U S Embassy Amman -Jordan

Upgrade Air Handling Unit System for Storage Area STATEMENT OF WORK (SOW)



2016

Facilities Management

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DESCRIPTION OF WORK:

1. General:

- A. This is brief description of work to be performed at the site. Refer to the contract documents, codes and references for all work required to be done at the site.
- B. Project work scope entails supplying and replacing the existing Commercial (warehouse space)Air Handling Units (AHU) 8 and it is control devices with new energy efficient same or more capacity models.
- C. The work shall include all labor, materials, administration, tools, consumable materials, and equipment, insurance, supervision and incidental items essential for proper installation and operation, even though not specifically mentioned or indicated on the drawings but which are usually provided or are essential for proper installation and operation of all systems as indicated on the drawings and specified herein.

2. Scope Of work

The specifications and drawings describe the minimum requirements that must be met by the contractor for the installation of all work as shown on the drawings and as specified hereinafter:

Work shall consist of:

- A. Discount and removal of existing system components (AHU, temperature sensors, actuators, etc.)
- B. Provide and install new more efficient operation AHU's. The new system shall consist of: new temperature sensors, actuators, wiring, etc. to monitor and adjust all HVAC systems components.
- C. Re connect all devices, components and sensors
- D. Labelling all sensors and bus wiring at each end to identify what device and/or contact point is at the other end of the wire.
- E. Perform a comprehensive reprogramming of the new system.
- F. Test and commission for proper operation and hand over to the Contracting Officer Technical Representative (CTOR)
- G. All existing ductwork system, inclusive air outlets, shall be cleaned and sanitized
- H. Repairing any civil works resulting from the replacement.
- I. All metal and duct works necessary for the replacement.
- J. Discard of old AHU's as per local regulation.

3. Equipment Data

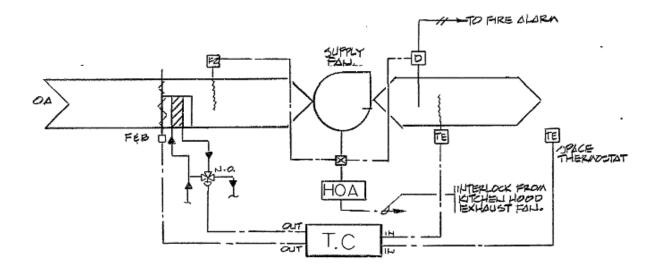
A. Building Automation System (BAS)data:

BACnet Protocol (network) – Niagara Graphic end user MNB 1000 and MNB300 controllers

B. AHU's data

			Sypply F	AN @38	Sypply FAN @380V-3Ø-50HZ	ZH0:		Return F	AN Data	Return FAN Data@380V-3Ø-50HZ	ZH05-Ø		ot Water	Preheat (Hot Water Preheat Coil @ 180 EWT/150 LTW	EWT/15(MTJ (
Unit				EXT. SP	EXT. SP Total SP				EXT. SP Total SP	Total SP					ΔD			ΔP			
NO.	Service	Location	CFM	IN H20	IN H20	внр/нр	RPM	CFM	IN H20	IN H20	3HP R	D MA	CFM IN H2O IN H2O BHP/HP RPM CFM IN H2O IN H2O BHP RPM CFM EAT LAT	T LAT		O MBH	GPM	FT.H20	IN.H2O MBH GPM FT.H2O AreaFT ² Rows	IA S	_
		warehouse											-								
AHU8	AHU8 Service annex storage	storage	9680	0.73	1.29	9680 0.73 1.29 4.2/7.5 607 9200 No Return FAN	607	9200	No Retur	n FAN			0896	65	90.5	0.2 146	5.9 14.	7 0.12	9680 65 90.5 0.2 146.9 14.7 0.12 14.8	1	8
			Chilled	WaterC	ooling Co	Chilled WaterCooling Coil @ 48 EWT/58 LTW	WT/58 L	N.													
				EATF		LATF		ΔP	Total Sens	Sens	V	d!					Minou	Min outside Air			
			CFM	DB WB		DB	WB	IN.H20	MBH	MBH	3PM F	T.H20	DB WB IN.H2O MBH MBH GPM FT.H2O Area FT ² Rows FPI	ws FPI		Filter Type	CFM		Model		
		warehouse																			
AHU8	AHU8 Service annex storage	storage	No cool	ing Coil	No cooling Coil Required	_									Low	Low Velocity		480	480 Carrier 39ED17	717	

4. Schematic Diagram:



SYSTEM PARAMETERS

- 1. Provide local hand/off/auto switch,
- Activation of associated kitchen hood exhaust fan shall energize supply air fan.
- 3. 3-Way HW valve and face and bypass dampers shall modifate in sequence to maintain discharge supply air temperature as reset from space thermostat. Below 40 F O.A. temperature, 3-way HW coil shall be fully opened and setpoint shall be maintained by modulation of face and bypass dampers.

5. Sequence of Operation

• AHU 8:

The system will start through week block SFSS, which starts the supply fan SFSS. When running the environmental conditions are maintained by LOOP block SATC controlling the supply air temperature SATP in line with the reset requirements of the room temperature RMTP. The temperature is maintained by controlling the heating valves HTCV and the fresh air/exhaust damper system CLDM . When the outside air temperature increase above the setting of TSTAT block OATP the damper system will be held at the minimum fresh air condition, this condition is also the lowest level of fresh air under normal control as determined by limit block SATC. During unoccupied times the system is started by TSTAT block RMSB if a low room temperature is reached.

Flow switches in the supply SFSW and return RFSW will generate alarms should they not match the normal state. Alarms are also generated by the freeze stat FZSW and smoke detection SKSW, alarm blocks being FZAL and SKAL respectively. In both of these cases the system will be stopped.

When the system is off the cooling valve, fresh air/exhaust dampers will be closed and the heating valve will be open.

6. **Submittals**

- A. Product Data: Include manufacturer's technical literature for each AHU's and control device. Indicate dimensions, capacities, performance characteristics, electrical characteristics, and finishes for materials, installation and startup instructions for each type of product.
- B. Include technical data for operator workstation equipment, interface equipment, control units, transducers/transmitters, sensors, actuators, valves, relays/switches, control panels, and operator interface equipment.
- C. Qualification Data: For Installer and Manufacturer.
- D. Field quality-control test reports.
- E. Guarantee (Warranty): The contractor shall submit a written one "1" year guarantee under normal use of the new AHU's by the Embassy. Included in the guarantee will be provision and agreement to correct all deficiencies and defects in at the contractor's expenses.
- F. Work Schedule
- G. Operation and Maintenance manuals (Data): For AHU's instrumentation and control system to include in emergency, operation, and maintenance manuals to include the "Operation and Maintenance Data," include the following:
 - o Maintenance instructions and lists of spare parts for each type of control device.
 - o Interconnection wiring diagrams (As-Built) with identified and numbered system components and devices.
 - Inspection period, cleaning methods, cleaning materials and calibration tolerances.
 - o Calibration records
 - o Written description of sequence of operation including schematic diagram
 - o Schematic diagrams for field sensors and control hardware.
 - Wiring diagrams for control units with termination numbers
 - Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

7. Quality Assurance

- A. Installer Qualifications: An experienced installer who is an authorized representative, a certified installer, and/or an approved installer of the system manufacturer for both installation and maintenance of units required for this Project.
- B. Manufacturer Qualifications: A firm experienced in manufacturing HVAC systems similar to those indicated for this Project and with a record of successful in-service performance.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

- D. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilation Systems."
- E. Control systems and components shall be designed and installed in accordance with ASHRAE/ANSI Standard 135-1995 (BacNet) or Lonworks protocol.
- F. Site Supervisor will ensure the material is not damaged prior to or during installation, and that standard industry practices as defined in the International Building Code are applied and followed at all times.
- G. A final inspection will be held with the Embassy, contractor and the Site Supervisor to inspect for quality of the finished works.

8. General Conditions:

- A. As there may be various conditions at the site, which are not clear in the Scope of Work, specifications, and drawings, it is important that each bidder verifies the work required. Each bidder must acquaint himself with the existing conditions and takes these conditions into consideration when preparing his bid. Lack of knowledge relative to the existing site conditions will not be allowed as basis for compensation. The contractor shall immediately report any discrepancies to the (COTR), and shall not begin the work until such matters are resolved.
- B. The contractor shall be responsible for damages to persons or property that occurs as a result of the contractor's fault or negligence. Contractor shall provide and maintain work environments and procedures, which will (1), safeguard the public and government personnel and property exposed to Contractor Operations and activities; and (2) avoid interruptions of government operations and delays in project completion date.
- C. For these purposes, the contractor shall:
 - Provide appropriate safety barricades and signs to identify hazardous conditions at the job site.
 - Comply with standards issued by any local government authority having jurisdiction over occupational health and safety issues.
 - Contractor shall maintain work site clean and remove any debris on regular basis.
- D. The contractor's bid for the entire work shall provide for supervision of any or all trades that is not intended to be performed with his own forces
- E. The contractor shall verify Quantities set out in the Bills of Quantities as being the quantities of the Works required to be executed by him in accordance with the contract Drawings and Specifications and these will <u>not</u> be subject to re measurement on completion

9. Codes, Standards and References

- A. All materials and workmanship shall comply with all applicable codes, specifications, local Jordanian ordnances, industry standards of latest editions
- B. The contractor performing the work must be familiar with industry standards applicable to that part of the work. The Contractor shall coordinate with the COTR all stages of the work, which shall be performed in accordance with the following Codes and standards:
 - 1. American National Standards Institute
 - 2. International Building Codes
 - 3. American National Electric Code
 - 4. Occupational Safety And Health Standards

10. Project Schedule and workers.

- A. Work days to be coordinated with Facilities Manager (FM)/Contracting Officer's Technical Representative (CTOR), work shall be performed during working hours, after working hours and during weekends.
- B. Contractor should submit proposed work schedule and project timeline for FM's/ COTR's approval.
- C. Work hours will be from 0800 to 1630, Saturday through Friday.
- D. The following must be approved prior to the contractor proceeding to the next phase.

11. Safety

- A. Site Supervisor will ensure that all equipment used during the project is in safe operating condition. All personnel on the job site will be given the appropriate safety equipment. The Embassy reserves the right to stop the work if any unsafe conditions are found.
- B. All electrical equipment such as drills, grinding, buffing machines and any extension cords must be properly grounded and be free from any defect in the insulation
- C. All ladders/scaffoldings will be in good condition and used in a proper manner.

12. SECURITY

- A. A list of all personnel working on the project along with Identification numbers must be submitted to the embassy no later than 5 working days prior to the beginning of actual starting date of the project.
- B. While on the Embassy property, all personnel must be escorted at all times. Any personnel found unescorted will be removed from the project immediately.
- C. Job site personnel will be issued a visitors badge by the Security staff, and this badge must be worn at all times.

13. COORDINATION

- A. Coordinate location of temperature, pressure sensors, and other exposed control components with plans and room details before installation.
- B. Coordinate supply of conditioned electrical circuits for control units and operator workstation.
- C. Coordinate equipment with "Motor-Control Centers" to achieve compatibility with motor starters and annunciation devices.

14. **DEMONSTRATION**

Engage a factory-authorized service representative to train Government's maintenance personnel (up to 12 persons) to adjust, operate, and maintain HVAC instrumentation and controls 2 hours of training shall be performed.