of boilers, chillers, air handlers, and all items related to their replacement as deemed necessary.

C. Replacement of the Building Automation System (BAS) is also included in the scope.

II. EXISTING CONDITIONS

A. Hospital Building

1. The Hospital building HVAC system consists of (2) centrifugal chillers, (2) dual fuel water tube boilers, (2) cooling towers, (2) primary chilled water pumps, (2) condensate water pumps, (2) chilled water distribution pumps, (2) hot water pumps, (22) chilled and hot water coil air handling units with Variable Frequency Drive driven centrifugal fans, (22) relief fans, (22) passive outdoor-air supply gravity hoods, (22) passive relief gravity hoods, (100) exhaust fans, (403) VAV hot-water air-terminal units, (1) gas fired make-up air unit provides OA relief to the kitchen exhaust hood, (1) fan-coil unit, and (2) DX air handlers and associated air-cooled condensers serving as pool dehumidifiers for spaces where the original pool and whirlpool no longer exist.

B. Forensics Building

1. The Forensics building HVAC system consists of (2) air-cooled reciprocating type chillers, (2) dual-fuel flex water-tube type boilers, (2) base-mounted chilled water circulating pumps, (2) base-mounted hot water circulating pumps, (2) chilled and hot water coil air handling units with Variable Frequency Drive driven centrifugal fans, (2) relief fans, and (61) VAV hot-water air-terminal units.

C. Building Automation System (BAS)

1. Each building has its own Building Automation System (BAS) that monitors system performance and status with the front-end interface located in the maintenance area. It is the original Siemens BAS system and is 23 years old.

IV. RECOMMENDATIONS

A. Hospital Building

1. (100) Exhaust fans have been recently replaced and do not require replacement as stated by the director of maintenance.

2. (2) Cooling towers are not in the scope of this project.

3. (2) DX pool dehumidifiers are not currently used for dehumidification because the pool and whirlpool no longer exist. The units are not requested for replacement, per building maintenance staff.

4. (2) Centrifugal chillers are original to the building. Median service life is 23 years and are recommended for replacement.

5. (2) dual-fuel water-tube boilers are original to the building. Median service life is 24 years and are recommended for replacement.

6. (2) Primary chilled water pumps, (2) condensate water pumps, (2) chilled water distribution pumps and (2) hot water pumps are all base-mounted type and are original to the building. Median service life of base-mounted pumps is 20 years and are recommended for replacement.

7. (20) Air handling units with hot and chilled water coils and centrifugal fans, and (20) associated tube centrifugal relief fans are original to the building. Water leaks and corrosion is present on several units. Median service life of centrifugal fans is 25 years and median service life of water coils is 20 years. Air handling units and relief fans are recommended for replacement.

8. (403) VAV hot-water air terminal units are original to the building. Median service life of VAV air terminal units is 20 years. According to maintenance staff valve actuators have begun to fail and have been replaced on some units. The units are recommended for replacement.

9. (1) Gas fired make-up air unit is original to the building. Median service life of a single zone roof-top air conditioner unit is 15 years. It is recommended for replacement.

10. (1) Fan coil unit is original to the building. Median service life of centrifugal fans and DX coils are 20 years. It is recommended for replacement.

11. All median service life estimates are per ASHRAE 2015 Owning and Operating Costs.

B. Forensics Building

1. (1) of (2) Air cooled reciprocating package chiller is original to the building. Median service life of a reciprocating chiller is 20 years. It is recommended for replacement. The 2nd air cooled chiller was replaced about 3 years ago and is not recommended for replacement.

2. (2) Boilers, water-tube, dual fuel units are original to the building. Median service life of steel water-tube boilers is 24 years and are recommended for replacement.

3. (2) Chilled water circulating pumps and (2) hot water circulating pumps are original to the building. Median service life of base-mounted pumps is 20 years and are recommended for replacement.

4. (2) Air handling units with hot and chilled water coils and centrifugal fans, and (2) associated tube centrifugal relief fans are original to the building. Water leaks and corrosion is present. Median service life of centrifugal fans is 25 years and median service life of water coils is 20 years. Air handling units and relief fans are recommended for replacement.

5. (61) VAV hot-water air terminal units are original to the building. Median service life of VAV air terminal units is 20 years. According to maintenance staff valve actuators have begun to fail and have been replaced on some units. The units are recommended for replacement.

6. All median service life estimates are per ASHRAE 2015 Owning and Operating Costs.

C. Building Automation System (BAS)

1. Replace BAS in each building with controls for all new equipment including air handlers, chillers, VAV boxes, boilers, and pumps.

ELECTRICAL

I. INTRODUCTION

A. The purpose of this survey is to provide recommendations on the electrical equipment serving the HVAC equipment replacement, upgrades and estimated construction cost based on its current conditions. The goal is to assess determine the need and requirements for electrical equipment serving each boiler, chiller, air handler, pump, and other items related to their replacement as deemed necessary.

B. The Middle Tennessee Mental Health Institute located at 221 Stewarts Ferry Pike in Nashville, Tennessee is a campus originally constructed in 1994. The scope of this survey includes the Main Hospital Building and Forensics Building.

II. EXISTING CONDITIONS

A. Overall System Description:

1. The existing hospital and forensics building is served by underground utility company power which distributes throughout each building at 480/277 volt, 3 phase, 4 wire through the power company provided transformers. Hospital emergency power is served by one 750KW generator located in the hospital's emergency generator room of the CEP. The forensic building's emergency power is served by one 300KW generator located in the forensic building's emergency generator room of the CEP.

2. Each building is provided with an electrical distribution system serving lighting, power, HVAC equipment, fire alarm and low voltage systems. Most building's electrical distribution is Square D equipment located in each building's electrical equipment rooms.

3. All electrical equipment appears to be in good working order and properly sized for the building it serves. Installation appears to be code complaint with no noticeable excessive degradation of disconnects, panels or breakers. All wiring appears to be installed in conduit. The majority of the electrical equipment appears to be original to the building at approximately 24 years old and should provide reliable service for an additional 15 years. Average life expectancy is approximately 40-50 years when properly maintained.

4. All boiler, chiller, air handler, and pump disconnecting means is located adjacent to the equipment being served and is mostly fusible disconnects.

5. Existing VFDs and disconnects serving the mechanical equipment appear to be in good condition should provide reliable service for another 10 years or so.

III. RECOMMENDATIONS

A. General:

1. The electrical design shall be in accordance with the following general design criteria:
   a. Voltage drop calculations per demand load, not to exceed 2% on feeder conductors, 3% on branch circuit conductors and 5% overall.
   b. Branch circuit ratings not less than the non-continuous load plus 125% of the continuous load.
   c. All equipment specified shall be Underwriter's Laboratories (UL) labeled and listed when available.
   d. Motors less than ½ horsepower shall be connected to 120 volt, single phase service.
   e. Motors ½ horsepower and larger shall be connected to 480 volt, three phase service.
   f. Flexible conduit, minimum ½" trade size and 6' length shall be used for all motor connections.
   g. Intermediate metal conduit (IMC) with threaded couplings and fittings shall be used in slabs, in exterior walls, and for exposed surface applications to a height of 8 feet above finished floor.
   h. Electrical metallic tubing (EMT) with a set screw type couplings and fittings shall be used generally for concealed applications, interior partition walls and for exposed surface applications.
   i. Raceways penetrating exterior building walls shall have internal and external seals to resist moisture.
   j. Minimum size of raceways shall be ½" trade size for power systems and ½" trade size for control and auxiliary systems.
   k. Power and control wiring shall be single insulated conductors installed in raceway systems.
   l. Conductors shall be copper and sizes shall be stated in American Wire Gauge (AWG) notation.
   m. Minimum conductor size shall be No. 12 AWG for power and lighting circuits, No. 10 AWG for all neutrals, No. 14 AWG for mechanical systems control circuits, and No. 16 AWG for auxiliary systems or as recommended by system manufacturers.
   n. Conductor insulation shall be No 12 AWG for power and lighting circuits, No. 10 AWG for all neutrals, No. 14 AWG for mechanical systems control circuits, and No. 16 AWG for auxiliary systems or as recommended by system manufacturers.
   o. Conductor insulation shall be code grade type THHN/THWN, rated 90°C.
   p. Label all panelboards and provide new typed panel directions.

B. Main Hospital Building:

1. Existing centrifugal chillers (CH-1, CH-2) will be replaced with new units of like size and configuration. The existing conduit, wiring and disconnects are in good condition and will be reused. Contractor will disconnect and reconnect each unit's electrical connections. Provide new fuses in existing fused disconnects.

2. Existing air handling units (AH-1 through AH-22) and associated relief fans (RLF-1 through RLF-22) will be replaced with new units of like size and configuration. The existing conduit, wiring, disconnects, and VFD's are in good condition and will be reused. Contractor will disconnect and reconnect each unit's electrical connections. Provide new fuses in existing VFD's and fused disconnects.

3. Existing chilled water pumps (PCHP-1, PCHP-2) will be replaced with new units of like size and configuration. The existing VFD's are nearing the end of their life cycles and will be replaced. Conduit and wiring are in good condition and may be reused. Contractor will disconnect and reconnect each unit's electrical connection to the new VFD's.

4. Existing chilled water pumps (SCHP-1, SCHP-2) will be replaced with new units of like size and configuration. The existing disconnect serving both pumps is nearing the end of its life cycle and will be replaced. Provide new fuses in the existing VFD serving both pumps. Conduit and wiring are in good condition and may be reused. Contractor will disconnect and reconnect each unit's electrical connection.

5. Existing boilers and boiler pumps (B-1, B-2, HWP-1, HWP-2) will be replaced with new units of like size and configuration. The existing VFD's serving the pumps are nearing the end of their life cycles and will be replaced. Conduit and wiring for boilers, boiler controls, and pumps are in good condition and may be reused. Contractor will disconnect and reconnect each unit's electrical connection.

6. Existing condenser water pumps (CWP-1, CWP-2) will be replaced with new units of like size and configuration. The existing VFD's are nearing the end of their life cycles and will be replaced. Conduit and wiring are in good condition and may be reused. Contractor will disconnect and reconnect each unit's electrical connection to the new VFD's.

7. Existing gas fired make-up air unit on the roof will be replaced. It is anticipated that conduit and wiring are in good condition and may be reused. Contractor to verify. Provide new electrical disconnect and reconnect the unit's electrical connection.

8. Existing fan coil unit will be replaced. It is anticipated that conduit and wiring are in good condition and may be reused. Contractor to verify. Provide new electrical disconnect and reconnect the unit's electrical connection.

9. All existing VAV boxes will be replaced. Contractor will provide all new wiring and circuit with no more than 10 per circuit.

C. Forensics Building:

1. Existing boilers (B-30, B-31) will be replaced with new units of like size and configuration. Conduit and wiring for boilers and boiler controls are in good condition and may be reused. Contractor will disconnect and reconnect each unit's electrical connection.

2. Existing outdoor chiller (CH-1) will be replaced and will use a new VFD. Conduit and wiring from the existing disconnect and controls are in good condition and may be reused if applicable. Contractor will disconnect and reconnect the unit's electrical connection.

3. Existing pumps (CHP-30, CHP-31, HWP-30, HWP-31) will be replaced with new units of like size and configuration. The existing VFD's are nearing the end of their life cycles and will be replaced. The existing conduit and wiring are in good condition and will be reused. Contractor will disconnect and reconnect the unit's electrical connections.

4. Existing air handling units (AH-30, AH-31) and associated return fans (RLF-30, RLF-31) will be replaced with new units of like size and configuration. The existing conduit, wiring, disconnects, and VFD's are in good condition and will be reused. Contractor will disconnect and reconnect each unit's electrical connections. Provide new fuses in existing VFD's and fused disconnects.

5. All existing VAV boxes will be replaced. Contractor will provide all new wiring and circuit no more than 10 per circuit.

Estimated Construction Costs

Based on the above scope of work the estimated construction costs are shown below.

Date: 08-15-17
Title: Mechanical Cost Estimate - Preplanning
Project: Middle TN Mental Health Institute Mechanical System Upgrades
Location: Nashville, TN
SBC No.529/000-08-2012-19 Pre-Planning #321706 Task Authorization #19-013-N
SSR Project No. 1742045.0

Cost Item	Units		Unit Cost		Sub-Total
Demolition - Exis. Units			Lump	$	$ 180,000
Hospital Building					
Chiller, Centrifugal, 400T	2	unit	320,000	$/unit	$ 640,000
Boiler, Water-Tube, Dual Fuel, 5021 MBH	2	unit	150,000	$/unit	$ 300,000
Pump, base mounted, 15 HP	4	unit	21,890	$/unit	$ 87,560
Pump, base mounted, 20 HP	2	unit	24,310	$/unit	$ 48,620
Pump, base mounted, 25 HP	2	unit	27,170	$/unit	$ 54,340
Air Handling Unit, Package, VAV, 10,000 CFM	7	unit	120,000	$/unit	$ 840,000
Air Handling Unit, Package, VAV, 15,000 CFM	13	unit	180,000	$/unit	$ 2,340,000
Relief Fan, Centrifugal, 3 HP	1	unit	4,290	$/unit	$ 4,290
Relief Fan, Centrifugal, 5 HP	6	unit	5,170	$/unit	$ 31,020
Relief Fan, Centrifugal, 7.5 HP	13	unit	7,070	$/unit	$ 91,910
Air Terminal Unit, VAV, HW coil, 200 CFM	27	unit	1,078	$/unit	$ 29,106
Air Terminal Unit, VAV, HW coil, 400 CFM	126	unit	1,100	$/unit	$ 138,600
Air Terminal Unit, VAV, HW coil, 600 CFM	102	unit	1,100	$/unit	$ 112,200
Air Terminal Unit, VAV, HW coil, 800 CFM	62	unit	1,155	$/unit	$ 71,610
Air Terminal Unit, VAV, HW coil, 1000 CFM	50	unit	1,155	$/unit	$ 57,750
Air Terminal Unit, VAV, HW coil, 1250 CFM	17	unit	1,295	$/unit	$ 22,015
Air Terminal Unit, VAV, HW coil, 1500 CFM	9	unit	1,295	$/unit	$ 11,655
Air Terminal Unit, VAV, HW coil, 2000 CFM	10	unit	1,460	$/unit	$ 14,600
Gas Fired Make-up Air Unit, 400 MBH	1	unit	22,770	$/unit	$ 22,770
Fan Coil Unit	1	unit	8,470	$/unit	$ 8,470

Forensics Building					
Chiller, Reciprocating Type, Air Cooled 80T	1	unit	80,000	$/unit	$ 80,000
Boiler, Water-Tube, Dual Fuel, 960 MBH	2	unit	29,000	$/unit	$ 58,000
Pump, base mounted, 3 HP	2	unit	10,175	$/unit	$ 20,350
Pump, base mounted, 5 HP	2	unit	12,540	$/unit	$ 25,080
Air Handling Unit, Package, VAV, 20,000 CFM	1	unit	240,000	$/unit	$ 240,000
Air Handling Unit, Package, VAV, 15,000 CFM	1	unit	180,000	$/unit	$ 180,000
Relief Fan, Centrifugal, 10 HP	1	unit	9,480	$/unit	$ 9,480
Relief Fan, Centrifugal, 7.5 HP	1	unit	7,070	$/unit	$ 7,070
Air Terminal Unit, VAV, HW coil, 200 CFM	10	unit	1,078	$/unit	$ 10,780
Air Terminal Unit, VAV, HW coil, 400 CFM	18	unit	1,100	$/unit	$ 19,800
Air Terminal Unit, VAV, HW coil, 600 CFM	13	unit	1,100	$/unit	$ 14,300
Air Terminal Unit, VAV, HW coil, 800 CFM	9	unit	1,155	$/unit	$ 10,395
Air Terminal Unit, VAV, HW coil, 1000 CFM	5	unit	1,155	$/unit	$ 5,775
Air Terminal Unit, VAV, HW coil, 1250 CFM	3	unit	1,295	$/unit	$ 3,885
Air Terminal Unit, VAV, HW coil, 1500 CFM	2	unit	1,295	$/unit	$ 2,590
Air Terminal Unit, VAV, HW coil, 2000 CFM	1	unit	1,460	$/unit	$ 1,460
Building Automation System					
Install new BAS system, Hospital					$ 1,364,400
Includes demo of existing. Vendor pricing.					
Install new BAS system, Forensics					$ 290,000
Includes demo of existing. Vendor pricing.					
Misc.					
Roof work			Lump	$	$ 2,500
Pretest T&B			Lump	$	$ 3,000
Final T&B			Lump	$	$ 10,000
Electrical					
Hospital Building			Lump	$	$ 62,590
Forensics Building			Lump	$	$ 41,173
Sub-total					**$ 7,569,144**
Contractor OH&P			15	%	$ 1,135,372
Builder's Risk			0.55	%/yr	$ 41,630
Bond			1.5	%	$ 113,537
Contingency			15	%	$ 1,135,372
Total					**$ 9,995,055**

END OF ASSESSMENT