

**SCOPE OF WORK
INSTALLATION WATER
UTILITY STORAGE SYSTEM
U.S. EMBASSY DJIBOUTI – September 2015**

1 PROJECT DESCRIPTION

- 1.1 This project work is to provide all engineering, material, and labor to install a utility water piping and storage system at US Embassy Djibouti.
- 1.2 The project work includes:
 - 1.2.1 Excavation and construction of pad for new above-grade raw water storage tanks, pumps, piping, and controls.
 - 1.2.2 Provide and install of new fiberglass water tanks with level controls and level safety interlocks for transfer pump.
 - 1.2.3 Re-routing and connection of water utility piping to water tanks to include all controls and isolation valves. Contractor will coordinate with the Embassy Contracting Officer's Representative (COR) and the City to provide the relocation and tie-in of the utility water.
 - 1.2.4 Provide and install new feeder pump to assist the incoming utility water pressure. Installation includes new electrical service from panel in main switchgear room of utility building, new pad, and all piping and controls.
 - 1.2.5 Provide and install new transfer pump to move water from the new raw water storage tanks into the utility building equipment. Installation includes new electrical service from panel in main switchgear room of utility building, new pad, and all piping and controls.
 - 1.2.6 Provide and install interlock between storage tank level controls and the transfer pump to insure that the pump does not operate at low tank levels.

2 GENERAL CONDITIONS

- 2.1 Contractor must be bonded and licensed to perform work in Djibouti.
- 2.2 Prior to bid, Contractor must make an ON-SITE visit with qualified engineers and electricians to determine exact site conditions.
- 2.3 A Qualified Person must be on-site at all times during this scope of work.
- 2.4 All electrical work must be performed by U.S. certified and licensed Electricians.
- 2.5 All mechanical work must be performed by certified and licensed Pipe-Fitters.
- 2.6 All equipment installed shall be commissioned on-site using factory recommended procedures and by factory certified representatives.
- 2.7 All labor, tools, and materials must be provided by Contractor. Contractor will not be allowed to use USG equipment.
- 2.8 Material shipped into Djibouti for this project may be brought in duty free.

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- 2.8.1 The Contractor must pay for transportation of all Contractor purchased material to the site and the U.S. Embassy will provide a tax exoneration certificate for customs.
- 2.8.2 Any equipment, including tools, brought in to Djibouti duty free for this project must become the property of the USG and cannot be taken out or used off-site.

2.9 Packaging and Marking

U.S. Embassy Djibouti
Lot 350 - B Haramous
B.P. 185
Republic of Djibouti

- 2.10 Direction for changes in the Scope or Cost of this Work can only come from the Contracting Officer (CO). Additional costs will not be accepted if a contract change order has not been given by the Contracting Officer. Any work performed on this project outside of the Scope of Work provided by the Contracting Officer shall be deemed not reimbursable by the U.S. Government.
- 2.11 All scheduling, submittals, and installation will be coordinated through the Contracting Officer's Representative (COR).

3 PERSONNEL REQUIREMENTS

3.1 Contractor Supplied Personnel Technical Qualifications

3.1.1 Qualified Electrical Labor

- 3.1.1.1 All personnel used in the performance of the electrical work shall be licensed and qualified electricians or electrical professionals as recognized by at least one U.S. State or local jurisdiction.
- 3.1.1.2 At least one team member must have 10 or more years of applicable electrical experience in the United States.
- 3.1.1.3 Resumes for all proposed team personnel detailing their experience MUST be submitted with the Cost Proposal or it will not be considered.
- 3.1.1.4 Similar installation experience must be clearly shown on all resumes submitted.
- 3.1.1.5 Equipment manufacturer technicians (factory representatives) are exempt from this requirement and may supplement but not replace the U.S. staff.

3.1.2 Electrical Installation Labor

- 3.1.2.1 All contractor-provided electrical installation labor furnished under this task order and the electrical tasks to be completed thereto shall be executed only by journeyman and master level tradespersons, licensed to the trade which he/she practices.

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- 3.1.2.2 Equipment manufacturer technicians (factory representatives) are exempt from this requirement and may supplement but not replace the U.S. staff and must be under constant direction and supervision from licensed personnel.
- 3.1.3 Mechanical Installation Labor
 - 3.1.3.1 All contractor-provided mechanical installation labor furnished under this task order and the mechanical/piping tasks to be completed thereto shall be executed only by journeyman and master level tradespersons, licensed to the trade which he/she practices.
 - 3.1.3.2 Equipment manufacturer technicians (factory representatives) are exempt from this requirement and may supplement but not replace the licensed journeyman staff and must be under constant direction and supervision from licensed personnel.
- 3.1.4 Trade Licenses
 - 3.1.4.1 All professional tradesmen licenses for Contractor personnel shall be current and valid at the time of COR review and shall be maintained and remain current and valid for the complete duration of the project execution.
- 3.1.5 Use of Non-Licensed Labor
 - 3.1.5.1 Contractor use of non-licensed electrical laborers, helpers, etc. to execute, plan, lay out, or otherwise direct the execution of the electrical work activities under this task order is not allowed.
 - 3.1.5.2 Local hired labor shall not perform functions beyond manual labor such as debris removal and must be directly managed and supervised by the contractor.

4 SAFETY

- 4.1 Contractor must submit with the bid, a Company Safety Plan including a specific Safety Plan tailored to this project to include an Activity Hazard Analysis (AHA).
- 4.2 All safety plans must conform to USACE (Army Corps of Engineers) Safety and Health Manual EM-385.
- 4.3 General. The contractor shall provide and maintain work environments and procedures which will safeguard the public and Government personnel, property, materials, supplies, and equipment exposed to contractor operations and activities; avoid interruptions of Government operations and delays in project completion dates; and, control costs in the performance of this contract. For these purposes, the contractor shall:
 - 4.3.1 Provide appropriate safety barricades, signs and signal lights;

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- 4.3.2 Comply with the standards issued by any local government authority having jurisdiction over occupational health and safety issues; and,
- 4.3.3 Ensure that any additional measures the contracting officer determines to be reasonably necessary for this purpose are taken.
- 4.3.4 For overseas construction projects, the contracting officer shall specify in writing additional requirements regarding safety if the work involves:
 - 4.3.4.1 Scaffolding;
 - 4.3.4.2 Work at heights above two (2) meters;
 - 4.3.4.3 Trenching or other excavation greater than one (1) meter in depth;
 - 4.3.4.4 Earth moving equipment;
 - 4.3.4.5 Temporary wiring, use of portable electric tools, or other recognized electrical hazards. Temporary wiring and portable electric tools require the use of a ground fault circuit interrupter (GFCI) in the affected circuits; other electrical hazards may also require the use of a GFCI;
 - 4.3.4.6 Work in confined spaces (limited exits, potential for oxygen less than 19.5 percent or combustible atmosphere, potential for solid or liquid engulfment, or other hazards considered to be immediately dangerous to life or health such as water tanks, transformer vaults, sewers, cisterns, etc.);
 - 4.3.4.7 Hazardous materials—a material with a physical or health hazard including but not limited to, flammable, explosive, corrosive, toxic, reactive or unstable, or any operations which creates any kind of contamination inside an occupied building such as dust from demolition activities, paints, solvents, etc.; or
 - 4.3.4.8 Hazardous noise levels.
- 4.4 Records. The contractor shall maintain an accurate record of exposure data on all accidents incident to work performed under this contract resulting in death, traumatic injury, occupational disease, or damage to or theft of property, materials, supplies, or equipment. The contractor shall report this data in the manner prescribed by the contracting officer.
- 4.5 Subcontracts. The contractor shall be responsible for its subcontractors' compliance with this clause.
- 4.6 Written program. Before commencing work, the contractor shall:

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- 4.6.1 Submit a written plan to the contracting officer for implementing this clause. The plan shall include specific management or technical procedures for effectively controlling hazards associated with the project; and,
 - 4.6.2 Meet with the contracting officer to discuss and develop a mutual understanding relative to administration of the overall safety program.
- 4.7 Notification. The contracting officer shall notify the contractor of any non-compliance with these requirements and the corrective actions required. This notice, when delivered to the contractor or the contractor's representative on site, shall be deemed sufficient notice of the non-compliance and corrective action required. After receiving the notice, the contractor shall immediately take corrective action. If the contractor fails or refuses to promptly take corrective action, the contracting officer may issue an order suspending all or part of the work until satisfactory corrective action has been taken. The contractor shall not be entitled to any equitable adjustment of the contract price or extension of the performance schedule on any suspension of work order issued under this clause.

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5 SCOPE OF WORK

5.1 PRIOR TO IMPLEMENTATION

- 5.1.1 Submit to the CO and/or COR within 30 days of Notice to Proceed, document submittal package that includes:
 - 5.1.1.1 Single-line schematic
 - 5.1.1.2 Basic piping layouts,
 - 5.1.1.3 Control sequence of operation,
 - 5.1.1.4 Bill of material to be installed,
 - 5.1.1.5 Equipment submittals including pumps, piping, valves, electrical controls, and hangers/supports.
 - 5.1.1.6 Complete finalized Work Plan including Critical Path Method (CPM) schedule
 - 5.1.1.7 The Work Plan shall clearly show planned outages and detail cooperation and assistance requested from Post to accomplish the work.
- 5.1.2 Submit a detailed sequence of operation for the chiller, pump, and diverter valve as per the SOW.
- 5.1.3 The submittal package shall be complete in all aspects and shall include existing and proposed electrical one-line diagrams, equipment layout sketches, equipment details and cut sheets, a complete materials list.

5.2 IMPLEMENTATION

5.2.1 CONCRETE PAD CONSTRUCTION

- 5.2.1.1 Removal and disposal of existing round quartz aggregate (river rock) in the area of this scope of work.
- 5.2.1.2 Excavation of engineered backfill to grade and level the site for the new slab.
- 5.2.1.3 Backfilling and compaction with compactable crushed granite or limestone aggregate.
- 5.2.1.4 Installation of all form work.
- 5.2.1.5 Provision and installation of rebar.
- 5.2.1.6 Provision and installation of concrete.
- 5.2.1.7 Concrete Work
 - 5.2.1.7.1 Concrete work and materials shall conform to ACI-301 and ACI-318 (latest edition)

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- 5.2.1.7.2 Concrete shall develop 4000 psi compressive strength @ 28 days.
- 5.2.1.7.3 Bar reinforcement shall conform to ASTM A-615 Grade 60. Details and lap splices per ACI-315 and ACI-318 (latest edition).
- 5.2.1.7.4 Concrete shall be placed in a manner that will prevent segregation of concrete materials and the infiltration of soil and/or water into the mix.
- 5.2.1.7.5 Contractor will cover the entire pad with burlap and provide a technician to spray the burlap EVERY DAY during the curing process. Plastic covering will not be acceptable.
- 5.2.1.7.6 Control joints shall be saw cut not later than 24 hours after concrete has been poured.
- 5.2.1.7.7 Control joints will be 5250mm O.C. in both directions.
- 5.2.1.7.8 Joints shall be filled with mastic joint filler.
- 5.2.1.7.9 Surface will be a light broom finish.
- 5.2.1.7.10 All slab edges will be chamfer corner (25mm x 25mm)

5.2.2 WATER TANK AND PIPING

- 5.2.2.1 Contractor will construct the water tank pad. Please refer to section 5.2.1 for details of pad construction.
- 5.2.2.2 There will be two raw water tanks (RWT-1 and RWT-2) with horizontal oriented structure. Each water tank will have minimum 10,000 liters volume size.
- 5.2.2.3 The water tanks will be a fiberglass, single wall tank with supports to allow inspection under the tank.
- 5.2.2.4 All piping will be minimum Schedule 80 CPVC rated at 200degF and Schedule 80 galvanized steel pipe for wall and foundation penetrations. Submit alternate proposals to the COR for approval.
- 5.2.2.5 Contractor will build a shade cover over the tanks, attached to the wall of the utility building and supported at the edge by steel posts. Cover must be high enough to give access clearance to the tanks (minimum 1 meter).
- 5.2.2.6 The tanks will have acrylic or clear plastic site glass level for visual check of tank level. Some form of removable, cage protection will be installed around Sight glass level. Sight glass will have a ¼ turn ball valve at the top and bottom of each sight glass to isolate the sight glass for maintenance and replacement.

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- 5.2.2.7 Both RWT-1 and 2 will each be provided with a separate level control system (float operated fill valve) that will control the level of water in each tank.
- 5.2.2.8 Both RWT-1 and 2 will be provided with level safety control float, wired in series to the transfer pump control circuit, to insure that the transfer pump does not run less than 1 meter of water in the tanks (adjustable).
- 5.2.2.9 The inspection lids will be hinged and fit tightly to the body of the tank. Hinges will allow the tank lid to open completely against the side of the tank.
- 5.2.2.10 All inspection lids will be supplied with a hasp to allow the lids to be padlocked to the body of the tank.
- 5.2.2.11 The utility water (ONEAD) feed will branch to be piped in each tank separately to allow redundancy in case of one tank failure.
- 5.2.2.12 Isolation valves will be installed on each feeder line. Isolation valves will all be ¼ turn ball valves rated for domestic water use.
- 5.2.2.13 Wall hydrants will be installed and piped from the boundary wall **INSIDE THE SERVICE CAC PARKING AREA** to the two tanks. This connection will serve as water truck connection point to fill the tanks in case of utility water outage.
- 5.2.2.14 The two water tanks will be piped together using 3” pipe at the bottom of the two tanks with isolation valves for each tank. Also a union or flange connection will be placed on the 3” line between the two tanks in case one needs to be replaced.
- 5.2.2.15 Pump suction will be piped in such a way that the pump can take suction from either tank or both tanks. Isolation valves will all be ¼ turn ball valves rated for domestic water use. Insure all lines to tanks can be easily removed from tanks in case tank replacement is needed.
- 5.2.2.16 The raw water feeder line from the transfer pump will be piped to the plate and frame heat exchanger inside the water utility room.
- 5.2.2.17 Foundation penetrations will be done below grade in Schedule 80 galvanized steel pipe and sealed per New Embassy Construction requirements.
- 5.2.2.18 Wall penetrations will be done in Schedule 80 galvanized steel pipe and sealed per New Embassy Construction requirements.
- 5.2.2.19 A bypass raw water line parallel to the **plate and frame heat exchanger** (alternate in bid) will be installed with isolation valves to allow HX

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maintenance. Isolation valves will all be ¼ turn ball valves rated for domestic water use.

5.2.3 FEEDER AND TRANSFER PUMPS

5.2.3.1 The **feeder** pump will be in the public utility feeder line from the meter to the tanks and will aid utility pressure in moving utility water into the new storage tanks. Pump must be able to work in negative suction head, optimal rated at 40gpm at 60psi, and must be rated for operation at 50degC.

5.2.3.1.1 Pump will be 220v, single phase, 50Hz, pad mounted and rated as Type 4X water-tight, dust-tight, and corrosion resistant.

5.2.3.1.2 Contractor will build pump pad suitable for the pump weight and operation. Please refer to section 5.2.1 for detail.

5.2.3.1.3 Pump will be optimal 40gpm rated at 60psi. Pump curves to be submitted for approval prior to purchase.

5.2.3.2 The **transfer** pump will be in the transfer line from the storage tanks to the plate and frame heat exchanger. Pump will be, vertical, multi-staged pump rated for operation at 50degC (base design is Grundfos). Contractor will size the pump with applicable capacity against calculated head loss to move 40gpm at 60psi.

5.2.3.2.1 Pump will be 220v, single phase, 50Hz, pad mounted and rated as Type 4X water-tight, dust-tight, and corrosion resistant.

5.2.3.2.2 Contractor will build pump pad suitable for the pump weight and operation. Please refer to section 5.2.1 for detail.

5.2.3.2.3 Pump will be optimal 40gpm rated at 60psi. Pump curves to be submitted for approval prior to purchase.

5.2.4 PIPING AND VALVES

5.2.4.1 All piping will be minimum Schedule 80 CPVC rated at 200degF or Schedule 80 galvanized steel pipe for wall and foundation penetrations.

5.2.4.2 All isolation valves will be quarter-turn ball valves rated for 300 psi and potable water service.

5.2.4.3 Contractor will flush and chlorinate all piping prior to final acceptance.

5.2.4.4 Contractor will coordinate tie-in of the new water service with the COR. The existing tank must remain operational until the new system is on-line.

5.2.4.5 All hangers, pipe supports, and hardware must be galvanized type.

5.2.5 PLATE AND FRAME HEAT EXCHANGER INSTALLATION (**ALTERNATE
BID**)

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- 5.2.5.1 Contractor will provide and install a plate and frame heat exchanger mounted on the existing pad in the water utility room.
- 5.2.5.2 Heat exchanger will be plate and frame of sufficient size to cool in-coming city water temperature from design day highs of 120degF (50degC) to an output of 77degF (25degC) @ 35 gallons per minute (132 LPM) at 60 PSI.
- 5.2.5.3 Incoming water is approximately 1300-1500 ppm of salinity and 1600-1800 ppm hardness. All equipment must be rated to withstand these conditions with all material, including fasteners, to be minimum 316SS.
- 5.2.5.4 All piping installed will be correct to support temperatures and flows required to meet performance.

5.2.6 ELECTRICAL SYSTEM

- 5.2.6.1 All electrical wiring will be sized for ambient de-rating above 42degC
- 5.2.6.2 All electrical wiring will be THHN, 90degC rated.
- 5.2.6.3 All conduit installed outside of the electrical switchgear room will be galvanized rigid conduit (RGC), galvanized intermediate metal conduit (IMC), or liquid-tight flexible conduit with appropriate fittings.
- 5.2.6.4 Contractor will provide and install required panelboard, breakers for this project to match the existing panel Eaton manufacturer and model type.
- 5.2.6.5 Contractor will install a 20 amp NEMA 4X weather-proof service outlet with a 10mA GFCI protection on the chiller pad. GFCI breaker will be installed at the panel.
- 5.2.6.6 Service outlet will be mounted on galvanized uni-strut and will be 24 inches above the finished pad height.
- 5.2.6.7 Contractor will install weather-proof LED light fixtures at each tank opening and at the transfer and feeder pump locations (attached to Utility Building). Fixture circuit will be provided with 10mA GFCI protection at the panel.
- 5.2.6.8 Service outlet and lighting will be fed from a separate breaker in the distribution panel located in the main switchgear room.

5.2.7 IMPLEMENTATION AND SERVICE INTERRUPTION

- 5.2.7.1 The contractor will provide all coring and excavation to route piping from the Utility demark manhole to the new tanks as well as all penetrations into the Embassy Utility building for utility water and chilled water.

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- 5.2.7.2 The contractor shall notify the COR in writing three (3) work days prior to any planned electrical water outages.
- 5.2.7.3 The contractor must schedule work to maintain flexibility since interruptions may not be granted on the date(s) requested.
- 5.2.7.4 Electrical shutdowns and operation of electrical breakers and switches shall be accomplished only by qualified personnel and upon advance approval of the COR.
- 5.2.7.5 Proper lock out/tag out procedures shall be followed, the contractor shall supply lock out/tag out materials.
- 5.2.7.6 Power shall be maintained to all operational loads (as determined by the COR) during normal working hours.

5.2.8 LABELING.

- 5.2.8.1 All equipment, junction boxes, and circuits installed or altered as part of the SOW shall be correctly labeled per U.S. National Electric Code (NEC).
- 5.2.8.2 Hand written labels or labels deemed by the COR to peel off too easily will not be accepted.
- 5.2.8.3 Circuit and panel numbers will be labeled on chiller, pump, service outlet, and lighting.

5.3 AFTER IMPLEMENTATION

5.3.1 O & M MANUALS

- 5.3.1.1 A final written report with detail work done, test and commissioning of equipment.
- 5.3.1.2 The report shall include hard copy and softcopy of as-built of the piping system that is detail and complete in all respect in Auto-CAD and in PDF.
- 5.3.1.3 The electrical one-line diagram as-built shall show the electrical circuits.
- 5.3.1.4 Three sets of O&M manuals shall be provided to the COR prior to departure from site after completion.
- 5.3.1.5 O&M manuals must include all schematics, parameter settings that may be needed in the maintenance or troubleshooting of the system and equipment.

5.3.2 SPARES.

- 5.3.2.1 Factory recommended Heat Exchanger and Pump spares for a two-year period of continuous operation and maintenance shall be provided.
- 5.3.2.2 Provide one (1) spare GFCI breaker for lighting/outlet circuit. Breaker may be installed in the panel.

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- 5.3.2.3 Spares being available locally shall not waive the need for spares provided and stored on site. All electrical equipment must meet U.S. NEC requirements.
- 5.3.2.4 The spares shall be provided to the COR prior to the contractor's departure from site after completion.
- 5.3.2.5 The spare parts shall be passed to the Embassy in an organized manner (meaning formal handover to the Embassy so that the Embassy understands what they are being given) and with detail list of all components included.

5.4 TRAINING

- 5.4.1 After installation and commissioning is complete, training session shall be provided by the contractor for all assigned Embassy employees.

6 WARRANTY

- 6.1.1 The installing contractor shall provide a one-year complete coverage warranty that includes all parts, materials, labor, travel costs, per diem, and all miscellaneous costs.
- 6.1.2 The contractor may seek reimbursement from the manufacturer or any other entity providing warranties for the equipment installed, but the contractor must be the responsible party for warranty repairs.
- 6.1.3 The contractor shall provide, at his cost, for onsite repairs within 72 hours of notification of an operational problem or failure within the warranty period for the pumps.

7 POINTS OF CONTACT

- 7.1 **CONTRACTING OFFICER:** The Contracting Officer (CO) shall be the Embassy General Services Officer Griffin LeNoir (LenoirGP@state.gov)
- 7.2 **CONTRACTING OFFICER REPRESENTATIVE (COR)** shall be the Embassy Facility Manager Michael Wilson (WilsonMR4@state.gov)

- 8 PROPOSAL SUBMITTAL:** proposal shall be submitted to GSO, U.S. Embassy Djibouti.

END SOW