STATEMENT OF WORK
FOR

Colombo Chancery – 100% Outdoor Air Unit
Repair by Replacement

United States Embassy
Colombo, Sri Lanka

March 17, 2017
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1.0 INTRODUCTION

1.1 The United States Department of State (DOS) requires design and construction services for the replacement of an air handling unit (AHU), which provides 100% outdoor air to Chancery office building. Due to age and corrosion, the existing equipment can no longer provide adequate conditioned air for ventilation and building pressurization. The existing chilled water fed AHU and associated devices shall be removed. The existing chilled water piping local to the AHU shall be capped and reconfigured as necessary to ensure chilled water flow is maintained to all existing chilled water fed devices. In its place, the contractor shall install a new direct expansion (Dx) refrigerant split system consisting of a new indoor unit and an outdoor condensing unit. The contractor shall install new refrigerant piping and controls wiring between the new indoor and outdoor units. The new system shall have a dehumidification sequence utilizing a hot gas reheat configuration. The contractor shall provide and install new electrical infrastructure for both the indoor unit and outdoor unit.

1.2 This project shall be a design-build, firm fixed price, including a limited design effort and construction services specified in this scope.

1.3 The Project Director / Contracting Officer’s Representative (PD/COR) Point of Contact for matters related to this SOW is as follows:

U.S. Department of State  
Daniel Hess  
Facilities Manager  
U.S. Embassy, Colombo, Sri Lanka  
(e) HessDP@state.gov

1.4 A pre-bid walk-thru will be coordinated with invited bidders by the PD/COR and the Colombo Post Facility Manager (FM). The project schedule, along with other miscellaneous project specifics will be reviewed during the walk-thru.

2.0 GENERAL REQUIREMENTS

2.1 Building Codes. Work is governed by the latest version of the International Building Code (IBC) and the OBO Supplements, which includes the International Mechanical Code, International Plumbing Code, and National Electric Code. Work shall comply with OBO standards and local jurisdictional requirements. Work not in compliance with the IBC and NEC shall be deemed not in compliance with the Contract.

2.2 Additional Info. Included with this Statement of Work narrative are attached exhibits including:

2.2.1 Exhibit A – Existing Mechanical Drawings w/ Project Specific Mark-ups. See Exhibit A for existing mechanical drawings. Includes mechanical room and outdoor air riser diagram.
2.2.2 Exhibit B – *York Solutions Air Handler – Equipment Guide*. See Exhibit B for information regarding the York Solutions AHU, which would be accepted for use on this project.

2.2.3 Exhibit C – *York YCUL Condenser – Equipment Guide*. See Exhibit C for an example of an air-cooled condenser that could be accepted as part of the new work scope.

2.2.4 Exhibit D – *Equipment Specifications*. See Exhibit D for the detailed equipment specifications. This statement of work outlines the general project requirements. Where more detailed information is required, the specifications shall be references. Any discrepancies between the scope of work narrative and the attached specifications shall be brought the attention of the PD/COR.

2.3 **Seismic.** Seismic restraints shall be applied to new mechanical equipment, piping, and ductwork as required per the local zone classification. Seismic restraints shall be designed (as required) to restrict horizontal seismic forces in two directions, transverse and longitudinal directions.

2.4 **Location.** The Project takes place at the Embassy of the United States of America in Colombo, Sri Lanka.

2.5 **Shipping.** The Contractor is responsible for shipping, delivery, and storage of all tools, materials, and equipment to the Work site.

2.6 **Visas.** The contractor is responsible for processing visas for technicians.

2.7 **Trash/Disposal.** Unless otherwise directed, the contractor is responsible for removing all trash, debris, demolished systems/equipment, and unused materials from the Embassy property. Disposal shall comply with U.S. and Colombo, Sri Lanka laws and regulations.

2.8 **Safety.** The Contractor is responsible for the safety of for his/her employees, and for conduct of the work in a manner that prioritizes the safety of Post residents, employees, and visitors.

2.9 **Damage.** Protect parking lots, sidewalks, landscaping, furniture, furnishings, carpets, and interior finishes from damage. Damage caused by the Contractor will be returned to original condition at the expense of the Contractor.

2.10 **Interruptions of Service.** The Contractor shall maintain existing systems in service to the maximum extent possible and coordinate interruptions of any utility services in advance with the Facility Manager. During occupied hours, mechanical systems shall remain operational without any negative impact to occupant comfort.

2.11 **Refrigerant Handling.** Handling / charging of refrigerants for use in air conditioning systems shall comply with U.S. and Colombo, Sri Lanka laws and regulations.

2.12 **Drawing/AutoCAD Files.** If needed for reference, available existing design/construction documentation, including AutoCAD files associated with the project may be provided by
the PD/COR if requested by the contractor. Availability and accuracy of existing files cannot be guaranteed. Contractor shall field verify all equipment, systems, and measurements as required to completed the tasks included in this SOW.

2.13 **Submittals.** The contractor shall provide submittals for all new equipment, materials, and chemicals. See included specifications exhibit for additional information. Installed equipment/materials that have not been approved by the PD/COR will not be accepted.

2.14 **Warranty.** The contractor shall provide warranties on all equipment, materials, and workmanship. See included specifications exhibit for additional information.

### 3.0 DETAILED SCOPE OF WORK

3.1 Provide workers, equipment, and materials necessary to demo one (1) existing chilled water fed air handler with one (1) new Dx split system. Trades shall include, but may not be limited to mechanical, electrical, roofing/flashing, carpentry, and painting.

3.2 In addition to the contractor providing the new mechanical and electrical equipment; miscellaneous duct accessories, vibration isolators, piping, piping connections, valves, gages, miscellaneous piping accessories, disconnect switches, circuit breakers, electrical conductors, controls wiring, and other miscellaneous materials are part of the Work. The contractor shall provide a complete functioning system.

3.3 All used equipment, debris, trash and hazardous materials will be removed from the property and disposed of properly by the contractor. At a minimum, materials shall be removed weekly. Locations for dumpsters are not guaranteed. Access for trucks/dumpsters shall be coordinated with the PD/COR and FM. The Contractor is responsible for ensuring that disposal of equipment, debris, and hazardous material complies with the laws and regulations of Colombo, Sri Lanka.

3.4 Start-up and commissioning of the new equipment is part of the Work. All mechanical and electrical functions at the mechanical equipment and at the thermostat(s)/controllers will be verified in all modes. Start-up and commissioning shall be completed with the FM or designated technical staff in attendance. Coordinate with PD/COR and FM.

3.5 Training: The contractor shall provide training for all new equipment/systems to the facility maintenance staff. Coordinate with PD/COR and FM. Minimum of 4 hours of training required. Training must be provided by a manufacture certified technician.

3.6 **Existing Equipment Removal / Demolition Requirements:**

3.6.1 **General:** The contractor shall provide all means to shut-down equipment, isolate equipment, drain down, flush and refill the systems, and lock-out/tag-out systems as required to safely complete the specified tasks. During construction, the contractor shall protect the roof membrane from tears / punctures.

3.6.2 Remove and properly dispose of one (1) existing chilled water fed air-handler located in the Ground Floor mechanical room at the Colombo Chancery:

i. Existing Equipment: 100% OA chilled water fed air handler.
ii. The contractor is responsible for safely disconnecting and removing all ductwork, electrical power/controls components, condensate disposal piping, and chilled water piping that is connected to the existing air handler.

iii. The contractor shall locate and protect ductwork, condensate drain piping, and electrical power/controls circuits that will be reused for the new work scope.

iv. The contractor is responsible for removing the existing air handler and associated components from the property.

v. The contractor is responsible for cleaning and preparing the mechanical room area for the installation of the split system air handler. Preparation shall include, but is not limited to a new/modified housekeeping pad, structural supports, seismic vibration isolation, new upsized electrical infrastructure, etc.

3.7 **New Equipment and New Work Requirements:**

3.7.1 Design, Provide, and Install a New Dx Split System:

i. Requirements:

1. Limited Design:

   a. New AHU Fan - The contractor is responsible for evaluating the as-built conditions of the duct system and validating the external static pressure requirements of the new indoor air handler fan operating at a volumetric flowrate of 4,500 CFM. An OBO estimate has been provided below with the basis of design (BOD) equipment information. The contractor shall provide a signed/sealed letter from a licensed mechanical engineer or OBO approved equivalent validating the AHU fan is sized properly and adequate for the intended use. This letter shall be included in the equipment submittal.

   b. New Electrical Infrastructure – Using the new indoor / outdoor units proposed for use, the contractor shall calculate new conductor/conduit sizes and overcurrent protection requirements. The contractor shall work the FM to determine what electrical panels can be used for the equipment. The contractor shall perform calculations to confirm the panels can handle the added load. The contractor shall provide a letter from a licensed electrical engineer summarizing the electrical requirements and verify the installation complaint with OBO building codes and manufacturer requirements.

   c. Seismic/Wind Restrains – The contractor is responsible for calculating and selecting the appropriate seismic / wind restrains for the equipment. The contractor shall provide a letter from licensed engineer accompanying the restraint submittal.

2. The contractor shall provide and install one (1) new Dx air-cooled split system with hot gas reheat and all necessary mechanical and electrical
accessories to provide a fully functioning system that meets the project requirements. See Exhibit B and C for examples of equipment that could be acceptable for use on this project. See section 3.7.1.ii below for a summary of equipment requirements. See Exhibit D for equipment specifications.

3. As described in the limited design effort above, the contractor shall evaluate the existing electrical infrastructure for use with the new split system. If the existing infrastructure is not adequate for the new air handler or condenser, the contractor shall provide and install new conduit/conductors and a new breaker in the main distribution panel. A new disconnect with integral breaker shall be provided for the new condenser regardless of whether or not the electrical infrastructure has to be upgraded. Any paths for the routing of new conductors/conduit shall be approved by the FM.

4. Supports / Painting: The contractor shall fabricate all necessary steel supports for the new condenser and air handler. The air handler shall be installed in the same location as the existing chilled water fed hander. The new condenser shall be installed in a location determined by the Facility Manager and reviewed during the pre-proposal site survey. All new steel supports for the condenser shall be primed and painted to protect the equipment from corrosion. The surfaces shall receive at least one (1) coat of a primer (e.g; Sherman-Williams Pro Industrial Pro-Cryl Universal Acrylic Primer) and two (2) coats of a top/finish coat (e.g.; Ameron Siloxane PSX-700).

ii. New Equipment Summary:

(Manufacturer/Model substitutions shall meet or exceed the York Solutions Series AHUs and York YCUL Condenser Series Equipment. Substitutions are acceptable, but are subject to approval by the PD/COR, FM, and FAC/PS Mechanical Engineer)

1. One (1) New 100% Outdoor Air - Dx Indoor Air Handler (York Solutions Series AHU):
   a. The air handler casing shall be double wall foam panel construction with minimum R-13 insulation.
   b. Isolation damper. AHU shall have a motor operated automatic isolation damper (stainless steel or aluminum) at the OA inlet of the unit. When if the unit is not in operation the OA isolation damper shall remain closed.
   c. Shall be furnished with a variable speed supply fan for balancing; however, the unit will operate as constant volume. 4,500.00 CFM with an external static pressure of 1.5”. Contractor shall verify external static per this SOW limited design deliverable requirements.
   d. The equipment shall be furnished with a dehumidification sequence utilizing hot gas reheat. The reheat shall be capable of heating the air to a room neutral condition of 70 Deg. F (21 Deg. C).
   e. The evaporator coil and hot gas reheat coil shall be factory coated
with a phenolic or epoxy coating rated for Marine environments. Non-factory applied coatings (e.g., field applied coatings) will not be accepted.

f. The air handler shall be furnished with a minimum of three thermostats to monitor unit performance. They may be factory or field installed. One thermostat shall be installed at the inlet to capture the outdoor air temperature. One shall be installed downstream of the evaporator coil. And one shall be installed downstream of the hot gas reheat coil. The all thermostats be shall mounted in a location easily visible to the post staff for monitoring.

g. The contractor shall install one analog static pressure gauge on the ductwork downstream of the new air handler in the mechanical room. The gauge shall mounted in a location easily visible to the post staff for monitoring. Basis of design: 0”-3” H2O Dwyer Instruments Differential Pressure Gauge.

h. The contractor shall install new canvas (or similar) flexible connections at the inlet and outlet connections to the AHU to minimize vibration transmission to the ductwork system.

i. A controls user interface with digital display shall be installed on the air handler or within the mechanical room local to the air handler. The interface shall provide equipment status, including alarms and current operating conditions. The user interface shall allow the monitoring and also user adjustments for the evaporator leaving air temperature and the hot gas reheat coil leaving air temperature.

j. The controls furnished with the equipment (field or factory supplied) shall allow for a 7 day programmable schedule in increments of 1 hour.

k. New equipment shall use: R-410a, R-407c, or R-134a refrigerant.

l. Evaporator Coil Performance:
   
i. The coil Entering Air Conditions (Outdoor Air) shall be assumed at 85.5 Deg. F. Dry Bulb and 80.5 Deg. F. Wet Bulb.

   ii. The evaporator coil Leaving Air Conditions shall be assumed at 54.0 Deg. F. Dry Bulb and 53.5 Deg. F. Wet Bulb.

   iii. The equipment shall be sized at approximately 38 refrigeration tons (133.6 kW) of cooling. 4,500 CFM.

2. One (1) Marine Grade Air-Cooled Condenser

   (See Attached Chiller Specification for Additional information)

   a. Basis of Design: York YCUL Series

   i. Condenser Coil Options

      1. Copper Tube & Copper Fin Coils with factory applied
ii. Condenser Housing and Structural Frame
   1. Housing and Structural Frame shall be Galvanized Steel or Aluminum

iii. Compressors
   1. The system shall have a minimum of two (2) compressors.

b. Cooling Capacity: Approx. 38 Refrigeration Tons (133.6 kW).

c. Hot Gas Reheat Capacity: Reheat coil shall be capable of heating 54.0 Deg. F. Dry Bulb and 53.5 Deg. F. Wet Bulb air up to room neutral conditions at 75 Deg F Dry Bulb.

d. New condenser shall be able provide full cooling capacity with ambient conditions at 95 Deg F dry bulb (35 Deg. C. dry bulb).

e. New equipment shall use: R-410a, R-407c, or R-134a refrigerant.

f. Phase / Power Loss Protection: The condenser shall be provided with a phase failure relay that trips on phase loss, phase reversal, voltage unbalance, or under-voltage. This device can be a factory option from the condenser manufacturer or can be furnished and installed separately by the contractor.

3.7.2 New System: Test, Adjust, and Balance (TAB) Requirements

i. Requirement Summary:

1. Following the installation and start-up of the new split system, the contractor shall perform an air-side test, adjust, and balance (TAB) procedure on the new AHU and the entire downstream outdoor air riser. The air flow rates for each outlet of the riser have been included in Exhibit A. The TAB effort shall be performed by a licensed technician with NEBB, AABC, or other OBO approved equivalent certifications.

4.0 ATTACHMENTS

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