



**US Army Corps  
of Engineers  
Afghanistan Engineer District**

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## **ANP ANCOP Patrol Battalion**

Muqur, Badghis  
Badghis Province, Afghanistan

# **Project Specifications And Drawings**

Revised July 2012

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**THIS IS A SINGLE-PHASE REQUEST FOR PROPOSAL**

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**SECTION 00555**  
**DESIGN CONCEPT DOCUMENTS**

**1. GENERAL**

This section identifies documents issued with this solicitation which establish the concept, basis for the project design and/or the basis of construction. These requirements are minimum standards and may be exceeded by the Offeror. Deviations from these concepts and standards may be approved if considered by the Government to be in its best interests.

The extent of development of these requirements in no way relieves the successful Offeror from the responsibility of completing the design, construction documentation, and construction of the facility in conformance with applicable criteria and codes.

**1.1 ENGINEERING AND DESIGN CRITERIA**

General design requirements are set forth in this solicitation herein. The United Facilities Guide Technical Specifications are the primary specifications criteria for the construction of the project. No design criteria will be furnished by the Afghanistan Engineer District except that which may be required for design and is not available from commercial sources or from the Construction Criteria Base (CCB) or 'Techinfo' website located at <http://www.wbdg.org/ccb/>. The references within CCB must be obtained by the A/E if the criteria are required or desired. All design, unless otherwise specified, shall be per the requirements of Sections 01010 and 01015, and shall be based on nationally recognized industry standard, criteria, and practice.

**1.2 APPENDIX DOCUMENTS**

See Appendices for further technical requirements, criteria, and parameters that are a part of this contract.

**1.3 TECHNICAL SPECIFICATIONS**

Technical Specifications included herein shall be utilized as standards for the corresponding construction work. The successful Offeror shall develop complete construction specifications using the criteria included in these specifications.

The Government will provide Division 1 specifications sections, herein this document, as required, to the successful Offeror; and these sections shall be included in the final construction specifications without change. The Contractor shall furnish these specifications on electronic media for the production of construction specifications when requested. These specifications shall be submitted together with other required contractor prepared project construction documents in the 95% Design Submittal of the Design Phase in accordance with Section 00150 THE SITE ADAPT PROCESS.

**1.4 ORDER OF PRECEDENCE**

In case of conflict, duplication, or overlap of design criteria specified in the contract documents or government-provided drawings, the following order of precedence shall be followed:

1. All requirements of Section 01010 Scope of Work  
Any requirements as set forth in Section 01010 which are not included in the Technical Requirements Section 01015 and/or Appendix drawings, shall be considered as set forth in all contract documents
2. Government-provided standard drawings

Refer also to Section 01015 TECHNICAL REQUIREMENTS Paragraph titled "Compliance" further for precedence criteria.

Where question or conflict occurs regarding any construction document, Contractor shall notify the Contracting Officer (KO) immediately. KO shall furnish A decision or resolution of the questions in writing to the Contractor.

#### **1.5 ADDITIONAL DOCUMENTS/CRITERIA FURNISHED BY THE GOVERNMENT**

The following documents will be furnished to the Contractor when requested by the Offeror or Contractor:

Design Criteria published by the Government such as Technical Manuals (TM), Engineer Manuals (EM), Engineer Technical Letters (ETL) and other documents related to the design referenced herein which are not available on the Internet, including the CCB website.

The following will not be furnished to the Contractor.

Commercial design criteria and specifications will not be furnished by the Government.

Conversion of electronic media to other formats shall be the responsibility of the Contractor.

**-- END OF SECTION --**

**SECTION 01010  
SCOPE OF WORK**

**1.0 PROJECT REQUIREMENTS**

This project consists of the design and construction of site improvements and construction of facilities to support the Afghanistan National Police (ANP) program for one (1) Afghan National Civil Order Police (ANCOP) Compound serving a population of approximately five-hundred (500) personnel, to be located in Badghis Province, Afghanistan. This project is defined as the management, planning, design, material, labor, and equipment, to site adapt and construct all utilities, vehicular access, buildings, force protection measures, site security, de-mining activities, and all other features as required herein.

The Work within this contract shall be designed and constructed in accordance with the most recent editions of building and life safety codes, force protection requirements and security standards and other references as listed in 01015 Technical Requirements. A partial listing of references is included herein:

- IBC, International Building Codes
- NFPA 101, Life Safety Codes
- UFC 4-010-01, DoD Minimum Anti-Terrorism Standards for Buildings

Standard Design drawings are provided in appendices (see Appendices A respectively). All Work shall be performed in accordance with the Standard Design drawings except as specifically indicated in this RFP.

**1.1 LOCATION**

The site is located in Badghis Province, Afghanistan, as shown on the attached site assessment.

The terms limit of work, project boundaries, and contract limits that are stated throughout this contract shall be defined as the coordinates stated above and on the concept plan within the appendix.

The coordinates of it boundaries are:

Corner	Latitude (N)	Longitude (E)	MRGS
1	35.091843	63.092101	41S NU 0839583232
2	35.095689	63.097405	41S NU 0887883659
3	35.091063	63.096939	41S NU 0883683146
4	35.089919	63.095709	41S NU 0872483019
5	35.090760	63.092989	41S NU 0847683112

**1.2 ENGLISH LANGUAGE REQUIREMENT**

All information shall be presented in English. The Contractor shall have a minimum of one English-speaking representative present to communicate with the Contracting Officer’s Representative (COR) at all times when work is in progress.

**1.3 SUBMITTALS**

Submittals and a Submittal Register are required as specified in Section 01335.

**1.4 CQM TRAINING REQUIREMENT**

Refer to Section 01451 Contractor Quality Control for Construction Quality Management (CQM) Training requirements.

## **1.5 GENERAL REQUIREMENTS**

The ANCOP Patrol Battalion compound shall have a design population of five-hundred (500) persons.

Design and construct all facilities and other features in accordance with the government provided Standard Design drawings, Section 01015, and all applicable references herein. Standard Design items may require design adaptations to meet site conditions; these adaptations shall be designed and constructed in accordance with all requirements herein, and shall be submitted for approval.

In case of any discrepancy between Section 01010 Scope of Work and 01015 Technical Requirements, the 01010 Scope of Work takes precedence. The COR shall be notified immediately of any inconsistencies discovered in this RFP. All requirements set forth in this Section, but not included in the Technical Requirements and/or drawings, shall be considered as set forth in both and vice versa.

Verify all provided dimensions and all existing conditions described in the Request for Proposal and Appendices prior to the start of any construction. The Contractor is highly encouraged to verify existing site conditions before submitting proposals.

All standard construction amenities such as underground utilities, site grading, electrical, communication, detailing etc. shall be implied as design and construction requirements.

The Contractor is encouraged to use Afghan labor and subcontractors to the maximum extent possible commensurate with technical, security or other requirements or necessary considerations. The intent of this Contract is also to use locally procured materials and labor to the maximum extent possible, but this does not allow the Contractor to make changes to the Government-provided drawings, specifications or design analysis, except where specifically indicated herein.

Any standard that can be determined to be substantially equivalent to the standards specified in this document may be used, but it is the Contractor's responsibility to show the equivalency of the alternate standard. Reviewable documentation must be provided to the KO for approval prior to use; no part of any time lost due to such actions shall be made the subject of claim for extension of time, excess costs, or damages by the Contractor.

Window screens shall not be provided, with exceptions as indicated herein.

The finish of wet room walls and floors (including all rooms of the Latrine(s), and all rooms of the Dining Facility), shall be either sealed concrete or sealed concrete masonry units (CMU), per the construction as detailed in the Standard Design drawings. Wall tile and floor tile, as shown in the Standard Design drawings, shall be omitted.

### **1.5.1 LIFE SAFETY REQUIREMENTS**

Fire sprinkler systems are not required. Install hardwired smoke detectors per the requirements referenced herein; fire alarm control panels are not required. Wall-mounted A-B-C 6kg fire extinguishers shall be provided and installed for every 100 square meters of floor space in each building. The facilities shall comply with all other safety requirements as required within the Standard Design drawings and applicable references.

## **1.6 IF DIRECTED GFM&E**

The Government may elect to furnish select materials and/or equipment (GFM&E). In such cases, the Contractor may not be required to furnish these materials and equipment, but the Contractor shall take responsibility for them. If the Government decides to provide these items to the Contractor, the Contractor shall pick up the GFM&E at the Farah FOB and transport/deliver to the site. The Contractor shall provide complete installation and all associated requirements in accordance with the Section 01010-Scope of Work and Section 01015-Technical Requirements. In addition, see Section 01060-Special Clauses for additional information concerning (GFM&E).

Under each corresponding Unit Price item in the Section 00010-Proposal Schedule the Contractor shall list a Unit Price for the enumerated material and/or equipment.

## **2.0 SUMMARY OF WORK**

### **2.1 GENERAL**

#### **2.1.1 MOBILIZATION / DEMOBILIZATION**

Mobilization and Demobilization shall consist of all labor, equipment, supplies and facilities required to stage all equipment and facilities needed for construction of this project. Requirements for mobilization and temporary structures are set forth in 01015 Technical Requirements and 01060 Special Requirements.

#### **2.1.2 SECURITY**

Security is critical to construction in Afghanistan, especially on roads and remote areas away from Coalition Force bases. The Contractor must have an appropriate amount of security/protection to match the threat in the project area and along the supply routes. The Contractor shall develop detailed static and dynamic security plans in accordance with Section 01040 and submit them for Government approval. The Government will not issue Clearance for Construction until security plans have been submitted and approved. Refer to Section 01040 for detailed security requirements.

The Contractor shall list static security and dynamic security under separate bid items as shown in Section 00010 Proposal Schedule.

The Contractor shall be responsible for physical security of all materials, supplies, and equipment of every description, including property which may be Government-furnished or owned, for all areas occupied jointly by the Contractor and the Government, as well as for all work performed.

The Contractor shall provide perimeter force protection security for the developing site. Security may include, but is not limited to, a perimeter fence and private security guards. Perimeter security shall prevent unauthorized site access and provide safety protection to the Contractor work force and government personnel for the duration of the project. The Contractor is solely responsible for security; however, local police shall be coordinated with regarding security.

##### **2.1.2.1 UNEXPLODED ORDNANCE (UXO) REMOVAL AND CLEARANCE**

Contractor IS responsible for initial clearance/removal.

The Contractor shall search for, identify and clear all mines and unexploded ordnance (UXO) from the entire site as indicated on the concept site plan with the inclusion of 20 meters from the perimeter road. The contractor may only provide clearance/removal services via UN Mine Action Center for Afghanistan (UNMACA) accredited entities, and clearance shall be accomplished to the anticipated foundation depth as indicated in the contract. If sub-surface construction activities are to be performed on this site the minimum clearance depth will be 1 meter. Sub-surface clearance for construction activities in excess of 1 meter as defined by the contract parameters will also be the responsibility of the contractor. Clearance by definition is an investigation and clearance of all sub-surface metallic anomalies on the site. Clearance/removal may only be undertaken in accordance with International Mine Action Standards (IMAS), Afghanistan Mine Action Standards (AMAS), and applicable U.S. Army Corps of Engineer (USACE) Ordnance & Explosives (OE) safety standards. When mines and/or UXO's are identified, the Contractor shall place them in a location in accordance with IMAS/AMAS/USACE until destruction of the items can take place. Construction work shall not occur inside the safety exclusion zone based on the most probable munitions (MPM) expected on the site. Construction will not commence in any area that has not been cleared to the specified depth.

**The contractor will provide a standard UXO/Mine Clearance safety work plan to the US Army Corps of Engineers UXO / Mine Clearance COR for review prior to commencement of all UXO/mine clearance activities on the project sites. Once the UXO/ Mine Clearance has concluded, the contractor shall provide the US Army Corps of Engineers UXO / Mine Clearance COR a clearance certificate for review and approval before any construction activities are to commence.**

*NOTE 1:* The USACE does not need written clearance certificate approval from the UNMACA to approve the construction start activities. However, the contractor is responsible for providing a copy of the clearance certificate to the UNMACA for entry into their country wide database. A final signed copy of the UNMACE certificate must then be provided to the USACE UXO/Mine Clearance COR.

It is the responsibility of the Contractor to be aware of the risk of encountering UXO/mines and to take all actions necessary to assure a safe work area to perform the requirements of this contract. The Contractor assumes the risk of any and all personal injury, property damage or other liability arising out of or resulting from any Contractor action taken hereunder. The Contractor and its subcontractors may not handle, work with, move, transport, render safe, or disarm any UXO/mine, unless they have appropriate accreditations under the IMAS/AMAS from the UNMACA.

If a UXO/mine is encountered after a UNMACA-approved clearance certificate is provided to the Government, UXO/mine disposal shall be handled in accordance with Section 01015, Technical Requirements.

*NOTE 2:* Point of Contact for UXO/Mine Clearance Safety Work Plan review and approval shall be directed to the US Army Corps of Engineers Mine Clearance Safety/COR:

UXO Safety/ Mine Clearance COR, USACE  
[tas.uxo.demining.safety@usace.army.mil](mailto:tas.uxo.demining.safety@usace.army.mil), Roshan:079-403-1452 Comm:540-723-6129

## **2.2 DESIGN PROGRAM**

### **2.2.1 SITE SURVEY**

The Site Survey shall consist of all labor, equipment and supplies necessary to produce the topographical and other data in accordance with the requirements specified in Sections 01015 and 01335.

### **2.2.2 GEOTECHNICAL REPORT**

The Geotechnical Report shall contain the results of a geotechnical investigation conducted in accordance with the requirements specified in Section 01015. All labor, equipment and supplies necessary to conduct a geotechnical investigation shall be considered a part of the Geotechnical Report.

### **2.2.3 A/E DESIGN**

A/E (Architectural/Engineering) Design shall consist of all labor, equipment and supplies required to furnish a completed project design in accordance with the requirements specified herein, and in Section 01015 and Section 01335.

#### **2.2.3.1 MASTER PLAN**

The Contractor shall prepare a programmatic Master (Site) Plan, designed to include all requirements required herein. The Master Plan shall include all locations of construction office/storage containers, lay-down and construction debris removal area. The development of the master plan will include participation in a charrette that will be conducted at the Corps of Engineers Area or Resident Office administering the contract, if deemed necessary by the Government. The charrette shall be scheduled to occur within ten (10) calendar days of Notice to Proceed. The programmatic Master Plan shall be submitted to the Government no later than thirty (30) days after Notice to Proceed.

Development of the compound contained within the Perimeter Security Wall should utilize the most suitable land for construction, and shall be planned in accordance with the Concept Site Plan. Facilities shall not be located in wadis or dry river beds. The sidewalk network as illustrated on the Concept Site Plan shall be modified so that sidewalks are located to connect to building entrances.

The proposed costs of the Master Plan shall be included as part of the line item "A/E Design" in the 00100 Bid Schedule.

## **2.2.4 RECORD DRAWINGS**

Record Drawings shall consist of all labor, equipment and supplies required to produce Record (As-Built) Drawings in accordance with the requirements specified in Section 01335 and 01780A.

## **2.3 SITE DEVELOPMENT**

### **2.3.1 SITE PREPARATION**

The Contractor shall demolish and dispose all existing site structures, vegetation, debris, concrete, utilities, foundations and structures, at the site prior to commencement of new work.

### **2.3.2 SITE GRADING AND STORMWATER MANAGEMENT**

Site grading and drainage features shall conform to the requirements and references specified in the 01015 Technical Requirements. All drainage shall be conveyed off site; stormwater retention is not permitted as a drainage solution.

**The Contractor shall be aware that potentially there will be a large amount of cut, fill, and grading on this project to mitigate stormwater/flooding issues and shall bid accordingly. All grading and infrastructure quantities are to be determined by the Contractor.**

**The overall site maximum slope shall not exceed 5%, therefore, terracing or retaining walls may be required. Terraces require erosion control measures and shall have a maximum slope of 1V:3H.**

**NOTE:** The Contractor shall be aware that there are several 'wadis' and drainage pathways through the site that must be accounted for in the drainage plan. The drainage plan shall be in accordance with all requirements in Section 01015.

#### **2.3.2.1 MITIGATION OF ONSITE WADIS**

Contractor shall grade the site, or design and construct via engineered means, to divert surface rainwater (stormwater) around the compound as water flows from the elevated areas in the surrounding areas of the compound to the existing wadi on the opposite side of the compound.

The proposed costs of this item shall be included as part of the line item "Site Grading and Stormwater Management" in the 00010 Bid Schedule.

### **2.3.3 WELL**

Drill and construct one (1) water WELL to a minimum depth of 150 meters and a maximum depth of 200 meters in accordance with Section 01015. This CLIN includes all labor material and equipment for the entire well stem except for what is delineated in paragraph 2.3.3.1 of this scope of work.

#### **2.3.3.1 WELL CASING AND SCREEN MATERIAL**

Under this Unit Price item, the Government may provide the well casing and screen material for this compound. The casing and screen material will be suitable for a well of the depth required at this project site. The Contractor shall provide all skilled and unskilled labor, materials (except the casing and screen material), and tools and equipment necessary to complete all activities associated with the foundation, erection/installation, plumbing, electric, etc for the entire system except the well casing and screen material if provided as GFM&E. The Contractor shall provide only a price for the cost of the Well Casing and Screen Material under this CLIN. If this material is provided by the Government it will expect a full credit for this line item.

### **2.3.4 POTABLE WATER SYSTEM AND STORAGE**

Design and construct a Potable Water System (PWS), served by the well, to include one ( ELEVATED WATER TANK ) above ground storage tank with the remaining water stored in a ground surface mounted water storage tank(s). Total water storage shall be 232,500 liters

The Storage Tank(s) shall be located adjacent to the water well as illustrated on the Concept Site Plan.

The water system shall be constructed in conformance with Section 01015, the government provided drawings, AED Design Requirements, and UFC 3-230-03A Water Supply. This CLIN includes all labor material and equipment for the entire potable water system and storage system except for what is delineated in paragraph 2.3.4.1 and 2.3.4.2 of this scope of work.

#### **2.3.4.1 ELEVATED WATER STORAGE TANK AND 20 METER HIGH WATER TOWER**

Under this Unit Price item, the Government may provide the 26,500 liter/7,000 gallon capacity water tank and a 20-meter water tower for the tank. This Unit Price item only includes the tank and tower. The tower will consist of only the steel structure in pieces that will be able to be erected without welding (See the 20 METER WATER TOWER drawings in Appendix A, Drawings S3-S20). The associated elevated water tank will consist of prefabricated steel panels in pieces and will be able to be erected without welding. All bolts, washers, and nuts required for both the tower and tank will be provided. In addition, the tank will be provided with all required welded in components to connect it and the tower to the domestic water system. The Contractor shall provide all skilled and unskilled labor, materials (except the tank and tower as described in the above sentences), and tools and equipment necessary to complete all activities associated with the foundation, erection/installation, plumbing, electric, etc for the entire system except the tank and tower material if provided as GFM&E. The Contractor shall provide only a price for the cost of the Elevated Water Storage Tank and 20 Meter High Water Tower under this CLIN. If this material is provided by the Government it will expect a full credit for this line item.

#### **2.3.4.2 WELL PUMP**

Under this Unit Price item, the Government may provide the well pump for this compound. The well pump will be suitable for pumping water from a well of the depth anticipated at this project site. The Contractor shall provide all skilled and unskilled labor, materials, and tools and equipment (except the well pump) necessary to complete all activities associated with the foundation, erection/installation, plumbing, electric, etc for the entire system except the well pump if provided as GFM&E. The Contractor shall provide only a price for the cost of the Well Pump under this CLIN. If this material is provided by the Government it will expect a full credit for this line item.

### **2.3.5 WASTEWATER COLLECTION AND TREATMENT SYSTEM**

The Wastewater Collection and Treatment system shall be designed and constructed in accordance with 01015 Technical Requirements. The Wastewater Collection System shall consist of gravity sewer pipe network and all accessories such as manholes, cleanouts, and building service connections. The Collection System shall connect to the Wastewater Treatment Plant (WWTP).

#### **2.3.5.1 WASTEWATER TREATMENT PLANT**

The Contractor shall design and construct a wastewater treatment plant according to the requirements in Section 01015.

The wastewater treatment plant (WWTP) shall be a partial mix aeration lagoon system that has features including but not limited to a lift/pump station (if necessary), headworks, aeration pond, settling pond, sludge drying lagoons, and chlorine contact tank. In addition the Contractor shall design and construct a support building(s) for lab/office/storage space. The capacity of the wastewater treatment plant shall be 93,000 liters per day. Refer to the Site Concept Plan attached in the Appendix for the general location of the WWTP. The waste water treatment lagoon system shall be designed and constructed such that the system shall not be flooded by a 20-year storm event and shall include considerations for potential flooding events originating upstream.

The Contractor shall design and construct a 35 m<sup>2</sup> CMU building. . The Contractor shall provide lighting per Section 01015. The exterior finish shall be stucco per Section 01015. Interior Construction: The interior wall surfaces shall be painted plaster. No painted plywood or other wood panel product shall be used. Metal roofing on an overbuilt structure shall be used. The slope of the roof shall be a minimum of 2V:10H. The exterior door and frame shall be galvanized with a factory applied finish. Electrical: provide wall outlets, electric heating, ceiling fan, and an exhaust fan with makeup air opening. The Contractor shall provide one (1) counter mounted stainless steel sink, (1) one stainless work table. Provide hot and cold water, drain and venting for the sink. Provide a floor drain and hose bib to facilitate wash down of the laboratory.

The Contractor shall design and construct an approximately 14 m<sup>2</sup> CMU chemical feed/storage building as part of the waste water treatment plant. The chemical feed/storage building shall contain all hypochlorite system components and space for chemical storage. The chemical feed/storage building shall be adequately ventilated to prevent accumulation of chemical off gases. The Contractor shall provide a hose bib in the building and floor drain. The Contractor shall provide lighting per Section 01015. The exterior finish shall be stucco per Section 01015. Interior Construction: The interior wall surfaces shall be painted plaster. No painted plywood or other wood panel product shall be used. Metal roofing on an overbuilt structure shall be used. The slope of the roof shall be a minimum of 2V:10H. The exterior door and frame shall be galvanized with a factory applied finish. Provide two (2) aggregate surfaced vehicle parking spaces. Provide aggregate surfaced driveways and driving lanes as necessary.

The wastewater treatment plant shall be surrounded with a 3 m high chain link security fence with Y channel and triple strand concertina wire on top. The fence shall have one (1) lockable personnel gate and two (2) lockable double swing arm gates. The fencing shall be offset a minimum of 8 m from the exterior walls of buildings and other wastewater treatment plant facilities. Construct the fencing and gates per the Fencing Details provided in the Appendix.

WWTP Outfall: The Contractor shall design and construct a gravity or force main outfall pipe from the waste water treatment lagoon system to the nearest wadi or suitable off site drainage ditch. The design and construction of the outfall shall include measures to prevent erosion due to the flow from the Wastewater Treatment Plant.

Backup Power: The Contractor shall design and construct a backup power generator system for the waste water treatment system which is independent of the prime power plant. The Contractor shall ensure that the backup power generator system will accommodate the waste water facility's power requirements. The backup power generator system shall provide fuel storage for the generator with capacity to provide 48 hours of continuous generator run time along with an electrical distribution system to the facility. Additional requirements for the backup power system are in Section 01015. The generator and the fuel storage shall be placed on a concrete pad with secondary containment capable of holding 110% of the fuel storage tanks volume. Additionally the generator/fuel storage station shall have a metal canopy over it to protect it from weather and prevent water from accumulating in the secondary containment.

### **2.3.6 ELECTRICAL GENERATION AND DISTRIBUTION SYSTEM**

Design and construct an Electrical Generation and Distribution system.

Design and construct all components of an Electrical Generation and Distribution System, to include generator(s), fuel tank(s), switchgear, and all other components. Design all parts of the system in accordance with Section 01015, and the referenced codes/publications. "Generator(s), fuel tank(s), and switchgear shall be located at the Fuel Storage, Generator Canopy and Vehicle Fuel Point" area, described herein.

**The Contractor shall fill generator tank(s) with fuel at project turnover, after successful completion of commissioning.** Contractor is also responsible for providing fuel for the commissioning. This CLIN includes all labor material and equipment for the entire electrical generation and distribution system except for what is delineated in paragraph 2.3.6.1 Generator Set and 2.3.6.2 Generator Fuel Tank of this scope of work.

#### **2.3.6.1 GENERATOR SET**

Under this Unit Price item, the Government may provide the generator for this compound. The generator set consists of only the generator unit. The Contractor shall provide all skilled and unskilled labor, materials, and tools and equipment necessary to complete all activities associated with the foundation, erection/installation, plumbing, electric, etc for the entire system (except the generator set) if provided as GFM&E. The Contractor shall provide

only a price for the cost of the Generator Set under this CLIN. If this material is provided by the Government it will expect a full credit for this line item.

### **2.3.6.2 GENERATOR FUEL TANK**

Under this Unit Price item, the Government may provide the fuel tank(s) for this compound. The fuel tank(s) will be suitable for the adequate storage of diesel fuel per the requirement for the compound. The fuel tank(s) will include saddles stands, man-way, and fittings on the tank to connect to the fuel lines. The Contractor shall provide all skilled and unskilled labor, materials (except the fuel tank as described in the above sentences), and tools and equipment necessary to complete all activities associated with the foundation, erection/installation, plumbing, electric, etc for the entire system except the fuel tank if provided as GFM&E. The Contractor shall provide only a price for the cost of the Generator Fuel Tank under this CLIN. If this material is provided by the Government it will expect a full credit for this line item.

**Three (3) fuel storage tanks of 30,000 liter capacity are required to support the Generator installation.**

**The final design of the fuel tanks shall provide the quantities identified in this Section and Description while using the "Standard Design" drawings for concept and basic configuration.**

### **2.3.7 COMMUNICATION SYSTEM**

Design and construct the communications infrastructure. The communications ductbank system shall extend from the Administration/Headquarters Buildings to all guard towers, guard shacks and guard houses. The communications wiring shall be installed by others. Communication infrastructure shall be designed and constructed in accordance with Section 01015, Technical Requirements.

Backbone Pathway: Telecommunication pathways from the telecommunications entrance facility to telecommunications room(s), and, telecommunications equipment rooms (backbone conduits) shall be installed.

### **2.3.8 FUEL STORAGE, GENERATOR CANOPY, AND VEHICLE FUEL POINT**

Contractor shall design and construct a diesel (vehicle) fuel storage and dispensing system, including remote Fuel Delivery Point and all necessary components and installation of all required equipment and tanks in accordance with Section 01015 and standard drawings titled "17 Fuel Generators Canopy".

Sizing of the generator fuel storage tanks shall be in accordance with requirements as described in Section 01015.

**Contractor shall fill each fuel tank with fuel at project turnover after successful completion of commissioning.**

Contractor shall design and construct a canopy and enclosures to house the Fuel Tanks, Electrical generators and switchgear as conceptually illustrated in Appendix drawings titled "17 Fuel Generator Canopy" as follows:

Containment Dike: All fuel tanks shall be enclosed within a containment dike consisting of a concrete slab on grade and containment wall per provided drawings.

Protection wall: A fully grouted non-structural continuous 200mm masonry block wall shall fully enclose both all of the fuel tanks and the generators along with their associated switch gear and controls on the north, east and west sides. The protection wall shall end 1 meter from the Perimeter Security Wall so as to provide access to the equipment and tanks for service and general maintenance. The protection wall shall be 3meters height above the concrete slab and maintain a minimum 1 meter clearance from all tanks and components within.

Canopy: All equipment, Fuel Tanks, Generators and Switchgear shall be housed under one common steel canopy structure as illustrated in standard drawings Appendix A. Canopy height shall be 1m minimum clear above wall enclosure below.

This CLIN includes all labor material and equipment for the entire fuel storage, generators, canopy and vehicle fuel point except for what is delineated in paragraph 2.3.8.1 Vehicle Fuel Tank, 2.3.8.2 Fuel Pump and 2.3.8.3 Fuel Dispenser of this scope of work.

### **2.3.8.1 VEHICLE FUEL TANK**

Under this Unit Price item, the Government may provide the fuel tank(s) for this compound. The fuel tank(s) will be suitable for the adequate storage of diesel fuel per the requirement for the compound. The fuel tank(s) will include saddles stands, man-way, and fittings on the tank to connect to the fuel lines. The Contractor shall provide all skilled and unskilled labor, materials (except the fuel tank as described in the above sentences), and tools and equipment necessary to complete all activities associated with the foundation, erection/installation, plumbing, electric, etc for the entire system except the fuel tank if provided as GFM&E. The Contractor shall provide only a price for the cost of the Vehicle Fuel Tank under this CLIN. This credit shall be listed under item Vehicle Fuel Tank. If this material is provided by the Government it will expect a full credit for this line item.

### **2.3.8.2 FUEL PUMP**

Under this Unit Price item, the Government may provide the fuel pump(s) for this compound. The fuel pump(s) will be suitable for the fuel delivery from the tank to the fuel dispenser to meet the fueling requirements for the compound. The fuel pump(s) will include skid rail, duplex pumps, valves and fittings (on the skid), control panel, connectors for power, and enclosure for either the control panel or an entire skid depending on the manufacture. The Contractor shall provide all skilled and unskilled labor, materials, and tools and equipment (except the fuel pump as described in the above sentences) necessary to complete all activities associated with the foundation, erection/installation, plumbing, electric, etc for the entire system except the fuel pump if provided as GFM&E. The Contractor shall provide only a price for the cost of the Fuel Pump(s) under this CLIN. If this material is provided by the Government it will expect a full credit for this line item.

### **2.3.8.3 FUEL DISPENSER**

Under this Unit Price item, the Government may provide the fuel dispenser(s) for this compound. The fuel dispenser(s) will be suitable for the adequate delivery of fuel to vehicles to meet the fueling requirements for the compound. The fuel dispensers(s) will include enclosure, suction pumps, meter, power connection, hose and nozzle, and pipe fitting at the dispenser(s). The Contractor shall provide all skilled and unskilled labor, materials, and tools and equipment (except the fuel dispenser(s) as described in the above sentences) necessary to complete all activities associated with the foundation, erection/installation, plumbing, electric, etc for the entire system except the fuel dispenser if provided as GFM&E. The Contractor shall provide only a price for the cost of the Fuel Dispenser under this CLIN. This credit shall be listed under item Fuel Dispenser. If this material is provided by the Government it will expect a full credit for this line item.

### **2.3.9 ASPHALT ROADWAYS/DRIVEWAYS AND PARKING**

Construct asphalt-surfaced roadways/driveways, located as illustrated on the Concept Site Plan. All roadways located inside the Perimeter Security Wall shall match what is listed on the Concept Site Plan.

Parking areas shall be designed so that parking space sizes and quantities match what is listed on the Concept Site Plan.

Provide a 100m long convoy asphalt paved stage area as shown on the Concept Site Plan.

### **2.3.10 AGGREGATE ROADWAYS/DRIVEWAYS/SIDEWALKS AND PARKING**

Construct aggregate roadways/driveways/sidewalks and parking areas, shall be located as illustrated on the Concept Site Plan. All roadways/driveways located outside the Perimeter Security Wall shall be aggregate.

Native crushed stone max. 20mm diameter and to 100 mm depth, shall be placed around a 3-meter perimeter of all buildings and structures.

Provide a 5,000sm aggregate motor pool area as shown on concept site plan.

All sidewalks shown on the concept site plan shall be aggregate.

### **2.3.11 FLAG POLES**

Construct two (2) 10m tall aluminum flagpoles with a common at-grade reinforced concrete base, located as illustrated on the Concept Site Plan, in accordance with the Standard Design drawings.

## **2.4 FORCE PROTECTION**

### **2.4.1 PERIMETER SECURITY WALL**

Construct a masonry or native stone Perimeter Security Wall, as illustrated on the Concept Site Plan, in accordance with the government provided Standard Drawings and all other requirements herein.

Construct stone masonry wall with reinforced concrete core as shown on Standard Drawing detail with following exceptions: The top of wall height shall be 3000mm **above grade** (in lieu of the 2400mm as currently detailed), with a single strand of concertina wire on the outriggers. The footing width shall be 1450mm (in lieu of 1300mm width as currently detailed), and centered under wall. The footing reinforcement shall be #16 bars @ 300mm on center each way, at the top and bottom of the wall footing.

### **2.4.2 FENCING, GATES, AND BARRIERS**

Provide chain-link fencing and gates at each of the following locations, as illustrated on the Concept Site Plan: at the DFAC service yard, surrounding the Female Barracks, the Motor Pool area (to include the Vehicle Maintenance and POL Buildings) and the Waste Water Treatment Plant and lagoon. Provide double-leaf swinging lockable gates at chain-link fences to allow direct vehicular access to the Dining Facility service area, and Motor Pool driveways. Fencing and gates shall be constructed in accordance with the Standard Design drawings.

Provide 3meter high chain-link fence to surround the Motor Pool area, to include the Vehicle Maintenance and POL Buildings. Provide double-leaf swinging gates at the two driveways into the Motor Pool area, in the driveway location illustrated on the Concept Site Plan.

At the Female Barracks, provide a 3 meters in height chain link fence 5-meters from building perimeter. Provide lockable entry gates through chain link fenced area at each sidewalk leading from a building entrance.

At the Wastewater Treatment Plant and lagoon, provide a 3 meters in height chain link fence 3 meters minimum from the perimeter of the plant. Provide lockable entry gates through chain link fenced area

Provide one (1) Personnel Gate in the Perimeter Wall at the man-door location illustrated on the Concept Site Plan. Gate shall be constructed in accordance with the Standard Design drawings.

Concrete barrier walls shall be located in areas as illustrated on the Concept Site Plan.

Provide and install Drop-Arm gates at locations as illustrated on the Concept Site Plan. Gates shall be constructed in accordance with the Standard Design drawings.

Provide Sliding Steel Gates at entrance/exit points into the compound, located as illustrated on the Concept Site Plan. All Sliding Steel Gates shall be constructed in accordance with the Standard Design drawings.

Provide speed bumps on approach to exterior drop-arm checkpoint at all ECP locations.

## **2.5 FACILITIES**

### **2.5.1 ADMINISTRATION BUILDING W/ WOOD STOVE HEAT**

Construct one (1) Administration Building w/ Wood Stove Heat, located as illustrated on the Concept Site Plan. Administration Building shall be constructed in accordance with the provided Standard Building Design drawings, entitled "01\_AD13\_Admin Bldg\_Type2W (1446)".

Provide window screens for windows in all rooms throughout the building.

### **2.5.2 DINING FACILITY**

Construct one (1) Dining Facility, located as illustrated on the Concept Site plan. Dining Facility shall be constructed in accordance with the provided Standard Building Design drawings, entitled “02\_Dining\_Facility\_Type\_2\_(559 GSM)\_WS”.

Provide window screens in all windows throughout the building.

### **2.5.3 TRAINING BUILDING W/ WOOD STOVE HEAT**

Construct one (1) Training Building, located as illustrated on the Concept Site Plan. Training Building shall be constructed in accordance with the provided Standard Building Design drawings, entitled “03\_CL06\_Traing Bldg (Wood)”.

The operable partition shall be omitted from the design.

### **2.5.4 OPEN BAY BARRACKS W/ WOOD STOVE HEAT**

Construct three (3) Open Bay Barracks, located as illustrated on the Concept Site Plan. Open Bay Barracks shall be constructed in accordance with the provided Standard Building Design drawings, entitled “04\_B13\_Open Bay Barracks\_Type 2W (579)”.

Provide three (3) clotheslines, constructed in accordance with the Standard Design drawings, adjacent to the Barracks Building; clothesline shall not be located in the Assembly Area, illustrated on the Concept Site Plan.

### **2.5.5 SENIOR BARRACKS W/ WOOD STOVE HEAT**

Construct two (2) Senior Barracks, located as illustrated on the Concept Site Plan. Senior Barracks shall be constructed in accordance with the provided Standard Building Design drawings, entitled “05\_B12\_Senior Barracks\_Type 1W (862)”.

Provide three (3) clotheslines, constructed in accordance with the Standard Design drawings, adjacent to the Barracks Building; clothesline shall not be located in the Assembly Area, illustrated on the Concept Site Plan.

### **2.5.6 FEMALE BARRACKS W/ WOOD STOVE HEAT**

Construct one (1) Female Barracks, located as illustrated on the Concept Site Plan. Female Barracks shall be constructed in accordance with the provided Standard Building Design drawings, entitled “06\_B25 - Womens Barraks”.

Provide three (3) clotheslines, constructed in accordance with the Standard Design drawings adjacent to the Female Barracks, as illustrated on the Concept Site Plan.

### **2.5.7 LATRINES**

Construct three (3) Latrines, located in accordance with the Concept Site Plan. Latrines shall be constructed in accordance with the provided Standard Building Design drawings, entitled “07\_L02-Latrine (Medium)”.

### **2.5.8 GUARD TOWERS**

Construct five (5) Guard Towers, located in accordance with the Concept Site Plan. Guard Towers shall be constructed in accordance with the provided Standard Building Design drawings, entitled “08\_FP04a\_GT Walk and Fence”.

The design of the Guard Tower shall be flipped or mirrored for particular locations, so that its orientation matches to the Concept Site Plan.

### **2.5.9 GUARD SHACKS**

Construct three (3) Guard Shacks, located in accordance with the Concept Site Plan. Guard Shacks shall be constructed in accordance with the provided Standard Building Design drawings entitled "09\_Guard Shack".

### **2.5.10 GUARD HOUSE W/ WOOD STOVE HEAT**

Construct one (1) Guard House, located in accordance with the Concept Site Plan. Guard Shacks shall be constructed in accordance with the provided Standard Building Design drawings, entitled "10\_FP07\_Guard House".

### **2.5.11 WELL HOUSE**

Construct one (1) Well House located in general accordance to the Concept Site Plan; the Well House shall be located at the drilled Well site. Well House shall be constructed in accordance with the provided Standard Building Design drawings, entitled "11\_Well House".

### **2.5.12 SECURE STORAGE BUILDING (ASP)**

Construct one (1) Secure Storage Buildings (Ammunition Supply Point), located in accordance with the Concept Site Plan. Secure Storage Buildings shall be constructed in accordance with the provided Standard Building Design drawings, entitled "12\_Secure Storage". No other buildings or structures shall be located within a 45 meter standoff distance from the Secure Storage Buildings.

### **2.5.13 VEHICLE MAINTENANCE AND POL BUILDING**

Construct one (1) Vehicle Maintenance and one (1) Petroleum, Oil and Lubricant (POL) Building, located in accordance with the Concept Site Plan. The Vehicle Maintenance and POL Building shall be constructed in accordance with the provided Standard Building Design drawings, entitled "13\_Vehicle Maintenance & POL Building".

### **2.5.14 WAREHOUSE**

Construct two (2) Warehouses, located in accordance with the Concept Site Plan. The Warehouses shall be constructed in accordance with the provided Standard Building Design drawings, entitled "14\_Warehouse Building".

The Warehouses shall be oriented such that the overhead door is facing the adjacent roadway.

### **2.5.15 TRASH COLLECTION POINT**

Contractor shall construct two (2) Trash Collection Points, located in accordance with the Concept Site Plan. Trash Collection Points shall be constructed in accordance with the provided Standard Building Design drawings, entitled "15\_Trash Point".

### **2.5.16 SMALL ARMS MAINTENANCE BUILDING**

Construct one (1) Small Arms Maintenance Building, located in accordance with the Concept Site Plan. Small Arms Maintenance Building shall be constructed in accordance with the provided Standard Building Design drawings, entitled "16\_Arms Storage".

Exterior doors shall be heavy duty steel security grade. Design and construct wooden racks in each Arms Room for storing long-arm weapons vertically; racks shall not be furnished with locking bars.

Provide explosion-proof interior lighting. Provide exterior lighting on the corners of the building sufficient to light an area 30 m from the building.

**-- END OF SECTION --**

**SECTION 01015  
TECHNICAL REQUIREMENTS**

**1.0 GENERAL**

**1.1 COMPLIANCE**

The Contractor's design must comply with Technical Requirements contained herein. The Contractor's designer shall have a minimum of 5 years experience with the design and construction of the same magnitude and complexity as required in this project. The Contractor shall provide design and construction using the best blend of cost, construction efficiency, system durability, ease of maintenance and environmental compatibility.

Technical Requirements, as included in this Section, shall only be used for Work that is to be designed per the contract requirements. Work that is to be constructed using the provided Standard Designs shall not use the Technical Requirements herein; that Work shall be built to the requirements of the 01010, the Standard Designs.

**1.2 MINIMUM & ALTERNATE REQUIREMENTS**

The design and product requirements stated in these documents are minimum requirements. Exceeding the minimum requirements for the equipment and products as improvements to the design stated herein is highly encouraged at no additional cost and as approved by the government. The technical requirements listed in Codes and Technical Criteria, Section 1.8, apply to this project. Any deviation from the technical requirements shall be approved by the Contracting Officer. Request for deviations shall be submitted for approval. Variations shall furnish the same system safety, durability, ease of maintenance and environmental compatibility. The Contractor will be required to submit information as specified in Section 01335, 3.6.4 Variations, for all proposed variations with which to make a comprehensive comparison of the proposed alternate. All variations of approved designs must be approved by the Contracting Officer.

**1.3 ASBESTOS CONTAINING MATERIALS**

Asbestos containing material (ACM) shall not be used in the design and construction of this project. If no other material is available which will perform the required function or where the use of other material would be cost prohibitive, a waiver for the use of asbestos containing materials must be obtained from the Contracting Officer.

**1.4 SAFETY**

**1.4.1 UNEXPLODED ORDNANCE (UXO)**

**1.4.2 UXO/MINE DISCOVERY DURING PROJECT CONSTRUCTION**

It is highly recommended that all construction ground guide/ground observation personnel maintain a minimum 16 m buffer zone from all heavy equipment during excavation activities. A daily check of the area for signs of recently emplaced UXO/IED's is also highly recommended, to include unusual disturbed soil areas or mounds of soil from the previous day. If during construction, the contractor becomes aware of or encounters UXO/Mine or potential UXO/Mine, the contractor shall immediately stop work at the site of encounter, clearly mark the area of UXO/Mine, move to a safe location, notify the COR, and mitigate any delays to scheduled or unscheduled contract work. Once the contractor has informed the COR, the contractor will await further direction. UXO/Mine disposal will not be the responsibility of the Contractor.

**1.5 LIMITATION OF WORKING SPACE**

The Contractor shall, except where required for service connections or other special reason(s), confine his operations strictly within the boundaries of the site. Workmen will not be permitted to trespass on adjoining property. Any operations or use of space outside the boundaries of the site shall be by arrangement with all interested parties. It

must be emphasized that the Contractor must take all practical steps to prevent his workmen from entering adjoining property and in the event of trespass occurring the Contractor will be held entirely responsible.

Areas located immediately outside the construction area are known to contain mines and unexploded ordnance (UXO). Contractors assume all risks when venturing in or out of the designated work area.

## **1.6 TEMPORARY STRUCTURES**

The Contractor shall erect suitable temporary fences, lighting, and necessary structures to safeguard the site, materials and plant against damage or theft and for the protection of the general public and shall adequately maintain the same throughout the course of the contract.

## **1.7 SUBCONTRACTORS**

Compliance with the provisions of this section by subcontractors will be the responsibility of the contractor.

## **1.8 LIST OF CODES AND TECHNICAL CRITERIA**

The following codes and technical criteria and those referenced therein shall be required for this project. References within each reference below shall be required and adhered to. If there is conflict in the criteria the most stringent requirement shall be applied. This list is not exhaustive and is not necessarily complete. The publications to be taken into consideration shall be those of the most recent editions.

AABC - Associated Air Balance Council (National Standards for total System Balance)

ACI 301M Specifications for Structural Concrete, latest edition, American Concrete Institute

ACI 318 Building Code Requirements for Structural Concrete, latest edition, American Concrete Institute

ACI 530/ASCE 5/TMS 402, Building Code Requirements for Masonry Structures, latest edition

Air Force Manual 32-1071, Security Engineering, volumes 1-4, 1 May 1994

American Institute of Steel Construction (AISC), Specifications for Structural Steel Buildings (latest edition)

American Petroleum Institute (API) Codes

American Water Works Association, ANSI/AWWA C651-99 standard

AISC 360 Specification for Structural Steel Buildings, latest edition, American Institute of Steel Construction

AISC 341 Seismic Provisions for Structural Steel Buildings, latest edition

American Water Works Association, ANSI/AWWA C651-99 standard

AR 190-11, Physical Security of Arms, Ammunition, and Explosives, latest edition

ASCE 7-05, Minimum Design Loads for Buildings and Other Structures

ASHRAE - American Society of Heating, Refrigeration and Air-Conditioning

Engineers Handbooks latest editions: Fundamentals; HVAC Systems and Equipment; HVAC Applications; Refrigeration.

ASHRAE Standard 55-latest edition, Thermal Environmental Conditions for Human Occupancy

ASHRAE Standard 62.1-latest edition, Ventilation for Acceptable Indoor Air Quality

ASHRAE Standard 62.2-latest edition, Ventilation and Acceptable Indoor Air Quality for Low-Rise Residential

ASHRAE Standard 90.1-latest edition, Energy Standard for Buildings Except Low-Rise Residential Buildings

ASHRAE Standard 90.2-latest edition with Supplement, Energy-Efficient Design of Low-Rise Residential Buildings

ASME - American Society for Mechanical Engineering  
ASTM - American Society for Testing and Materials  
ASTM-D-1586 Standard Test Method for Standard Penetration Test  
ASTM-D-5299 Standard Guide for Decommissioning Ground Water Wells  
AWS D1.1, Structural Welding Code – Steel, American Welding Society  
Design Standard per Memorandum for Record, Design Standards, DTD 16 August 2009 BT, Appendix B-1 and B-2  
DoD Ammunition and Explosives Safety Standards  
EIA ANSI/TIA/EIA-607: Commercial Building Grounding/Bonding Requirement Standard  
Factory Mutual (FM) Approval Guide-Fire Protection (2002)  
IBC – International Building Code, latest edition  
BS 7671 British Standard for Electrical Installations requirements  
IEEE C2, National Electrical Safety Code (NESC), latest edition  
IFGC – International Fuel Gas Code, latest edition  
IMC – International Mechanical Code, latest edition  
IPC – International Plumbing Code, latest edition  
Lighting Handbook, IESNA, latest edition  
MIL-HDBK-1190, Facility Planning and Design Guide  
National Association of Corrosions Engineers (NACE) Codes  
Codes and Standards of the National Fire Protection Association (NFPA), as applicable and enacted in 2002 or later.  
NFPA 1, General Fire Protection, latest edition  
NFPA 10, Portable Fire Extinguishers, latest edition  
NFPA 30, Flammable and Combustible Liquids Code, latest edition  
NFPA 30A, Code for Motor Fuel Dispensing Facilities and Repair Garages, latest edition  
NFPA 54, National Fuel Gas Code, latest edition  
NFPA 58, Liquefied Petroleum Gas Code, latest edition  
NFPA 70, National Electrical Code, latest edition  
NFPA 72, National Fire Alarm Code, latest edition  
NFPA 75, Standard for the Protection of Information Technology Equipment  
NFPA 80, Fire Rated Doors and Windows, latest edition  
NFPA 90A, Air Conditioning and Ventilating Systems, latest edition  
NFPA 96, Fire Protection for Commercial Kitchens, latest edition  
NFPA 101, Life Safety Code, latest edition  
NFPA 110, Standard for Emergency and Standby Power Systems, latest edition  
NFPA 221, Standard for Chimneys, Fireplaces, Vents, And Solid Fuel–Burning Appliances, latest edition  
NFPA 1141, Site Fire Protection, latest edition  
Plumbing and Drainage Institute (PDI-WH-201) water hammer arrestors  
International Mine Action Standards, latest edition; (see <http://www.mineactionstandards.org> for copy of standards)

SMACNA-Sheet Metal and Air Conditioning Contractors' national Association, Standards and Guides  
TM 5-785 Weather Data  
TM 5-805-4 Noise and Vibration  
UFC 1-200-01, Design: General Building Requirements  
UFC 1-300-07A, Design Build Technical Requirements  
UFC 1-300-09N, Design Procedures  
UFC 3-220-03fa, Soils and Geology  
UFC 3-230-03a, Water Supply, latest edition  
UFC 3-230-04a, Water Distribution, latest edition  
UFC 3-230-06a, Subsurface Drainage, latest edition  
UFC 3-230-07a, Water Supply: Sources and General Considerations, latest edition  
UFC 3-230-08a, Water Supply: Water Treatment, latest edition  
UFC 3-230-09a, Water Supply: Water Storage, latest edition  
UFC 3-230-10a, Water Supply: Water Distribution, latest edition  
UFC 3-230-13a, Water Supply: Pumping Stations, latest edition  
UFC 3-230-17FA, Drainage in Areas Other than Airfields, latest edition  
UFC 3-240-03N, Operation and Maintenance: Wastewater Treatment System Augmenting Handbook, latest edition  
UFC 3-240-09fa Domestic Wastewater Treatment, latest edition  
UFC 3-240-07fa Gravity Sewers, latest edition  
UFC 3-240-04A Wastewater Collection latest edition  
UFC 3-310-01, Structural Load Data  
UFC 3-310-02A, Structural Design Criteria for Buildings  
UFC 3-301-01 Structural Design Criteria for Buildings  
UFC 3-410-01FA, Heating, Ventilation and Air Conditioning  
UFC 3-410-02A, HVAC Control Systems, latest edition  
UFC 3-410-04N, Industrial Ventilation  
UFC 3-420-01, Plumbing Systems Design  
UFC 3-420-02FA, Compressed Air  
UFC 3-430-01FA, Heating and Cooling Distribution Systems  
UFC 3-460-01, Petroleum Fuel Facilities  
UFC 3-501-03N, Electrical Engineering Preliminary Considerations, latest edition  
UFC 3-520-01, Interior Electrical Systems, latest edition  
UFC 3-520-05, Stationary Battery Areas, latest edition  
UFC 3-530-01AN, Design: Interior and Exterior Lighting and Controls, latest edition  
UFC 3-535-01, Visual Air Navigation Facilities, latest edition  
UFC 3-540-04N Design: Diesel Electric Generating Plants, latest edition  
UFC 3-550-03FA Design: Electrical Power Supply and Distribution Systems, latest edition

UFC 3-550-01 Exterior Electrical Power Distribution, latest edition  
UFC 3-600-01, Design: Fire Protection Engineering for Facilities, 14 Jul 2009  
UFC 4-010-01, Design: Minimum DoD Antiterrorism Standards for Buildings, latest edition  
UFC 4-010-02, DoD Minimum Antiterrorism Standoff Distances for Buildings, latest edition  
UFC 4-020-03, Security Engineering: Fences, Gates, and Guard Facilities, 14 June 2007  
UFC 4-020-01FA, Security Engineering: Project Development, latest edition  
UFC 4-020-02FA, Security Engineering: Concept Design, latest edition  
UFC 4-020-03FA, Security Engineering: Final Design, latest edition  
UFC 4-020-04FA, Electronic Security Systems: Security Engineering, latest edition  
UFC 4-021-01, Design and O&M: Mass Notification Systems, latest draft version  
UFC 4-022-01, Security Engineering: Entry Control Facilities/Access Control Points, latest edition  
UFC 4-229-01N, Design: General Maintenance Facilities, latest edition  
UFC 4-022-03, Security Engineering: Fences, Gates, and Guard Facilities, latest edition  
UFC 4-722-01, Design: Dining Facilities, 27 January 2003  
UL Standards (as applicable)UL 142, Steel Aboveground Tanks for Flammable and Combustible Liquids  
Underwriters' Laboratories (UL) Fire Protection Equipment Directory (2002)UL 710, Exhaust Hood for Commercial Cooking Equipment, latest edition  
UL 752, Bullet Resisting Equipment, 2000 or later  
USCINCCENT OPORD 97-1  
Overseas Environmental Baseline Guidance Document, Department of Defense, May 2007  
Unified Facility Criteria (UFC) is available online at [http://www.wbdg.org/ccb/browse\\_cat.php?o=29&c=4](http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4)

In addition, technical criteria provided in USACE-AED Design Requirements (most recent version) shall be required for use in design and construction specifications as indicated in the following documents. The following design criteria shall be used:

AED Design Requirements - Site Layout Guidance, latest version  
AED Design Requirements - Well Pumps & Well Design/Specifications, latest version  
AED Design Requirements – Water Tank and Water Distribution Systems, latest version  
AED Design Requirements - Booster Pumps, latest version  
AED Design Requirements – Chlorinators, latest version  
AED Design Requirements - Hydro-Pneumatic Tanks, latest version  
AED Design Requirements - Jockey Pumps, latest version  
AED Design Requirements - Water Tanks, latest version  
AED Design Requirements – Hydrology, latest version  
AED Design Requirements - Culvert and Causeway Design, latest version  
AED Design Requirements - Sanitary Sewer and Septic Systems, latest version  
AED Design Requirements - Grease Trap, latest version  
AED Design Requirements - Oil-Water Separator, latest version

AED Design Requirements - Package Wastewater Treatment Plants and Lagoons, latest version

AED Design Requirements - Vertical Curves, latest version

AED Design Requirements – Horizontal Curves & Super elevation, latest version

AED Design Requirements – Geotechnical Investigations for USACE Projects, latest version

The AED Design Requirement documents can be downloaded at Afghanistan Engineering District's website located at <http://www.aed.usace.army.mil/engineeringtop2010.asp>

Standards other than those mentioned above may be accepted if the standards chosen are internationally recognized and meet the minimum requirements of the specified standards. The Contractor shall be prepared to submit proof of this if requested by the Contracting Officer.

## **1.9 AED DESIGN REQUIREMENTS DOCUMENTS**

AED Design Requirements documents (latest version) listed above shall be adhered to in this contract. These documents are available from the AED-N website located at: <http://www.aed.usace.army.mil/engineeringtop2010.asp>. These documents shall be used as the basis for design and construction, and for selecting options within the United Facilities Guide Specifications (UFGS). It is the contractor's option to use specifications contained in the AED Design Requirements Documents, when provided, or to adapt the UFGS specifications to match the requirements provided in the AED Design Documents and specifications. Site or project specific data and requirements in the AED Design Requirements documents shall supersede UFGS language where there are differing criteria which must be evaluated and selected. The AED-N electrical standards and load calculations shall not be used for designing the electrical system.

## **2.0 SITE DEVELOPMENT**

### **2.1 ENVIRONMENTAL PROTECTION**

#### **2.1.1 APPLICABLE REGULATIONS**

The Contractor shall comply with all Host Nation laws, rules, regulations or standards concerning environmental pollution control and abatement with regard to discharge of liquid waste into natural streams or manmade channels. The contractor shall review host nation and U.S. Government environmental regulations with the contracting officer prior to design and discharge of any liquid wastes into natural streams or manmade channels.

#### **2.1.2 NOTIFICATION**

The Contracting Officer will notify the Contractor in writing of any observed non-compliance with the foregoing provisions. 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 stopping all or part of the work until satisfactory corrective action has been taken. No extension of time or damages will be awarded to the Contractor unless it was later determined that the Contractor was in compliance.

#### **2.1.3 SPILLAGES**

Measures shall be taken to prevent chemicals, fuels, oils, greases, bituminous materials, waste washings, herbicides and insecticides, and construction materials from polluting the construction site and surrounding area.

#### **2.1.4 DISPOSAL**

Disposal of any materials, wastes, effluents, trash, garbage, oil, grease, chemicals, etc., shall be taken to a dumpsite off site and subject to the approval of the Contracting Officer. Burning at the project site for the disposal of refuse and debris will not be permitted.

## **2.2 CIVIL SITE DEVELOPMENT**

### **2.2.1 SITE PLAN (MASTER PLAN)**

The Contractor shall prepare plat or plan of property consisting of a Boundary and Site Survey. The survey shall show the closure of the property boundary consisting of identifying all property corners, establishing horizontal and vertical control, listing all bearing and distances of property lines from all property corners, and tie-ins (showing bearing and distance) from at least two (2) major offsite man-made or natural features. This survey shall meet the requirements of World Geodetic System 1984 (WGS 1984 UTM Zone 41North in decimal degrees). The survey design shall include topographic information with existing contour lines and spot elevations of relevant topographic features, and show the locations of all buildings, structures, major trees, road pavements right of ways, names of roads, drainage features, widths of roads, easements, right of ways, setbacks, parking and paving areas, storage containers, stoops, sidewalks and walkways, walls, fences and gates, Concrete barriers, bunkers, existing above-ground and underground utilities, dry creek beds (wadis), drainage channels, and hydrological, geological, or other physical conditions that could impact design. If there are areas where offsite surface water runoff has the potential to affect this project, topographic information of these areas will be required to be provided.

Based on the Boundary Survey and the provided Concept Site Plan, a separate Master (Site) Plan shall be prepared showing the property boundary, and all proposed surface features including but not limited to buildings/facilities, roads, setbacks, parking and paving areas, storage containers, stoops, sidewalks and walkways, above ground utilities, bunker locations. The Contractor shall identify and show perimeter walls, fences and gates, guard towers and entry control point structures. Also shown on the Site Plan shall be pertinent existing features (on-site and off-site) that will have an influence or impact on the development of the site. The Contractor shall locate the facilities in general agreement with the Concept Site Plan and any requirements in Section 01010. All site features shall be clearly defined and dimensioned on the Site Plan. Buildings shall be located to provide access for emergency vehicles and fire fighting. Roads and parking areas shall be designed for turning radius of the largest vehicle entering the compound. The site plan shall show geometric design of the site, including applicable dimensions of all exterior facilities, mechanical equipment, pavements, utilities, etc. Required facilities are described in the following sections of this specification. All roads and areas where tractor-trailer vehicles will travel shall be designed for the worst case turning radius. Design and construction of roads and pavements shall be based on recommendations from geotechnical investigation required herein.

All Master (Site) Plans shall be drawn in the following projection and datum for incorporation into the U.S. Army Corps of Engineers GIS system:

WGS 1984 UTM Zone 41 North

### **2.2.2 DEMOLITION**

Demolition shall include removal of all structures, foundations, pavements, and utilities, to include clearing and grubbing. All refuse and debris shall be disposed of off-site as described in paragraph DISPOSAL. Holes and depressions shall be backfilled and compacted in lifts not to exceed 2000 mm in height unless specified otherwise. Fill materials shall be composed of satisfactory soils or aggregates defined in ASTM D 2487 as GW, GM, GC, GP, SP, SW, SM, and SC. Minimum soil compaction shall be 95 percent of maximum density as defined in ASTM D 1557.

Scrap metal shall be the property of the Host Government. The scrap metal on site shall be moved to an area away from the site perimeter as directed by the Contracting Officer's Representative and left for the Host Government to remove and/or salvage. Demolished fencing and concertina wire shall be neatly rolled up for reuse by the host government. Likewise, used fence posts and outriggers shall be neatly stockpiled for reuse by the host government.

### **2.2.3 SITE GRADING & DRAINAGE (STORMWATER MANAGEMENT)**

The Contractor shall design and construct all necessary site grading to insure adequate drainage so that no areas will be flooded due to a 24-hour rainfall of a 20-year frequency. Drainage of the area should be compatible with the existing terrain. Provide adequate drainage to minimize flooding, and promote drainage to the nearest wadi or adequate drainage ditch for the entire development. Building floor elevation shall be a minimum 150 mm above grade and slope away from the building on all sides at a minimum of five percent for a distance of 3 m.

Rainfall data utilized for hydrology calculations shall be based on data obtained from meteorological records collected in Afghanistan. National agencies may be consulted for data. In the absence of site specific data, intensity-duration-frequency curves contained in the AED Design Requirements – Hydrology, latest edition shall be used by extrapolating the rainfall intensity information from the stations in closest proximity to the project. Under no circumstances will relationships developed by extrapolation from foreign countries be used for hydrologic studies.

The installation of culverts, sized for maximum stormwater flows, shall be required at all road and walkway locations which cross drainage ditches. All culverts at the Perimeter Security Wall shall include personnel access denial system(s). Culvert shall be designed for HS-20 loading.

The sides of all new earthen storm drainage (including canals, trenches, ditches, swales, etc) shall not have a slope greater than 1:3 (vertical: horizontal). The sides of storm drainage with greater slope is allowed, but the drainage must be lined with a stone and mortar finish or concrete lined to prevent erosion.

Place aggregate groundcover (native crushed stone) in areas to reduce erosion and to provide dust control. Contractor shall compact underlying subgrade to a minimum 95 percent of the laboratory maximum dry density as determined by ASTM D 1557, Modified Proctor test.

## **2.2.4 ROADWAYS/DRIVEWAYS**

Location, type, and width of roads, parking, maneuver, and storage areas required are stated in Section 01010. Roads, parking, maneuver, and storage areas shall be geometrically designed, graded for proper drainage, and provided with necessary drainage structures. All roads shall be of wearing surface 7.3 meters (24 feet) wide, unless required noted, graded for proper drainage, provided with necessary drainage structures and completed with prescribed surfaces in accordance with applicable sections of UFC 3-250-18FA and UFC 3-250-01FA. Contractor shall notify the Contracting Officer immediately if initial site survey determines that area hydrology requires major drainage structures or bridges. Also, the Contracting Officer shall be immediately notified if the required lengths of road or preexisting conditions are determined to be substantially or materially different than the above-described conditions/estimates.

All intersecting roads, parking, maneuver areas, storage areas, and foot paths, driveways, and culvert crossings are required to end with a smooth transition with new road profiles.

For all roads, the Contractor shall provide 1.0 m wide, aggregate base shoulder compacted to 95% maximum density that is 150 mm thick at 2.0% slope on both sides of the roadway. Provide 1.0 m wide shoulder around all parking areas, storage areas, and motor pools consisting of 150 mm thick aggregate base course material at 2.0% slope. The centerline of all roads shall be sloped a minimum of 1% and a maximum of 8%.

The roads shall be designed for HS-20 loading. All roads shall be designed geometrically with applicable sections of UFC 3-250-18FA and UFC 3-250-01FA to accommodate WB-50 vehicles with a maximum speed of 20 kilometers per hour. Pavement surfaces shall be designed for a design life of 25 years, Road Class F, Category IV.

The above pavement structures dictated above are minimum requirements. Design of roads, parking, maneuver, and storage areas shall be conducted based on geotechnical data. The geotechnical data shall be used to calculate the pavement structure using the minimum pavement structure as dictated above as a reference. Reference Section “Geotechnical” below.

Aggregate Base Course (ABC) material must be well graded, durable, uniformly moistened, and mechanically stabilized by compaction. Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure in ASTM D 1557.

### **2.2.4.1 ASPHALT ROADWAYS AND DRIVEWAYS**

All roads and areas indicated in Section 01010 to be asphalt paved shall be surfaced with minimum 50 mm thick hot mix asphalt concrete compacted at 98% maximum density placed above a minimum 200 mm thick base course minimum compacted at 95% maximum proctor density placed above 150 mm thick of scarified sub-grade compacted to 95% maximum density, unless otherwise noted.

#### **2.2.4.2 AGGREGATE ROADWAYS, DRIVEWAYS AND PARKING AREAS**

The aggregate surface road section shall have a minimum of the following: 100 mm thick aggregate base course material compacted to 95% maximum proctor density, placed above 150mm of aggregate sub base compacted to 95% maximum dry density, placed above scarified subgrade compacted to 90% maximum proctor density. The Contractor shall adhere to the material gradations per UFC 3-250-09FA.

#### **2.2.4.3 SIDEWALKS/FOOTPATHS**

The Contractor shall design and construct 100 mm thick by 1.5 m wide aggregate foot paths along roads, between buildings, parking areas, and other logically anticipated areas to serve as pedestrian foot paths and fire lanes. If footpaths are to be used as fire lanes, the fire lane shall be a minimum of 3 m wide and shall be designed for HS-20 loading.

#### **2.2.4.4 SITE GRADING AND DRAINAGE**

The road shall be built up above existing grade for storm water drainage and protection where necessary. Poor subgrade material shall be removed and replaced with clean, compactable gravel.

##### **2.2.4.4.1 STORM DRAINS**

New storm drain pipes shall be designed for gravity flow during the design storm having a recurrence interval of no less than 20 years. The hydraulic grade line shall be calculated for the storm drain system and all energy losses accounted for. Design computations shall adhere to procedures contained in UFC 3-230-17A. Storm drain systems shall be designed to provide a minimum flow velocity of 0.75 meters per second when the drains are one-third or more full.

##### **2.2.4.4.2 CONCRETE PIPE**

Reinforced concrete pipe shall be a minimum Class III. Type I cement may be used only when sulfates in the soil are 0.1 percent or less and dissolved sulfates in the surface water are 150 ppm or less. Type II cement may be used only when sulfates in the soil are 0.2 percent or less and dissolved sulfates in the surface water are 1,500 ppm or less. Only Type V cement may be used if sulfates in the soil exceed 0.2 percent or dissolved sulfates in the effluent exceed 1,500 ppm. Concrete pipe shall be assumed to have a minimum design service life of 50 years unless the Contractor determines that conditions at the site will reduce the service life. Concrete culverts and storm drains shall be protected by a minimum of 1 m of cover during construction to prevent damage by heavy construction equipment.

#### **2.2.4.5 ROAD SIGNS**

The roadway shall have proper road signage. All road signage shall be in English, Pashto and Dari. Signage shall be required to notify drivers of speed limits, approaching curves, schools, towns, speed bumps, etc. Road signs are required at every intersection of the road. Regulatory signs shall be placed such that all traffic entering the main roads from side roads will be required to stop. The bottom edge of the sign shall be a minimum of 2 meters above the road surface at the shoulder. Signage type, size and placement shall be in accordance with the UNCRSS. Details of all signs with dimensions and either coloring or notes describing the colors shall be provided.

#### **2.2.5 FORCE PROTECTION DESIGN**

The Contractor shall design and construct force protection measures. The Force Protection design shall incorporate minimum setbacks for new facilities to maximum extent possible as permitted by size of the site and the requirements of the user. Force Protection design shall also meet the requirements of UFC 4-010-01, Design: Minimum DoD Antiterrorism Standards for Buildings, 8 Oct 2003 and UFC 4-010-02, DoD Minimum Antiterrorism Standoff Distances for Buildings, 8 Oct 2003.

### **2.2.5.1 PERIMETER SECURITY WALL**

The Perimeter Security Wall shall be constructed according to the Standard Design detail in the Appendix A. Inside grade shall in all cases be higher than outside grade. The ground grade shall slope away from the wall for at least 5 meters and shall be kept a minimum of 3.0 meters below the top of wall for a minimum distance of 10 meters. The wall shall be designed to prevent visual access to the inside of compound by all pedestrian and vehicular traffic outside the compound which may require the wall to be built at a higher level in some locations. Any penetrations through the Perimeter Security Wall shall only be for site drainage purposes and shall have force protection such as a welded bar grill, welded grating, or other pre-engineered barrier.

### **2.2.5.2 OUTRIGGERS**

Outrigger supporting arms shall be “Y” shaped with middle post, securely embedded 400mm by a 50mm diameter metal tube into the top of the wall. Posts shall conform to ASTM F 1083, Pipe, Steel, Hot Dipped Zinc Coated (Galvanized) Welded. Outriggers shall be spaced a maximum of 3000mm on center.

### **2.2.5.3 ECP GATES**

### **2.2.5.4 REINFORCED BARBED TAPE**

Reinforced barbed tape shall be 600 mm diameter concertina style coil consisting of 31 loops. Each loop shall consist of 19 barb clusters per loop. Adjacent coils loops shall be alternately clipped together at three points about the circumference to produce the concertina effect upon deployment. Spacing between attachments points when deployed shall be 400 mm. The reinforced barbed tape shall be fabricated from 430 series stainless steel with hardness range of Rockwell (30N) 37-45 conforming to the requirements of ASTM A 176. Each barb shall be a minimum of 30.5 mm (1.2 inch) in length, in groups of 4, spaced on 102 mm (4 in) centers. The stainless steel core wire shall have a 2.5 mm (0.098 in) diameter with a minimum tensile strength of 895 MPa. Sixteen gauge stainless steel twistable wire ties shall be used for attaching the barbed tape to the barbed wire. The reinforced barbed tape shall be equivalent to NSN: 5660-01-457-9852.

### **2.2.5.5 CHAIN-LINK FENCE**

Chain link fence and gate fabric shall be No. 9 gage wires woven into a 50 mm diamond mesh. Fabric shall be coated with 366 grams per square meter zinc galvanizing. Posts shall be ASTM F 1083 Pipe, Steel, Hot Dipped Zinc Coated (Galvanized) Welded or equal. All fence installations shall be a minimum of 3 meters in height. The top of all fence installations and all gates shall be provided with outriggers and reinforced barbed tape as indicated above.

### **2.2.5.6 ENTRY CONTROL POINT - PERIMETER SECURITY GATES**

The Sliding Steel Vehicle Entry Gates and the Swinging Steel Personnel Gate mounted in the Perimeter Security Wall shall be constructed according to the Standard Design details in the Appendix A drawings.

The Sliding Steel Vehicle Entry Gate panel shall be framed using square and rectangular steel tube members and provided with a continuous 5 mm thick steel plate skin on both the outside and inside faces of the gate panel. Provide a minimum of 150mm x 150mm x 5mm thick square steel tube support columns at all indicated conditions. Provide ball bearing support wheels at guide support columns and four (4) evenly spaced ball bearing pulley style wheels on the bottom of the gate panel.

The personnel gate shall be swing type. Hinged gates shall be 1.2 meters wide x 3 meters height leaf constructed of square shaped steel tube framing members and square shaped steel tube intermediate posts and rails. The design of the gates shall insure that it is dimensionally stable, square, true and planar. Gate leafs shall not rack or deflect when install on its hinges. Gates shall have a three (3) heavy duty hinges that are anchor mounted to the exterior masonry walls and to the gate leaf. Gates should include locking mechanisms that can be secured with a padlock.

### **2.2.5.7 PRIMARY ECP**

Primary ECP shall be laid out and constructed as illustrated in the Concept Site Plan. The gate shall be considered the Active Vehicular Barrier (AVB). Drop arms and guard shack shall be provided and located at a minimum distance of one and a half vehicles away from the entrance to serve as a checkpoint. Jersey Barriers or other approved alternatives shall be used to design and construct a Passive Vehicular Barrier (PVB) beyond and away from the checkpoint to significantly slow down approaching vehicles. The PVB shall be laid out to force approaching vehicles into a snake-like manoeuvre while approaching the checkpoint and to significantly slow them down.

Provide rejection lanes where applicable after vehicle inspection and before entrance to the compound to allow rejected vehicles to circle back to the entrance road without interruption of the queue.

#### **2.2.5.7.1 CONCRETE PVB**

Barriers shall be concrete blocks of one meter by one meter by one meter dimensions. Similar arrangements of large stones (one cubic meter size), jersey barriers or equal sized obstacles may be used.

## **2.3 CIVIL UTILITIES**

### **2.3.1 WATER**

#### **2.3.1.1 GENERAL**

The Contractor shall provide water distribution mains, branches, service connections to include all pipe, valves, bends, thrust blocking, fittings and appurtenances. Exterior water line construction shall include service to all buildings and facilities as described in the Scope of Work Section 01010.

The required average daily flow (ADF) shall be the average daily demand (ADD) per person - derived from 155 liters per capita per day (lpcd) – multiplied by a capacity factor of 1.5, multiplied by the design population.

In the event potable or non-potable use water is required prior to completion of the water facilities infrastructure the Contractor may be issued a Request for Proposal to provide non-potable (tank truck) and potable (bottled or other reliable source) consumption.

Provide a minimum of one (1) outside water hydrant (hose spigot) for all buildings with water service. Every hose spigot shall have a lockable valve on its water line located inside an adjacent building or in a valve box. All buildings with water supply shall have a water meter installed in a locked cabinet area inside the building.

The water system shall be designed to operate between 345-414 kPa. Minimum pressures of 207 kPa will be allowed at peak domestic flow conditions.

Features of the water system shall be sized to provide flow or storage capacity as follows:

- **Booster Pumps** – The capacity shall be based on the total fixture unit flow for the entire compound. Three (3) identical pumps shall be provided which are all sized to deliver 50 percent of the calculated capacity. Pumps shall automatically alternate to distribute wear and shall automatically turn on and off based on demand and system pressures. The total dynamic head (TDH) of the booster pumps shall be calculated to maintain a minimum, residual system pressure of 0.28 MPa (40 psi) at the calculated capacity unless stated otherwise in the contract documents. Either a bladder style expansion tank or a hydro-pneumatic tank shall be supplied when booster pumps are used in the water system.
- **Hydro pneumatic tanks** – Volume and pressure regulation to maintain a pressure range provided in the technical requirements based on a rate equal to the ADF (ADD x c x CF).
- **Water Mains** – Diameter based on the installation fixture unit flow or two times the ADF (ADD x c x CF)

and velocity requirements per this guide unless a minimum diameter is specified which is adequate to provide flow and meet the specified maximum velocity. The flow through the system shall be distributed on the basis of fixture unit flow in each the buildings serviced or per contract

- Water Service Lines - Diameter based on fixture units of the building serviced.

### 2.3.1.2 WATER WELLS

Construct water well(s) inside the compound, to provide sufficient supply for the population of the facility. The well construction and water well capacity shall be based on the allowable safe yield of the new well determined by a well pump test as described in the USACE-AED Well Design Guide and Water Well Guide Specification, latest version. The new well site shall be at a location approved by the Government. The new well site shall be no closer than 60 m from any existing wells.

The Contractor shall submit all required information listed in Section 7.0 of the USACE-AED Well Design Guide to the government for review and conduct:

1. Well Test Plan - Must be submitted PRIOR to any well drilling activities and must include procedures for decommissioning dry wells in the event water is not encountered,
2. Obtain Approval of Well Test Plan – Test well construction cannot start until government approval of well test plan,
3. Drill Test Well - after approval of the well test plan by the government, drill a test well,
4. Pumping Test – Capacity test of test well yield,
5. Water Quality Testing - sample and test the quality of the test well water,
6. Design Well - design a permanent well based upon the test well lithology and groundwater data, and
7. Submit Water Well Test and Permanent Well Design Report - provide water quality lab results, pump test results, drillers log, lithology log, and submit a well construction design for approval PRIOR to the start of final well construction (submit prior to installing any permanent well features), and
8. Obtain Approval – Final well construction cannot start until government approval of Water Well Test Report and Permanent Well Design with proposed construction details, and
9. Construct Well – Build well in accordance with approved well construction detail and contract specifications. The final well construction details must be provided in the post-construction as-builts.

It is acknowledged that water may not be available at the site despite Contractor good faith efforts to find it.

Well construction shall be in accordance with AED Design Requirements - Well Pumps & Well Design/Specifications, latest version - which includes, but is not limited to, requirements for well screen, casing, gravel pack, well pump, disinfection, water meters and testing requirements. All design requirements, material specifications, and testing contained in this document shall be used and submittals shall be made promptly in accordance with Section 01335. Failure to follow the construction and submittal procedures outlined may, at AED's discretion, result in rejection of the well and the Contractor having to remove the well casing and screen, re-drill the well, and reinstall the proper features per an AED approved design.

Well Test Plan: Prior to the start of well drilling activities at the site, the contractor must submit a well test plan that describes:

- Type of drill method to be used (percussion, mud rotary, or air rotary),
- GPS location and target depth of the test well,
- Qualifications of the rig geologist,
- Test borehole diameter for unconsolidated sediment and hard bedrock,
- Methods to control artesian conditions, if anticipated to be encountered,
- Type and diameter of temporary casing,
- Description of pumping test procedures,
- Abandonment procedures and methods in the event of a dry hole,
- Water quality sampling and testing including identifying certified analytical laboratory to be used, and
- Other details as required under the AED Design Requirements - Well Pumps & Well Design/Specifications, latest version.

Test Well: After the Government approves the Well Test Plan and before permanent well construction, at least one test well of at least 150mm in diameter and to the contracted minimum depth requirements shall be drilled into the water bearing stratum or bedrock. The test well to be constructed shall be located as shown on the drawings, or where directed by the Contracting Officer (CO) or his representative (COR).

A GPS instrument will be used to determine the geographic coordinates of the well. This information shall meet requirements of the World Geodetic System 1984 (WGS 84 and the correct UTM Zone – 41, 42, or 43) in decimal degrees. The test hole shall be used to determine the location and character of the water bearing strata and to obtain samples of the various formations. Samples of drilling cuttings shall be taken at every change of strata and at depth intervals not to exceed 1.5 meters. A driller's log shall be made based on the cuttings obtained. The drill cuttings shall be divided, put into suitable containers and labeled. These samples shall be approximately half a liter each. If the test hole fails to indicate the presence of water bearing strata or is abandoned for any other reason, the test hole shall be abandoned and plugged in conformance to UFGS-33 20 00 (April, 2008) Section 1.3.2. At the completion of the test hole, a drillers log shall be prepared containing the following information:

- Depth of static water depth and water bearing strata;
- Lithology log with type, thickness, and depth of different material strata contacts;
- Color, size, and soil description of cuttings; and
- Proposed well construction details based upon lithology and water bearing strata found and contract specifications.

The drillers log must be submitted as part of the Water Well Test and Permanent Well Design Report.

Test and Permanent Well Depth. The well shall be drilled to a minimum depth as described in the 01010 Scope of Work in an attempt to find potable water meeting WHO water quality requirements. The depth of the test and permanent well shall take into consideration the drawdown depth, screen depth and pump submergence as described in the AED Design Requirements document. If water cannot be found at a sufficient yield after drilling to that linear depth, the contractor will be responsible for properly decommissioning the well under the contract, and then the Contractor will be considered to have fulfilled the terms of the contract and will be entitled to the full price of the contract CLIN for Well. However, the Contractor must still furnish all other parts of the water distribution system as described in the specifications.

Test Well Pumping Test: To determine the expected yield from the test well and to assure acceptable water quality, a pumping test shall be performed in the candidate test well. As described in AED Design Requirements - Well Pumps & Well Design/Specifications, latest version, three types of tests can be performed including 1) Step-drawdown Test; 2) Specific Capacity Test; and 3) Pumping test. The results of the pumping test must be submitted as part of the Water Well Test and Permanent Well Design Report and must include data table, graphs, and pumping test descriptions.

Water Well Test Report - PRIOR to the start of final well construction, the contractor must provide the government a water well test report that includes water quality lab results, pump test results, drillers log, lithology log, and a permanent well construction design for approval. The Water Well Test and Permanent Well Design Report must be submitted and approved by the government prior to installing any permanent well features.

The Water Well Test and Permanent Well Design Report shall include:

- water quality lab results,
- pump test results,
- drillers log,
- lithology log, and
- permanent well construction design that must include-
  - (a) Location in decimal degrees.
  - (b) Number of screens and depth of screen settings in the well.
  - (c) Size of well screen inside and outside diameters and length.
  - (d) Pipe material (material schedule and specification).
  - (e) Standard screen slot opening, mm and spacing.
  - (f) Effective open area of screen (sq cm per meter).

- (g) Transmitting capacity (liters/meter).
- (h) Sieve analysis of the material to be screened.
- (i) A graphic showing screen and casing with adjacent lithology types.
- (j) Calculations supporting screen slot size.
- (k) Photo of screen slot pattern.
- (l) Results of Gravel Pack selection analysis.

After approval of the Water Well Test and Permanent Well Design Report, the contractor may start construction of the well.

Permanent Well Casing. Contractor shall utilize 150mm casing diameter and the allowable casing material is steel (ASTM A53 Grade B or ASTM A139 Grade B). Use of PVC for the permanent well is not authorized. The minimum wall thickness for steel pipe used for casing is 8 mm. Table below provides minimum pipe wall thicknesses for various diameters:

Minimum steel pipe casing wall thicknesses by well diameter

Nominal Diameter, mm (in)	Wall Thickness, mm (in)
150 (6)	8 (.250)
200 (8)	8 (.250)
250 (10)	8 (.279)
300 (12)	9 (.330)
350 (14)	10 (.375)
400 (16)	10 (.375)
450 (18)	10 (.375)
500 (20)	10 (.375)

In unconsolidated material, casing shall extend to the top of the well screen. In suitable rock formations (drilled wells) with low collapse properties, the hole may be left open (i.e., filter pack and well screen may not required) with casing extended 3 m into the rock formation. All wells will be cased 0.5 meters above grade (i.e., base of pit, ground surface, etc.) and be fitted with a lockable cap with air gap (vacuum relief during pumping). Each section of casing will be joined with standard couplings and full-threaded joints, or by proper welding, so that all joints are sound and watertight. Well casing alignment shall not interfere with the proper installation and operation of the pump. The bottom of the casing shall be fitted with a metal well screen that will permit maximum transmission of water without clogging. The minimum length of screen shall be at least 3 m.

Permanent Well Screen. The casing will be fitted with a 150mm (Note: RFP author shall provide the size of Screen per the “ANP Project GFM&E Tracker”) well screen that will permit optimal transmission of water without clogging. Screen shall only be placed in the interval of the aquifer targeted. To prevent flow of sewage, bacteria, and other contaminants typically found at the groundwater surface, wells should be either screened at least 40 meters below the static water table or below a confining later beneath the static water level. The material of construction, opening requirements, minimum lengths and placement shall be per the AED Design Requirements document.

Filter Pack - The width of the filter pack must be larger than the casing by at least 100 mm (50 mm on each side of the casing). The annular space between the casing and the borehole will be filled with gravel, overburden, or concrete as follows:

- 1) The annular space between the well screen and borehole shall be filled with material that will form a filter to minimize production of fines and not clog the slots in the screen (e.g., washed, well-graded silica sand). A uniformity coefficient of 2.5 for the filter pack is required, and
- 2) The filter pack must extend 3 m above the top of the topmost screen interval.

Sealing: Above the filter pack, the annular space between the casing and the borehole must be filled with grout or a neat cement as follows:

- 1) The annular space above the filter pack up must be sealed with at least 3 m of bentonite.

- 2) A neat cement grout seal must be placed from the top of the bentonite to within 2 m beneath the ground surface. The grout shall be placed in one continuous mass and shall be impermeable.
- 3) All aggregate shall contain less than 5 percent of shale, clay lumps, coal, lignite, soft or unfragmented stone, or other deleterious materials.

The neat cement grout seal shall be proportioned of Portland Cement conforming to ASTM Specification C150, Type I or II and bentonite (either sodium bentonite or calcium type montmorillonite or opalite). The cement-bentonite mix shall be proportioned, by weight, as follows; 6.6: 1: 0.4 (water : portland cement : bentonite). The water-cement (w/c) ratio shall not exceed 7.

Well Development- After construction is complete; the well shall be thoroughly developed. The developing equipment shall be of sufficient capacity to remove all drilling fluids, sand, rock cuttings or any other foreign matter. The wells shall be thoroughly cleaned from top to bottom before beginning the well tests. Overpumping for well development is NOT approved for this project. Only well development methods that involve surging and removal of sediment from the casing/screen will be approved. Mechanical surging, air-surging, and high velocity jetting may be used to develop the well. Development shall continue until turbidity of the water meets WHO turbidity standards.

Performance Testing: Upon completion of the permanent production well, the Driller shall conduct a continuous 6-hour pumping test at the designed flow rate. Drawdown will be recorded from time-zero at the following time intervals:

First 5 minutes—every 30 seconds  
Next 5 minutes – every minute  
Next 50 minutes—every 10 minutes Next  
2 hours—every 20 minutes Next 2  
hours—every 40 minutes Last hour—one  
sample at end

If water levels are recorded digitally with a transducer, smaller time intervals are often programmed into the software. This is acceptable. The above guidance serves as minimum time intervals. Recovery data will also be recorded at intervals described above. Recovery data will be recorded until drawdown reaches 90% of pre-pumping levels.

Well Disinfection. The well shall be disinfected to remove bacteriological contamination that may cause the well-water supply to be unsafe for human consumption. The chlorine solution used for disinfecting the well shall be of such volume and strength and shall be so applied that a concentration of at least 50 mg/L of available chlorine shall be obtained for the entire water depth of the well, and this solution shall remain in the well for a period of at least 12 hr. If the samples collected after disinfection show bacteriological contamination, the contractor shall prepare and apply to the entire depth of the well a total volume of the chlorine solution of at least 100 mg/L of available chlorine equal to at least four times the volume of water in the well. The contractor shall allow this solution to remain in the well for a period of at least 24 hr.

Source protection - Surface drainage within 30 m of wellhead shall ensure no ponding, flooding or collection of runoff adjacent to the well. This can be accomplished through surface grading or use of gravel drains to modify site drainage in the vicinity of the well. Identify all sources of contamination and ensure the proposed well site meets minimum standoff distances as indicated below:

- a. Sewage storage areas (outhouses, tanks, individual sewage pits, lagoons, and WWTP) – 30 m
- b. Septic fields (infiltration galleries) – 30 m
- c. Fuel storage, engine maintenance/repair – 30 m

**Well Pump** – The Contractor shall utilize a single well pump per well with the following parameters: a well head mounted motor/ 230V/50HZ/1-Phase/top discharge/ open well head/pump head equal to depth plus 30 meters/80 liters per minute. A submersible, centrifugal pump shall be installed inside the casing either slightly above the highest screen interval or between screen sets. Pumps must not be installed adjacent to screens and shall not be installed at the bottom of the well. Control of the pump shall be by means of a Hand-Off-Auto (HOA) switch. In the “Auto” position, the pump shall be started and stopped automatically by water levels in the water storage tank. Pump shall start at low level and shall stop at high level. Level controls shall be adjustable. Manual start shall be the Hand position. Specification section 01010 Scope of Work may have requirements for both an electrical submersible and a hand pump in the same well. Well pump testing and water clarity testing after well development shall be per the requirements in AED Design Requirements - Well Pumps & Well Design/Specifications, latest version or most recent version.

[RFP Writer: Delete this paragraph if only an elevated storage tank shall be used.]

**Well Tank** – Provide bladder style pressure tank for well pump to minimize pressure surges and water hammer effects. The well pressure tanks shall be located downstream of the pump to provide a constant pressure to the system and reduce the well pump cycles, see the below paragraph on Hydropneumatic tanks for the sizing and the number of acceptable pump cycles per hour.

**2.3.1.3 WATER QUALITY SAMPLING AND ANALYSIS**

The Contractor shall perform water quality sampling and testing at the source. The Contractor shall utilize well-qualified and equipped testing capability in the project site area, if available. If professional testing services are not available in the area, the Contractor will submit an alternative practical testing source for approval.

Details on laboratory analyses are presented in USACE-AED Well Pumps & Well Design February 2012 version, Section 5.2 (also see DOD TB MED 577, 2005, TM 5-813-3, and UFC 3 230 08a Water Supply Water Treatment, January 2004).

<b>Physical and Biological Characteristics:</b>
• Turbidity
• Conductivity
• Total Dissolved Solids
• pH
• Total/fecal coliform
• Total Hardness (as CaCO <sub>3</sub> )
<b>Chemical Characteristics (Expressed as mg/L)</b>
• Arsenic
• Chromium <sup>+6</sup>
• Lead
• Cadmium
• Selenium
• Copper
• Sodium
• Potassium
• Magnesium
• Fluoride as F

• Manganese as Mn (Dissolved and total)
• Iron as Fe (Dissolved and total)
• Sulphates as SO <sub>4</sub>
• Chlorides as Cl
• Nitrites as NO <sub>2</sub>
• Nitrates as NO <sub>3</sub>
• Ammonia
• Bicarbonate
• Carbonate

#### 2.3.1.4 WELL PUMP TESTING

Well pump testing and water clarity testing after well development shall be per the requirements in AED Design Requirements - Well Pumps & Well Design/Specifications, latest version or most recent version.

#### 2.3.1.5 RAW WATER DISINFECTION

Contractor shall perform disinfection of the well water in accordance with AED Design Requirements - Well Pumps & Well Design/Specifications, latest version. Bacteriological samples shall be collected and examined in accordance with Standard Methods for the Examination of Water and Wastewater by a qualified lab as approved by the Contracting Officer.

#### 2.3.1.6 SERVICE BOOSTER PUMPS

Contractor shall provide a booster pump station with capacities defined above with end suction or split case double suction horizontal split case (frame mounted) centrifugal pumps arranged in parallel for pumping water storage into the main distribution system. The pumps and controls shall be designed to supply and maintain acceptable system pressure throughout the distribution network given the full range of flow conditions (low flow to peak). Provide suitable expansion tank for booster pump system sized for anticipated pressure surges, if hydro pneumatic tanks are not to be used. The suction side of the service booster pumps shall have an eccentric reducer and gate valve installed. The discharge side shall have a gate valve, check valve between the pump and the gate valve and concentric reducer, pressure gage and air relief valve.

#### 2.3.1.7 HYDRO-PNEUMATIC SURGE TANK

The Contractor shall provide horizontally mounted and insulated above ground surge hydro-pneumatic tank(s) containing water and compressed air located adjacent to the water pumps to maintain pressure during surges. A compressor is required to charge the tank with air, or a pre-charged bladder type tank may be used. At low level the water remaining in the tank(s) shall be at least ten percent of the capacity of the tank. The tank(s) size shall be determined such that the pump cycles not less than 4 times per hour or more than 10 times per hour.

Tank shall be sized for peak demand. Use the capacity factor required by AED Design Guide to approximate the peak demand. An additional safety factor (multiplying factor) of 1.2 shall be used.

Tank volume =  $D/[1-(P_f+P_{atm})/(P_o+P_{atm})]$ , where  $D=t*(Q*60)/4$ , where D = Drawdown (liters, T = cycle time (min.) and Q = tank flow rate (liters/sec.)

#### 2.3.1.8 WATER STORAGE TANK

Water storage tank capacity shall be based on what is dictated in Section 01010. Contractor shall provide a steel ground storage reservoir (GST) to be located on the ground surface as dictated in Section 01010. Water shall continuously circulate through the tanks piping and shall be heated to prevent freezing of the tank and pipes entering

the tank. A system of heat wrapped tape and exterior tank insulation is not considered a feasible permanent insulation system as it does not conform to a twenty (20) year life expectancy. The storage facilities shall be located above drainage areas and locations subject to flooding as approved by the Contracting Officer. The storage facilities shall be located on the higher elevations of the site to promote gravity flow and reduce pumping requirements. Overflow and air vents shall be screened so that birds, rodents and debris cannot enter the reservoir. The tank shall meet all applicable codes for potable water storage. The interior coatings for the tank shall meet NSF/ANSI 61 requirements.

Exterior area lights shall be installed, either mounted to the side of the building or on poles.

Contractor shall provide commercially fabricated steel elevated water storage tank. The elevated water storage tank and supporting structures shall be constructed in strict conformance with the furnished drawings and specifications. The tank shall meet all applicable codes for potable water storage. The interior coatings for the tank shall meet NSF/ANSI 61 requirements. Contractor shall ensure that all elements of the Water Tank have been designed, fabricated, and erected in accordance with AWWA D100-05 Welded Carbon Steel Tanks for Water Storage and AWWA D102-06 Coating Steel Water Storage Tank.

The following geotechnical investigation will be conducted at the proposed location of the water tanks:

Current geotechnical requirements as outlined in the AED Design Guide for Geotechnical Investigations provide geotechnical information for shallow foundation structures constructed on AED projects. The geotechnical characteristics of the soils at the location of the water towers must be adequate to support the deep loadings generated by the tower and water tank. The following are required prior to approval for construction of water towers using the design provided by AED. Information listed below should be submitted to AED as soon as practicable to allow construction of the tower in a timely manner.

1. Site Characteristics Information
  - A. Site plan showing location of each tower.
  - B. Elevation of original and finished grade at the center of each tower foundation.
  - C. Finished floor elevations of every building on the site receiving water.
  - D. Top of concrete of pedestal containing anchor bolts used to secure each tower.
2. Bore Hole Information
  - A. Boring log for each water tower foundation. Diameter shall be 150 mm or 200 mm diameter. Depth shall be 16.5 m from finished grade. Location shall be center of water tower foundation.
  - B. Samples shall be collected every 0.75 m.
  - C. Sample results for EVERY sample taken during boring operation.
    - (1) Penetration Test and Split-Barrel Sampling of Soils using ASTM D 1586.
    - (2) Lab Determination of Water (Moisture) Content of Soils using ASTM D 2216.
    - (3) Liquid Limit, Plastic Limit, and Plasticity Index of Soils using ASTM D 4318.
    - (4) Classification of Soils for Engineering Purposes (Unified Soil Classification System) using ASTM D 2487.

The water system shall be designed and constructed in accordance with the AED Design Requirements, latest version, and UFC 3-230-03A Water Supply which include the use of a capacity factor. Water demand required for fire fighting and for irrigation and landscaping needs shall not be included in design demand calculations.

### **2.3.1.9 DISINFECTION & CHLORINATION SYSTEM**

Use hypochlorite compounds for disinfection. A manufacturer assembled, self-contained, skid-mounted, hypochlorinator consisting of mixer, mixing tank, pump pipe injector, and control panel shall be used to feed a sodium hypochlorite solution of 1- 5 percent available chlorine into the system. Hypochlorite compound may be a liquid or solid form. The pump shall feed a hypochlorite solution in proportion to the water demand. The hypochlorinator shall have a pumping rate, liters per day (lpd) (gallons per day (gpd)) adequate to deliver 5 percent available hypochlorite solution adjustable to the quantity of water being produced from the source. The chlorine-feeding system shall consist of controls and devices necessary for a complete operating system. Dosage rate will vary somewhat depending on actual pump production rate and available residual chlorine in the system. Contractor shall determine the required dosage rate milligrams per liter (mg/l) to maintain the required chlorine residual (usually 0.2-0.4 mg/l) in the distribution system. Chlorine solution tank shall be large enough to hold a three days supply of

hypochlorite solution. A fresh solution shall be prepared every two or three days because the solution may lose its strength over time and this will affect the actual chlorine feed rate. The hypochlorite shall be stored in a cool dry place. Sodium hypochlorite can lose from two to four percent of its available chlorine content per month at room temperature. Contractor shall verify required minimum residual chlorine in accordance with local requirements verified and approved by the Contracting Officer. The chlorination system shall have the capability for manually adjusting the dosage rate and be installed in such a manner that the system can be easily disconnected and bypassed in the event of health safety or routine maintenance and repair. Disinfection of water mains shall be in accordance with AWWA standard C651-86 and disinfection of storage facilities in accordance with AWWA standard C652-86. The package disinfection system shall be located in the well pump house.

### **2.3.2 WATER DISTRIBUTION SYSTEM**

#### **2.3.2.1 GENERAL**

The Contractor shall provide a water distribution system. The distribution network shall be laid out in a combination grid and looped pattern with dead ends not exceeding 30 m. Use similar piping materials for all buildings and pipe runs in the distribution system for efficiency of future maintenance activities. Dead end sections shall not be less than 150 mm diameter and shall either have blow off valves or fire hydrants (flushing valves) installed for periodic flushing of the line. Any pipe with a fire hydrant on the line shall be at least 150 mm in diameter. Water supply distribution shall connect to a building service at a point approximately 1.5 m outside the building or structure to which the service is required. All piping and joints shall be capable of at least 1.03 MPa leakage testing and 1.38 MPa hydrostatic test pressure, unless otherwise specified. Pipe diameters shall be adequate to carry the maximum flow of water at velocities less than 1.5 m/sec. Piping segments where velocities less than 0.15 m/sec are anticipated shall be noted and brought to the attention of AES. The operating pressure range shall be between 276 kPa to 414 kPa at all points of the distribution system. If pressures greater than 690 kPa (100 psi) cannot be avoided, pressure-reducing valves shall be used.

A system pressure of 207 kPa (30 psi) is acceptable at extreme peak flow conditions. A system pressure below 207 kPa shall be considered a deviation in the technical requirements requiring Contracting Officer approval.

Adequate cover must be provided for frost protection. A minimum cover of 800 mm is required to protect the water distribution system against freezing. Water lines less than 1.25 m deep under roadway/driveway crossings (to include parking areas) shall be encased in concrete of at least 150 mm thickness around the pipe extending out to one m from each road edge.

#### **2.3.2.2 PIPE**

The Contractor shall provide Ductile Iron or PVC pipe of adequate strength, durability and be corrosion resistant with no adverse effect on water quality.

##### **2.3.2.2.1 WATER MAINS AND BRANCHES**

Pipe material for water mains and branches shall be PVC or Ductile Iron (DI). The exterior surface of the pipe must be corrosion resistant. Distribution lines shall be 100 mm (4 in) and larger and shall be reduced only at the junction of building connections. Pipe diameters shall be selected to meet the previously specified flow, velocity, and pressure conditions. If Ductile Iron (DI) pipe is installed underground the pipe shall be encased with polyethylene in accordance with AWWA C105. Ductile iron pipe shall conform to AWWA C104. DI fittings shall be suitable for 1.03 MPa (150 psi) pressure unless otherwise specified. Fittings for mechanical joint pipe shall conform to AWWA C110. Fittings for use with push-on joint pipe shall conform to AWWA C110 and C111. DI fittings shall be cement mortar lined (standard thickness) in accordance with C104. All pipes and joints shall be capable of at least 1.03 MPa (150 psi) and 1.38 MPa (200 psi) hydrostatic test pressure unless otherwise specified herein. Polyvinyl Chloride (PVC) pipe shall conform to ASTM D 1785. Plastic pipe coupling and fittings shall be manufactured of material conforming to ASTM D 1784, Class 12454B. PVC screw joint shall be in accordance with ASTM D 1785, Schedules 40, 80 and 120. PVCu pipe couplings and fittings shall be manufactured of material conforming to ASTM D 1784, Class 12454B. Pipe less than 80mm (3 inch), screw joint, shall conform to dimensional requirements of ASTM D schedule 80. Elastomeric gasket-joint, shall conform to dimensional requirements of

ASTM D 1785 Schedule 40, PVCu (or uPVC) pipe and fittings shall have SDR that provide equal or superior strength properties to ASTM 1785 SCH 40 or SCH 80 pipe and fittings.

### **2.3.2.2.2 WATER SERVICE**

Water service line diameter shall be based on fixture units of the building serviced or per contract Building service lines will be sized according to the following guidance. Water service connections from the mains to the buildings shall vary from 19 mm, 25 mm, 38 mm, 75 mm, to 100 mm as calculated, depending on the maximum flow velocity and minimum pressure requirements as determined by hydraulic analysis of fixture flows. Pipe service connections from the distribution main to the building shall be either Polyvinyl Chloride (PVC) plastic Schedule 80 ASTM D 1785 or copper tubing conforming to ASTM B 88M, Type K, annealed. PVC pipe couplings and fittings shall be manufactured of material conforming to ASTM D 1784, Class 12454B. Contractor shall not use HDPE for any of the water pipes.

### **2.3.2.2.3 HYDROSTATIC, LEAKAGE, AND DISINFECTION TESTS**

The Contracting Officer will be notified not less than 48 hours in advance of any water piping test and will be given full access for monitoring testing procedures and results. Where any section of water line is provided with concrete thrust blocking for fittings or hydrants, tests shall not be made until at least 5 days after installation of concrete thrust blocking, unless otherwise approved. Pressure and leakage testing shall be as specified in AED Design Requirements – Water Tank and Water Distribution Systems, latest version.

### **2.3.2.2.4 HYDRO STATIC (PRESSURE) TEST**

After the pipe is laid, the joints completed, and the trench partially backfilled leaving the joints exposed for examination, the newly laid piping or any valved section of piping shall, unless otherwise specified, be subjected for 1 hour to a hydrostatic pressure test of 1.38 MPa (200 psi). Each valve shall be opened and closed several times during the test. Exposed pipe, joints, fittings, hydrants and valves shall be carefully examined during the partially opened trench test. Joints showing visible leakage shall be replaced or remade as necessary. Cracked or defective pipe, joints, fittings, hydrants and valves discovered following this pressure test shall be removed and replaced and retested until the test results are satisfactory.

### **2.3.2.2.5 LEAKAGE TEST**

Leakage tests shall be conducted after all pressure tests have been satisfactorily completed. The duration of each leakage test shall be at least 2 hours, and, during the test, water lines shall be subjected to not less than 1.38 MPa (200 psi). Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved or approved section, necessary to maintain pressure to within 34.5 kPa of the specified leakage test pressure after the pipe has been filled with water and all air expelled. Pipe installation will not be accepted if leakage exceeds the allowable leakage, as determined by the following formula:

#### **METRIC UNITS:**

$$L = 0.00042454 * N * D * P^{1/2} \quad \text{where:}$$

L = Allowable leakage in liters per hour

N = Number of joints in the length of pipeline tested

D = Nominal diameter of the pipe in mm

P = Average test pressure during the leakage test, in MPa gauge

#### **US UNITS:**

$$L = 0.0001351 * N * D * P^{1/2} \quad \text{where:}$$

L = Allowable leakage in gallons per hour

N = Number of joints in the length of pipeline tested

D = Nominal diameter of the pipe in inches

P = Average test pressure during the leakage test, in psi gauge

Should any test of pipe disclose leakage greater than that calculated by the above formula, the defective joints shall be located and repaired until the leakage is within the specified allowance, without additional cost to the government.

#### **2.3.2.2.6 PIPELINE DISINFECTION TESTS**

##### **2.3.2.2.6.1 DISINFECTION PROCEDURE**

Before acceptance of potable water operation, each unit of completed waterline shall be disinfected as prescribed by AWWA C651. After pressure tests have been completed, the unit to be disinfected shall be thoroughly flushed with water until all entrained dirt and mud have been removed before introducing the chlorinating material. Flushing will be performed in a manner and sequence that will prevent recontamination of pipe that has previously been disinfected. The chlorinating material shall be liquid chlorine, calcium hypochlorite, or sodium hypochlorite. The chlorinating material shall provide a dosage of not less than 50 ppm and shall be introduced into the water lines in an approved manner. Polyvinyl Chloride (PVC) pipelines shall be chlorinated using only the above-specified chlorinating material in solution. The agent shall not be introduced into the line in a dry solid state. The treated water shall be retained in the pipe long enough to destroy all non-spore forming bacteria. Except where a shorter period is approved, the retention time shall be at least 24 hours and shall produce not less than 25 ppm of free chlorine residual throughout the line at the end of the retention period. Valves on the lines being disinfected shall be opened and closed several times during the contact period. The line shall then be flushed with clean water until the residual chlorine is reduced to less than one ppm. During the flushing period, each fire hydrant on the line shall be opened and closed several times.

##### **2.3.2.2.6.2 SAMPLING**

For each building connected to the water system, personnel from the Contractor's commercial laboratory shall take at least 3 water samples from different points, approved by the Contracting Officer, in proper sterilized containers and perform a bacterial examination in accordance with approved methods. The commercial laboratory shall be verified to be qualified by the appropriate authority for examination of potable water. Contractor shall submit a water sampling protocol for approval. This shall include at a minimum the name of the laboratory, parameters to be tested, the Company conducting the sampling, and the sample locations.

##### **2.3.2.2.6.3 ACCEPTANCE REQUIREMENTS**

The disinfection shall be repeated until tests indicate the absence of bacteria for at least 2 full days. The unit will not be accepted until satisfactory bacteriological results have been obtained. All retests shall be conducted at the Contractor's expense.

##### **2.3.2.2.6.4 TIME FOR MAKING (HYDROSTATIC/PRESSURE) TESTS**

Except for joint material setting or where concrete thrust blocks necessitate a five (5) day delay, pipeline jointed with rubber gaskets, mechanical or push-on joints, or couplings may be subjected to hydrostatic pressure, inspected, and tested for leakage at any time after partial completion of backfill.

##### **2.3.2.2.6.5 CONCURRENT (HYDROSTATIC AND LEAKAGE) TESTS**

The Contractor may elect to conduct the hydrostatic tests using either or both of the following procedures. Regardless of the sequence of tests employed, the results of pressure tests, leakage tests, and disinfection shall be recorded for submission and approval. Replacement, repair or retesting required shall be accomplished by the Contractor at no additional cost to the Government. Pressure and leakage testing may be conducted concurrently. Hydrostatic tests and disinfection may be conducted concurrently using water treated for disinfection to accomplish the hydrostatic tests. If water is lost when treated for disinfection and air is admitted to the unit being tested, or if any repair procedure results in contamination of the unit, disinfection shall be re-accomplished.

### **2.3.3 VALVES**

#### **2.3.3.1 GATE AND BUTTERFLY VALVES**

Valves (Gate valves w/box) shall be placed at all pipe network tees and cross intersections, and the number of valves shall be one less than the number of lines leading into and away from the intersection. For isolation purposes valves shall be spaced not to exceed 40 m. Gate valves shall be in accordance with AWWA C 500 and/or C509. Butterfly valves (rubber seated) shall be in accordance with AWWA C504 et. al. The valves and valve boxes shall be constructed to allow a normal valve key to be readily used to open or close the valve. Provide traffic-rated valve boxes. Provide concrete pad, one m square, for all valve boxes. Valves shall be pressure rated to 1.38 MPa (200 psi).

#### **2.3.3.1.2 VACUUM AND AIR RELEASE VALVES**

Air release valves are required to evacuate air from the main high points in the line when it is filled with water, and to allow the discharge of air accumulated under pressure. Vacuum relief valves are needed to permit air to enter a line when it is being emptied of water or subjected to vacuum. Contractor shall submit manufacturer's data for properly sized combination air and vacuum release valves and determine their locations on the distribution system subject to review and approval of the Contracting Officer.

#### **2.3.3.1.3 BLOW-OFF VALVES**

The Contractor shall provide 40-50 mm blow-off valves at ends of dead end mains. Valves should be installed at low points in the mains where the flushing water can be readily discharged to natural or manmade drainage ditches, swales or other.

#### **2.3.3.1.4 THRUST BLOCKING**

Contractor shall provide concrete thrust blocking at any point where the layout of the system changes the direction of the flow, increases the velocity, or decreases or stops the flow. At these points, the pipes and fittings must be anchored and kept from moving or pulling apart by the use of thrust blocks installed against undisturbed earth.

### **2.3.4 SANITARY SEWER (WASTEWATER SYSTEM)**

#### **2.3.4.1 GENERAL**

The Contractor shall obtain topographic information or other maps that show vegetation, drainage channels and other land surface features such as underground utilities and related structures that may influence the design and layout of the collection system. Sanitary sewers less than 1.25 meters under roadways/driveways (to include parking areas) shall have reinforced concrete cover at least 150 mm thick around the pipe. Concrete cover will extend out to at least 1 m from each road edge.

Exterior sanitary sewer line construction shall include service to all buildings as described in the Scope of Work Section 01010. Contractor shall design sanitary sewer collection system using approved field survey data and finished floor elevations. Depending upon the topography and building location, the most practical location of sanitary sewer lines is along one side of the street. In other cases they may be located behind buildings midway between streets. Main collection sewers will follow the most feasible route to the point of discharge. The sewer collection system shall be designed to accommodate the initial occupancy and a reasonable expansion capability. Sewer collection capacity shall be based on the two times the average daily wastewater flow unless minimum diameter specified is adequate to provide flow and required maximum velocity; wastewater flow through the system shall be distributed on the basis of fixture unit flow in each the buildings serviced by multiplying the proportion of the total fixture flow from each building or facility times the total wastewater flow for the project or installation as determined above.

All sewers shall be located outside of the roadways as much as practical, and minimize the number of roadway crossings. To the extent practical, a sewer from one building shall not be constructed under another building, or

remain in service where a building is subsequently constructed over it. Construction required shall include appurtenant structures and building sewers to points of connection with building drains 1.5m (5 feet) outside the building to which the sewer collection system is to be connected.

The Contractor shall use the following criteria where possible to provide a layout which is practical, economical and meets hydraulic requirements:

Follow slopes of natural topography for gravity sewers.

Check subsurface investigations for groundwater levels and types of subsoil encountered. If possible, avoid areas of high groundwater and the placement of sewers below the groundwater table.

Avoid routing sewers through areas which require extensive restoration or underground demolition

Depending upon the topography and building locates, the most practical location of sanitary sewer lines is along one side of the roadway/driveway. In other cases they may be located behind buildings midway between roadways. The intent is to provide future access to the lines for maintenance without impacting vehicular traffic.

Avoid placing manholes in low-lying areas where they could be submerged by surface water or subject to surface water inflow. In addition, all manholes shall be constructed 50 mm higher than the finished grade, with the ground sloped away from each manhole for drainage.

Sewer lines shall have a minimum of 800 mm of cover for frost protection.

Locate manholes at change in direction, pipe size, or slope of gravity sewers.

Sewer sections between manholes shall be straight. The use of a curved alignment shall not be permitted.

If required by the design, locate manholes at intersections of roadways/driveways where possible. This minimizes vehicular traffic disruptions if maintenance is required.

Sewer lines less than 1.25 m deep under road crossings shall have a reinforced concrete cover of at least 150 mm thickness around the pipe or shall utilize a steel or ductile iron carrier pipe. It is recommended to continue the reinforced concrete cover or carrier pipe a minimum of one m beyond the designated roadway.

Verify that final routing selected is the most cost effective alternative that meets service requirements.

#### **2.3.4.2 PROTECTION OF WATER SUPPLIES**

The Contractor shall ensure that the sewer design meets the following criteria:

Sanitary sewers shall be located no closer than 30 m horizontally to water wells or reservoirs to be used for potable water supply.

Sanitary sewers shall be no closer than 3 m horizontally to potable water lines; where the bottom of the water pipe will be at least 300 mm above the top of the sanitary sewer, horizontal spacing shall be a minimum of 1.8 m.

Sanitary sewers crossing above potable water lines shall be constructed of suitable pressure pipe or fully encased in concrete for a distance of 2.7 m (9 ft) on each side of the crossing. Pressure pipe will be as required for force mains in accordance with local standards and shall have no joint closer than 1 m (3 ft) horizontally to the crossing, unless the joint is fully encased in concrete.

When sanitary sewers cross water lines the designer shall cross the water line above the sewer line whenever possible. In such cases the water line shall be located a minimum distance of 450 mm above the sewer line or shall be fully encased in concrete for a distance of 3 m on each side of the crossing.

#### **2.3.4.3 QUANTITY OF WASTEWATER**

System capacity shall be calculated as 80% of the calculated daily water use.

**2.3.4.4 GRAVITY SEWER**

Sanitary sewers shall be designed in accordance with the AED Design Requirements for Sanitary Sewer and Septic Systems, latest version to flow at a maximum in the following way:

- a. Sanitary sewer laterals, mains and trunk lines flow velocities shall be designed to provide a minimum velocity of 0.6 m per second (mps)
- b. A minimum velocity of 0.8 to 1.05 mps at the peak diurnal flow rate
- c. Flows shall be based on allocating the proportion of the average daily or peak daily flow to each building or facility on the basis of fixture unit flow developed for the plumbing design.
- d. Minimum pipe slopes shall be provided regardless of the calculated flow velocities to prevent settlement of solids suspended in the wastewater. Minimum pipe slopes are provided in the AED Design Requirements for Sanitary Sewer and Septic Systems. (A partial listing of requirements is listed in the cart below.)

Minimum Slopes for Sewers	
Sewer Pipe Size (mm)	Minimum Slope in meters per 100 meters
100	1.00
150	0.62
200	0.40
250	0.28
300	0.22
350	0.17
400	0.15

Unless otherwise indicated (see Building Connections and Service Lines), gravity sewer pipe shall be installed in straight and true runs in between manholes with constant slope and direction. Adequate cover must be provided for frost protection. A minimum cover of 800 mm will be required to protect the sewer against freezing.

**2.3.4.4.1 MANHOLES**

The Contractor shall provide standard depth manholes (MH), (depth may vary) with an inside dimension of 1.2 m. Manholes shall be made of either a cast-in-place reinforced concrete with reinforced concrete cover, or of pre-cast reinforced concrete manhole that tapers to a 750 mm (30 in) cast iron frame that provides a minimum clear opening of 600 mm (24 in). In every case, the manholes, frames and covers shall be traffic rated, H-20 load rating. All manholes shall be provided with a concrete bench with a flow line trough, smoothly formed to guide waste flow to the outlet pipe from the inlet pipe(s). The top surface of the bench shall be above the crown of all pipes within the manhole. All surfaces of the bench shall be sloped smoothly toward the trough to guide flow, even under peak flow conditions. Sanitary sewer lines shall enter at the manhole flow line. Where the invert of the inlet pipe would be more than 0.5 m above the manhole floor, a drop inlet shall be provided. No internal drop structures shall be permitted at lift stations. Inlet to lift station wet wells shall enter below the lowest water level of the pump operating range, and if necessary a drop inlet approach pipe external to the lift station may be used to avoid cascading influent flow. The angle between inflow and outflow pipes converging at a manhole shall not be less than 90°.

**2.3.4.4.2 MANHOLE DESIGN REQUIREMENTS**

Manholes are required at junctions of gravity sewers and at each change in pipe direction, size or slope, except as noted hereinafter for building connections. Manholes shall be installed at start of all main runs.

#### **2.3.4.4.3 SPACING**

The distance between manholes must not exceed 120 m in sewers of less than 460 mm in diameter. For sewers 460 mm and larger, and for outfalls from wastewater treatment facilities, a spacing of up to 180 m is allowed, provided the velocity is sufficient to prevent sedimentation of solids.

#### **2.3.4.4.4 PIPE CONNECTIONS**

The crown of the outlet pipe from a manhole shall be on line with or below the crown of the inlet pipe.

#### **2.3.4.4.5 FRAMES AND COVERS**

Frames and covers shall be cast iron, ductile iron or reinforced concrete, traffic rated in any case to an H-20 load rating. Cast iron frames and covers shall be traffic rated, circular with vent holes.

#### **2.3.4.4.6 STEPS FOR MANHOLES**

Steps shall be cast iron, polyethylene coated, at least 15 mm thick, not less than 400 mm in width, and spaced 300 mm on center.

#### **2.3.4.5 PIPE**

Pipe shall conform to the respective specifications and other requirements as follows: Provide Polyvinyl Vinyl Chloride (PVC) conforming to ASTM D 3034, Type PSM with a maximum SDR of 35, size 380 mm or less in diameter. PVC shall be certified as meeting the requirements of ASTM D 1784, cell Class 12454 B. Minimum pipe sizes for the main lines shall be 200 mm (8 in) diameter and service lines/laterals shall be a minimum of 150 mm diameter. Smaller diameters shall not be used. Contractor may use PVC or HDPE pipe provided the SDR and strength properties of the pipe equal or exceed the properties of ASTM D 1784 for PVC.

##### **2.3.4.5.1 FITTINGS**

Fittings shall be compatible with pipe supplied and shall have a strength not less than that of the pipe. Fittings shall conform to the respective specifications and requirements as follows: provide PVC fittings conforming to ASTM D 3034 for type PSM pipe.

##### **2.3.4.5.2 JOINTS**

Joints installation requirements shall comply with the manufacturers installation instructions. Flexible plastic pipe (PVC or high density polyethylene pipe) gasket joints shall conform to ASTM D3212.

##### **2.3.4.5.3 BRANCH CONNECTIONS**

Branch connections shall be made using regular fittings or solvent-cemented saddles as approved. Saddles for PVC pipe shall conform to Table 4 of ASTM D 3034. The minimum depth of the cover over the pipe crown shall be 0.8 m.

##### **2.3.4.5.4 BUILDING CONNECTIONS AND SERVICE LINES**

Building connections and service lines will be planned to eliminate as many bends as practical and provide convenience in rodding. Bends greater than 45 degrees made with one fitting should be avoided; combinations of elbows such as 45-45 or 30-60 degrees should be used with a cleanout provided. Connections to other sewers will be made directly to the pipe with standard fittings rather than through manholes. However, a manhole must be used if the connection is more than 30 m from the building cleanout. Tee connections to the main or branch are not allowed. Service connection lines will be a minimum of 150 mm diameter and laid at a minimum one percent grade.

Service laterals shall be at least 200 mm and sloped to maintain the minimum velocity as described in paragraph "Gravity Sewer."

#### **2.3.4.5.5 CLEANOUTS**

Cleanouts must be installed on all bends of sewer-building connections to provide a means for inserting cleaning rods into the underground pipe. Install manufactured wye fittings. In lieu of a wye fitting, an inspection chamber may be installed. The inspection chamber shall be of the same construction as a manhole. The cleanout will be of the same diameter as the building sewer, and never be smaller than 150 mm. If there are no bends in the sewer building connection, a cleanouts shall be installed within 1 m from the building.

#### **2.3.4.6 GREASE INTERCEPTORS**

Grease interceptors are used to remove grease from wastewater to prevent it from entering the sanitary sewer and septic systems. All Dining Facilities (DFACs) shall incorporate preliminary treatment with use of a grease interceptor prior to the sanitary sewer system. The only waste lines upstream of the grease interceptor shall be grease laden waste from the kitchen or other areas. Grease interceptor design shall be based on AED Design Requirements - Grease Trap, latest version. The grease interceptor shall be of reinforced cast-in-place concrete, reinforced precast concrete or equivalent capacity commercially available steel, with removable three-section, 9.5 mm checker-plate cover, and shall be installed outside the building. Steel grease interceptors shall in be installed in a concrete pit and shall be epoxy-coated to resist corrosion as recommended by the manufacturer. Concrete shall have 28MPa minimum compressive strength at 28 days. The grease interceptor shall connect to the sanitary sewer system.

Contractor shall provide bollards around the tank and construct a minimum 4 m wide access road from the closest roadway to the grease interceptor for a pump truck. The access road shall be of the same material as the main roads in the compound. Under no circumstance shall the grease interceptor be installed inside the building. Provide outside water spigot for cleaning.

#### **2.3.4.7 FIELD QUALITY CONTROL**

##### **2.3.4.7.1 FIELD TESTS AND INSPECTIONS**

The Contracting Officer will conduct field inspections and witness field tests specified in this section. The Contractor shall perform field tests and provide labor, equipment and incidentals required for testing.

Check each straight run of pipeline for gross deficiencies by holding a light in a manhole; it shall show a practically a full circle of light through the pipeline when viewed from the adjoining end of the line. When pressure piping is used in a non-pressure line for non-pressure use, test this piping as specified for non-pressure pipe.

Test lines for leakage by either infiltration tests or exfiltration tests. Prior to testing for leakage, backfill trench up to at least lower half of the pipe. When necessary to prevent pipeline movement during testing, place additional backfill around pipe to prevent movement during testing, but leaving joints uncovered to permit inspection. When leakage or pressure drop exceeds the allowable amount specified, make satisfactory correction and retest pipeline section in the same manner. Correct visible leaks regardless of leakage test results.

Infiltration tests and ex-filtration tests: Perform these tests for sewer lines made of specified material, not only concrete, in accordance with ASTM C 969M, ASTM C 969. Make calculations in accordance with the Appendix to ASTM C 969M and ASTM 969.

Perform tests as follows:

Concrete pipe: Test in accordance with ASTM C 924M, ASTM C 924. Allowable pressure drop shall be given in ASTM C 924M ASTM C 924. Make calculations in accordance with the Appendix to ASTM C 924M, ASTM C 924;

Ductile-iron pipe: Test in accordance with the applicable requirements of ASTM C 924M, ASTM C 924. Allowable pressure drop shall be as given in ASTM C 924M, ASTM C 924. Make calculations in accordance with the Appendix to ASTM C 924M, ASTM C 924;

PVC Plastic pipe: Test in accordance with applicable requirements of UBPPA UNI-B-6. Allowable pressure drop shall be as given in UBPPA UNI-B-6. Make calculations in accordance with the Appendix to UBPPA UNI-B-6.

#### **2.3.4.7.2 DEFLECTION TESTING**

Deflection testing will not be required however; field quality control shall ensure that all piping is installed in accordance with deflection requirements established by the manufacturer.

### **2.3.5 WASTEWATER TREATMENT LAGOON SYSTEMS**

Partial mix aerated wastewater treatment lagoon systems shall be designed in accordance with AED Design Requirements - Package Wastewater Treatment Plants and Lagoons, latest version.

*Wastewater Lagoon Site Survey.* The Contractor shall conduct a topographic survey to determine existing site characteristics. The Contractor shall conduct a utility survey to determine the locations of any nearby security fences and buildings, water lines, wells, sanitary sewers, storm sewers and communication/electrical lines. The Contractor shall provide survey for all outfall piping locations and the outfall area in the existing wadi to include topographic survey of a minimum of 20 m on both sides of the proposed outfall location.

*Waste water Treatment Lagoon Layout.* The Contractor shall design a layout for the system to include all lagoon geometry, waste water inlet and off loading station configurations, number of process compartments, yard piping, bypass valves, surface aerators and disinfection equipment and piping, effluent contact chambers and discharge facilities including the outfall system, and sludge drying, sludge drying water recirculation piping, grey water irrigation pond and pumps and related site preparation and earthwork.

#### **2.3.5.1 WASTE WATER TREATMENT LAGOON SYSTEM CAPABILITIES**

The partial mix aerated wastewater treatment lagoon system shall be designed to accommodate the wastewater hydraulic load as specified in Section 01010. The wastewater treatment lagoon system shall be designed and constructed such that it operates with the ability to process inflow rates to the waste water lagoon system from the off loading station based on the calculated peak hourly flow. Feed rate to the plant components shall be determined by the Contractor from the analysis of the installation peak flow and average daily flow evaluation. All treatment train components shall be designed and constructed in pairs and with bypass capability in order to continue wastewater treatment while performing maintenance on a particular component in the treatment train.

#### **2.3.5.2 REQUIREMENTS OF DESIGN**

Design to pass 100% of design capacity without overflowing.

Influent Characteristics of Wastewater:

- a. BOD<sub>5</sub> – 400 mg/L
- b. TSS –400 mg/L
- c. TKN – 80 mg/L
- d. Fecal Coliform – 10<sup>8</sup> MPN /100 mL

Effluent Criteria Limitations for Direct Surface Water Discharge:

- a. BOD<sub>5</sub>
- b. The 30-day average will not exceed 30 mg/L
- c. The 7-day average will not exceed 45 mg/L
- d. CBOD<sub>5</sub> may be substituted for BOD<sub>5</sub>. In those cases the following limits will apply:
  1. 30-day average will not exceed 25 mg/L
  2. The 7-day average will not exceed 40 mg/L

Note: Parameter CBOD<sub>5</sub> limit, if substituted for the parameter BOD<sub>5</sub>, should be at least 5 mg/L less than each numerical limit for the thirty (30) day and seven (7) day average for the BOD<sub>5</sub> limit. The CBOD<sub>5</sub> test procedure suppresses the nitrification component in the BOD<sub>5</sub> test procedure, thereby reducing the value or effects and lowering the oxygen demand.

- e. TSS
- f. The 30-day average will not exceed 30 mg/L.
- g. The 7-day average will not exceed 45 mg/L.
- h. pH
- i. The effluent pH values will be maintained between 6.0 and 9.0.

Temperature Ranges: see the mechanical section for the range of temperatures that apply.

Processes: To be determined by the Contractor as part of the scope of work subject to Government approval as required in AED Design Requirements - Package Wastewater Treatment Plants and Lagoons latest version.

### **2.3.5.3 LAGOONS**

The Contractor shall design the partial mix aerated lagoons in accordance to the AED Design Requirements - Package Wastewater Treatment Plants and Lagoons latest version. The lagoons shall be lined with a geomembrane liner with a hydraulic conductivity no greater than  $1 \times 10^{-7}$  cm/sec, or shall be concrete lined. The Contractor shall construct a minimum of two (2) lagoons of equal volume.

### **2.3.5.4 FLOW SPLITTING**

For multiple treatment trains, provide flow splitting capabilities to evenly distribute flow to each treatment train with broad adjustable rectangular weirs. Plant influent shall be conveyed directly into the flow lagoon basins.

### **2.3.5.5 INLET BAR SCREEN**

A bar screen shall be provided prior to flow equalization to remove large solids from the incoming raw sewage. The bar screen will be fabricated from 13 mm diameter bars spaced 25 mm apart. The bars shall be sloped to permit easy cleaning of accumulating debris. A deck shall be furnished for drying the debris. Minimum area of bar screen shall be 0.9 m x 0.9 m.

### **2.3.5.6 FLOW EQUALIZATION**

Provide flow equalization volume designed to attenuate maximum peak flows equal to 150% of the design flow for two hours. Flow control to the lagoons shall be accomplished by gravity flow of the influent from the off loading station. The off loading station shall contain broad adjustable rectangular discharge weirs. The broad weirs will be adjustable so that a measured amount of influent will flow to the lagoons.

### **2.3.5.7 CHLORINE CONTACT CHAMBER**

A chlorine contact chamber will be provided for proper disinfection of the treated waste water prior to discharging from the plant. The chlorine contact chamber will have appropriate detention time based on the design flow to meet effluent standards. Sufficient flow baffles will be supplied to ensure proper mixing of the chlorine solution with the plant effluent and detention time.

### **2.3.5.8 HYPOCHLORITE SYSTEM**

Provide a liquid chlorine (hypechlorite) feed system sized to satisfy all disinfection requirements at the waste water treatment plant. It is anticipated that calcium hypochlorite will be delivered to the plant in the small containers and stored in a dedicated, dry, well ventilated building. No other chemicals, cleaning solvents, lubricants, etc. are to be stored in the dedicated space. The hypochlorite feed system will consist of batch mix/feed storage tanks, positive

displacement metering pumps, piping, valves and other appurtenances, and pump controls. For redundancy, provide a dedicated metering pump for each treatment train.

Provide two minimum 400 liter fiberglass reinforced plastic or polyethylene mix/feed tanks. The Contractor shall base the preliminary tank size on commercial strength 12.5% hypochlorite batch solution, and assumption that 45 kilograms of calcium hypochlorite batched in each tank. Tanks shall be elevated on a pad for housekeeping and to provide a flooded metering pump suction, and shall come with hinged cover, top mounted mixer, and 25 mm bottom outlet connection. The Contractor shall provide a concrete secondary containment for the mix/feed tank. The concrete secondary containment shall provide a minimum total of 900 liter capacity. The Contractor shall construct a concrete Mixers shall have local, manual on/off control. Hypochlorite metering pumps shall be positive displacement type with stroke and speed control. The pumps shall be capable of adjustable speed operation using DC SCR drive and shall be flow-paced off a flow signal from the lagoon system. Coordinate pump motor type with drive unit provided. Metering pumps shall have capacity to dose minimum 10 mg/L chlorine or as required to meet applicable discharge limits, whichever is greater. Provide a dedicated pump for each treatment train. At a minimum, each metering pump shall be provided with the following appurtenances: Pulsation dampener, adjustable diaphragm backpressure valve, adjustable pressure relief valve, calibration column, pressure indicator with diaphragm seal, Y-strainer. Provide a suitable diffuser or injection assembly for dispersing chemical at the point of application.

Provide non-potable dilution water for batching the dry calcium hypochlorite. Provide appropriate protective clothing and eye protection. Provide an emergency shower and eyewash station in the chlorine feed building.

Chlorine feed piping shall be 13 mm schedule 80 PVC. Provide double walled containment for chlorine lines between the feed building and the point of application. Provide isolation valves to allow equipment to the isolated for maintenance.

Provide power, control wiring and dilution water as required for a complete and operable system.

#### **2.3.5.9 CENTRAL CONTROL PANEL**

The electrical controls will consist of magnetic starters, program timers and switches necessary to automatically control all electrical devices and/or motors on the waste water treatment system.

Manual-off-auto selector switches and magnetic starters in conjunction with the program timer will control the blower/motor. The program timers will have the capability to operate the treatment system when required as determined by the variation in the daily flow rate. Properly sized circuit breakers and fuses will protect all electrical equipment and circuitry. The control system will be designed to operate all duplex or standby equipment.

Electronic flow meters shall be installed at appropriate locations on inflow and outfall locations to monitor influent and effluent flows. The controls and monitors shall be located at the central control panel.

#### **2.3.5.10 ACCESS LADDER, WALKWAYS AND HANDRAILS**

Provide an access ladder to each structure above grade. Provide service walkways with handrails to service the plant equipment. Walkways shall be a minimum 0.9 m. Provide service walkways between trains and other plant structures so each structure can be accessed without having to climb back down a ladder.

#### **2.3.5.11 PIPING**

All piping that is not buried in accordance with this section shall be Schedule 40 black steel pipe.

#### **2.3.5.12 VALVES**

The Contractor shall install bypass valves and piping so that each component in the process train can be bypassed for maintenance.

### **2.3.5.13 SLUDGE DRYING BEDS**

Provide four (4) sludge drying beds sized to adequately provide the capacity to dry sludge produced by the lagoon system. Convey sludge from lagoons to beds by gravity. Provide isolation valves to each bed and splash plate in front of outlet to spread the sludge over the bed and prevent erosion of the sand.

Beds shall be capable of holding 0.3 m of liquid sludge. Profile the following bed layers:

- a. 0.3 m top layer of uniform coarse sand (effective size between 0.3 to 0.75 mm)
- b. 0.1 m intermediate layer of uniform fine gravel (effective size between 4 to 5 mm)
- c. 0.1 m bottom layer of uniform coarse gravel (effective size between 20 to 25 mm)

Slope bed subgrade to drain to drainage laterals. Encase drainage laterals in 0.1 m of uniform coarse gravel. Drainage lateral shall be 0.1 m below bottom gravel layer. Slope drainage laterals and header a minimum of 1% to drain to lift station. Drainage laterals shall be perforated ASTM 3034 100 mm PVC pipe with two rows of holes 13 mm in diameter on 120 mm centers and 120° apart. Space laterals evenly at 3 m apart. Lateral are to run entire length or width of bed. Manifold laterals to common ASTM 3034 150 mm PVC header. Locate feed pipe at opposite end of access point for dried sludge removal equipment (e.g. bulldozer). Slope bed side walls at 2H: 1V slope.

The Contractor shall design and construct effluent recirculation system for the excess effluent that collects in the drying beds. The effluent recirculation system shall consist of, but not inclusive of, pumps and piping that will convey effluent to the lagoon system.

### **2.3.5.14 START UP TESTING**

The Contractor shall include a proposed start-up testing and training program in the operation and maintenance manuals. When the wastewater system construction nears completion and all units are operative, the Contractor shall commence a commissioning and startup procedure for the treatment system. The treatment system includes all treatment plant units and associated equipment, sludge holding and digestion, sewage dump pad, and all buildings. The Contractor shall operate the treatment facility for a trial period of two months performing all daily and weekly operation and maintenance (O&M) tasks recommended by the equipment manufacturer. The Contractor shall utilize services of qualified operators; including the use of at least two Afghan Nationals that the Contractor shall train. During the routine O&M, the Contractor shall perform all sampling and testing necessary to ensure proper daily operations in achieving the required effluent standards. The Contractor shall maintain a log that includes records of daily O&M activities, e.g. repairs, inflow measurement, aeration cycles, effluent cycling, waste and return sludge pumping, and sludge drying. The Contractor shall also maintain and operate the sludge disposal operation during the trial period.

## **2.3.6 STORM SEWER SYSTEMS**

### **2.3.6.1 DESIGN STORM RETURN PERIOD (BASELINE FREQUENCY)**

Developed portions of the site installation such as administration, industrial and barracks areas, shall be based on a rainfall of 20-year frequency. Basic system design shall be in accordance with UFC 3-230-17A, Chapter 2. Potential damage or operational requirements may warrant a more severe criterion or in certain areas a lesser criterion may be appropriate. The design of roadway culverts and other on-site storm drainage features & structures will normally be based on 20-year rainfall event. Protection of installations against flood flows originating from areas exterior to the base installation shall be based on a 20-year or greater rainfall.

### **2.3.6.2 STORM DRAINAGE SYSTEM DESIGN**

The Contractor shall be responsible for the complete design of the storm drainage system. Drainage of runoff from unpaved areas onto pavements shall be minimized. If storm drain piping is required it shall comply with the requirements in this section. Where storm drain pipes are of different diameters, the pipe crown elevations should be matched at the drainage structure. Storm drain lines shall be located outside of paved areas to the extent possible.

Under no circumstance shall storm drain lines be located beneath buildings. All open storm drainage channels shall be concrete lined. Erosion control shall be provided for all storm drain structures during construction. Water from roof down spouts shall be drained off building site. All storm drain pipe and structures shall comply with the requirements specified in UFGS Specification Section 33 40 00 Storm Drainage Utilities. For cases when there is a need to penetrate the perimeter wall for drainage purposes (outfall), multiple wall penetrations shall be used to provide redundancy. Each drainage penetration through the perimeter wall shall be protected from unauthorized ingress/egress through the use of grates or rebar.

### **2.3.6.3 HYDRAULIC DESIGN**

New storm drain pipes shall be designed for gravity flow during the design storm baseline unless otherwise approved by the Government. The hydraulic grade line shall be calculated for the storm drain system and all energy losses accounted for. Design computations shall adhere to procedures contained in UFC 3-230-17A. Storm drain systems shall be designed to provide a maximum velocity of 2m/s.

### **2.3.6.4 AREA INLETS**

Area inlets shall be properly sized and designed to accommodate the design flows. All grates shall be of a “bicycle safe” design.

#### **2.3.6.4.1 CONCRETE PIPE**

Reinforced concrete pipe shall be a minimum Class III. Type I cement may be used only when sulfates in the soil are 0.1 percent or less and dissolved sulfates in the effluent are 150 ppm or less. Type II cement may be used only when sulfates in the soil are 0.2 percent or less and dissolved sulfates in the effluent are 1,500 ppm or less. Only Type V cement may be used if sulfates in the soil exceed 0.2 percent or dissolved sulfates in the effluent exceed 1,500 ppm. Concrete pipe shall be assumed to have a minimum design service life of 50 years unless the Contractor determines that conditions at the site will reduce the service life. Concrete culverts and storm drains shall be protected by a minimum of one m of cover during construction to prevent damage by heavy construction equipment.

#### **2.3.6.4.2 CORRUGATED METAL PIPE**

Corrugated metal pipe shall not be used.

#### **2.3.6.4.3 PLASTIC PIPE**

Stiffness of the plastic pipe and soil envelope shall be such that the predicted long-term deflection shall not exceed 7.5 percent. Plastic culverts and storm drains shall be protected by a minimum of one m of cover during construction to prevent damage by heavy construction equipment. Split couplers shall not be allowed for corrugated high-density polyethylene pipe. Plastic pipe shall be assumed to have a minimum design service life of 50 years unless the Contractor determines that conditions at the site will reduce the service life (then plastic pipe shall not be used).

### **2.3.7 OIL WATER SEPERATORS**

Oil/water separators shall be utilized for all drains from the vehicle wash racks. Separators shall be located for easy maintenance and cleaning. Drain water from the separator shall drain to the surface drainage system.

## **2.4 GEOTECHNICAL**

### **2.4.1 SOIL INVESTIGATION**

Existing geotechnical information is not available at the project site. Any site-specific geotechnical data required to develop foundations, materials, earthwork, and other geotechnical related design and construction activities for this project shall be the Contractor’s responsibility. The Contractor shall develop all pertinent geotechnical design and

construction parameters by appropriate field and laboratory investigations and analyses. The Contractor shall produce a detailed geotechnical report that includes:

- a. Clear description of the anticipated construction including planned grading and structural details to provide an estimation of foundation loads (compression, uplift, lateral, and moment) and settlement tolerance.
- b. Detailed site and area reconnaissance that includes a description of local geology and origin of sediments, surface features (e.g., ditches or other excavations, existing structures, vegetation, rock outcrops, seeps or springs), surface soil type(s), and subsurface lithology).
- c. Justification of number and depth of borings.
- d. Site plan illustrating exploratory boring locations.
- e. Boring logs that include groundwater levels (if encountered).
- f. Field tests and analyses (e.g., Unified Soil Classification System, field density, SPT).
- g. Analytical laboratory test results in accordance with ASTM or other recognized standards (e.g., sieve analysis, Atterberg Limits (plastic and liquid), moisture content, hydrometer, consolidation/collapse potential, specific gravity of solids, direct shear, density, chemical [sulfate, chloride, pH, lime], K values) and any other tests as needed to properly conduct necessary calculations to determine the engineering properties of the soil.
- h. A summary of the results of the subsurface geotechnical conditions including allowable soil bearing capacity, foundation recommendations, pavement design criteria, and construction materials (e.g. concrete cement, asphalt, and aggregates).

Two copies of the geotechnical report shall be submitted to the COR. Foundations, including sub-grade, shall be designed and constructed based on calculations and recommendations from a licensed structural engineer provided by the Contractor.

For standard penetration test (SPT), the Contractor shall use ASTM D1586. All geotechnical laboratory and field work shall be based on standards set forth in the ASTM. Contractor shall not use any DIN standards for penetration tests in lieu of ASTM D 1586. Soil investigations shall be in accordance with AED Design Requirements: Geotechnical Investigations for USACE Projects, latest version, or most recent version.

For foundation design, allowable soil bearing pressures shall be determined by calculations made based on the physical and mechanical properties obtained from laboratory testing. The soil bearing pressures calculated shall be compared with the International Building Code (IBC) 2006 Table 1804.2. The lower of the two bearing pressures, calculated or Table 1804.2, shall be chosen for the allowable soil bearing pressure.

California Bearing Ratio (CBR) tests shall be conducted on the existing soils throughout the proposed road alignment and vehicle parking and maneuver areas. Results from the tests shall be used to calculate the pavement structure using the minimum pavement structure as dictated in paragraph 2.3 as a reference. In the event that the calculations based on the CBR tests reveal that the pavement structure dictated in paragraph 2.3 is insufficient to carry the design load, the Contractor shall design and construct a subbase layer for the pavement structure.

The Contractor shall conduct soils classification per ASTM D 2487-06.

No design review submittal shall be considered complete without an approved geotechnical report. Geotechnical investigation plans and report of investigations shall be submitted promptly in accordance with Section 01335.

## 2.4.2 GEOTECHNICAL QUALIFICATIONS

A geotechnical engineer that is a member of a geotechnical firm responsible to the Contractor shall oversee all geotechnical engineering design parameters. The geotechnical engineer shall be qualified by:

- a. Education in geotechnical engineering;
- b. Professional registration;
- c. Minimum of ten (10) years of experience in geotechnical engineering design.

The geotechnical firm conducting the field investigation and laboratory work shall be certified by the Chief, Quality Assurance Branch USACE-AES or Chief, Quality Assurance Branch USACE-AEN. Certification document shall be submitted as part of the Geotechnical Report.

## 3.0 STRUCTURAL

### 3.1 GENERAL

Foundations shall be properly placed on suitable compacted ground area and shall be in accordance with the recommendations from the geotechnical investigation. Building foundations shall be founded a minimum of 800 mm below grade. Foundation designs shall be corroborated with the geotechnical findings and recommendations.

Building foundations were designed for a soil bearing capacity of 72 KPa (1500 psf). The geotechnical investigation shall confirm bearing capacity to be no less than 72 KPa (1500 psf). If geotechnical investigation shows less than 72 KPa (1500 psf), Contractor shall redesign footings based on the geotechnical investigation. Foundation designs shall be corroborated with the geotechnical findings and recommendations.

Field welding shall not be used for any part of the Main Structural Force Resisting System for significant structures. The Main Structural Force Resisting System is that part of the structural system providing the required resistance to all gravity loads (dead; live) and all lateral loads (wind; seismic). Bolted connections in lieu of welding are recommended. Exemptions to these guidelines would be minor structural connections; including metal trusses bearing on a reinforced concrete roof, and non-load bearing applications. Certified shop welding of pre-engineered buildings and various structural members shall be permitted.

### 3.2 DESIGN

For any structure that is designed, rather than provided, the design shall be performed by or under the direct supervision of the Contractor's structural engineer. All structural design documents shall be stamped and signed by a registered structural engineer.

Calculations shall be in SI (metric) units of measurements. All components of the structures shall be designed and constructed to support safely all loads without exceeding the allowable stress for the materials of construction in the structural members and connections.

### 3.3 STANDARDS

The Contractor should use the following American standards to provide structural design if local standards are not available, relevant, or applicable. The Contractor shall follow American Concrete Institute Standards (ACI) for design and installation of all concrete structures.

Concrete	ASTM C 39 and ACI 318; 28 MPa ( $f'_c = 4,000$ psi) minimum specified compressive strength @ 28 days, and maximum water-cement ratio of 0.45.
Steel Reinforcement	ASTM A 615; 420 MPa ( $F_y = 60$ ksi) yield strength.
Welded Wire Fabric	ASTM A 185.
Anchor Bolts	ASTM F 1554; Grade 36 steel.
Bolts and Studs	ASTM A 307.

Plaster	ASTM C 926.
Concrete Masonry Units	ASTM C 90; Type I (normal weight, moisture control).
Mortar	ASTM C 270; Type S (ultimate compressive strength of 13 MPa).
Grout	ASTM C 476; 14 MPa (2,000 psi) minimum compressive strength @ 28 days (slump between 200 mm to 250 mm).
Structural Steel	ASTM A 36; 250 MPa ( $F_y = 36,000$ psi).
Welding	AWS D1.1 (American Welding Society)
Cold-Formed Steel	AISI Specification for the Design of Cold-formed Steel Structural Members

### **3.4 DEAD AND LIVE LOADS**

Dead loads shall be in accordance with ASCE 7-05 Minimum Design Loads for Buildings and Other Structures. Dead loads consist of the weight of all materials of construction incorporated in the buildings. Live loads shall be per Chapter 4. All facilities shall be classified as a minimum of Category II in accordance with Table 1-1.

### **3.5 WIND LOADS**

Wind loads shall be calculated in accordance with ASCE 7-2005 using a "3-second gust" wind speed of 135 km/hr. Exposure = C. Importance Factor = 1.0.

### **3.6 SNOW LOADS**

Snow Loads shall be calculated per local standard practice where known and shall not be reduced based on tributary area. Structures shall be designed for roof snow load where it exceeds the roof live load.

### **3.7 SEISMIC**

The building and all parts thereof shall be designed for the seismic requirements as defined by the International Building Code referenced herein.

Spectral ordinates shall be  $S_s = 1.28g$  and  $S_1 = 0.51g$ ;  $I = 1.0$

### **3.8 REINFORCED CONCRETE**

All concrete members shall be designed and constructed in accordance with the provisions of the American Concrete Institute, Building Code Requirements for Structural Concrete, ACI 318. A minimum 28 day compressive strength of 28 MPa shall be used for design and construction of all concrete. Concrete shall have maximum water-cement ratio of 0.45. Reinforcing steel shall be deformed bars conforming to American Society for Testing and Materials publication ASTM A 615, Deformed and Plain Billet-Steel Bars for Concrete Reinforcement. The minimum yield strength  $F_y$  shall be 420 MPa.

No concrete shall be placed when the ambient air temperature exceeds 32 degrees C unless an appropriate chemical retardant is used. In all cases when concrete is placed at 32 degrees C or hotter it shall be covered and kept continuously wet for a minimum of 48 hours.

### **3.9 STRUCTURAL CONCRETE**

Concrete structural elements shall be designed and constructed in accordance with the provisions of the American Concrete Institute, Building Code Requirements for Structural Concrete, ACI 318. A minimum cylinder 28 day compressive strength of 28 MPa shall be used for design and construction of all concrete, except that 24 MPa shall be used for Shotcrete applications. Reinforcing steel shall be deformed bars conforming to American Society for

Testing and Materials publication ASTM A 615, Deformed and Plain Billet-Steel Bars for Concrete Reinforcement. Concrete members at or below grade shall have a minimum concrete cover over reinforcement of 75 mm. Concrete shall have maximum water-cement ratio of 0.45. No concrete shall be placed when the ambient air temperature exceeds 32 degrees C unless an appropriate chemical retardant is used. In all cases when concrete is placed at 32 degrees C or hotter it shall be covered and kept continuously wet for a minimum of 48 hours. Except with authorization, do not place concrete when ambient temperature is below 5 degrees C or when concrete is likely to be subjected to freezing temperatures within 24 hours. When authorized, when concrete is likely to be subjected to freezing within 24 hours after placing, heat concrete materials so that temperature of concrete when deposited is between 18 and 27 degrees C. Methods of heating materials are subject to approval of the Contracting Officer. Do not heat mixing water above 74 degrees C. Remove lumps of frozen material and ice from aggregates before placing aggregates in mixer. Follow practices found in ACI 306.1.

### **3.10 MASONRY**

Masonry shall be designed and constructed in accordance with the provisions of the latest editions of Building Code Requirements for Masonry Structures, ACI 530/ASCE 5/TMS 402. Mortar shall be Type S and conform to ASTM C 270. All masonry used below grade shall be fully grouted. All cells of exterior CMU walls shall be fully grouted. For interior CMU walls, only the reinforced cells shall be grouted. All interior and exterior CMU walls shall have reinforced horizontal bond beams at a maximum spacing of 1,200 mm on center.

### **3.11 STRUCTURAL STEEL**

Structural steel shall be designed and constructed in accordance with the provisions of American Institute of Steel Construction (AISC), Specifications for Structural Steel Buildings.

### **3.12 COLD-FORMED LIGHT GAUGE STEEL**

Design of cold-formed steel structural members shall be in accordance with the provisions of American Iron and Steel Institute (AISI), Specifications for Design of Cold-Formed Steel Structural Members.

### **3.13 STEEL ROOF JOISTS**

Steel roof joists shall be placed according to the roof design and roof manufacturer specifications. Steel purlins shall be installed perpendicular to the steel beams. Use continuous metal roof sheets from ridge to eave to avoid constructing roof seams. In lieu of the continuous metal roof sheets, the Contractor can submit a plan for roofing seams; however, the plan must show a detail of how leaks will be avoided, and the Contracting Officer before application must approve the plan. Steel "hat channels" can be installed for the connection to the CONEX box module. Provide all necessary metal framing for roof fascia and soffits. See structural paragraph for structural characteristics of steel joists.

### **3.14 OPEN WEB STEEL JOISTS**

Open web steel joists shall conform to SJI Specifications and Tables. Joists shall be designed to support the loads given in the standard load tables of SJI Specifications and Tables.

### **3.15 METAL DECK**

Deck units shall conform to SDI Publication Number 29. Panels of maximum possible lengths shall be used to minimize end laps. Deck units shall be fabricated in lengths to span three or more supports with flush, telescoped or nested 50 mm (2 in) laps at ends, and interlocking, or nested side laps. Metal deck units shall be fabricated of steel thickness required by the design and shall be galvanized.

### **3.16 CORRUGATED METAL ROOFING**

Design of cold-formed steel structural members shall be in accordance with the provisions of American Iron and Steel Institute (AISI), Specifications for Design of Cold-Formed Steel Structural Members.

### **3.17 FOUNDATIONS**

All structures shall be provided with a reinforced concrete foundation properly placed on suitable native or compacted earth and shall be prepared in accordance with the recommendations from the geotechnical investigation. Where frost protection is required, the perimeter foundation shall be founded a minimum of 800 mm below final grade.

All foundations have been or shall be designed for a maximum soil bearing capacity of  $0.75 \text{ kg/cm}^2$ . A geotechnical investigation shall confirm bearing capacity to be no less than  $0.75 \text{ kg/cm}^2$ . If geotechnical investigation shows less than  $0.75 \text{ kg/cm}^2$ , the Contractor shall redesign the foundation based on the values provided in the geotechnical investigations.

### **3.18 EARTHWORK AND FOUNDATION PREPARATION**

#### **3.19 CAPILLARY WATER BARRIER**

Bedding material for slabs on grade shall be coarse-graded gravel with little or no fines in order to prevent surface water from migrating up and maintaining contact with the bottom surface of the building slab. Graded material shall comply with ASTM C136 test method for sieve analysis of gravels with only 3 percent by weight passing the 37.5mm (1.5 inch) mesh size sieve, and no more than 2 percent by weight passing the 75 micrometers (No. 200) mesh size sieve, and conforming to the soil quality requirements specified in the paragraph entitled "Satisfactory Materials."

Capillary water barriers shall be placed under floor slabs (not under footings) and be a minimum of 150 mm thick.

Provide minimum 6 mil polyethylene vapor barrier sheet with edges lapped 1 meter and taped and located on top of the capillary water barrier gravel. Install the vapor barrier prior to placing the concrete.

#### **3.20 SATISFACTORY MATERIALS**

Any materials classified by ASTM D 2487 as GW, GM, GC, GP, SP, SW, SM, and SC and free of debris, roots, wood, scrap material, vegetation, refuse, soft unsound particles, or objectionable materials. Unless specified otherwise, the maximum particle diameter shall be one-half the lift thickness at the intended location.

#### **3.21 UNSATISFACTORY MATERIALS**

Any materials which do not comply with the requirements set forth in the Satisfactory Materials paragraph. Unsatisfactory materials also include man-made fills, trash, refuse, or backfills from previous construction. Unsatisfactory material also includes material classified as satisfactory which contains root and other organic matter, frozen material, and stones larger than 75mm. The Contracting Officer shall be notified of any unsatisfactory materials.

#### **3.22 CLEARING AND GRUBBING**

Unless indicated otherwise, remove trees, stumps, logs, shrubs, brush and vegetation, and other items that would interfere with construction operations within lines 1.5 m outside of the building and structure line. Remove stumps entirely. Grub out matted roots and roots over 50 mm in diameter to at least 460mm below existing surface.

#### **3.23 STRIPPING**

Strip suitable soil from the site where excavation or grading is indicated and stockpile separately from other excavated material. Material unsuitable for use as topsoil shall be stockpiled and used for backfilling. Locate

topsoil so that the material can be used readily for the finished grading. Where sufficient existing topsoil conforming to the material requirements is not available on site, provide borrow materials suitable for use as topsoil. Protect topsoil and keep in segregated piles until needed.

### **3.24 EXCAVATION AND COMPACTION OF FILL**

Excavate to contours, elevation, and dimensions indicated. Reuse excavated materials that meet the specified requirements for the material type required at the intended location. Keep excavations free from water. Excavate soil disturbed or weakened by Contractor's operations, soils softened or made unsuitable for subsequent construction due to exposure to weather. Excavations below indicated depths will not be permitted except to remove unsatisfactory material. Unsatisfactory material encountered below the grades shown shall be removed as directed. Refill with satisfactory material and compact to at least 95 percent of the maximum dry density, as determined by the Modified Proctor laboratory procedure. ASTM D 1557 shall be used for producing the Modified Proctor moisture-density curve, unless the soil to be compacted includes more than 30 percent retained on the 19 mm (3/4" in) sieve. In this case, the Contractor must replace the ASTM D 1557 laboratory compaction procedure with AASHTO T 180, Method D, corrected with AASHTO T 224.

During compaction, the moisture content of the soil shall be within 1.5 percent of the optimum moisture content, as determined by the Modified Proctor laboratory procedure. The thickness of compacted lifts shall not exceed 15 cm and the dry density of each compacted lift shall be tested by either sand cone (ASTM D 1556) or nuclear gage (ASTM D 2292). If the nuclear gage is used, it must first be compared to sand cone tests for each soil type to verify the accuracy of the nuclear gage measurements for moisture content, wet density, and dry density. Furthermore, every tenth nuclear gage test must be accompanied by a sand cone test and these verification data must be summarized and submitted to the Contracting Officer. Density tests shall be performed at a frequency of not less than one test for each 200 square meters and not less than two tests per compacted lift.

### **3.25 STRUCTURES WITH SPREAD FOOTINGS**

Ensure that footing subgrades have been inspected and approved by the Contracting Officer prior to concrete placement. Fill over excavations with concrete during foundation placement.

## **4.0 ARCHITECTURAL REQUIREMENTS**

Architectural-related Technical Requirements, as included in the following sub-paragraphs, shall only be used for Work that is to be designed per the contract requirements. Work that is to be constructed using Standard Designs shall not use the requirements of the following sub-paragraphs; that Work shall be built to the requirements of the 01010, the Standard Designs.

### **4.1 GENERAL**

All materials and products to be used throughout the facilities under contract are to be in accordance with the provided drawings and specifications. Different sub-contractors shall not use different material or standards under the contract. Intent of the project is to use locally procured materials (unless specified otherwise) and labor to the maximum extent possible while satisfying seismic, international building code, and national fire protection agency life safety code. Conflicts between criteria shall be brought to the attention of the Contracting Officer for resolution. In such instances, the Contractor shall furnish all available information with justification to the Contracting Officer.

### **4.2 DESIGN CRITERIA**

Designs for the facility types requested in this proposal are provided in the Appendix. These designs shall be used to create a complete and usable facility meeting the minimum requirements stated in these documents. The Codes, Standards, and Regulations listed in these documents shall be used in the construction of this project. The publications shall be the most recent editions. Standards other than those mentioned may be accepted provided they meet the minimum requirements and the contractor shall submit proof of equivalency to the Contracting Officer for approval.

IBC - International Building Code, latest edition

NFPA 101 - Life Safety Code, latest edition

### **4.3 LIFE SAFETY/ FIRE PROTECTION/ HANDICAPPED ACCESSIBILITY**

A life safety and fire protection analysis shall be completed prior to construction commencement for all buildings designed by the Contractor. This analysis shall be documented in plans and in the design analysis. All spaces shall be classified following NFPA 101 or IBC. Whichever code is used shall be stated and referenced in the life safety plan. The facilities of this contract shall comply with all safety requirements of the NFPA 101.

### **4.4 CONCRETE**

#### **4.4.1 FINISH**

If finish is exposed concrete, then the floor shall be a broom finish for texture and shall not interfere with sloping for drainage of the surface. Vertical work shall have a form finish. Exposed concrete shall be sealed with an approved sealer.

#### **4.4.2 PRECAST**

Storage of precast units shall be in a dry place or materials shall be covered with a plastic or protective layer. Units shall be detailed to provide size, shape and location of installation. Precast units shall meet the minimum concrete strength requirements.

### **4.5 MASONRY**

Storage of masonry materials shall be in a dry place or materials shall be covered with a plastic protective layer. Cover open walls each day to keep them protected and dry. Masonry construction systems shall be reinforced.

#### **4.5.1 CONCRETE MASONRY UNITS**

Concrete masonry units (CMU) for exterior walls shall be either 290 mm wide x 390 mm x 190 mm high or otherwise as shown on the standard drawings. They shall be installed in running bond level and plumb. Mortar joints shall be 10 mm on all sides between CMU. Joints shall be struck with a concave tool to provide a smooth recessed curved surface. Install only quality units. The surface shall be free of chips, cracks, or other imperfections that would detract from the overall appearance of the finished wall. Defective CMU or mortar shall be rejected. All CMU for internal or exterior walls shall be reinforced. CMU shall be sealed in all wet areas/rooms.

### **4.6 STONE**

Stone type shall be identified for approval in design. Mortar shall be of lower strength than stone and weep holes shall be provided in cavity wall systems.

### **4.7 THERMAL PERFORMANCE OF EXTERNAL BUILDING ASSEMBLIES**

External building assemblies shall meet the requirements of TI-800, Design Criteria, UFC 3-400-01 Design: Energy Conservation, and ASHRAE Standard 90.1, latest editions, but shall meet the following minimum requirements:

Assembly	Minimum Thermal Value
Exterior walls (above grade)	RSI 2.280 (R 13)
Ceilings/roof	RSI 5.284 (R 30)
Floor (over unheated space)	RSI 3.346 (R 19)
Exterior doors	RSI 0.252 (R 1.43)
Exterior windows/(glazing within doors)	RSI 0.308(R 1.75)
Skylights	RSI 0.180 (R 1.02)

This table is a summary of ANSI/ ASHRAE 90.1 Table 5.5-5, Climate Zone 5 (A,B,C)

RSI measured in K-m<sup>2</sup>/W, R measured in SF-F-hr/BTU. 1 K-m<sup>2</sup>/W = 5.678 SF-F-hr/BTU.

#### **4.8 ANTITERRORISM / FORCE PROTECTION**

Force protection/anti-terrorism measures for this location shall be as defined in 01010.

#### **4.9 ROOFING AND WEATHERPROOFING**

All buildings shall have a sloped metal roof. Buildings with pitched roofs shall be provided with metal eaves, and soffits. All exterior entry ways to be covered and protected by rain gutters and diverters as to not have water falling on the entry ways to all buildings.

##### **4.9.1 SLOPING METAL ROOFING**

Building shall be weatherproofed in accordance with manufacturer's recommendations, and shall be provided with prefinished sloping metal roofing system (including structural support) with a minimum 2:12 slope. Install soffit and ridge venting. Provide rigid insulation over concrete roof slab, in accordance with contract drawings. Roof shall have a gutter and downspout system, or a diverter, at main entrances only to evacuate rain accumulation. Downspouts shall be attached securely to building exterior wall utilizing wall straps, as required. Metal roofing shall be prefinished in manufacturer's standard white color. All roof components (ridge vents, exhaust fans hoods, gutters, metal fascia, metal roof trim, etc.) shall be prefinished to match metal roof color.

##### **4.9.2 METAL FASCIA**

No wood fascias and/or soffits are allowed. Use metal fascias throughout. Attach drip flashing to metal fascia so that it extends past bottom of metal fascia to 50mm over stucco fascia, as indicated on contract drawings. Concrete soffits shall be a minimum width of 600mm extending from the building exterior wall.

##### **4.9.3 METAL SOFFIT VENT**

Provide perforated lay-in type metal soffit venting where indicated on drawings provided by the government. Soffit vents shall be prefinished to match color of metal fascia.

##### **4.9.4 CONCRETE SOFFIT VENT**

Provide venting through concrete soffit. Vent openings shall be 50mm diameter and spaced 2000 mm and set in a minimum of 200 mm from the exterior fascia edge. Provide insect screen over vent opening.

##### **4.9.5 OPTIONAL STRIP VENT AT METAL FASCIA**

Contractor may use optional continuous strip vent to provide attic ventilation in lieu of concrete soffit vent openings described above. Metal fascia will be required to be extended forward 40mm (1.5 in.) of the original detail location to accommodate the continuous strip vent. This will be accomplished by attaching purlins of 40 mm (1.5 in.) height to eave steel stud fascia support, and then attaching fascia to purlins. Strip vent shall be mechanically fastened to eave steel studs above the top edge of concrete soffit such that metal fascia drip edge will overlap to provide closure and hide vent strip. The completed installation shall allow continuous venting between metal fascia and concrete soffit. Attachment of strip vent shall be in accordance with vent strip manufacturer's recommended installation instructions. Strip vent shall be prefinished to match fascia color.

##### **4.9.6 CONTINUOUS RIDGE VENT**

For sloping roofs, provide continuous metal ridge vent at the top of roof along the ridge. Ridge vent shall be sized to provide adequate ventilation of the roofing system.

## **4.9.7 FLASHING & SHEET METAL**

### **4.9.7.1 MATERIALS**

Any metal listed by ASTM, DIN, BS or EN standards. Manual for a particular item may be used, unless otherwise specified or indicated. Materials shall conform to the requirements specified below and to the thicknesses and configurations established in ASTM, DIN, BS or EN standards. Different items need not be of the same metal, except that if copper is selected for any exposed item, all exposed items shall be copper.

### **4.9.7.2 STEEL SHEET, ZINC-COATED (GALVANIZED)**

Zinc coated steel conforming to ASTM A 525, DIN BS or EN Standards.

### **4.9.7.3 CONNECTIONS AND JOINTING**

#### **4.9.7.3.1 SOLDERING**

Soldering shall apply to copper and stainless steel items. Edges of sheet metal shall be pre-tinned before soldering is begun. Soldering shall be done slowly with well heated soldering irons so as to thoroughly heat the seams and completely sweat the solder through the full width of the seam. Edges of stainless steel to be pre-tinned shall be treated with soldering acid flux. Soldering shall follow immediately after application of the flux. Upon completion of soldering, the acid flux residue shall be thoroughly cleaned from the sheet metal with a water solution of washing soda and rinsed with clean water.

#### **4.9.7.3.2 SEAMING**

Flat-lock and soldered-lap seams shall finish not less than 25 mm. wide. Unsoldered plain-lap seams shall lap not less than 75 mm. unless otherwise specified. Flat seams shall be made in the direction of the flow.

#### **4.9.7.3.3 CLEATS**

A continuous cleat shall be provided where indicated or specified to secure loose edges of the sheet metalwork. Butt joints of cleats shall be spaced approximately 3 mm. apart. The cleat shall be fastened to supporting wood construction with nails evenly spaced not over 300 mm. on centers. Where the fastening is to be made to concrete or masonry, screws shall be used and shall be driven in expansion shields set in concrete or masonry.

## **4.9.8 PROTECTED MEMBRANE ROOFING SYSTEM**

Contractor shall install protected membrane roofing system in accordance with government provided specifications. Components of the roofing system shall comply with the manufacturer's specification.

## **4.9.9 SEALANTS**

Provide a sealant compatible with the material(s) to which it is applied. Do not use a sealant that has exceeded shelf life or has jelled and cannot be discharged in a continuous flow from the gun. Apply the sealant in accordance with the manufacturer's instructions with a gun having a nozzle that fits the joint width. Force sealant into joints to fill the joints solidly without air pockets. Tool smooth fresh sealant after application to ensure adhesion. Sealant shall be uniformly smooth and free of wrinkles. Upon completion of sealant application, roughen partially filled or unfilled joints; apply sealant, and tool smooth as specified. Sealer shall be applied over the sealant when and as specified by the sealant manufacturer.

### **4.9.9.1 INTERIOR SEALANT**

ASTM C 834 or ASTM C 920, Type S or M, Grade NS, Class 12.5. Use NT, DIN, BS, or EN equal standards.

#### **4.9.9.2 EXTERIOR SEALANT**

For joints in vertical and horizontal surfaces, provide ASTM C 920, Type S or M, Grade NS, DIN, BS, or EN equal standards.

#### **4.9.9.3 FLOOR JOINT SEALANT**

(ASTM C 920) Type S or M, Grade P, class 25, use T.

#### **4.9.9.4 PRIMERS**

Provide a non-staining, quick-drying type and consistency recommended by the sealant manufacturer for the particular application.

Immediately prior to application of the sealant, clean out loose particles from joints. Where recommended by sealant manufacturer, apply primer to joints in concrete masonry units, wood, and other porous surfaces in accordance with sealant manufacturer's instructions. Do not apply primer to exposed finish surfaces.

#### **4.9.9.5 BOND BREAKERS**

Provide the type and consistency recommended by the sealant manufacturer to prevent adhesion of the sealant to backing or to bottom of the joint. Provide bond breakers to the back or bottom of joint cavities, as recommended by the sealant manufacturer for each type of joint and sealant used, to prevent sealant from adhering to these surfaces. Carefully apply the bond breaker to avoid contamination of adjoining surfaces or breaking bond with surfaces other than those covered by the bond breaker.

#### **4.9.9.6 BACKING**

Backing shall be 25 to 33 percent oversize for closed cell and 40 to 50 percent oversize for open cell material, unless otherwise indicated.

#### **4.9.9.7 CLEANING SOLVENTS**

Provide type(s) recommended by the sealant manufacturer except for aluminum and bronze surfaces that will be in contact with sealant.

#### **4.9.9.8 SURFACE PREPARATION**

Surfaces shall be clean, dry to the touch, and free from dirt, frost, moisture, grease, oil, wax, lacquer, paint, or other foreign matter that would tend to destroy or impair adhesion. Oil and grease shall be removed with solvent and surfaces shall be wiped dry with clean cloths. When resealing an existing joint, remove existing caulk or sealant prior to applying new sealant. For surface types not listed below, the sealant manufacturer shall be contacted for specific recommendations.

#### **4.9.9.9 MASKING TAPE**

Masking tape shall be placed on the finish surface on one or both sides of a joint cavity to protect adjacent finish surfaces from primer or sealant smears. Masking tape shall be removed within 10 minutes after joint has been filled and tooled.

#### **4.9.9.10 BACKSTOPS**

Install backstops dry and free of tears or holes. Tightly pack the back or bottom of joint cavities with backstop material to provide a joint of the depth specified.

#### **4.9.9.11 PROTECTION**

Protect areas adjacent to joints from sealant smears. Masking tape may be used for this purpose if removed 5 to 10 minutes after the joint is filled.

#### **4.9.9.12 FINAL CLEANING**

Provide cleaning solvent type(s) recommended by the sealant manufacturer except for aluminum and bronze surfaces that will be in contact with sealant. Upon completion of sealant application, remove remaining smears and stains and leave the work in a clean and neat condition. Remove excess sealant with a solvent-moistened cloth on metal and other non-porous surfaces.

### **4.10 LOUVERS**

#### **4.10.1 INTERIOR LOUVERS**

SDI 111-C, Louvers shall be stationary sight-proof or lightproof type as required. Louvers for lightproof doors shall not transmit light. Detachable moldings on room or non security side of door; on security side of door, moldings to be integral part of louver. Form louver frames of 0.90 mm thick steel and louver blades of a minimum 0.60 mm. Louvers for lightproof doors shall have minimum of 20 percent net-free opening. Sight-proof louvers shall be inverted "V" blade design with minimum 55 or inverted "Y" blade design with minimum 40 percent net-free opening.

#### **4.10.2 EXTERIOR LOUVERS**

Louvers shall be inverted "Y", "V" or "Z" type. Weld or tenon louver blades to continuous channel frame and weld assembly to door to form watertight assembly. Form louvers of hot-dip galvanized steel of same gage as door facings. Louvers shall have steel-framed insect screens secured to room side and readily removable. Provide aluminum wire cloth, 7 by 7 per 10 mm or 7 by 6 per 10 mm mesh, for insect screens.

### **4.11 WINDOWS, DOORS & GLAZING**

#### **4.11.1 WINDOWS**

Windows shall be operable: side-hinged, horizontal sliding, awning type complying with NFPA101. Glazing in windows shall be laminated in accordance with the force protection criteria, UFC 4-010-01.

Provide insect screens only in Dining Facilities and medical-related rooms. Insect screens shall be removable type.

##### **4.11.1.1 MATERIALS**

###### **4.11.1.1.1 ALUMINUM EXTRUSIONS**

Provide alloy and temper recommended by the window manufacturer for the strength, corrosion resistance, and application of required finish, meeting the DIN 1725 raw material requirements, but not less than 215 N/mm<sup>2</sup> ultimate tensile strength and not less than 1.5 mm thick at any location for main frame and sash members.

###### **4.11.1.1.2 FASTENERS**

Provide aluminum, nonmagnetic stainless steel, epoxy adhesive, or other materials warranted by the manufacturer to be non-corrosive and compatible with aluminum window members, trim, hardware, anchors, and other components of window units.

#### **4.11.1.1.3 REINFORCEMENT**

Where fasteners screw-anchor into aluminum less than 3 mm thick, reinforce the interior with aluminum or nonmagnetic stainless steel to receive screw threads or provide standard non-corrosive pressed-in splined grommet nuts.

#### **4.11.1.1.4 EXPOSED FASTENERS**

Except where unavoidable for application of hardware, do not use exposed fasteners. For application of hardware, use fasteners that match the finish of the member or hardware being fastened, as appropriate.

#### **4.11.1.1.5 ANCHORS, CLIPS, AND WINDOW ACCESSORIES**

Fabricate anchors, clips, and window accessories of aluminum, nonmagnetic stainless steel, or hot-dip zinc-coated steel or iron complying with the requirements of DIN 1748; provide sufficient strength to withstand design pressure indicated. As a minimum provide 3 anchors on each side of the frame.

#### **4.11.1.1.6 COMPRESSION-TYPE GLAZING STRIPS AND WEATHERSTRIPPING**

Unless otherwise indicated, and at the manufacturer's option, provide compressible stripping for glazing and weather stripping such as molded EPDM or neoprene gaskets.

#### **4.11.1.1.7 SEALANT**

For sealants required within fabricated window units, provide type recommended by the manufacturer for joint size and movement. Sealant shall remain permanently elastic non-shrinking, and non-migrating. Comply with Sealants of these specifications for selection and installation of sealants.

#### **4.11.1.1.8 WIRE FABRIC INSECT SCREEN**

Wire Fabric Insect Screen shall be permanently fixed to the exterior of operable windows, as required in the 01010.

#### **4.11.1.2 HARDWARE**

Provide the manufacturer's standard hardware fabricated from aluminum, stainless steel, or other corrosion-resistant material compatible with aluminum and of sufficient strength to perform the function for which it is intended. Provide at a minimum one locking device on the interior of each window. Any operable window over 2 square meters shall have two locking devices as a minimum.

#### **4.11.1.3 FABRICATION**

Provide aluminum windows with factory finish in all buildings as indicated in the design drawings. Provide a locking device on the interior of each window. Provide anchors on each side of the frame into the adjoining structure, 3 on each side. Provide weather stripping system for all exterior windows and doors.

#### **4.11.1.4 METAL WINDOW SILLS**

Galvanized metal window sills, 0.90 mm, shall be installed on the exterior of all windows. The metal window sills shall have a turn down of 50 mm over the exterior masonry and stucco. Metal sills shall extend from side to side of the masonry opening in a single piece. Extend the metal window sill a minimum of 20 mm under the bottom of the aluminum windows. Install masonry mortar as required for a smooth surface under the window sills. Sills shall slope a minimum of 6 mm to the exterior and not allow water to puddle.

#### **4.11.1.5 FINISHES**

Apply baked enamel in compliance with paint manufacturer's specifications for cleaning, conversion coating, and painting. Color shall be white meeting the requirements of DIN 50018

#### **4.11.1.6 INSPECTION**

Inspect openings before beginning installation. Verify that rough or masonry opening is correct and the sill plate is level. Masonry surfaces shall be visibly dry and free of excess mortar, sand, and other construction debris.

#### **4.11.1.7 INSTALLATION**

Comply with manufacturer's specifications and recommendations for installation of window units, hardware, operators, and other components of the work. Set window units plumb, level, and true to line, without warp or rack of frames or sash. Provide proper support and anchor securely in place. Set sill members and other members in a bed of compound or with joint fillers or gaskets, as shown, to provide weather tight construction. Refer to the Sealant sections for compounds, fillers, and gaskets to be installed concurrently with window units. Coordinate installation with wall flashings and other components of the work.

#### **4.11.1.8 ADJUSTING**

Adjust operating sash and hardware to provide a tight fit at contact points and at weather stripping for smooth operation and a weather tight closure.

#### **4.11.1.9 CLEANING**

Clean aluminum surfaces promptly after installation of windows. Exercise care to avoid damage to protective coatings and finishes. Remove excess glazing and sealant compounds, dirt, and other substances. Lubricate hardware and other moving parts.

### **4.11.2 DOORS**

Fire rated doors and frames shall be tested and approved as an assembly and shall be provided by a single manufacturer/distributor. Hardware for fire rated door assemblies shall be labeled as appropriate for fire rated applications and shall be coordinated with door manufacturer. All exterior doors shall be heavy duty metal doors with metal frames. Interior door shall be hollow metal doors with hollow metal frames. Commercial duty lock sets and hardware shall be used on all doors. Hinges shall be the 5 knuckle type or equivalent. Provide door handles and locksets that can be locked with a key on all doors. All door locks shall have a thumb latch on inside of door such that no key is necessary to exit the room or building. Coordinate the final keying schedule with Contracting Officer prior to ordering lock sets. Generally each building should have 8 master keys fitting all locks, 8 sub-master keys fitting all exterior doors and 3 keys each for each interior door. Include 25% spare key blanks for the amount of keys provided per building. Provide numbering system identifying key to associated room door. Provide weather stripping system for all exterior doors.

#### **4.11.2.1 STEEL DOORS**

SDI A250.8, except as specified otherwise. Prepare doors to receive specified hardware. Undercut where indicated. Exterior doors shall have top edge closed flush and sealed to prevent water intrusion. Doors shall be 44.5 mm thick, unless otherwise indicated. Doors shall be constructed using heavy gauge steel with minimum thickness of 1.2 mm.

#### **4.11.2.2 FIRE AND SMOKE DOORS AND FRAMES**

The requirements of NFPA 80 and NFPA 105 respectfully shall take precedence over details indicated or specified.

#### **4.11.2.3 THRESHOLDS**

All exterior doors (except Mech/Elect rooms) shall be provided with manufactured metal thresholds conforming to ANSI/BHMA A156.21. Thresholds shall span continuously from jamb to jamb.

#### **4.11.2.4 STANDARD STEEL FRAMES**

SDI A250.8, except as otherwise specified. Form frames to sizes and shapes indicated, with welded corners or knock-down field-assembled corners. Provide steel frames for doors, transoms, sidelights, mullions, cased openings, and interior glazed panels, unless otherwise indicated.

#### **4.11.2.5 WELDED FRAMES**

Continuously weld frame faces at corner joints. Mechanically interlock or continuously weld stops and rabbets. Grind welds smooth.

#### **4.11.2.6 STOPS AND BEADS**

Form stops and beads from 0.9 mm thick steel. Provide for glazed and other openings in standard steel frames. Secure beads to frames with oval-head, countersunk Phillips self-tapping sheet metal screws or concealed clips and fasteners. Space the fasteners approximately 300 to 400 mm on centers. Miter molded shapes at corners. Use butt or miter square or rectangular beads at corners.

#### **4.11.2.7 WEATHER-STRIPPING, INTEGRAL GASKET**

Provide weather-stripping that is a standard cataloged product of a manufacturer regularly engaged in the manufacture of this specialized item. Black synthetic rubber gasket with tabs for factory fitting into factory slotted frames, or extruded neoprene foam gasket made to fit into a continuous groove formed in the frame, may be provided in lieu of head and jamb seals. Weather stripping shall be looped neoprene, synthetic rubber gasket, or vinyl held in an extruded non-ferrous metal housing. Air leakage of weather stripped doors shall not exceed 0.003125 cubic meters per second of air per square meter of door area when tested in accordance with ASTM E 283.

#### **4.11.2.8 ANCHORS**

Provide anchors to secure the frame to adjoining construction. Provide steel anchors, zinc-coated or painted with rust-inhibitive paint, anchors not lighter than 1.2 mm thick.

#### **4.11.2.9 WALL ANCHORS**

Provide at least three anchors for each jamb. For frames which are more than 2285 mm in height, provide one additional anchor for each jamb for each additional 760 mm or fraction thereof.

##### **4.11.2.9.1 FLOOR ANCHORS**

Provide floor anchors drilled for 10 mm anchor bolts at bottom of each jamb member. Where floor fill occurs, terminate bottom of frames at the indicated finished floor levels and support by adjustable extension clips resting on and anchored to the structural slabs.

##### **4.11.2.10 HARDWARE PREPARATION**

Provide minimum hardware reinforcing gages as specified in ANSI A250.6. Drill and tap doors and frames to receive finish hardware. Prepare doors and frames for hardware in accordance with the applicable requirements of SDI A250.8 and ANSI A250.6. For additional requirements refer to BHMA A115. Drill and tap for surface-applied hardware at the project site. Build additional reinforcing for surface-applied hardware into the door at the factory. Locate hardware in accordance with the requirements of SDI A250.8, as applicable. Punch door frames, with the

exception of frames that will have weather-stripping or lightproof or soundproof gasketing, to receive a minimum of two rubber or vinyl door silencers on lock side of single doors and one silencer for each leaf at heads of double doors. Set lock strikes out to provide clearance for silencers.

#### **4.11.2.11 HINGES**

Exterior hinges shall have non-removable pins and be satin-chrome steel or stainless steel; Grade 1 anti-friction or ball bearing; and 3 each of 115 mm x 115 mm per leaf up to 900 mm wide door 125 mm x 125 mm for doors 900 mm to 1,200 mm wide. Interior hinges shall be Grade 1; antifriction or ball bearing; and 3 each of 115 mm x 115 mm per leaf up to 900 mm wide door 125 mm x 125 mm for doors 900 mm to 1,200mm wide. Hinges for labeled fire doors must be either steel or stainless steel. Hinges shall conform to ANSI/BHMA A156.1 and A156.7.

#### **4.11.2.12 LOCKSETS, LATCHETS, EXIT DEVICES, AND PUSH AND PULL PLATES**

Exterior doors shall have mortise locks conforming to ANSI/BHMA A156.13 for metal doors. Emergency exit devices shall be Grade 1, flush mounted type. Interior doors shall have mortise locksets conforming to ANSI/BHMA A156.13, Series1000, Grade 1. All locks and latch sets shall be the product of the same manufacturer. Locksets, padlocks and latch sets shall be provided, as required, with lever handles on each side. Provide heavy duty hasp and locks at all fuel storage tanks.

#### **4.11.2.13 CLOSERS**

Closers shall be provided on all exterior doors and fire-rated doors. All exterior doors and interior doors that require security or privacy such as toilet room shall be provided with heavy-duty hydraulic closers. Closers shall conform to ANSI/BHMA A156.4, Grade 1. Closers shall be surface-mounted, modern type, with cover. Closer shall be adjustable type and have slow-down control to prevent door leaf from slamming to frame. Provide door silencers on all door frames provided with closers.

#### **4.11.2.14 DOOR STOPS**

Door Stops: Door stops shall be provided on all exterior and interior doors. Door stops shall comply with ANSI/BHMA A156.16 and shall be satin chrome on bronze, Grade 1.

#### **4.11.2.15 KEYING SYSTEM & LOCK CYLINDERS**

Provide locks for all doors. A Master key system shall be provided. Master key system shall include a separate & different key for each door with a master key provided to open any & all doors.

Cylinders: Lock cylinders shall comply with BHMA A156.5. Lock cylinder shall have six pins. Cylinders shall have key removable type cores. All locksets, exit devices, and padlocks shall accept same interchangeable cores.

#### **4.11.2.16 FINISHES**

All surfaces of doors and frames shall be thoroughly cleaned, chemically treated and factory primed with a rust inhibiting coating as specified in SDI A250.8, or paintable A25 galvanize-annealed steel without primer. Where coating is removed by welding, apply touchup of factory primer.

#### **4.11.2.17 WATER-RESISTANT SEALER**

Provide a water-resistant sealer compatible with the specified finish as approved and as recommended by the door manufacturer.

#### **4.11.2.18 FABRICATION AND WORKMANSHIP**

Finished doors and frames shall be strong and rigid, neat in appearance, and free from defects, waves, scratches, cuts, dents, ridges, holes, warp, and buckle. Molded members shall be clean cut, straight, and true, with joints coped

or mitered, well formed, and in true alignment. Dress exposed welded and soldered joints smooth. Design door frame sections for use with the wall construction provided. Corner joints shall be well formed and in true alignment. Conceal fastenings where practicable. On wraparound frames for masonry partitions, provide a throat opening 3 mm larger than the actual masonry thickness. Design other frames in exposed masonry walls or partitions to allow sufficient space between the inside back of trim and masonry to receive caulking compound.

#### **4.11.2.19           INSTALLATION**

Before installation, seal top and bottom edges of doors with the approved water-resistant sealer. Seal cuts made on the job immediately after cutting using approved water-resistant sealer. Fit, trim, and hang doors with a 2 mm minimum, 3 mm maximum clearance at sides and top, and a 5 mm minimum, 6 mm maximum clearance over thresholds. Provide 10 mm minimum, 11 mm maximum clearance at bottom where no threshold occurs. Bevel edges of doors at the rate of 3 mm in 50 mm. Door warp shall not exceed 6 mm when measured in accordance with WDMA I.S. 1-A. Hang doors in accordance with clearances specified in SDI A250.8. After erection and glazing, clean and adjust hardware.

#### **4.11.2.19.1       FRAMES**

Set frames in accordance with SDI 105. Plumb, align, and brace securely until permanent anchors are set. Anchor bottoms of frames with expansion bolts or powder-actuated fasteners. Build in or secure wall anchors to adjoining construction. Backfill frames with mortar. When an additive is provided in the mortar, coat inside of frames with corrosion-inhibiting bituminous material. For frames in exterior walls, ensure that stops are filled with rigid insulation before grout is placed.

#### **4.11.2.19.2       GROUTED FRAMES**

For frames to be installed in exterior walls and to be filled with mortar or grout, fill the stops with strips of rigid insulation to keep the grout out of the stops and to facilitate installation of stop-applied head and jamb seals.

#### **4.11.2.20           PROTECTION AND CLEANING**

Protect doors and frames from damage. Repair damaged doors and frames prior to completion and acceptance of the project or replace with new, as directed. Wire brush rusted frames until rust is completely removed. Clean thoroughly. Apply an all-over coat of rust-inhibitive paint of the same type used for shop coat. Upon completion, clean exposed surfaces of doors and frames thoroughly. Remove mastic smears and other unsightly marks.

#### **4.11.2.21           WEATHERSTRIPPING**

Provide weather-stripping that is a standard cataloged product of a manufacturer regularly engaged in the manufacture of this specialized item. Weather stripping shall be looped neoprene or vinyl held in an extruded non-ferrous metal housing. Air leakage of weather stripped doors shall not exceed 0.003125 cubic meters per second of air per square meter of door area when tested in accordance with ASTM E 283. Install doors in strict accordance with the manufacturer's printed instructions and details. Weather strip the exterior swing-type doors at sills, heads and jambs to provide weather tight installation. Apply weather stripping at sills to bottom rails of doors and hold in place with a brass or bronze plate. Apply weather stripping to door frames at jambs and head. Shape weather stripping at sills to suit the threshold.

#### **4.11.2.22           PRE-FITTING**

At the Contractor's option, doors may be provided factory pre-fit. Doors shall be sized and machined at the factory by the door manufacturer in accordance with the standards under which they are produced. The work shall include sizing, beveled edges, mortising, and drilling for hardware and providing necessary beaded openings for glass and louvers. Provide the door manufacturer with the necessary hardware samples, and frame and hardware schedules as required to coordinate the work.

#### **4.11.2.23 FINISHES**

Provide door finish colors as selected by the Contracting Officer from the color selection samples.

#### **4.11.3 GLAZING**

All glazing shall be double laminated and insulating. Laminated glazing shall be constructed of two panes of minimum 3mm tempered glass laminated to a minimum 0.75mm polyvinyl-butyril (PVB) interlayer, in accordance with UFC 4-010-01. Two panes of laminated glazing shall be installed in each window with hermetically sealed 13mm airspace between them. After installation of windows, the contractor shall install a minimum 3mil tinted film (Scotch shield Ultra Safety and Security Window Film or approved equal) to the inside face of the glazing in accordance with manufacturer's instructions.

##### **4.11.3.1 TEMPERED GLAZING**

Tempered glass shall be kind FT fully tempered flat type. Class 1 clear, condition A uncoated surface, Quality q3-glazing select, conforming to ASTM, DIN, BS or EN standards. Color shall be clear.

##### **4.11.3.2 GLAZING ACCESSORIES**

###### **4.11.3.2.1 SEALANT**

Sealant shall be elastomeric conforming to ASTM, DIN, BS, or EN standards. Type S or M, Grade NS, Class 12.5, Use G, of type chemically compatible with setting blocks, preformed sealing tape and sealants used in manufacturing insulation glass. Color of sealant shall be as selected from manufacturer's full range of standard colors by Contracting Officer.

###### **4.11.3.2.2 GLAZING GASKETS**

Glazing gaskets shall be extruded with continuous integral locking projection designed to engage into metal glass holding members to provide a watertight seal during dynamic loading, building movements and thermal movements. Glazing gaskets for a single glazed opening shall be continuous one-piece units with factory-fabricated injection-molded corners free of flashing and burrs. Glazing gaskets shall be in lengths or units recommended by manufacturer to ensure against pull-back at corners.

###### **4.11.3.2.3 FIXED GLAZING GASKETS**

Fixed glazing gaskets shall be closed-cell (sponge) smooth extruded compression gaskets of cured elastomeric virgin neoprene compounds conforming to ASTM, DIN, BS or EN standards.

###### **4.11.3.2.4 WEDGE GLAZING GASKETS**

Wedge glazing gaskets shall be high-quality extrusions of cured elastomeric virgin neoprene compounds, ozone resistant, conforming to ASTM, DIN, BS, or EN standards.

###### **4.11.3.2.5 PUTTY AND GLAZING COMPOUND**

Glazing compound shall conform to ASTM, DIN, BS, or EN standards for face-glazing metal sash. Putty shall be linseed oil type conforming to DIN, BS, or EN standards for face-glazing primed wood sash. Putty and glazing compounds shall not be used with insulating glass or laminated glass.

###### **4.11.3.2.6 SETTING AND EDGE BLOCKING**

Neoprene setting blocks shall be dense extruded type conforming to ASTM, DIN, BS, or EN standards. Silicone setting blocks shall be required when blocks are in contact with silicone sealant. Profiles, lengths and locations shall be as required and recommended in writing by glass manufacturer.

#### **4.11.3.2.7 PREPARATION**

Openings and framing systems scheduled to receive glass shall be examined for compliance with glass manufacturer's recommendations including size, squareness, offsets at corners, presence and function of weep system, face and edge clearance requirements and effective sealing between joints of glass-framing members. Detrimental materials shall be removed from glazing rabbet and glass surfaced and wiped dry with solvent. Glazing surfaces shall be dry and free of frost.

#### **4.11.3.2.8 INSTALLATION**

Glass and glazing work shall be performed in accordance with, glass manufacturer's instructions and warranty requirements. Glass shall be installed with factory labels intact and removed only when instructed. Edges and corners shall not be ground, nipped or cut after leaving factory. Springing, forcing or twisting of units during installation will not be permitted.

#### **4.11.3.2.9 CLEANING**

Upon completion of project, outside surfaces of glass shall be washed clean and the inside surfaces of glass shall be washed and polished in accordance with glass manufacturer's recommendations.

#### **4.11.3.3 PROTECTION**

Glass work shall be protected immediately after installation. Glazed openings shall be identified with suitable warning tapes, cloth, or paper flags, attached with non-staining adhesives. Reflective glass shall be protected with a protective material to eliminate any contamination of the reflective coating. Protective material shall be placed far enough away from the coated glass to allow air to circulate to reduce heat buildup and moisture accumulation on the glass. Glass units which are broken chipped, cracked, abraded, or otherwise damaged during construction activities shall be removed and replaced with new units.

### **4.12 FINISHES**

All exterior and interior surfaces, including facility exterior shall be selected from or match standard RLB manufacturer's colors. Flooring shall be sheet vinyl. Provide color boards with all materials for COR approval prior to ordering materials.

#### **4.12.1 PAINTS & COATINGS**

Paints and coatings shall be provided per the UFGS Specification 09 90 00 Paints and Coatings.

#### **4.12.2 CONCRETE HARDENER**

Concrete sealers shall be a liquid chemical sealer-hardener compound. Apply a minimum of two coats. Sealer shall be compatible with climate temperatures and not reduce the adhesion of resilient flooring, tile, paint, roofing, waterproofing or other materials applied to the concrete.

#### **4.12.3 PAINT**

Paint shall be oil based or latex. A primer shall be placed prior to any coats of paint. A minimum of two (2) coats of paint shall be used for each surface. Existing painted material shall be cleaned, cracks patched, and prepared for new paint. Existing sealant shall be inspected, cleaned or removed and new sealant placed.

#### **4.12.4 EXPOSED EXTERIOR STEEL TRIM, FRAMES, DOORS AND PIPE RAILINGS**

Exposed exterior steel shall include items such as trim, frames, door, pipe rails and other exposed steel surfaces. Provide manufacturers standard baked on finish where possible. For unfinished steel items, paint with one coat oil-

based primer, with 2 coats of oil-based alkyd gloss enamel, color to be selected by the Contracting Officer from the color board provided by the Contractor.

#### **4.12.5 EXPOSED WOOD TRIM, FRAMES AND DOORS**

Exposed wood shall include items such as trim, frames, doors and other exposed wood surfaces. Paint with one coat oil-based primer, 2 coats of gloss enamel, color to be selected by the Contracting Officer from the color board provided by the Contractor

#### **4.12.6 EXPANSION JOINTS IN PLASTER & STUCCO**

Expansion joints shall be provided as specified in ASTM, DIN 18339, BS or EN Standards for all walls, floors and ceilings.

#### **4.12.7 EXTERIOR WALLS**

The exterior of all buildings shall be stucco and/or plaster conforming to ASTM C926 where indicated in standard building design. A temperature of between 4 and 27 degrees C shall exist for a period of not less than 48 hours prior to application of plaster and for a period of at least 48 hours after plaster has set. Control joints shall be designed for expansion and contraction of plaster work due to thermal exposure. Control joints shall comprise of back to back casing beads. Install new stucco in 2 coats. The first coat shall be a scratch coat approximately 10 mm thick. Allow 7 days to cure. The second coat shall be finish stucco, smooth finish, approximately 10 mm thick. Allow 7 days to cure before painting. Stucco showing over sanding, cracks, blisters, pits, checks, discoloration or other defects is not acceptable. Defective plaster work shall be removed and replaced with new plaster at the expense of the Contractor. Patching of defective work will be permitted only when approved by the Contracting Officer. Patching shall match existing adjacent work in texture and color. All exterior color finish shall be integral with the stucco finish. No painted stucco shall be permitted due to minimize future maintenance.

#### **4.12.8 INTERIOR WALLS**

##### **4.12.8.1 PLASTER WALLS**

Interior walls shall be plaster applied in a similar manner as exterior stucco. Paint with 2 coats of semi-gloss off-white with less than 0.06% lead by weight color to be selected by the Contracting Officer from the color board provided by the Contractor.

##### **4.12.8.2 SOUND CONTROL**

Walls between sleeping rooms shall have a Sound Transmission Class (STC) minimum 45-55 or better, An STC value is a single number rating used to characterize the sound insulating value of a partition (wall, floor, or ceiling). All walls shall be caulked at floor and ceiling prior to installing wall base. All openings between rooms shall be caulked or sealed. Doors shall have rubber seal around frames and threshold.

##### **4.12.8.3 HARDENED (CMU) INTERIOR WALLS**

Interior walls intended to be CMU shall be a minimum thickness of 100 mm. Interior CMU walls shall be plaster applied in a similar manner as exterior stucco. Paint with 2 coats of flat off-white paint with less than 0.06% lead by weight color to be selected by the Contracting Officer from the color board provided by the Contractor.

#### **4.12.9 INTERIOR CEILINGS**

##### **4.12.9.1 CONCRETE CEILINGS**

Concrete ceilings shall be exposed concrete painted with 2 coats of flat white, with less than 0.06% lead by weight.

#### **4.12.9.2 SUSPENDED CEILINGS**

Suspended ceilings shall be 13 mm Gypsum Wall Board (GWB) supported by metal grid system per manufacturer's standard. Fire rated GWB, where required, shall be type X per NFPA 252 requirements or approved foreign equivalent.

#### **4.13 TILE WORK**

Tile work shall not be performed unless the substrate and ambient temperature is at least 10 degrees C and rising. Temperature shall be maintained above 10 degrees C while the work is being performed and for at least 7 days after completion of work. Upon completion, tile surfaces shall be thoroughly cleaned in accordance with manufacturer's approved cleaning instructions. Acid shall not be used for cleaning glazed tile. Floor tile with resinous grout or with factory mixed grout shall be cleaned in accordance with instructions of the grout manufacturer. After the grout has set, tile wall surfaces shall be given a protective coat of a non-corrosive soap or other approved method of protection.

#### **4.14 SPECIALTIES**

##### **4.14.1 MIRRORS**

600 mm x 900 mm, 6 mm plate glass shall be mounted above all lavatories. Mount bottom of mirrors 1100 mm above finished floor.

##### **4.14.2 TOILET PAPER HOLDERS**

Toilet paper holders with removable pin shall be stainless steel, installed approximately 200 mm above floor by eastern toilets and 600 mm above floor by western toilets.

##### **4.14.3 SHOWER CURTAIN RODS & SHOWER CURTAIN**

Shower curtain rods, stainless steel, heavy duty, 1.20 mm shall be mounted between the walls of each shower stall. Mount rod 2000 mm above finished floor. Provide a shower curtain with support rings for each shower stall.

##### **4.14.4 GRAB-BARS**

Stainless steel grab-bars, heavy duty, 1.20 mm, two each 900 mm and 1050 mm long, 40 mm diameter shall be mounted behind and beside all eastern toilets, and bathtubs as they occur. Mount grab-bars between 610mm - 900 mm height on the walls. Each bar shall support no less than 91 Kg in any direction.

##### **4.14.5 PAPER TOWEL DISPENSERS**

Paper towel dispensers, 0.683 mm Type 304 stainless steel, surface mounted. Furnish tumbler key lock locking mechanism.

##### **4.14.6 LIGHT DUTY METAL SHELF**

Provide a 600 mm long x 150 mm wide, light duty stainless steel shelf with integral brackets over each lavatory and laundry sink.

##### **4.14.7 ROBE HOOKS**

Provide a minimum of two robe hooks on all toilet and shower stalls.

##### **4.14.8 CLOTHESLINES**

Fabricate clothes line assembly in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling imitations. Clearly mark units for reassembly and coordinated installation. Wire-rope assemblies (clothes line cable) shall minimize the amount of turnbuckle take-up used for dimensional adjustment so the maximum amount is available for tensioning wire ropes. Wire rope shall be

nylon covered. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of ~1 mm, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces. Form work true to line and level with accurate angles and surfaces. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate. Cut, reinforce drill, and tap as indicated to receive finish hardware, screws, and similar items. Welded connections: cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

## **5.0 MECHANICAL**

### **5.1 GENERAL**

Provide complete heating, ventilating and air-conditioning (HVAC) systems. Where systems and equipment are fully designed and specified in the appendix drawings, provide in strict accordance with the Standard Design drawings. Where any system or equipment is not fully designed or specified, provide the necessary engineering services to complete the design.

### **5.2 HVAC INSTALLER QUALIFICATIONS**

The HVAC works shall be executed by a heating and cooling specialist experienced in the design and construction HVAC equipment to include conventional refrigerant systems, heat pump units, space heaters and knowledge in fabricating specialized units consisting of supplemental electric resistance heaters in satisfying the specified indoor design conditions.

### **5.3 STANDARD PRODUCTS**

All materials and equipment shall be standard products of manufacturers regularly engaged in the manufacture of the product and shall duplicate products that have been in satisfactory use for at least two (2) years prior to bid opening.

The Contractor shall submit the following for equipment to be provided under this section of the specification: Manufacturer's data including performance characteristics at design conditions; Catalog cuts showing dimensions, performance data, electrical requirements, compliance with the codes, standards and regulations; Drawings, as necessary, indicating location and installation details.

### **5.4 CODES, STANDARDS AND REGULATIONS**

The design and installation of all HVAC systems shall conform to the standards, codes, and regulations provided in the paragraph, List of Codes and Technical Criteria, where applicable, except where otherwise indicated under particular clause(s). The publications to be taken into consideration shall be those of the most recent editions and primarily in accordance with the American Society of Heating, Refrigeration, and Air-Conditioning (ASHRAE). Standards other than those mentioned may be accepted provided that the standards chosen are internationally recognized and meet the minimum requirements of the specified standards. The Contractor shall submit proof of equivalency if requested by the Contracting Officer.

### **5.5 EQUIPMENT PROTECTION**

Provide exterior pad-mounted mechanical equipment with either protective fences and concrete-filled steel bollards or protective screen walls to prevent accumulation of debris and vandalism.

#### **5.5.1 OUTDOOR DESIGN CONDITIONS**

Contractor shall use the below weather data for equipment compatibility with the site conditions). The Outdoor Design Conditions given are for purposes of sizing HVAC equipment. Generators shall be designed to operate in an ambient Temperature of 50 Degrees Celsius due to annual maximum temperature as well the loss of performance due to dusty conditions and less than ideal installation conditions.

**[Herat Area:]**

Latitude – (approx.) 34.22 deg. North

Longitude – (approx.) 62.22 deg. East

Elevation – (approx.) 964 m (3,163 ft)

Summer – 38 C (100 F) Dry Bulb (DB) & 20 C (68 F) Wet Bulb (WB)

Winter – (-6 C/21 F)

Daily Range – 9 C (17 F)

**5.5.2 INDOOR DESIGN CONDITIONS**

<u>Facility Type</u>	<u>Summer Temperature</u>	<u>Winter Temperature</u>
Headquarters / Administration Buildings	Communications room only: Cooling 25 C (78 F)	Heating 20 C (68 F)
Barracks	No Cooling	Heating 20 C (68 F)
Latrines	No Cooling	Heating 20 C (68 F)
Training Building	No Cooling	Heating 20 C (68 F)
DFAC	No Cooling	Heating 20 C (68 F)
POL Storage Building	No Cooling	Heating 20 C (68 F)
Fuel Operator's Building	No Cooling	Heating 20 C (68 F)
Guard Towers	No Cooling	Heating 20 C (68 F)
Guard House	No Cooling	Heating 20 C (68 F)
Booster Pumps	No Cooling	Heating 13 C (55 F)
Small Arm Storage	No Cooling	Heating 20 C (68 F)
Vehicle Maintenance Building	No Cooling	Heating 20 C (68 F) in Offices Heating 13 C (55 F) in Maintenance Areas
Well House	No Cooling	Heating 13 C (55 F)
Storage Buildings / Warehouses	No Cooling	Heating 20 C (68 F); Offices Only

Warehouses , storage buildings and vehicle maintenance bays shall be provided with ventilation to maintain the indoor conditions to 10 F above the summer ambient DB temperature.

### **5.5.3 NOISE LEVEL**

Noise levels inside occupied spaces generated by HVAC systems indoors shall not exceed NC 35.

### **5.5.4 INTERNAL LOADS**

Occupancy: ASHRAE standards shall be used to calculate sensible and latent heat from people. In general, light/moderate office work is 73 W (250 Btuh) sensible and 45 W (155 Btuh) latent.

Lighting: 21.5 W/sq.m (2 W/sq.ft) maximum (however lighting levels shall meet minimum requirements and shall be accounted for in the cooling loads based on the actual lighting design).

Outdoor Air: Outdoor ventilation air shall be provided per ASHRAE Standard 62.1. Minimum outside ventilation requirements for offices and bedroom sleeping quarters shall be 2.5 lps/person (5.3 cfm/person) plus 0.3 lps/sq.m of floor space (0.6 cfm/sq.ft). Outdoor air requirements can be satisfied by windows that open to the outside. Enclosed occupied areas without windows shall have outside air ventilation rates based on occupancy using the formula above in combination with a means for providing outside make-up air by means of forced-air outside air ventilation systems or forced-air exhaust systems.

Communication (Comm) Rooms: Comm rooms containing computer servers and other heat-producing electronic equipment shall be provided with independently controlled cooling. See Electrical for comm room equipment requirements.

Toilet/Shower Exhaust: 85 cmh (50 cfm) per toilet, urinal, and shower head.

Ablution Exhaust: 35 cmh/sq.m (2 cfm/sq.ft).

Building Pressurization: 1.3 mm wg (or 12,5 Pa or 0.05" wg); Maintain negative pressure in latrine areas. Pressurization is only applicable for buildings provided with central ducted forced air systems

## **5.6 HVAC EQUIPMENT**

The Contractor shall size and select all heating and cooling equipment based on equipment manufacturer's performance data for the project site location and elevation.

### **5.6.1 EXTERIOR HVAC EQUIPMENT**

For exterior pad-mounted mechanical equipment, provide protective fences, concrete-filled steel bollards, and/or protective screen walls to prevent vandalism and damage by natural elements.

### **5.6.2 AIR COOLING & HEATING EQUIPMENT**

Environmental control of the facilities shall be achieved by HVAC equipment as listed below and approved by the U.S. Government. Contractor shall size and select equipment based on equipment manufacturer's performance data at the project site elevation and temperature conditions and ensure the equipment's performance meets the design heating and cooling sizing requirements. The following table represents, as a minimum, facility-specific system requirements and does not limit the applicability of general system requirements stated elsewhere in this specification.

\* Indirect-tempering of outside make-up air shall be accomplished by locating heating and/or cooling equipment in close proximity to outside air louvers (fitted with filters, screens, and dampers as a minimum) for minor conditioning of raw outside air.

### **5.6.3 CONTROL WIRING AND PROTECTION DEVICES**

HVAC controls shall be products of the equipment manufacturers and shall be installed in accordance with the manufacturers' recommendations. Thermostats of individual units shall be located near the unit return intakes; thermostats of units serving multiple areas shall be located near the return of the space with the highest heat generation. For each thermostat, provide a lockable housing that allows viewing of settings without permitting access. Thermostats shall be mounted 1.5 meters (5 feet) above the finished floor and shall be easily accessible.

#### **5.6.4 EQUIPMENT FANS**

All HVAC fans shall be heavy-duty centrifugal forward curved, backward inclined, or airfoil fans with overload protection. Each fan shall be provided complete with vibration isolator, external lubricators, individual wall on/off switches, and all accessories as necessary and indicated.

#### **5.6.5 CEILING FANS**

Ceiling fans shall be 5-bladed, 1320 mm (52"), minimum, in diameter, and provided at one 40 sq.m of floor space, or as indicated. Fans shall have reversible motors. Fans shall be centered or distributed evenly throughout the room. Coordinate placement with the lighting plan to prevent conflict or casting shadows. Fan mount shall be flush, standard, or angle mount depending on ceiling height. Fan shall be mounted such that the fan blade is a minimum 2.5 m (98") above the finished floor. The fans shall be provided without light kits. The finish shall be factory painted white. The controls shall be wall-mounted from either a single pole switch or from two (2) 3-way switches to provide on/off operation. Install per manufacturers' instructions.

#### **5.6.6 UNIT HEATERS**

Provide commercial, self-contained unit heaters with fans and heating elements. Heating elements shall be nickel chromium and shall have overload protection. Unit heaters shall have integral thermostats.

### **5.7 AIR TRANSFER SYSTEMS**

#### **5.7.1 DUCTWORK**

Ductwork systems include ductwork, fittings, manual volume control dampers, grills, and/or registers. Ductwork shall be constructed of galvanized steel or aluminum sheets and installed in accordance with SMACNA "HVAC Duct Construction Standards (Metals and Flexible).

#### **5.7.2 DUCT INSULATION, VAPOR BARRIER, AND JACKETING**

Duct insulation shall be provided for all makeup air ductwork that is located in the conditioned space. All ductwork exterior to the building shall be insulated with a minimum RSI=0.88 (R5).

Makeup air duct systems shall be provided with vapor barrier protection to prevent condensation. Insulation exposed to weather or physical damage shall be protected with aluminum jacketing.

#### **5.7.3 REGISTERS AND GRILLES**

Registers and grilles shall be factory fabricated of steel or aluminum and distribute the specified air quality evenly over the space intended. The devices shall be square, rectangular, or with perforated face. Units will be mounted in ceilings, high sidewalls, or directly to ductwork and shall be sized for the airflow to be delivered with a maximum NC rating of 35.

#### **5.7.4 AIR FILTRATION**

All supply air shall be filtered using manufacturer's standard washable filters mounted inside the unit. In addition, all outdoor air intakes shall be equipped with 50 mm (2 inch) thick washable filters. Outdoor air intakes shall be installed as high as is reasonably possible in order to minimize dust entrainment. The intakes shall be sized so that free air velocities are below 2.5 m/s (500 fpm).

#### **5.7.5 WALL PENETRATIONS**

Building wall penetrations for fans, exhaust duct, vents, louvers, etc. shall be carefully made so as not to deteriorate the structural integrity of the wall system. The Contractor is encouraged to locate exterior wall louvers above doors, whenever possible, to take advantage of the structural framing void located above doors. The Contracting Officer shall be consulted and the recommendations strictly adhered to.

### **5.7.6 OUTSIDE AIR INTAKE, MAKE-UP, AND EXHAUST LOUVERS**

Outside air louvers shall be factory fabricated of steel, stainless steel, or aluminum and allow the specified air quantity into the intended space. Louvers shall be square or rectangular with rain-proof exterior face blades and internal grille. To reduce sand and dirt migration, outside air intakes shall be installed as high as possible within architectural constraints or a minimum of 1.5 m (5') above the ground. Consideration shall be given to locating the louvers near the heating and cooling units (for indirect tempering of air) and encourage air flow across the room in conjunction with the exhaust fan. Outside air intake louvers shall be provided with air filter (See Air Filtration), insect screen, and, if indicated, motorized dampers interlocked to open when the toilet-shower room exhaust fans operate. Minimum louver dimensions shall be 300 mm x 300 mm (12" x 12") on the exhaust fans and submitted in the design analysis (DA) calculations.

All supply air shall be filtered using manufacturer's standard washable filters mounted inside the unit. In addition, all outside make-up air intakes shall be equipped with 50 mm (2") thick washable filters. Control wiring and protection of the air conditioning units shall be the manufacturer's standard, pre-wired factory installed or as recommended.

### **5.7.7 VENTILATION & EXHAUST FAN SYSTEMS**

All fans used for building ventilation, exhaust, and pressurization shall be selected for minimum noise level generation. All fans used for supply or roof/wall exhaust, including toilets, showers, and ablutions, shall be **centrifugal** forward curved, backward inclined, or airfoil fans with non-overloading characteristics of high efficiency and quiet running design. The fans shall be of the heavy-duty type with durable construction and proved performance in a desert environment. Each wall exhaust fan shall be provided with motorized or gravity dampers which close automatically when the fan is not running. Each ventilation or intake air fan shall be provided with an interlocked motorized damper which closes automatically when the fan is not running and shall be sized for and provided with filter and insect screen. Each fan shall be provided complete with vibration isolator, external lubricators, individual wall on/off switches, and all accessories and sound attenuators as necessary.

Intake or outside make-up air openings for exhaust fans shall be provided with motorized dampers which are interlocked with the exhaust fans and provided with air filters and insect screens. The motorized dampers shall open or close when the ventilation or exhaust fan is on or off respectively. Louvered openings for ventilation or exhaust fan systems shall be sized for a maximum static pressure (SP) drop (that includes filter resistance) of 25 Pa (0.10" wg) to prevent excessive negative pressurization of the building. **Exterior outside door louvers and undercuts are not permitted except under special circumstances.**

Maintenance shops and similar spaces that use solvents and oils shall be provided with mechanical exhaust air systems. Intake or outside make-up air openings for an exhaust fan system shall be provided as indicated above. The exhaust systems shall consist of a fan, ductwork, exhaust grilles, and interlock controls. Design shall be in compliance with the latest addition of the Industrial Ventilation UFC 3-410-04N or ACGIH Industrial Ventilation manual.

All occupied windowless rooms, without connections to a ducted central HVAC system (or without an avenue for obtaining outside ventilation air) shall be provided with forced-air outside air ventilation systems or forced-air exhaust systems.

### **5.7.8 WALL TRANSFER GRILLES**

Wall penetrations for air transfer between two spaces shall be provided with a factory fabricated grille on both the inlet and outlet sides of the opening. For fire-rated walls in accordance with NFPA-90A with air transfer penetrations, fire dampers shall be installed between the inlet and outlet grilles.

## **5.8 SPECIAL SYSTEMS**

### **5.8.1 KITCHEN HOOD EXHAUST AND MAKE-UP AIR**

Provide a commercial kitchen exhaust hood and make-up air system in strict accordance with the appendix drawings. The installation shall be in accordance with NFPA 96, SMACNA, and equipment manufacturer recommendations. The exhaust hoods shall be selected for Type I (grease smoke) operation and shall be provided with baffle grease filters. The hoods and all associated ductwork shall be constructed from 1.0mm (20-gauge)

stainless steel material.

All exhaust duct joints and seams shall be continuously welded or brazed. Brazing and supports shall be constructed of non-combustible material securely fastened to the structure. Bolts, screws, rivets, and other fasteners shall not penetrate the duct walls. Ducts shall be placed a minimum of 450mm (18 inches) from combustible material or 75mm (3 inches) from gypsum wallboard attached to non-combustible structures. Ductwork terminating through the roof shall extend a minimum of 450mm (18 inches) above the roof. Ductwork shall be pitched to drain back to the hood.

The roof-mounted centrifugal exhaust fan shall be the upblast type with fan motor located outside the airstream. The fan discharge shall be a minimum 1000 mm (40") above the roof and shall not impinge on other equipment or nearby building surfaces. The fan shall be manufactured in such a way as to permit easy inspection and cleaning. The connection between ductwork and exhaust fan shall be flanged, gasketed, and bolted. The exhaust fan shall be electrically interlocked with its corresponding makeup air fan to prevent system operation without both fans in service.

The make-up air grille shall be integral with the hood system as detailed in the appendix drawings.

### **5.8.2 LPG/PROPANE STOVE EXHAUST**

Each LPG/propane stove shall be provided with a dedicated chimney as indicated. The minimum flue thickness for metal chimneys shall be not less than 1.5 mm (16-gauge) thick steel. High temperature metal flues shall be guarded against human contact and protected from potential damage from large cooking pots by means of metal guards or masonry walls. All metal chimney flues shall be insulated and be sized as indicated for the stove flue gases to keep warm and flow quickly through the system. The chimney shall run straight up without offsets because each change in direction presents resistance to flow. The chimney system shall be reasonably well-sealed to prevent leaks that introduce cool air and make the system more vulnerable to adverse pressures. The LPG/propane stove kitchen shall be well vented with louvers located high on the walls on the building ends as indicated. The Contractor must submit shop drawings for approval.

## **5.9 WOOD COOKING STOVES FOR DINING FACILITIES**

A separate wood burning cooking stove kitchen annex building shall be provided within the DFAC yard with commercial grade built-in-place wood-fired cooking stoves. The annex shall be located adjacent to the kitchen as indicated. The annex shall be provided with a concrete slab, a sloped metal or concrete roof slab, and a minimum of three (3) reinforced CMU walls. Walls shall have a minimum height of 3.0 m (10') from floor to finished ceiling). The wood stove kitchen shall be well vented with louvers elevated a minimum of 1.5 m (5') on the end or side walls. Exhaust fans shall NOT be provided because of the effects on the chimney draft. A covered wood storage area, equal to a minimum of 0.3 cu.m (10 cu.ft) of volume per stove, shall be provided for rain shielding. Security fencing with gates with locks shall be provided around the entire annex kitchen complex.

The annex kitchen concrete floors shall be provided with trench drains that extends the length of the cooking area for cleaning purposes. Water service shall be provided for the cooking annex. Water piping shall be buried to prevent pipe freezing. Freeze-proof yard hydrants (where the actual valve is located below the frost line) shall be provided.

The kitchen annex shall be provided with power for light fixtures, receptacles, and other electrical devices required for a complete functional facility, see Electrical.

### **5.9.1 STOVES**

(4) Four stoves shall be constructed from masonry fire bricks and cooking stove tops shall be wide enough for a person to walk and accessible by small movable stairs. The stove firebox shall be shaped to maximize the heat absorbed by the cooking pots above and lined with an 15 mm (1/4") cast-iron insert to protect the fire brick. A 40 mm (1.5") toe space shall be provided for the entire interior length of floor in front of the stove lineup.

The minimum height of the stove shall be 950 mm (37") with a minimum stove-to-finished-ceiling clearance of 2.0 m (80"). Stoves shall be topped with a minimum 50 mm (2") thick cast-iron plate. The cast-iron stove top shall be a minimum of 1,000 mm x 1,000 mm (40" x 40") square with a 750 mm (30") diameter hole in the center to

accommodate a similar diameter stove plate insert. The 750 mm (30") metal insert shall also have a 450 mm (18") diameter hole in the center that accommodates a second smaller stove plate insert. The second insert shall have a 250 mm (10") diameter hole in the center that accommodates a final stove plate insert.

A minimum 25 mm (1") thick cast-iron fire grate (grid plate or fire basket) shall be provided in the wood firebox not less than 100 mm (4") nor more than 150 mm (6") above the firebox floor. The fire grate grill spacing shall not be less than 50 mm (2"). The wood feeding and ash removal doors shall be located on the exterior. The doors shall be constructed of not less than 7.0 mm (1/4") thick steel and provided with 40 mm (1.5") thick metal frames. One (1) exterior wood loading door shall have at least one (1) smaller peek door on the door itself that is approximately 100 mm x 100 mm (4" x 4").

### **5.9.2 STOVE CHIMNEYS**

Each stove shall be provided with a dedicated chimney routed inside the building envelope (or kitchen space) for the maximum allowable distance; hotter exhaust gases produce better chimney drafts. The main chimney shall be constructed using a stainless steel vent (or flue) enclosed with face brick. The face brick shall protect the user from accidental human contact and the metal flue from potential damage from large cooking pots; metal rails may be provide with approval. The minimum flue diameter shall not be less than 200 mm (8") diameter and thickness shall not be less than 3.0 mm (12-gauge). Chimneys penetrating and exiting through walls shall be provided with a 16 mm (5/8") thick steel lenti and exterior escutcheon type pipe sleeve for wall anchoring. All exterior portions of a chimney that exits through a wall shall be double-wall stainless steel with a minimum 25 mm (1") gap filled with fire-proof insulation.

All chimneys shall rise a minimum of 60 cm (24") above the roof ridge so a stable draft can be produced. In addition, the chimney shall be provided with rain cap to reduce the chances of adverse wind pressures. The chimney system shall be reasonably well-sealed to prevent leaks that introduce cool air and make the system more vulnerable to adverse pressures. When the chimney system is installed in a building kitchen with a fan powered exhaust and ventilation systems, the wood stove area shall be under positive pressure to facilitate the chimney draft. Contractor must submit shop drawings for approval prior to starting construction.

### **5.9.3 MECHANICAL REQUIREMENTS FOR GENERATORS**

**Note:** The full specification for the generator consists of this section, Mechanical Requirements for Generators, in combination with Generator Power System-Electrical Requirements for Generators specification found in the Electrical portion of this Section 01015.

The following shall be provided in the Mechanical design and installation for prime stationary generator sets and related mechanical systems with their interface with the facility. This includes, but not limited to, the following: Foundations, mountings, exhaust systems, cooling systems, ventilation, noise attenuation, and equipment configuration. See Electrical Section for power and electrical equipment requirements and Plumbing Section for fuel system requirements.

The generator set(s) shall be the manufacturer's design for outdoor weatherproof installation with skid-mounted high-ambient temperature radiator rated for 50 C (120 F).. Weatherproof generator set(s) shall be protected from the elements with a structural cover as indicated.

Heating devices for the generator set engine coolant and starter batteries shall be provided as per manufacturer's recommendation for cold starting. Ambient temperature and elevation derating calculations shall be clearly shown in the design analysis (DA).

Generator noise levels shall be based on the location and operating at 100% load. All generator sets, irrelevant where installed, shall be provided with the manufacturer's factory installed sound attenuation enclosure cabinets, the manufacturer's integral muffler system, as a minimum, to reduce noise.

All exterior installed generator sets (i.e. With three or fewer walls) shall be provided with, as a minimum, the manufacturer's factory installed weather-proof enclosure cabinet, the manufacturer's integral muffler system, vibration isolators, and vibration isolating foundation to reduce noise and prevent damage to the overhead structure. Generator set(s) shall be oriented with the prevailing winds when possible (with the alternator upwind) to promote heat removing air flow across the alternator and engine by the radiator fan.

All exterior weather-proof generator sets shall be provided with a covered structure and enclosed with a chain link security fence]. A structural cover shall also be provided over the generator accessories (i.e. Switch gear, etc.) [and bulk fuel storage tank(s)] [if the total fuel capacity is 38,000 l (10,000 gal) or less]. The overhead structure shall have a minimum clearance of 2.0 m (6.5') above the equipment and extend out with a minimum overhang of 1.0 m (40") beyond the equipment and any spill containment dikes.

Exterior exhaust system shall be with minimal backpressure, directed to disperse the noise away from people and occupied buildings, and located near the radiator air discharge.

For fuel and day tank requirements, see Plumbing paragraph, "GENERATOR FUEL STORAGE/DISTRIBUTION."

For fire emergencies, see Fire Protection paragraph, "PORTABLE FIRE EXTINGUISHERS."

Generator set(s) shall be oriented with the prevailing winds when possible (with the alternator upwind) to assist ventilation air flow across the alternator and engine and promote heat removal by the fan and radiator. All weather-proof generator sets and fuel storage tanks shall be provided with a covered (roof-only) structure enclosed with a chain link security fence. Covered structure shall have a minimum clearance of 2.0 m above the equipment.

### **5.10 TEST ON COMPLETION**

Upon completion of the work, the Contractor shall demonstrate to the Contracting Officer that the installation is adjusted and regulated correctly to fulfill the function for which it has been designed. The Contractor shall test, adjust, balance and regulate the section or sections of concern as necessary until the required conditions are obtained. Contractor shall coordinate with the Contracting Officer to schedule the tests. Tests shall include all interlocks, safety cutouts, and other protective devices to ensure correct functioning. All such tests shall be carried out with full written records of the values obtained and the final settings. All test results shall be submitted to the Contracting Officer in tabulated form. The following tests and measurements shall be performed:

Outdoor Conditions:	DB and WB temperatures
Indoor Conditions:	DB and WB temperatures
Heat Pumps and Unit Heaters:	Fan motor speed and input ampere reading Supply and return air temperature.
Ducted Make-Up Air Heaters:	Fan motor speed and input ampere reading Air flow rate
Exhaust Fans:	Fan motor speed and input ampere reading Air flow rate

### **5.11 WOOD STOVE HEATERS**

Contractor shall provide Wood Stoves for heating in accordance with all requirements of Section 01015 including clearance to combustibles, heating unit criteria, venting and manufacturers requirements. Provide wood stoves for room heating in all occupied spaces larger than 8 m<sup>2</sup> in floor area as is indicated in Appendix drawings. Do not install wood stoves for room heating in wet areas, such as latrines, ablution or laundry rooms. Do not install wood stoves for room heating in spaces that require tighter control of temperature such as communication rooms, ammunition storage, secure storage and critical spaces in medical facilities. Do not provide wood stoves for room heat in locations that require mechanical cooling. Mechanical cooling is achieved by equipment that requires a compressor and refrigerant, ventilation and air movement equipment such as ceiling fans and exhaust fans are not considered mechanical cooling.

Wood stoves for room heating shall be standalone type wood stoves, they shall not be recessed or connected to any part of the building structure other than non-combustible floor surface. Wood stove heaters shall have both a chimney and combustion make-up air. In no case, shall a wood stove heater receive combustion air from the room or interior space without the room receiving make-up air directly from the outside. All wood stove heaters shall be made of cast iron with fire brick interior. All wood stove heaters shall be manufactured in accordance to UL or EN

standards. In no case, will a “homemade” or site built wood stove heater be accepted. The chimney vent shall penetrate through the wall at all wood stove locations. For a roof penetration, the contractor shall submit written request to USACE engineering no later than at 65% design submittal, approval shall be in writing from USACE, until written approval is received from USACE, the contractor shall not assume the roof penetration is approved. The chimney venting shall pass through a wall thimble at least 24” above stove flue collar connection. Chimney venting shall meet UL 103 High Temperature or as required by manufacturer. The chimney shall be routed up the exterior side of the wall of the building and shall clear eave and terminate as required by manufacturer installation requirements. The rain cap shall not have any moving parts or hinges, field installed dampers are not allowed at any location within the chimney duct. The only acceptable damper is a wood stove manufacturer installed damper.

Clearance to Combustibles: The wood stove heater shall be located on a non-combustible surface with clearances to combustibles as required by manufacturer. All venting shall maintain clearance to combustibles as required by manufacturer and the IMC and UL or EN standards. The Contractor shall submit drawings showing clearances along with cut sheets of stove and venting at 65% submittal.

## **6.0 PLUMBING**

### **6.1 GENERAL**

Provide complete plumbing systems. Where any system or equipment is not fully designed or specified, provide the necessary engineering services to complete the design.

The Contractor shall design and build domestic cold and hot water systems, waste, drain and vent systems, fuel-oil storage and distribution systems required in the facilities identified in Section 01010 Scope of Work and as described herein. The Contractor shall also be responsible for complete design and construction of all domestic and special plumbing systems required for full and safe operations in the Generator Plant, Water Storage and other facility or structures required in this contract.

The work covered in this scope also includes the delivery to site, erection, adjusting, testing and balancing, and handing over in full operating condition all equipment and associated works.

#### **6.1.1 QUALIFICATIONS**

The plumbing systems shall be executed by a specialist experienced in the installation of these systems.

#### **6.1.2 STANDARD PRODUCTS AND SUBMITTALS**

All materials and equipment shall be standard product of a manufacturer regularly engaged in the manufacture of the product and shall duplicate items that have been in satisfactory use for at least two (2) years prior to bid opening.

The Contractor shall submit the following for equipment to be provided under this section of the specification: Manufacturer’s data including performance characteristics at design conditions; Catalog cuts showing dimensions, performance data, electrical requirements, compliance with the codes, standards and regulations; Drawings, as necessary, indicating location and installation details.

### **6.2 CODES, STANDARDS AND REGULATIONS**

The design and installation of equipment, materials and work covered under the plumbing services shall conform to the standards, codes, and regulations provide in the paragraph, List of Codes and Technical Criteria, where applicable except where otherwise indicated under particular clause(s). The publications to be taken into consideration shall be those of the most recent editions and primarily in accordance with the ICC International Plumbing Code (IPC) and ASHRAE Handbook-HVAC Applications for Service Water Heating. Standards other than those mentioned may be accepted provided that the standards chosen are internationally recognized and meet the minimum requirements of the specified standards. The Contractor shall submit proof of equivalency if requested by the Contracting Officer.

### **6.3 EQUIPMENT PROTECTION**

Exterior plumbing equipment shall be pad-mounted. In addition, security fences and traffic bollards, designed overhead structure/shelters for exterior generators, and 45-kg LP gas-propane tank storage areas shall be provided.

### **6.4 PLUMBING SYSTEMS**

#### **6.4.1 WATER**

Domestic cold and hot water shall be provided in the facilities to serve the water usage and plumbing fixtures provided for the facility. Water service to each facility shall enter the building in a mechanical, toilet, storage, or similar type space. A pressure reducer shall be placed at the water entry if the supplied pressure exceeds 80 PSI. The building service line shall be provided with a shut off valve installed either outside in a valve pit or inside the mechanical room or similar spaces. Water piping shall not be installed in or under the concrete foundation except for the service line. All water piping shall be routed parallel to the building lines and concealed in all finished areas. Insulation shall be provided where required to control sweating of pipes or to provide protection from freezing. Electric heat trace cable for freeze protection shall not be provided as a substitute for space heating systems.

##### **6.4.1.1 PIPING MATERIALS**

Domestic cold water shall be distributed by means of standard weight schedule 40 galvanized steel pipe, Polyvinyl Vinyl Chloride (PVC) or Polyethylene (PE) (ASTM D 2737) plastic piping. Domestic hot water shall be distributed by means of standard weight schedule 40 galvanized steel pipe, or Chlorinated Polyvinyl Vinyl Chloride (CPVC) piping. Domestic water joints shall be connected using either solvent cement or mechanical threads. Polypropylene (PP) pipe is not permitted for either domestic hot or cold water piping.

Waste and vent piping shall be either galvanized steel pipe (schedule 40) or Polyvinyl Vinyl Chloride (PVC) conforming to ASTM D 2665. Flexible waste and vent lines from fixtures (i.e. lavatories, water closets, etc.) and inserted into an adjacent pipe are not allowed except for clothes washer installations.

Corrosion protection shall be provided if galvanized piping comes in contact with earth or masonry floors, walls or ceilings. The Contractor shall attempt to route all piping beyond the grasp of the occupants. All exposed domestic water, sanitary waste, and vent piping shall be schedule 40 galvanized steel when surface mounted. Wall-mounting brackets for exposed domestic water, waste, and vent piping shall be spaced a maximum of 40 cm (16") apart to minimize vandalism.

##### **6.4.2 PLUMBING FIXTURES**

The following typical plumbing fixtures shall be provided:

- a. Eastern Water Closet shall be provided with flush tank assembly. Provide acid resisting ceramic water closet complete with rotating No-Hub 'P' trap and No-Hub coupling to meet piping requirements. Eastern Style water closet shall be furnished with integral non-skid foot pads and bowl wash down non-splashing flushing rim. The water closet shall be completely self supporting requiring no external mounting hardware and shall be flush with floor. The Eastern Style water closet shall incorporate waterproofing membrane flashing flange. Provide a cold water spigot 300mm above finished floor on the right (from a perspective of standing inside of the cubicle and looking out) sidewall of the cubicle. Spigot shall have a flexible hose and spray nozzle such that the occupant can wash over the water closet. Toilets shall be oriented north and south. Toilets shall not face east or west.
- b. Lavatories. All sinks shall be trough type constructed of block and concrete with ceramic tile exterior and lining capable of withstanding abuse. Provide maintenance access to waste piping and P-traps from under the sink. Trough-type sink faucets shall be similar to service (mop or janitor's) sink faucets with one-piece brass body construction, fixed short integral spout, hot and cold water manual mixing valves, and capabilities for withstanding abuse. Lavatories inside the prison cells shall be tamper-proof with integral spout, soap depression, and outlet connection to slip 40mm OD tubing.

- c. Sink Faucets. LN faucets shall be chrome plated brass or bronze alloy with hot and cold water valves for manual mixing. Faucet handles shall be chrome plated brass or bronze alloy. No goose neck faucet fixtures shall be used. Fixtures shall have flow restrictors not to exceed 4.0 lpm (1.0 gpm) (Note: Provide flow restrictor to achieve designated flow at available water pressure)
- d. Service (Mop or Janitor's) Sinks. Floor mount janitor, enameled cast iron with copper alloy rim guard. Provide hot and cold water valves with manual mixing. Faucet handles shall be copper alloy. Include a stainless steel shelf and three mop holders.
- e. Shower. Showerhead and faucet handles shall be stainless steel prison grade for LN facilities and regular stainless steel for coalition facilities. Provide hot and cold water valves for manual mixing. In addition to a shower head, provide each shower stall with a threaded faucet approximately 1.2 m above finished floor with hot and cold-water controls, mixing valve and a diverter type valve so water can be directed to either the shower or to the lower faucet. Shower shall be provided with low flow shower head. The shower head shall be heavy duty type and securely fastened to the wall.
- f. Emergency Shower and Eye Wash Assembly. Provide emergency shower and or eye wash assembly in Power Plant and in other facilities where appropriate. Provide a floor drain in the area, if appropriate (where emergency water flowing on the floor may lead to additional safety or operational complications).
- g. Kitchen Sink. Sinks shall be corrosion resisting formed stainless steel. Faucet bodies and spout shall be cast or wrought copper alloy. Handles, drain assembly, and stopper shall be corrosion resisting steel or copper alloy.
- h. Ablution Trench. Provide trench drains, as indicated on drawings, with brass grating and strainer. Provide each station with hot and cold water valves with manual mixing. Faucet handles shall be copper alloy.
- i. Grease Interceptor (Exterior only). Shall be steel construction manual cleaning type with removable checker-plate cover complete with flow control valve. Tested and rated in accordance with PDI G-101. Concrete shall have a minimum compressive strength of 21 MPa (3045 psi) in 28 days (kitchen use only).
- j. Floor Sink: Provide floor sink, circular or square, with 300mm overall width or diameter and 250mm nominal overall depth. They shall have acid resistant enamel interior with cast iron body, aluminum sediment bucket and perforated grate of cast iron. Outlet size as indicated on plans.
- k. Floor or Shower Drain: Cast iron construction with galvanized body, integral seepage pan, and adjustable perforated or slotted chromium plated bronze, nickel-bronze, or nickel brass strainer consisting of a grate and threaded collar. Toilet room floor drains are similar except are provided with built-in, solid, hinged grate.
- l. Trench Drains: Floor trench shall be concrete construction with a cast iron grate. The cast iron grate shall be sectionalized and hinged so that it can easily be opened to clean out the trench. Iron grates shall be fabricated in sections in length not greater than 1500 mm. The floor trench shall be provided with perforated aluminum pan inserts which can be removed to clean out large food particles. The floor trench drain shall be adjustable perforated or slotted chromium plated bronze, nickel-bronze, or nickel brass strainer consisting of a grate and threaded collar. This style of floor trench shall be installed in the kitchen area of the DFACs in response to kitchen cleaning practices of the local national staff.
- m. Room hose bibs and floor drains shall be provided as required. Afghan dining facility kitchen area clean-up hose bib to be supplied with connecting hose on reel including approximately 12 meters of hose. Provide clean-up spray nozzle with hose assembly.
- n. Provide P-Traps per International Plumbing Code IPC for all fixture drains, floor and trench drains, and shower drains. P-traps shall have minimum of 50 mm water seal.
- o. Large Pot sink, provide clean-up spray nozzle with hose assembly.

### 6.4.3 HOT WATER

Where domestic hot water systems are required to be designed by the Contractor, design these systems to supply 50°C (120°F) hot water to fixtures and outlets requiring hot water. Water of a higher temperature, 60 C (140 F) and above, shall be provided for special uses or processes as in kitchens (except hand wash lavatories) and for sterilization. All hot water piping shall be insulated. A hot water re-circulating pump shall be provided if hot water piping run exceeds 30 m (100). All water heaters shall be set to generate/store hot water at no less than 60 C (140 F).

#### 6.4.3.1 WATER HEATERS

Domestic hot water shall be generated by electric water heaters (WHs). All WHs shall be factory insulated. Each water heater shall be equipped with a vacuum relief valve and temperature and pressure (T&P) relief valve that discharge into a nearby floor drain; discharge piping shall terminate 50 mm (2") above the floor drain. The larger floor-mounted unit(s) shall be typically located inside a mechanical room, storage room, toilet/janitor room or similar type space. Smaller wall-mounted units may be located in toilet-lavatory areas for single remote water closets. Multiple water heaters (two or more) shall be of equal size and connected by common inlet and outlet manifolds in a "reverse return" configuration to ensure equal flow and drawdown rates. All floor-mounted WHs shall be elevated on a 100 mm (4") raised concrete pads. In cases where the pressure of the water system violates the manufacturer's recommendations, a pressure reducer shall be installed in the line before the water heater.

Water heater storage capacity (liters) and recovery capacity elements (kW or liters per hour) shall be sized in accordance with ASHRAE Fundamentals Handbook-HVAC Applications, "Service Water Heating." Provide water heater sizing according to the following chart:

<b>Building Type</b>	<b>ASHRAE Category</b>
Barracks, Latrine	Hotel
HQ, Administration	Office
DFAC	Hotel

The unit(s) capacities shall be for commercially available tank and electric heating element sizes.

### 6.5 WASTE, DRAIN AND VENT SYSTEM

#### 6.5.1 GENERAL

Every trap and trapped fixture shall be vented in accordance with the IPC. In order to minimize vent piping, incorporate either "Circuit Venting," "Combination Drain & Vent," or "Wet Venting" options systems in accordance with the IPC.

#### 6.5.2 DESIGN CONSIDERATIONS

The Designer shall have in mind a vent option (i.e. Fixture Venting, Circuit Venting, Wet Venting, etc.) before designing the route of the waste line(s) in a building in order to comply and avoid inconsistencies with the IPC. Vent piping shall not be routed horizontally under the floor. Every dry vent connection shall rise up vertically from the waste pipe no less than 45 degrees with the horizontal (Note: In most cases, the connection will be 90 degrees for the horizontal or straight up. See IPC). Every dry vent shall rise up vertically at least 15 cm above the flood level rim, of the fixture being vented, before going horizontally.

### **6.5.2.1 FLOOR DRAINS**

Floor drains shall be provided in each room that contains a water source. Floor drains shall be provided in the mechanical equipment and toilet/shower/ablution rooms. Floor drains shall be provided next to water heaters. In mechanical rooms, floor drains shall be provided to avoid running drain piping long distances above or over the floor. Drain outlet shall use a P-trap system to trap sewer gases and shall be a one-piece system without removable parts.

### **6.5.2.2 CLEANOUTS**

Cleanouts shall be provided no more than 8 m (25') apart when measured from the upstream entrance of the cleanout.

## **6.6 SPECIAL PLUMBING SYSTEMS**

### **6.6.1 GENERATOR FUEL STORAGE / DISTRIBUTION**

The Contractor shall design and provide a complete generator fuel storage/distribution system.

#### **6.6.1.1 FUEL OIL STORAGE AND CONTAINMENT**

Tanks shall be installed in accordance with NFPA 37 and shall be of the following sizes: Three (30) tanks of 30,000 liter capacity for generator diesel fuel storage. Two (2) tanks are required for vehicle fuel storage. One (1) tank for DIESEL shall be of 30,000 liter capacity for diesel vehicle fuel storage and One (1) tank of 5,000 liter capacity for MOGAS ( Motor Vehicle Gasoline ) vehicle fuel storage. Design and provide above-ground horizontal steel tank(s) with single-walls and a secondary containment dike. Under NO circumstances shall GALVANIZED tanks be provided for storage of fuel oil or diesel.

Bulk storage tanks shall be designed and manufactured for horizontal aboveground installation. Tanks shall be complete with fill tube and cap, suction tube, tank gauge, vent, and other fittings and appurtenances required for full and safe operation. Tanks shall be provided with support saddles, platform/stair and concrete pad. Molded neoprene isolation pads shall be provided at locations where steel contacts concrete to isolate the tank. Steel tank supports specifically are prone to encounter premature rusting due to constant exposure to moisture and their incompatibility with concrete.

The containment dike shall be sized to contain the entire contents of the largest tank plus 20 percent. The dike structure shall be constructed of reinforced concrete with a low point drain assembly of 50mm diameter.

Tanks shall be complete with fill tube and cap, suction tube, tank gauge, vent, and other fittings and appurtenances required for full and safe operation. Tanks shall be provided with support saddles, platform/stair and concrete pad. Molded neoprene isolation pads shall be provided at locations where steel contacts concrete to isolate the tank. Steel tank supports specifically are prone to encounter premature rusting due to constant exposure to moisture and their incompatibility with concrete.

Any tanks of 3,880 to 45,400 liters (1,000 to 12,000 gallons) capacity shall have a minimum of one (1) 760 mm (30") diameter manway. Any tanks larger than 45,400 liters (12,000 gallons) shall be provided with minimum of two (2) 900 mm (36") diameter manways. Any tanks 3,800 liters (1,000 gallons) and larger shall be provided with a minimum of one (1) tank manway to allow for internal tank access. Piping shall not penetrate through access manways. Tank shall be provided with a combination cleanout and gauge connection.

Vent pipe sizing shall be not less than 32 mm (1-1/4") nominal inside diameter. Vent shall be the rupture disc type calibrated to burst at 14 kPa (2 psi) pressure, and operate at 80 percent of burst setting. Tank shall be provided with an overfill alarm system. Tank shall be provided with two (2) stick gauges graduated in m and mm. Stick gauge shall be of wood and treated after graduating to prevent swelling or damage from the fuel being stored. Cathodic protection shall be provided for metal components in accordance with the manufacturer's recommendations. Storage tanks shall be handled with extreme care to prevent damage during placement and shall be installed in accordance with the manufacturer's installation instructions.

At least one (1) external platform/ladder access to tank top (i.e. manway) shall be provided and installed on a concrete pad.

#### **6.6.1.2 FUEL DISTRIBUTION SYSTEM**

Design and provide a complete fuel distribution system to supply clean fuel to the generators. Fuel shall be transferred from the bulk storage tank(s) by either the generator engine fuel pump(s), bulk tank submersible pump(s), or duplex-fuel pumps as determined by the designer and/or manufacturer, and be fitted with in-line fuel filters within 2 m (7') of the tank shell.

Fuel piping shall be black steel for all piping above grade and either steel or fiberglass for underground piping segments. Rubber hoses shall not be allowed. Galvanized piping, fittings, valves, or other equipment shall not be used for fuel oil or diesel conveyance. Secondary containment for underground fuel piping shall be provided with either double-wall fiberglass, double-wall black steel inner and steel outer with cathodic protection, double-wall black steel inner and fiberglass outer, or either black steel or fiberglass piping located in a concrete secondary containment trench with applied POL-resistant coating and removable covers (traffic-rated as applicable). Piping shall be installed straight and shall bear evenly on supports. Piping shall be free of traps, not embedded in concrete or pavement, and drain toward the corresponding storage tank when elevation permits. Belowground nonmetallic pipe shall be installed in accordance with pipe manufacturer's instructions. Belowground piping shall be laid with a minimum pitch of 0.4 m per 100 m (0.4 percent slope).

Design and provide a complete fuel filling system for unloading fuel from fuel tanker into individual bulk storage tanks. The fuel filling system shall include truck pad(s), duplex fuel transfer pumps, piping manifold and valves all in weather-proof cabinets. The system shall provide remote fuel level monitoring panels at the pad(s). Lockable containment box shall be provided to contain any spillage encountered during tank filling. Before construction begins, the Contractor shall coordinate with the Contracting Officer Representative and locate the fuel off-loading point outside of the perimeter wall to facilitate transfer of fuel from the commercial tanker trucks to the bulk storage tanks.

Provide complete fuel piping hydraulic calculations and all equipment product data in the 65% design analysis.

#### **6.6.2 FUEL OFF-LOAD SYSTEM**

A fuel filling system shall be provided for unloading fuel from fuel tanker into individual bulk storage tanks comprising of a 500 liters per minute/one duplex skid mount unit w/controls/ NEMA 3R enclosure, truck pad(s), duplex fuel transfer pumps, piping manifold and valves all in weather-proof cabinets. The system shall provide remote fuel level monitoring panels at the pad(s). Lockable containment box shall be provided to contain any spillage encountered during tank filling. Before construction begins, the Contractor shall coordinate with the Contracting Officer Representative and locate the fuel off-loading point outside of the perimeter wall to facilitate transfer of fuel from the commercial tanker trucks to the bulk storage tanks. The Contractor shall provide a full supply of fuel for EACH tank at the time of turnover to the Government.

#### **6.7 MOTOR POOL REFUELING POINT (STORAGE-DISPENSING)**

Fuel storage and distribution shall be provided to support the vehicles used at various locations. The fuels shall be stored in one or more above-ground or underground horizontal steel tank as per the capacity schedule given below. **Under NO circumstances shall GALVANIZED tanks be provided for storage of fuel oil or diesel.**

The refueling point shall provide for [both] diesel [and MOGAS] of quantities as stated in Section 01010. **The Contractor shall provide a full supply of fuel for ALL tanks at the time of turnover to the Government.**

Tanks shall be complete with fill tube and cap, suction tube, tank gauge, vent, and other fittings and appurtenances required for full and safe operation. Tanks shall have overflow protection devices [and remote overflow alarms]. Aboveground tanks shall be provided with support saddles, platform/stair, concrete pad, and spill containment provisions. Underground tanks shall be with either double-wall fiberglass, double-wall steel (Not commonly available at this time) with cathodic protection, or single-wall steel or fiberglass with a reinforced concrete secondary containment vault and applied POL-resistant coating.

Secondary containment dikes shall be provided for aboveground tank(s) and sized to contain the entire contents of the tank plus 10 percent. If more than one (1) tank is sharing a containment dike, then the dike need only be sized and have the capacity for the largest tank plus 20 percent.

[Fuels shall be transferred from the storage tanks by dispenser transfer pumps located within the fuel dispensing units.]

Fuel piping shall be black steel only for piping located above grade and either steel or fiberglass for underground; **rubber hoses shall not be allowed, except for fuel dispensers. Under NO circumstances shall GALVANIZED piping, fittings, valves, or other equipment be used for fuel oil or diesel conveyance.** Secondary containment for underground piping shall be provided with either double-wall fiberglass pipe, double-wall steel with cathodic protection, or steel or fiberglass pipe located in a concrete secondary containment trench with removal covers (traffic-rated as applicable) and applied POL-resistant coating. The Contractor shall size the piping from the storage tank to the inlet of the fuel dispensing unit such that the total equivalent suction pressure drop is no more than 20kPa.

Separate dispensing units shall be provided for diesel and MOGAS. Each dispensing unit shall be equipped with dual nozzles with 3.5 meters of hose and breakaway valves and swivels for each hose, two (2) mechanical dispensing meters, inline spin-on type filter, pressure regulating valves for above ground storage tanks and key control, integral suction pumps with a minimum suction pressure capacity of 20kPa and provide 80 liters per minute of fuel flow. Fuel dispensing unit shall be installed on an island such that two (2) vehicles can simultaneously fuel on either sides of the dispensing unit.

#### **6.7.1 LPG COOKING STOVES**

Cooking areas shall be provided with canopy type exhaust and associated exhaust and outside make-up air fans. See paragraph "Mechanical" in this Section. New stoves shall be set into formed concrete openings such that they can easily be removed for replacement, maintenance, and cleaning.

##### **6.7.1.1 COOKING STOVES/BURNERS**

Each LPG-propane stove shall be provided with three (3) burners and metal frame with four (4) legs. The stoves shall be of commercial quality and be capable of producing the highest heat output with all three (3) burners on. The center burner is low heat, center and middle burner is medium heat and all three burners is high heat. A gas flow regulating-adjusting valves shall be provided for each burner at the face of the appliance.

Stove dimensions are approximately 720 mm (28") long by 720 mm (28") wide by 500 mm (20") high.

##### **6.7.1.2 GAS PIPING**

Gas piping from the LPG/propane tanks to the respective gas stoves shall be wrought iron, ASTM B36.10M or steel (black or galvanized), ASTM A53. The steel piping shall terminate in front of the stoves with a shut off valve and quick disconnect nipple. A stainless steel flexible hose shall connect from the LPG/propane stove to the steel piping. Each end of the flexible hose shall be provided with quick disconnect fittings.

The LPG/propane piping shall not be embedded in the concrete floor. Installation of the LPG/propane piping in concrete trenches is highly recommended. The piping may be surface mounted provided that it is not susceptible to damage or causes any safety hazards.

Piping passing through the exterior wall shall be provided with pipe sleeves.

New stoves shall be set into formed concrete openings such that they can easily be removed for replacement, maintenance, and cleaning. Stove dimensions are 720 mm long by 720 mm wide by 500 mm high. The height includes the grill.

##### **6.7.1.3 PROPANE FUEL STORAGE (45 KG BOTTLES)**

LPG-propane storage tanks shall be located outside and exterior to the building in a storage yard.

The storage of fuels shall consist of individual 45 kg (100-pound) portable bottle tanks. For a 30-day supply of fuel, provide four (4) bottles per cook stove. The Contractor shall provide all tanks filled with LPG/propane fuel at time of completion.

**Remote Storage Area:** Stored filled and empty LPG/propane storage tanks shall be installed on a concrete pad and placed within a covered, secure, enclosure located a minimum of 8.0 m (26') from any occupied building. Portable bottle tanks shall be secured with chains to prevent tipping, and have caps on all bottles. Chain link enclosure with two (2) walkways and four (4) rows of tanks is recommended for ready access and easy securing of the bottles. Enclosed buildings are discouraged due to the potential for the buildup of propane in the event of a leak. Chain link fences with a visibility barrier are acceptable if the visibility barrier allows minimally impeded airflow.

**Connected Storage:** Connected Portable Tanks shall be located outdoors near or adjacent to the building behind a fire rated exterior wall. Tank area shall have a cover and be located in a chain link secured enclosure. One (1) tank per stove will be allowed in this location, with all tanks manifolded together (For facilities with three (3) or fewer stoves, the stoves may be individually piped.). The tanks shall be complete with fill fittings, tank gauge, vent, 2-stage and line regulators, and other fittings and appurtenances required for full and safe operation. Portable bottle tanks shall be secured with chains to prevent tipping.

## **6.8 TESTING AND COMMISSIONING**

The Contractor shall test all piping systems in accordance with IPC International Plumbing Code. The final test shall include a smoke test for drainage and vent system and pressure test for the domestic water piping. After completing the work, the Contractor shall demonstrate that all plumbing systems operate to fully satisfy the function for which these systems have been designed. The Contractor shall test, adjust, balance and regulate the system and its controls as necessary until the required designed conditions are met. The Contractor shall include tests for interlocks, safety cutouts and other protective devices to demonstrate safe operation. All such tests shall be carried out in the presence of the Contracting Officer and full written records of the test data and final settings shall be submitted to the Contracting Officer. After all tests are complete, the entire domestic hot and cold water distribution system shall be disinfected. The system shall not be accepted until satisfactory bacteriological results have been obtained.

## **7.0 FIRE PROTECTION**

### **7.1 PORTABLE FIRE EXTINGUISHERS**

Portable fire extinguishers shall be provided inside all facilities and at exterior locations. Provide extinguishers per the greater requirement of A) as required in accordance with NFPA 10, or B) minimum of one (1) A-B-C 6kg fire extinguishers for every 100sm of floor space. Generally, extinguishers will be of the multi-purpose dry chemical type except for occupancies requiring a special type extinguisher (e.g., carbon dioxide portable fire extinguishers for electrical rooms). Where located in the presence of fuel, the fire extinguisher shall be rated for extinguishing fuel fires for the types of fuel used.

## **8.0 ELECTRICAL**

### **8.1 GENERAL**

Contractor shall design and construct all electrical systems for the facilities to be provided. This includes design, construction, all necessary labor, equipment, and material for a fully functional system.

### **8.2 ELECTRICAL WORKERS QUALIFICATIONS**

Electrical work shall be performed by qualified persons with verifiable credentials who are thoroughly knowledgeable with applicable code requirements. Verifiable credentials consist of a certificate of graduations from an approved trade school and required amount of experience, depending on work being performed, and should be identified in the proposal that is submitted. A qualified person is one who has received training in and has demonstrated skills and knowledge in the construction and operation of electrical equipment and installations and the hazards involved. This includes the skills and techniques necessary to distinguish exposed live parts from other

parts of electric equipment, to determine the nominal voltage of exposed live parts, the clearance distances and corresponding voltages to which the qualified person will be exposed.

### **8.2.1 SUPERVISORY ELECTRICIAN**

Supervisory electricians must be graduates of an approved trade school, and must have two years of relevant electrician experience. Approved programs include but are not limited to the Afghanistan Technical and Vocational Institute (in Kabul), the Kunar Trades Training Center, and the Commercial Technical Training Center (in Jalalabad). Work experience resumes and graduation certificates shall be submitted and approved prior to commencement of any design or construction involving electrical work. Approval is granted by the Contracting Officer's Representative with guidance by the Quality Assurance Branch and/or the Safety Office of the US Army Corps of Engineers Afghanistan Engineer District – South.. Supervisory electricians shall be on site at all times when electrical work activities are in progress.

### **8.2.2 ELECTRICIANS**

Electricians must be graduates of an approved trade school and must be able to provide upon request a certification of successful course work completion and graduation in addition to a resume of work experience.

## **8.3 DESIGN CRITERIA**

### **8.3.1 APPLICABLE STANDARDS**

Design shall be in the required units as stipulated herein. Conflicts between criteria and/or local standards shall be brought to the attention of the Contracting Officer for resolution. In such instances, all available information shall be furnished to the Contracting Officer for approval.

All electrical systems and equipment shall be installed in accordance with the requirements set forth in the documents referenced herein.

### **8.3.2 ACCEPTANCE TESTING**

Contractor shall develop and submit for approval complete acceptance test procedures on all systems provided. As a minimum the testing procedures shall comply with the requirements of the National Fire Protection Association (NFPA) and the International Electrical Testing Association Inc. (NETA).

## **8.4 MATERIAL**

### **8.4.1 GENERAL**

Unless noted otherwise, all material used shall be in compliance with the requirements of UL standards. In the event that UL compliant materials are not available, Contractor may then select applicable British Standards (BS), IEC, CE, CSA, GS, DIN listed material (or equivalent), but the contractor must prove equivalence and must provide the government with a full copy of the relevant specification(s)/standard(s). Material and equipment installed under this contract shall be for the appropriate application and installed in accordance with manufacturers recommendations and/or manufacture test results.

Equipment enclosure types shall be in compliance with the National Electrical Manufacturer's Association (NEMA) or the International Electro-Technical Committee (IEC) standards.

Major components of equipment shall have the manufacturer's name, address, type or style, voltage and current rating, and catalog number on a non-corrosive and non-heat sensitive plate, securely attached to the equipment. All equipment delivered and placed in storage, prior to installation, shall be protected from the weather, humidity and temperature variation, dirt and dust, and any other contaminants. All equipment shall be in new condition, undamaged and unused.

## **8.5 STANDARD PRODUCT**

All material and equipment shall be a standard product of a manufacturer regularly engaged in the manufacture of the product and shall essentially duplicate items that have been in satisfactory use for at least two (2) years prior to bid opening.

### **8.5.1 DESIGN CONDITIONS**

All equipment shall be rated and designed for the maximum ambient temperature and altitude of the construction site. Equipment that is altitude and temperature sensitive, such as generators, shall be de-rated according to the manufacturer's recommendations. Generic de-rating criteria for altitude and for ambient temperature may be used to approximate the required size of such equipment during the design phase, but a stipulation shall be placed on the construction plans to adjust the size according to the de-rating criteria specific to the manufacturer's equipment chosen before the equipment is ordered.

### **8.5.2 RESTRICTIONS**

Aluminum conductors shall not be specified or used except as bare steel reinforced (ACSR) overhead conductors in an aerial primary distribution system. Aluminum windings shall not be used in transformers.

## **8.6 DESIGN REQUIREMENTS**

### **8.6.1 ELECTRICAL DISTRIBUTION SYSTEM**

The Contractor shall provide generator power as a prime source of power for the facilities. The electrical distribution system shall be designed based on the latest edition of NEC and the requirements or standards stipulated herein.

The Contractor shall provide a prime power distribution system to distribute power to the site's facilities and other loads as required. The distribution system shall be underground.

The Contractor shall provide all required conduit stub ups to connect all equipment (to include equipment included as part of any Optional Bid Items) to the switchgear lineup.

Secondary electrical distribution system shall be 380/220 volt, 3-phase, 4 wire, 50 hertz. Design of the electrical system within facilities shall include, but is not limited to (a) interior secondary power distribution system, (b) lighting and power branch circuit and devices, and (c) fire detection and alarm system. Electrical panelboards and feeders shall be designed for the connected loads, plus 25% spare capacity.

The underground distribution system shall be in direct buried schedule 80 ductbanks, Under roadways and vehicular traffic areas, ductbanks shall be buried not less than 1220mm below grade. Underground ducts shall be not less than 100mm diameter Schedule 80 PVC for non-roadway and light traffic areas, and concrete encased under roadways and heavy traffic areas. A spare conduit of equal size shall be provided.

Manholes and handholes shall be provided at changes of direction of more than 40 degrees and elsewhere as required to limit the pulling tension and sidewall pressure on the cables during installation to acceptable levels as defined by the cable manufacturer. Manholes shall be provided for ductbanks with more than 2 ducts. Handholes shall be provided wherever a manhole is not required by quantity of ducts or by cable manufacturer's installation recommendations.

Manholes and handholes for ductbanks shall be constructed in accordance with UFC 3-550-03, Plates UG-1 through UG-7 for both traffic and non-traffic applications.

All panelboards shall be circuit breaker 'bolt-on' type panels. Minimum size circuit breaker shall be rated at no less than 20-amperes. All panels shall have copper bus bars. Circuit breakers shall be connected to bus bar(s) within the panelboards. Daisy chain (breaker-to-breaker) connection(s) are not acceptable. Indoor distribution panels shall be flush mounted in finished areas and surface mounted in unfinished areas. All circuit breakers shall be labeled with an identification number corresponding to the panel schedule. A 3-pole circuit breaker shall be a single unit and not made up of 3 single pole circuit breakers connected with a wire or bridge to make a 3-pole breaker. All branch circuit wiring shall be copper, minimum #4 mm<sup>2</sup> (#12 AWG) installed in metal conduit. Wiring shall be surface

mounted in all areas. Provide 25% space for future circuit breakers in all panelboards. Power receptacles (outlets) shall be duplex type 220 V, 50 hertz, type CEE 7/7 with Earth Ground rated for 16A or better and shall be compatible with the required secondary power.

All splicing and terminations of wires shall be performed in junction or device boxes. Proper wire nuts/connectors shall be used for splicing wire. No twist-wire connections with electrical tape wrapped around it shall be acceptable. All electrical installation shall be in accordance with NEC. All building service entrance (service intake) panels shall be provided with kilowatt-hour (kWh) meters. A voltmeter and ammeter shall be provided also. All metering shall read true RMS values. Series rated equipment is not permitted. A digital power meter in lieu of a kWh meter, ammeter and voltmeter may be provided. Digital power meters shall meet or exceed ANSI/IEEE C37.90.1 All loads shall be coordinated to provide balanced loading. Phase imbalance at each panel shall not exceed 5%.

Voltage Drop for branch circuits shall be limited to no more than 3%; voltage drop from power source to loads shall be limited to no more than 5%.

All circuit breakers shall use down-stream coordination to ensure the breaker nearest a fault or overload is the first to trip.

### **8.6.1.1 GENERATOR POWER SYSTEM**

**Note:** The full specification for the generator consists of this section, Generator Power System-Electrical Requirements for Generators, in combination with the Mechanical Requirements for Generators specification found in the Mechanical portion of this Section 01015.

The generators shall be TWO (2) 550 kW, 380 / 220 V, 50 Hz. The generators shall supply power at the utilization voltage of the facilities served. The generator power system shall be configured as an N+1 system with the N representing the number of generators needed to supply the site's total load and +1 representing the number of additional generators of the same size required as a spare, and the entire system shall be connected to a synchronization panel. The generator power system shall be provided with a make-before-break, 4-pole, automatic transfer switch (ATS) rated for the capacity of the system. The ATS shall be capable of automatically and manually transferring the site's distribution system to generator power upon loss of local utility power and transferring back automatically and manually to local utility power upon its restoration.

The ATS shall be equipped with synchronizing/paralleling equipment to allow the generators to share the load of the site. When generator power is required at least one (1) generator shall be online at all times. When the load reaches 90% of the online generator's capacity, the standby generator(s) shall start. When the load drops below 80% of the online generators' capacity, the generator(s) shall drop off line, one at a time, keeping a minimum of one generator operating online.

If a commercial electrical service is available nearby, or anticipated to be available in the near future (within five years), switching shall be included to allow connection to commercial power. The transfer switch between the commercial power and generators shall be a make-before-break, 4-pole, manual transfer switch (MTS) rated for the capacity of the system.

Whenever a generator starts, it shall go through a cool down cycle prior to shutdown. All relaying shall be automatically reset for automatic restart and stopping of generators as the load increases or decreases. Load sharing by the standby generator(s) shall be adjustable between 50% and 95% of the load on the online generator(s). Sequence of operation shall be time clock controlled. A properly sized main switchboard shall be provided to distribute the power produced by the generator(s) to the facilities on the site.

Generators shall have a radiator nameplate ambient temperature rating of 50 degrees centigrade and be derated as necessary for the altitude of the site. Installing a generator with a lower ambient temperature and de-rating it for 50 degrees centigrade is not acceptable. Generator shall be provided inside "weather-proof" (IP54 or better) enclosure.

Generator fuel storage capacity shall be based on usage at total load for a minimum of 30 days. For fuel storage requirements, see Mechanical paragraph: Generator Fuel Storage/Distribution.

### **8.6.1.2 GENERATOR POWER TESTING AND COMMISSIONING**

The Contractor shall test generator power system.

### 8.6.2 LIGHTING

Lighting shall be provided as indicated in the attached Standard Designs, except at buildings without complete design. In those facilities, the Contractor shall provide and design the lighting system. Design levels shall be per IES standards as a minimum. For convenience, the following lighting level table is listed. Note: all spaces listed below may not be within the work required within this contract.

Living room/Quarters	30 FC (350 Lux)
Toilets, Showers, Latrines, washrooms	20 FC (200 Lux)
Mechanical/Electrical rooms	30 FC (300 Lux)
Corridors and Stairways	20 FC (200 Lux)
Offices (private)	30 h/3 v FC (300 h/30 v Lux)
Office areas (open)	30 h/5 v FC (300 h/50 v Lux)
Kitchens (commercial)	50 h/3 v FC (500 h/30 v Lux)
Dining Areas	20 h/3 v FC (200 h/30 h Lux)
Auditoriums (social)	5 h/3 v FC (50 h/30 v Lux)
Conference/Training	30 h/5 v FC (300 h/50 v Lux)
Armories	30 h/3 v FC (100 h/30 v Lux)
Patient Rooms (general)	Per UFC 4-510-01
Patient Rooms (critical)	Per UFC 4-510-01
Egress path (incl. exterior)	10 Lux
Areas adjacent to egress path	0.5 Lux

FC = Foot Candle

h = horizontal component

v = vertical component

Indoor lighting for all areas shall consist of fluorescent surface mounted light fixtures. Exterior lighting shall be HID high pressure sodium. Area lighting for the Motor Pool shall have photocell controlled switches. Moisture resistant/waterproof fluorescent light fixtures shall be provided in high humidity and wet areas such as latrines, showers and at exterior applications. Battery powered 'emergency' and 'exit' lights shall be provided within each building, as applicable, for safe egress during a power outage. All light fixtures shall be factory finished, complete and operational, to include but not be limited to, lens, globe, lamp, ballast etc. Industrial type fluorescent light fixtures shall not be used. Every room shall be provided with a minimum of one light switch. Light fixtures shall be mounted approximately 2.5-meters (8 feet) above finished floor (AFF) minimum. Fixtures may be pendant or ceiling mounted, depending on the ceiling type and height.

### 8.6.3 LIGHT FIXTURES

Lighting fixtures shall be a standard manufacturer's product. Fluorescent surface mounted light fixtures shall be power factor corrected and equipped with standard electronic ballast(s). All light fixtures shall properly operate using standard lamps available locally. Fixtures shall be fully factory wired and designed for appropriate application i.e. appropriate for that location where installed. Grounding rods shall be installed at all exterior light pole fixtures.

#### **8.6.4 EMERGENCY “EXIT” LIGHT FIXTURES**

Emergency “EXIT” light fixture shall be provided in accordance with NFPA requirements. Fixtures shall be single or double sided as required by the location and for wall/ceiling mounting. Unit shall illuminate continuously and be provided with self-contained nickel cadmium battery pack, to operate on floated-battery or trickle charge circuit. Fixture shall operate satisfactorily for 90 minutes during a power outage. Unit shall have test/re-set button and failure indication lamp. Primary operating voltage shall be 220 volts. Lettering “EXIT” in both Pasto and Dari, shall be color red and not less than 6 inches (150 mm) in height and on matte white background. Illuminations shall be with LEDs.

#### **8.6.5 SEARCH LIGHTS**

Searchlights shall be equivalent to the following:

- Prison grade
- Nickel reflectors (bullet resistant)
- 65 million candlepower (1,000 watts)
- Manual operation from below with one hand
- Xenon lamp
- Weatherproof design

#### **8.6.6 EMERGENCY LIGHTING**

Battery powered emergency lights shall be provided within each building per NFPA for safe egress during power outage. Fixtures shall be provided with self-contained nickel cadmium battery pack to operate on stand-by circuit for 90-minute minimum. Unit shall have test/re-set button and failure indication lamp. Normal operating voltage shall be 220volts. Emergency lighting fixtures shall be connected to the normal lighting system.

#### **8.6.7 LIGHT SWITCHES**

Light switch shall be single pole. Minimum of one light switch shall be provided in every room. Lighting in large rooms/areas may be controlled from multiple switches.

#### **8.6.8 RECEPTACLES**

All receptacles shall be duplex, unless otherwise specified in this section, the NEC, or other referenced standard.

Receptacles shall be spaced per NEC at a maximum of 2 meters (6 feet). Areas with computer work-stations or similar equipment will have additional receptacles. All circuits in wet/damp areas or within 1 meter (~3 feet) of sinks, lavatories, or wash-down areas shall have ground fault circuit interrupter (GFCI) type or residual current disconnect (RCD) type, as required per NEC. Total number of duplex receptacles shall be limited to six (6) per 16-ampere circuit breaker.

#### **8.6.9 CONDUCTORS**

All cable and wire conductors shall be copper. Conductor jacket and insulation shall be color coded to satisfy NEC requirements. The use of 75 or 90 degree C (minimum) terminals and insulated conductors is required. Use of higher degree C rated conductors on circuits with protective device terminals rated at a lower degree C is allowed but must be de-rated to the rating of the device terminals. Conductors sized No. 8mm and larger diameter shall be stranded. Conductors sizes No. 6mm and smaller diameter shall be solid, except that conductors for remote control, alarm, and signal circuits, classes 1, 2, and 3, shall be stranded unless specifically indicated otherwise. Conductors shall be sized per NEC requirements.

#### **8.6.10 GROUNDING AND BONDING**

Grounding and bonding shall comply with the requirements of NEC. Underground connections shall be exothermally welded. All exposed non-current carrying metallic parts of electrical equipment in the electrical system shall be grounded. Insulated grounding conductor (separate from the electrical system neutral conductor) shall be installed in all feeder and branch circuit raceways. Grounding conductor shall be green-colored, unless the local authority requires a different color-coded conductor. Ground rods shall be 20 millimeters (0.75 inches) in diameter

and 3 meters (~10 feet) long made of copper-clad steel. Final measurement of the ground resistance shall be in compliance with the requirements of the local authority but shall not exceed 25 ohms when measured more than 48 hours after rainfall.

#### **8.6.11 ENCLOSURES**

Enclosures for exterior and interior applications shall be NEMA Type 3S (IEC Classification IP54) and NEMA Type 1 (IEC Classification IP10) respectively.

#### **8.6.12 FIRE DETECTION & ALARM SYSTEM**

The Contractor shall install hardwired initiating devices and notification appliances to provide local alarm only.

Initiating devices and notification appliances shall be provided as required by the latest edition of NFPA 72. Each initiating device shall be capable of alarming all notification devices within the same building/structure when activated. All initiating devices and notification appliances shall be interconnected per NFPA 72 and hard-wired to AC power supply. The initiating devices and notification appliances will operate on battery only if site power is lost.

#### **8.6.13 TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS)**

Transient Voltage Surge Suppression shall be provided utilizing surge arresters to protect sensitive and critical equipment. As a minimum TVSS protection shall be provided at each panel serving electronic loads and shall be shown on the panel schedule. It is recommended that Metal Oxide Varistors (MOV) technology be used for such applications.

#### **8.6.14 CONDUIT RACEWAY SYSTEM**

Metal conduit (EMT) system shall be complete, to include but not limited to, necessary junction and pull boxes for all surface mounted conduit systems. Surface mounted nonmetallic raceways shall not be allowed. Smallest conduit size shall be no less than 20mm in diameter. All empty conduits shall be furnished with pull wire or cord or rope (depending on the size of conduit and length of run). System design and installation shall be per NEC requirements. Exterior conductors below grade shall be installed in concrete encased PVC conduit at a depth of 1220 millimeters.

#### **8.6.15 CABLE TRAY RACEWAY SYSTEM**

Cable trays shall be galvanized steel or aluminum wire mesh type and provided with, but not limited to, splices, end plates, dropouts and miscellaneous hardware. System shall be complete with manufacturer's minimum standard radius and shall be free of burrs and sharp edges. Nominal width of cable tray shall be 300mm. Nominal depth shall be 100mm. System design and installation shall be per NEC requirements.

#### **8.6.16 IDENTIFICATION NAMEPLATES**

Major electrical equipment, such as transformers, panelboards, and load centers, etc. shall be provided with permanently installed engraved identification nameplates. Nameplates or labels shall indicate the source feeding each piece of major electrical equipment.

#### **8.6.17 SCHEDULES**

All panel boards and load centers shall be provided with a directory. Directory shall be typed written in English, Dari and Pashto. The directory shall identify the conductor color code present in the panel. The directory shall also indicate the source where the panelboard/loadcenter is fed from.

#### **8.6.18 SINGLE LINE DIAGRAM**

Complete single line diagrams shall be provided for all systems installed. All major items in each system shall be identified and labeled for respective ratings. Single line diagrams for each system, installed in a clear plastic frame, shall be provided. Most current version of design, based on current design review, shall be kept on project site at all times for reference, and updated with redline edits to show any and all variations from the drawings.

**9.0 COMMUNICATIONS**

**9.1 APPLICABLE SPECIFICATIONS**

The Publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by designation only.

United States Department of Agriculture, Rural Utilities Service

RUS Bulletin 1751F-643 (2002) Underground Plant Design

RUS Bulletin 1751F-644 (2002) Underground Plant Construction

RUS Bulletin 1753F-151 (2001) Construction of Underground Plant, Parts II & III

ANSI TIA/EIA 606-A (2002) Administration Standard for The Telecommunications Infrastructure

ANSI TIA/EIA 607-A (2002) Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications

ANSI TIA/EIA 569-B (2004) Commercial Building Standard for Telecommunications Pathways and Spaces

ANSI TIA/EIA 758-A (2004) Customer-owned Outside Plant Telecommunications Infrastructure Standard

**9.2 COMMUNICATION SYSTEM**

The communications system for this project is to be RJ45 outlets (for telephone and data), and empty conduits designed, supplied and constructed by the Contractor. Communications wiring is by others. The design and construction of the systems shall be in accordance with the references and the requirements contained herein.

**9.3 EXTERIOR COMMUNICATION SYSTEM**

The Contractor shall design, provide and install the exterior communications infrastructure system. The system shall include but is not limited to communications manholes, hand-holes, and underground ductbank. The Contractor shall coordinate the communication system with the power distribution system to distribute communications to the compound’s facilities as required. The distribution system shall be an underground system. Communications manholes and handholes shall not be shared with other utilities. Manholes and handholes shall be either cast-in-place or precast concrete. Manholes minimal interior dimensions shall be 3.66m L x 1.83m W x 2.13m H. Hand-holes minimal interior dimensions shall be 1.22m L x 1.22m W x 1.22m H. The minimum concrete thickness shall be 127mm for walls, 152mm for roof, and 127mm for the floor. The quality of the concrete pour and the construction of the manhole and hand-hole shall be such that the rebar or visible rock shall not be seen in the surface of a wall. In other words, the pour shall not have any voids. The maximum distance between manholes and/or hand-holes shall be 170 m. Place a manhole or hand-hole at all 90 degree turns. The ducts shall be direct buried with a minimum of 600 mm of properly tamped dirt/backfill on the top. Hand-holes shall be installed in laterals in between manholes and buildings and only where the distance between the main duct system and the building is 100 meters or more. The maximum number of ducts in a hand-hole wall shall be two, with one having four (4) inner ducts installed unless there are two buildings close by and can be fed from one hand-hole. In this case, four (two with inner ducts) conduits can be installed in the walls. Manholes and hand-holes shall be installed on a leveled, crushed, washed gravel base of sufficient depth, i.e., a minimum thickness of 150 mm under the entire manhole, to allow for drainage and stability. Where manholes and hand-holes are installed in roadways or areas subject to vehicular traffic, the structure and lid (cover) shall support heavy vehicular traffic. Manholes and hand-holes shall be equipped with corrosion-resistant pulling irons and cable racks that are grounded and with a sump for drainage. Cable racking diagrams (manhole/hand-hole butterflies) shall be provided for the manholes and hand-holes. See accessories chart below for additional requirements.

Manhole and Hand-hole	HANDHOLE	MANHOLE
Accessories	1.22m X 1.22m X 1.22m	3.66m X 1.83m X 2.13m

Bonding Ribbon 16mm	20	65
Bonding Ribbon Clamps	12	20
Cable Rack 762mm	4	
Cable Rack 47 Hole		14
Corner Cable Rack Support		8
Cable Rack Hook 191mm	8	14 minimum
Cable Rack Standoff Bracket	9	12
Concrete Collar 152mm	1	1
Cover (Lid) 762 Diameter	1	1
Frame Support Structure for Lid	1	1
Ground Rod 19mm X 3m	1	1
Ground Rod Clamp 19mm	1	1
Metal Hit Anchor	10	20
Pull-In Irons	4	4
Sump	1	1

#### 9.4 EXTERIOR CONDUIT

The underground conduit for the manhole and duct system shall be direct buried (600 mm below surface), 100 mm DB type PVC or schedule 80, PVC. Inner ducts shall be four (4) 25 mm PVC or PE inner ducts field installed in the outer-duct. The inner ducts shall be installed in the duct face and secured with properly sized duct plugs which expand to seal the duct. The ducts shall be stubbed up, sealed, capped and tagged in the communications equipment room, and shall be sealed, capped, tagged and marked at the other end. Empty ducts shall be sealed with a mechanical, screw-type, reusable duct plug. The ducts will be concrete encased when install under roadways or areas subject to vehicular traffic. The ducts (inner and outer) shall be listed on the RUS list of materials acceptable for use on RUS projects. The minimum duct configuration in the main duct system (manhole to manhole) shall be a four (4) way ductbank, two conduits wide by two conduits deep (2 X 2) with one of the conduits having inner-ducts installed. Laterals off of the main duct system (manhole/hand hole to building) shall be a 2 way (1x2) with one duct having inner ducts. All conduits shall be terminated in ABS plastic terminators cast into the walls of the concrete structures. In manholes, all conduit windows shall be recessed. Pull wire/rope must be provided in all conduits. Conduits shall enter the manholes and hand-holes in the lower portion of the knockout window to simplify future conduit additions.

#### 9.5 TELEPHONE/DATA CABLING DISTRIBUTION SYSTEM FOR EACH BUILDING

The Contractor shall design, provide and install the building communications infrastructure system. The system shall include but is not limited to communications equipment racks, conduit, pull boxes, communications outlet boxes, and communications grounding/bonding infrastructure. Provide communications outlet boxes at all workstation locations in the open office, private office and receptionist areas. Outlet boxes shall be a single gang box (51 mm x 102 mm x 57 mm) or double gang box (119 mm x 119 mm x 57 mm boxes). The Contractor may use an equivalent sized outlet box. Conduit shall be installed from each outlet box location to the communications equipment rack location. Label the conduit on both ends with room number and outlet box number. Equipment racks shall be standard 475mm wide steel telecommunications racks. Provide all empty conduits with a pull rope. Properly sized metallic conduit and cable tray shall be used as appropriate to distribute the telephone/data cabling throughout the building. Minimum conduit size shall be 20 mm inside diameter. Pull boxes shall be placed in conduit runs where a continuous conduit length exceeds 30 meters or where there are more than two 90-degree bends. Pull boxes

shall be placed in straight runs of conduit and shall not be used in lieu of a bend. Equipment racks shall have a minimum 900 mm of space both in front of and behind the rack and behind any installed equipment. A minimum side clearance of 600 mm shall be provided on end racks.

## **9.6 TELECOMMUNICATION GROUNDING AND BONDING**

The Contractor shall provide a grounding and bonding system in accordance with ANSI TIA/EIA 607-A. The grounding system shall include but is not limited to a Telecommunications Main Grounding Busbar (TMGB), Telecommunications Grounding Busbars (TGB) where applicable, Telecommunications Bonding Backbone (TBB), Grounding Equalizer (GE), and Bonding Conductors.

## **9.7 LOUDSPEAKER AND ALARM SYSTEM**

Install Loud Speaker & Alarm System that can alert the entire compound via panic button from any tower or guard post station using either an aluminum or steel post. Loud Speaker & Alarm System shall include, but is not limited to central control stations, high power speaker arrays (HPSA), communication links, and ancillary equipment. Central control stations shall operate and control the system. Loud Speaker & Alarm System shall be capable of providing intelligible live and pre-recorded voice signals. The system shall include tones for conventional attack warning, non-conventional attack warning, all clear, and a system test tone. Speaker & Alarm System shall be exterior grade components to withstand severe weather conditions of cold, heat, rain, sleet, and dust storms and to be completely understandable during these conditions from any point within the compound. All wires shall be installed in conduits.

### **9.7.1 CENTRAL CONTROL STATIONS**

Loud Speaker & Alarm System shall be provided with at least one primary and one redundant central control station. The locations of the central control stations shall be coordinated with the Contracting Officer's Representative. The primary central control station should be located at the command post or similar location. The redundant central control center should be located at a physically separate location such as a security forces building, military police station, fire station, or emergency services office. The central control stations shall control the operation of outdoor speakers. Each central control station shall be equipped with batteries to supply power for a minimum of 4 hours of full-load operation. Control stations shall be capable to provide automatic status reporting for each HPSA and for all activations and the status of the activations. The controls shall provide an alarm summary report that provides a historical report for all changes of status, including all troubles, equipment failure, power system trouble (including normal and emergency power), unsolicited messages, tamper/supervision of the enclosure for the HPSA electronics, amplifier status, last activation and synchronization error, operator log on and log off, and configurable reports for time-based events such as "report all troubles from 1/01/04 to 6/30/04." Control stations shall feature multiple levels of password protection, including levels for system operators, maintainers, supervisors, and military commanders. The control stations shall be capable to deliver at least two essentially concurrent voice messages: one for threatened areas or buildings and one for adjacent areas or buildings. This includes the capability for two pre-recorded voice messages, or one live and one pre-recorded voice message. The control station shall have the capability to target specific messages to any individual HPSA, zone of HPSAs, or to all areas on the installation

### **9.7.2 HIGH POWER SPEAKER ARRAYS (HPSA)**

HPSAs shall be arranged into zones so that each zone can be individually controlled by the control station. HPSAs shall be designed with directional characteristics that will minimize the distortion of voice signals by interface from other zones. HPSAs shall be designed to maintain the intelligibility of voice signals within the zone at a level no less than 0.8 on the Common Intelligibility Scale (CIS) or 0.7 on the Speech Transmission Index (STI) during normal weather conditions in special outdoor areas such as those with a high concentration of multi-story buildings in close proximity. Parade grounds, training fields, and similar outdoor areas should also be provided with this higher intelligibility. Intelligibility may be less than 0.8 CIS in areas of the zone if personnel can determine that a voice signal is being broadcast and could walk less than 25 m to find a location in the zone with a CIS score of at least 0.8. It is necessary to control the occupational noise exposure to personnel from the HPSA. Sound levels at any location where personnel may be located, including directly underneath the HPSA, shall not exceed 120 decibels (adjusted) (dBA) when measured on the A-scale of a standard sound level meter at slow response. Do not exceed 85 dBA at the location of the individual HPSA equipment cabinet for those HPSAs designated to be furnished with a local

microphone. Each HPSA site for each zone shall include a field-mounted local control unit, microprocessor, amplifier, standby batteries, charger, power supply, radio, mounting brackets and loudspeaker assembly for pole or building mounting. Designated HPSA sites shall be capable of microphone input and shall be provided with a microphone designed to prevent feedback at that particular microphone location. All external conductors (conductors passing outside of the HPSA equipment cabinet) shall be provided with surge suppression tested to Underwriters Laboratories, Inc. (UL) standards. The HPSA control units shall feature a digitally addressable controller. The HPSA control units shall receive and store messages via the primary (and redundant, if required) communication link with a confirmation signal sent back to the primary and redundant central control stations. Provide a charger/ power supply that will accept alternating current (AC) input, backup electrical power generator input, battery input, or solar power cell input. The HPSA control units shall have the capability of storing pre-recorded messages. The HPSA control units shall provide a minimum of 7 standard tones. In addition, the systems shall have the capability to provide custom tones. Provide a tamper switch that will signal the central control station that the HPSA enclosure door is open. All equipment for each HPSA speaker site shall be housed in modular, mountable cabinets suitable for the local environmental conditions, including space heaters and ventilation fans, as appropriate. Speakers shall be able to operate between temperatures of -40 degrees Celsius (C) (-40 degrees Fahrenheit (F)) to +60 degrees C (+140 degrees F). Enclosures shall protect the HPSA control unit from external temperatures ranging from -40 degrees C (-40 degrees F) to +60 degrees C (+140 degrees F). The height shall not be less than 9 m (30 ft) or greater than 18 m (60 ft) above ground level. Poles shall be spun aluminum or galvanized steel poles. HPSA equipment cabinets shall be mounted on the elevated supporting structure with the top of the enclosure no more than 3 m (10 ft) above ground level. The equipment cabinet and power boxes must be capable of being locked shut.

### **9.7.3 COMMUNICATIONS LINKS**

Primary communications shall use radio frequency-type systems that comply with National Telecommunications and Information Administration (NTIA) requirements. The systems shall be designed to minimize the potential for interference, jamming, eavesdropping, and spoofing. Confirm that the devices conform to regulations and obtain the approval from the authority having jurisdiction prior to using radio frequency-type devices. Redundant communication means (when required) should be established using several alternate wireless radio frequency paths to the radios. The redundant communication means might be accomplished by using the communications backbone network (e.g., optical fiber cable). In this case, the central control units should accomplish this by being directly connected to the backbone network. Communications equipment furnished as part of the wide area MNS shall be commercial off-the-shelf (COTS). All programming codes or passwords required to access, update, modify, and maintain the communications equipment shall be provided no later than the date of final system acceptance. Full system supervision shall be provided. Notification of system alarm, supervisory, and trouble signals shall be provided to the central control stations within a time period not to exceed 200 seconds. The communications systems shall provide self-test and diagnostics capabilities. Local diagnostics information shall be transmitted to the central control stations.

**-END OF SECTION-**

## SECTION 01040

### SECURITY

#### 1.0 SPECIFIC CONTRACT SECURITY ASSESSMENT

The Contractor will construct the Project in an active war zone where International Security Assistance Forces (ISAF) may conduct offensive and defensive operations against a variety of hostile forces, to include members of the Taliban. The Contractor understands that it may not receive any support whatsoever in securing the Project site and in securing the transportation of materials to the Project site. Neither U.S. Government nor other ISAF forces are available to provide exclusive security for the Project. The Contractor is responsible for securing the Project site and in securing the transportation of materials to the Project site. The Contracting Officer possesses no ability to control the operations of either ISAF or hostile forces. The Government, acting in its sovereign capacity in its prosecution of its operations, may take actions which directly or indirectly affect the Contractor. These kinds of acts are general in application, not specifically directed at the Contractor. The Contractor recognizes that such actions may be taken, and that they will not entitle the Contractor to make claims for excusable or compensable delays. The Contractor possesses sufficient information about the specific security situation at the site to enable it to formulate an appropriate security plan. The Contractor understands that the security situation at the Project is subject to significant transformation in a short time span based on the changing operational picture in the region. The Contractor's security plan will take this factor into account.

At Afghanistan National Police Program project sites, it is anticipated the contractor's Life Support Areas (LSA) will be situated within the area defined by the License for Construction (LfC). It is the contractor's sole responsibility to ensure that the location of the LSA is acceptable to ANP. The Government shall not be responsible for the cost of moving LSA, unless the move is directed by the Contracting Officer in writing.

#### 2.0 GOVERNMENT PREREQUISITES TO CONTRACTOR DEPLOYMENT OF SITE SECURITY PERSONNEL

The following regulations and policies apply to Contractor-Provided Site Security Personnel:

- a. DODI 3020.41; **Contractor Personnel Authorized to Accompany the U.S. Armed Forces**; 3 OCT 2005 (available at [www.dtic.mil/whs/directives/corres/pdf/302041p.pdf](http://www.dtic.mil/whs/directives/corres/pdf/302041p.pdf)).
- b. DODI 3020.50; **Private Security Contractors (PSCs) Operating in Contingency Operations**; 22 JUL 2009 (available at [www.dtic.mil/whs/directives/corres/pdf/302050p.pdf](http://www.dtic.mil/whs/directives/corres/pdf/302050p.pdf)).
- c. USCENTCOM Contracting Command, **Acquisition Instruction**; 5 NOV 2010 (available at <http://c3-training.net/policy.html>).
- d. DFARS Subpart 225.74, Defense Contractors Outside the United States.

The Contractor understands its responsibilities under these regulations, policies, and standard contract clauses, as well as its responsibilities under Afghan law, with regard to its contracts for and employment of security personnel. The Contractor is not authorized to deploy any site security personnel until it complies with all prerequisites identified in these references. The Contractor acknowledges that its repeated failure to comply with these regulations, policies, and standard contract clauses constitute grounds for the Government to terminate the Contractor for default.

#### 3.0 GOVERNMENT REPRESENTATIVES

During the Project, USACE may disseminate essential security information to the Contractor and will attempt to assist with any Contractor's questions and concerns. The USACE Area Office OIC/NCOIC will serve as the Area Office Security Officer and the Resident Office OIC/NCOIC will serve as the Resident Office Security Officer (collectively "the Security Officers").

#### **4.0 SECURITY COORDINATION**

Contractor will be required to coordinate construction site security with any Afghan or Coalition Forces and Local Governments that are available, if any, to assist the Contractor on a case-by-case basis. Coordination does **not** include nor imply making any unauthorized or illegal payments to the local ANA/ANP or Local/Provincial Government Officials for permission or protection to construct the project. The Contractor will immediately inform the Government if asked to make any such payments, and the Government will provide further direction to the Contractor. Corruption will not be tolerated at any level, under any circumstances. Conducting business in this manner will be grounds for termination of the contract.

#### **5.0 SECURITY PLAN**

The Security Officers will review and approve all current and future Contractor security plans prior to submittal approval by the authorized representative of the Contracting Officer. The Security Officers shall ensure that all Contractor security plans are in accordance with the Contract requirements. The security plans shall address movement of Contractor labor, material, and equipment. The Security Officers will lead the quality assurance program to ensure Contractors are executing their approved security plans. The Government will not allow the Contractor to start work on the Project site without an approved security plan.

#### **5.1 SECURITY RATING**

Each contract or task order will be assigned a rating by the Area Office Security Officer. This rating will determine the level of approval for the security plan. Assistance from the District's J2/J3 may be required to assess the rating. Ratings and approval levels are below:

- a. Extremely High Risk: District Commander
- b. High Risk: Deputy CDR, Chief of E&C, Area OIC, J2 OIC, or J3 OIC
- c. Moderate Risk: Chief of Construction, Area OIC/NCOIC, or Area Engineer
- d. Low Risk: Resident OIC/NCOIC, Resident Engineer

The rating assigned is in no way an indication that the security situation at the site will remain at a constant level throughout the Project.

#### **5.2 SITE SECURITY FOR PROJECTS OUTSIDE OF ACTIVE COALITION FORCE BASES**

##### **5.2.1 STATIC REQUIREMENTS FOR SITE SECURITY**

The Contractor shall develop a site security plan and program to provide 24 hr/7 days a week security for the project site throughout the performance of the contract. The security plan must consider all construction-related sites; batch plants, material sources, stockpiles, worker camps and any other location where there is a major construction effort. The Contractor shall perform all required actions to protect the construction site compound from theft and vandalism and personnel from physical harm. Site perimeter security shall prevent unauthorized site access and provide safety protection to the Contractor workforce and government personnel for the duration of the project. These measures are strictly for the protection and defense of the on-site people and property; Contractors are not authorized to conduct any type of offensive operations.

##### **5.2.2 DYNAMIC REQUIREMENTS FOR TRANSPORTATION**

The Contractor shall develop a transportation security plan and program to provide continuous security for all transportation movements for the Project throughout the performance of the contract. The transportation security

plan must consider all construction-related transportation movements, including the transportation of materials, equipment, personnel, and other items and individuals to the site. The Contractor shall perform all required actions to protect the construction transportation movements from theft and vandalism and personnel from physical harm. These measures are strictly for the protection and defense of the people and property being transported; Contractors are not authorized to conduct any type of offensive operations.

### **5.3 ESTIMATED THREAT ASSESSMENT**

For both the site security plan and the transportation security plan, the Contractor shall identify the range of security operations from low to high threat. Included in this security plan will be the capability for a surge of manpower and equipment required during high threat conditions. The Contractor shall to notify all on-site personnel of increased threats and protective action to take.

### **5.4 ADDITIONAL CIVILIAN ARMING REQUIREMENTS**

The Contractor must include in its security plans, and must continue to maintain throughout the Project, current information on the following items for all its armed civilian personnel:

- a. MOI license number,
- b. AISA license,
- c. Armed Contractor & subcontractor company names,
- d. Contract number/title
- e. Contracting agency (USACE-AES)
- f. Type of work
- g. Number/type of weapons authorized,
- h. POC for company with contact details
- i. Government Contracting Officer and COR with contact details
- j. Number of security personnel by type (U.S., Afghan, Other),
- k. Company's country of registration/origin, names,
- l. Photos
- m. Tazkira numbers of security personnel as well as those personnel with access to weapons/ammo and those persons who will be handling or transporting explosives.

In addition the Contractor will immediately update any change to the coordinates of the Contractor's base camps, quarries, and current work locations. The Contractor shall include in both the site security plan and the transportation security plan a list of the chain of command.

### **6.0 SECURITY PLAN SUBMITTAL REQUIREMENTS**

Contractors will submit all security plans in accordance with contract Section 01335 – Submittal Procedures for Projects.

### **7.0 COMMUNICATION**

The Contractor will operate a 24/7 security operations center with communication capability to each guard on duty and the ability to notify all on-site personnel of increased threats and protective actions to take. The operations center will also have 24/7 communication with the local Coalition, ANA, or ANP security forces. The Contractor shall have communication with the Resident Office Security Officer at all times for rapid emergency response; the Resident Office Security Officer will give the Contractor the District J2/J3 contact information. Communication can be via cell phone, email, satellite phones, VHF, HF, CODAN, text, or other communication technologies compatible with the Government's capabilities. The Contractor will provide the Government with their contact information (names, numbers, frequencies, email addresses, transponder IDs, etc.) for the site encompassing all available communication means.

### **8.0 CONTRACTOR PROVIDED EQUIPMENT**

The Contractor will provide the operational security equipment including but not limited to weapons, radios, uniforms, vehicles, vehicle fuel, phones, and other equipment as proposed by the Contractor to provide complete site and transportation security.

## **9.0 KEY CONTROL**

The Contractor shall establish and implement methods in writing to ensure that all keys issued by the Contractor are not lost or misplaced and are not used by unauthorized persons. The Contractor shall develop procedures covering key control that will be included in their quality control system (See Section 01451). The project managers will keep a master log of all keys and provide a copy to the contracting officer's representative (COR) for verification. If a key is lost or stolen, the Contractor shall pay to have all impacted locks changed/rekeyed immediately.

## **10.0 CRITICAL INFORMATION TO REPORT**

The Government is responsible for the management and oversight of DOD Contracted AC/PSCs delivering services throughout Afghanistan. Given the impact of either Contractor misbehavior or catastrophic attacks against Contractors, it is critical that information regarding AC/PSC incidents is communicated quickly and accurately to the Government for purposes of management, fact-finding, and mitigation where necessary. The Government must receive the information addressed below. The Contractor will report any of these information requirements immediately to the Resident Office Security Officer:

- a. AC/PSC Escalation of Force to include the use of weapons resulting in the death or injury of an Afghan citizen, coalition, or U.S. service member, other government official, or Contractor
- b. AC/PSC accidents, traffic, or otherwise, resulting in the death or injury of an Afghan citizen, coalition, or U.S. service member, governmental official, or Contractor.
- c. Attacks against AC/PSC activities by Anti-Afghan Forces resulting in the death or injury of an Afghan citizen, coalition or US service member, governmental official, or Contractor.
- d. Reports of "lost convoys." These are AC/PSC escort or independent activities which have lost contact with their companies.
- e. AC/PSC Escalation of Force, accidents, or other activities that result in significant damage to Afghan or USG vehicles, materials or facilities.
- f. Anti-Afghan Force actions including small arms fires (SAF), RPG fire, indirect fire (IDF), improvised explosive devices (IEDs), and/or complex attacks against AC/PSC activities.
- g. Contractor accidental or negligent discharge of a weapon.

## **11.0 CONTRACTOR LIFE SUPPORT AREA (LSA)**

At Afghanistan National Police Program project sites, it is anticipated the contractor's Life Support Areas (LSA) will be situated within the area defined by the License for Construction (LfC). It is the contractor's sole responsibility to ensure that the location of the LSA is acceptable to ANP. The Government shall not be responsible for the cost of moving LSA, unless the move is directed by the Contracting Officer in writing.

**--END OF SECTION--**

**SECTION 01060  
SPECIAL CLAUSES**

**1. GENERAL**

**1.1 PRECONSTRUCTION CONFERENCE**

**1.1.1 SCHEDULE OF MEETING**

At the earliest practicable time, prior to commencement of the work, the Contractor and any Subcontractors whose presence is necessary or requested, shall meet in conference with representatives of the Contracting Officer to discuss and develop a mutual understanding relative to the details of the administration and execution of this contract. This will include but not necessarily be limited to the Contractor's Quality Control (CQC) Program, the Contractors Accident Prevention Program, submittals, correspondence, schedule, access to the work site, security requirements, interface requirements, temporary facilities and services, hazards and risks, working after normal hours or on weekends or holidays, assignment of inspectors, representations, special requirements, phasing, and other aspects of this project that warrant clarification and understanding.

**1.1.2 MEETING MINUTES**

It shall be the responsibility of the Contractors CQC System Manager to prepare detailed minutes of this meeting and submit those minutes to the Contracting Officer for approval within three (3) workdays. Any corrections deemed necessary by the Contracting Officer shall be incorporated and resubmitted within two (2) calendar days after receipt. Upon approval of the minutes by the Contracting Officer, the Contractor shall distribute the minutes to all parties present or concerned.

**1.2 PROJECT MANAGEMENT & SUPERVISION**

Provide at least one (1) qualified Project Manager and one (1) on-site Project Superintendent. Both shall comply with the English speaking requirements. The Project Manager must have a minimum 5 years experience as a Project Manager or Superintendent on projects like this contract or similar in size and complexity. The Project Superintendent must have a minimum of 5 years experience as a Superintendent on projects similar in size and complexity.

The Project Manager in this context shall mean the individual with the responsibility for the overall management of the project and the Project Superintendent shall mean the individual with the responsibility for quality and production. Both the Project Manager and Project Superintendent are subject to removal by the Contracting Officer for non-compliance with requirements specified in the contract and for failure to manage the project to insure timely completion. Furthermore, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time for excess costs or damages by the Contractor.

Approval of Project Manager and on-site Project Superintendent is required prior to start of construction. Provide resumes for the proposed Project Manager and on-site Project Superintendent describing their experience with references and qualifications to the Contracting Officer for approval. The Contracting Officer reserves the right to interview the proposed Project Manager and on-site Project Superintendent at any time in order to verify the submitted qualifications.

**1.3 AREA USE PLAN**

The Contractor shall submit to the Contracting Officer, within ten (10) calendar days after award of this contract, an Area Use Plan designating intended use of all areas within the project boundaries. This plan shall include, but not necessarily be limited to the following: the proposed location and dimensions of any area to be fenced and used by the Contractor; construction plant and building installations/the number of trailers and facilities to be used; avenues of ingress/egress to the fenced areas and details of the fence installation; drawings showing temporary electrical installations; temporary water and sewage disposal installations; material storage areas; hazardous storage areas.

Any areas that may have to be graveled shall also be identified. The plan shall also include a narrative description of the building structural system, the site utility system and the office or administration facilities. The Contractor shall also indicate if the use of a supplemental or other staging area is desired. The Contractor shall not begin construction of the mobilization facilities prior to approval by the Contracting Officer of the Area Use Plan described herein.

#### **1.4 CONTRACTOR'S MOBILIZATION AREA**

The Contractor will be permitted to use an area approved by the Contracting Officer within the contract limits for operation of his construction equipment and plants, shops, warehouses, and offices. Utilities will be provided for the Contractor as described below. The Contractor is responsible for obtaining any required additional mobilization area above that designated. The construction site shall be cleared of construction debris and other materials and the area restored to its final grade.

##### **1.4.1 CONTRACTOR'S TEMPORARY FACILITIES**

###### **1.4.1.1 GENERAL**

All facilities within the Contractor's mobilization area shall be of substantial construction suitable for the local weather conditions. Sanitary facilities shall meet the requirements of Corps of Engineers, Safety and Health Requirements Manual EM 385-1-1. Local nationals will not be granted any privileges under this contract. Government provided services are for American and Foreign national contractors only.

###### **1.4.1.2 ADMINISTRATIVE FIELD OFFICES**

The Contractor may provide and maintain administrative field office facilities within the mobilization area at the designated site. Government office and warehouse facilities will not be available to the Contractor's personnel.

###### **1.4.1.3 STORAGE AREA**

The Contractor shall construct a temporary 1.8 meter (6 foot) high chain link fence around trailers and materials. The fence shall include plastic strip inserts, colored green or brown, so that visibility through the fence is obstructed. Fence posts may be driven, in lieu of concrete bases, where soil conditions permit. Trailers, materials, or equipment shall not be placed or stored outside the fenced area unless approved in writing by the Contracting Officer.

###### **1.4.1.4 PLANT COMMUNICATION**

Whenever the Contractor has the individual elements of its plant so located that operation by normal voice between these elements is not satisfactory, the Contractor shall install a satisfactory means of communication, such as telephone or other suitable devices. If radio communication is approved by Contracting Officer / installation security office, frequency selection shall be approved by Contracting Officer to prevent interference with installation operations. Such devices shall be provided by the Contractor and made available for use by Government personnel as requested.

###### **1.4.1.5 APPEARANCE OF MOBILIZATION SITE FACILITIES AND/OR TRAILERS**

Mobilization Site Facilities and/or Trailers utilized by the Contractor for administrative or material storage purposes shall present a clean and neat exterior appearance and shall be in a state of good repair. Trailers or other transportable structures which, in the opinion of the Contracting Officer, require exterior painting or maintenance will not be allowed on the construction site until such work or maintenance has been performed to the satisfaction of the Contracting Officer.

###### **1.4.1.6 MAINTENANCE OF STORAGE AREA**

Fencing shall be kept in a state of good repair and proper alignment. Should the Contractor elect to traverse unpaved areas which are not established roadways with construction equipment or other vehicles, such areas shall be covered

with a layer of gravel as necessary to prevent rutting and the tracking of soil onto paved or established roadways; gravel gradation shall be at the Contractor's discretion.

#### **1.4.1.7 SECURITY PROVISIONS**

Adequate outside security lighting shall be provided at the Contractor's temporary facilities. The Contractor shall be responsible for the security of its own facilities and equipment in accordance with Contract Section 01040.

#### **1.4.1.8 SANITATION**

- a. Sanitary Facilities: The Contractor shall be responsible for maintaining such facilities at no expense to the Government.
- b. Trash Disposal: The Contractor shall be responsible for collection and disposal of trash from the work areas and from the mobilization area. General construction debris and demolition debris shall be collected and transported by the Contractor to a location designated by the Government. Construction debris, waste materials, packaging material and the like shall be removed from the work site daily. Loose debris capable of being windblown, shall be immediately placed in sealed or covered containers to prevent it from being blown onto taxiways or runways. Any dirt or soil that is tracked onto paved or surfaced roadways shall be cleaned daily. Materials resulting from demolition activities that are salvageable shall be stored within the fenced area described above. Stored material not indoors, whether new or salvaged, shall be neatly stacked when stored.

#### **1.4.1.9 TELEPHONE**

The Contractor shall make arrangements to install and pay all costs for telephone facilities desired.

#### **1.4.1.10 RESTORATION OF STORAGE AREA**

Upon completion of the project and after removal of mobilization facilities, trailers, materials, and equipment from within the fenced area, the fence shall be removed and will become the property of the Contractor. Areas used by the Contractor for the storage of equipment or material, or other use, shall be restored to the original or better condition. Gravel used to traverse unpaved areas shall be removed and all such areas restored to their original conditions.

#### **1.4.2 PROTECTION AND MAINTENANCE OF TRAFFIC**

During construction the Contractor shall provide access and temporary relocated roads as necessary to maintain traffic. The Contractor shall maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Contracting Officer. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment and the work, and the erection and maintenance of adequate warning, danger, and direction signs, shall be as required by the Host Nation and base authorities having jurisdiction. The traveling public shall be protected from damage to person and property. The Contractor's traffic on roads selected for hauling material to and from the site shall interfere as little as possible with base traffic. The Contractor shall investigate the adequacy of existing roads and the allowable load limit on these roads. The Contractor shall be responsible for the repair of any damage to roads caused by construction operations.

##### **1.4.2.1 USE OF EXISTING ROADS AS HAUL ROUTES**

The Contractor shall be responsible for coordinating with the base authorities for use of any existing roads as haul routes. Construction, and routing of new haul roads, and/or upgrading of existing roads to carry anticipated construction traffic shall be coordinated with the Base authorities and is the sole responsibility of the Contractor.

##### **1.4.2.2 EMPLOYEE PARKING**

The Contractor's employees may be allowed parking on the military installation. The Contractor is responsible for transporting workers (local nationals) from off post to the worksite, coordinating security identification screening,

and cooperating in gate searches with the base authorities. The government reserves the right to terminate any and all contractor parking at any time.

#### **1.4.3 TEMPORARY PROJECT SAFETY FENCING AND BARRICADES**

The Contractor shall impose all measures necessary to limit public access to hazardous areas and to ensure the restriction of workers to the immediate area of the construction and mobilization site. The Contracting Officer may require in writing that the Contractor remove from the work any employee found to be in violation of this requirement.

##### **1.4.3.1 BARRICADES**

Barricades shall be required whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Barricades shall be securely placed, clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night. Travel to and from the project site shall be restricted to a route approved by the Contracting Officer.

#### **1.4.4 HOST NATION AUTHORIZATIONS, PERMITS AND LICENSES**

It shall be the Contractor's responsibility to obtain such local authorizations, permits and licenses necessary to establish his quarry operations, batching operations and haul routes (See Special Clause entitled: COMPLIANCE WITH HOST COUNTRY RULES AND CUSTOMS).

#### **1.5 RESPONSIBILITY FOR PHYSICAL SECURITY**

Prior to mobilization, the Contractor shall submit his proposed means of providing project security to meet the requirements of Contract Section 01040 and prevent unauthorized access to equipment, facilities, materials and documents, and to safeguard them against sabotage, damage, and theft. The Contractor shall be responsible for physical security of all materials, supplies, and equipment of every description, including property which may be Government-furnished or owned, for all areas occupied jointly by the Contractor and the Government, as well as for all work performed.

#### **1.6 DUST CONTROL**

The Contractor shall be required to control objectionable dust in the work areas, access roadways, and haul roads by means of controlled vehicle speeds or dust palliatives. Vehicles transporting sand, cement, gravel or other materials creating a dust problem shall be covered, as directed by the Contracting Officer, or in accordance with local Laws, codes, and regulations.

#### **1.7 DIGGING PERMITS**

##### **1.7.1 REQUIREMENTS FOR DIGGING PERMITS**

Prior to the start of any work activity that requires excavation within the current base; the Contractor shall obtain a digging permit.

##### **1.7.2 REQUESTS FOR DIGGING PERMITS**

Requests for Digging Permits shall be submitted to Contracting Officer a minimum of seven (7) days prior to the start of the work activity covered by the permit. The request for a Digging Permit shall include a narrative description of the work to be performed and a detailed map of the area of the excavation clearly marking the location of all known utilities or other obstructions. If the work activity covered by the Digging Permit request also requires a utility outage, a separate request for the outage shall be submitted in accordance with the paragraph entitled CONNECTIONS TO EXISTING UTILITIES.

### **1.7.3 PREPARATION OF REQUESTS FOR DIGGING PERMITS**

Prior to submitting a request for a Digging Permit, the Contractor shall carefully review the area to be excavated to determine the location of existing utilities and other obstructions. The Contractor will review available drawings and will conduct a visual inspection of the site. The Contractor will utilize underground utility detecting devices such as metal and cable detectors to determine the location of existing utilities. All utility lines found shall be clearly flagged or marked and the location of the utility shall be shown on the drawing to be submitted with the request for Digging Permit.

### **1.7.4 EXISTING UNDERGROUND UTILITIES**

The Contractor shall exercise utmost care in researching locations of existing utilities and reducing damage to existing utilities. Any utilities damaged by the Contractor shall be promptly repaired by the Contractor. The Contracting Officer will review and approve any proposed repairs. Any damage to existing utilities will be immediately reported to the Contracting Officer and the Base Commander.

## **1.8 CONNECTIONS TO EXISTING UTILITIES**

### **1.8.1 GENERAL**

Any outage involving disruption of electrical service beyond the site area shall be requested in writing at least ten (10) days in advance of the date requested for the commencement of the outage. The Contractor shall provide a request, detailing the type of outage needed (water, sewer, electrical, steam, etc.), the time needed to perform the work, the reason for the outage, and the known affected facilities. The Contracting Officer shall be contacted prior to the outage to confirm the time and date. If the Contractor fails to initiate work at the approved time, the Contracting Officer may cancel the approved outage and may direct the Contractor to resubmit a new request. No part of the time lost due to the Contractor's failure to properly schedule an outage shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

### **1.8.2 EXISTING UNDERGROUND UTILITIES**

The Contractor is provided notice that existing utilities may be present in the construction area. The Contractor shall exercise the utmost care in researching locations of existing utility lines by implementing control measures to eliminate, or reduce to a level acceptable to the Contracting Officer, the chance of damaging or destroying existing utilities.

### **1.8.3 USE OF UNDERGROUND UTILITY DETECTING DEVICE**

Prior to any excavation, a metal and/or cable-detecting device shall be used along the route of the excavation. All underground utilities discovered by this method will be flagged a minimum distance of one-half (1/2) meter on each side of the location.

### **1.8.4 HAND EXCAVATION**

Hand excavation methods and special supervisory care shall be used between any flagged markers, in areas of known or suspected hazards, and in areas known or suspected to have multiple and/or concentrated utility lines or connections.

### **1.8.5 REPAIR OF DAMAGED UTILITIES**

The Contractor shall be responsible to repair any utilities damaged by him. The method of repair and schedule for performance of the repair shall be coordinated with, and subject to the approval of, the Contracting Officer. The repair work and any temporary work required to keep the system operational while repairs are being completed, shall be performed at no cost to the Government.

## **1.9 TEMPORARY OUTAGES OF EXISTING SERVICES**

To minimize outage impact to the mission of the installation, all outages shall be scheduled on weekends or from 2100 – 0530 hours on duty days and/or as directed by Contracting Officer Representative (COR). The period proposed for performance of the outage shall include sufficient contingencies to preclude impact to the peak working hours 0530 – 1800 hours during the workweek.

## **1.10 WATER**

The Contractor shall install and maintain necessary supply connections and piping for same, but only at such locations and in such manner as may be approved by the Contracting Officer. Water required for final testing, adjusting and balancing of HVAC systems will be furnished by the Government. Before final acceptance of systems, or facilities, all temporary connections and piping installed by the Contractor shall be removed at his expense in a manner satisfactory to the Contracting Officer.

## **1.11 ELECTRICITY (CONTRACTOR PROVIDED)**

Electrical service is not available for use under this contract; therefore all electric current required by the Contractor shall be the responsibility of the Contractor, furnished at his own expense. The Contractor shall provide diesel generators to meet his demand requirements. Electricity required for final testing systems will be furnished by the Government. [The Government will provide permanent high voltage electricity to a point indicated by the Contracting Officer for use by the Contractor in the performance of final testing of systems.] The means of doing so, such as by temporary distribution systems, shall be the responsibility of the Contractor. All temporary connections for electricity shall be subject to the approval of the Contracting Officer and shall comply with Corps of Engineers manual EM 385-1-1 entitled Safety and Health Requirements Manual. All temporary lines shall be furnished, installed, connected and maintained by the Contractor in a workmanlike manner satisfactory to the Contracting Officer. Before final acceptance of systems, or facilities, all temporary connections installed by the Contractor shall be removed at his expense in a manner satisfactory to the Contracting Officer.

## **1.12 WORK OUTSIDE REGULAR HOURS**

If the Contractor desires to carry on work outside regular duty hours, or on holidays, including the following U.S. holidays: New Year's Day, Memorial Day, Independence Day, Thanksgiving and Christmas. The Contractor shall submit an application to the Contracting Officer. Due to reliance upon local national laborers and time off due to local observances, there may be disruptions. Potentials dates are the following local observances: National Islamic Holiday of Ashura, Ramadan (actual date varies – check with local authorities). The Contractor shall allow ample time to enable satisfactory arrangements to be made by the Government for inspecting the work in progress. At night, exterior lighting shall be provided in conformance with EM-385-1-1 entitled "Safety and Health Requirements Manual".

### **1.12.1 EXTERIOR NIGHT LIGHTING**

Exterior night lighting shall be provided in conformance with EM-385-1-1 entitled Safety and Health Requirements Manual.

## **1.13 SCHEDULING OF WORK IN EXISTING FACILITIES**

As soon as practicable, but in any event not later than thirty (30) calendar days after award of this contract, the Contractor shall meet in conference with the Contracting Officer, or his duly authorized representatives, to discuss and develop mutual understanding relative to the scheduling of work in and access to the existing facilities where work has to be performed under this contract, so that the Contractor's proposed construction schedule is coordinated with the operating and security requirements of the installation.

## **1.14 CERTIFICATES OF COMPLIANCE**

Any certificates required for demonstrating proof of compliance of materials with specification requirements shall be executed in accordance with Section 01335 SUBMITTAL PROCEDURES FOR DESIGN/BUILD. Each certificate shall be signed by an official authorized to certify in behalf of the manufacturing company involved and shall contain the name and address of the Contractor, the project name and location, description and the quantity of the items involved, and date or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certification shall not be construed as relieving the Contractor from furnishing satisfactory material.

## **1.15 ACCIDENT PREVENTION**

The Contractor shall comply with all applicable Host Country laws and with such additional measures as the Contracting Officer may find necessary in accordance with CONTRACT CLAUSE 52.236-13 entitled ACCIDENT PREVENTION (NOV1991)-ALTERNATE 1 (APR 1984). Applicable provisions of the Corps of Engineers manual entitled Safety and Health Requirements Manual EM 385-1-1 will be applied to all work under this contract. The referenced manual may be obtained from the Contracting Officer at the jobsite or from the Afghanistan Engineer District at Kabul, Afghanistan.

### **1.15.1 ACCIDENT PREVENTION PROGRAM**

Within fifteen (15) days after award of this contract, and at least ten (10) days prior to the accident prevention pre-work conference, four (4) copies of the Accident Prevention Plan required by the CONTRACT CLAUSE 52.236-13 entitled ACCIDENT PREVENTION (NOV 1991)- ALTERNATE I shall be submitted for review by the Contracting Officer. The Contractor shall not commence physical work at the site until the Accident Prevention Plan (APP) has been reviewed and accepted by the Contracting Officer. The APP shall meet the requirements listed in Appendix "A" of EM385-1-1. The program shall include the following: TAC Form 61 "Accident Prevention Program Hazard Analysis (Activity Hazard Analysis)" fully completed and signed by an executive officer of the company in block No. 13. The Activity Hazard Analysis is a method in which those hazards likely to cause a serious injury or fatality are analyzed for each phase of operations. Corrective action is planned in advance, which will eliminate the hazards. An analysis is required for each new phase of work. On large or complex jobs the first phase may be presented in detail with the submittal of the Accident Prevention Plan rather than presenting the complete analysis. If the plan is to be presented in phases, a proposed outline for future phases must be submitted as a part of the initial Accident Prevention Plan submittal. Accident Prevention Plans will be reviewed for timeliness and adequacy at least monthly with a signature sheet signed and dated documenting that these reviews took place. Copy of company policy statement of Accident Prevention and any other guidance as required by EM 385-1-1, Appendix A.

### **1.15.2 GROUND FAULT CIRCUIT INTERRUPTER (GFCI) REQUIREMENT – OVERSEAS CONSTRUCTION**

The Corps of Engineers Health and Safety Manual, EM 385-1-1, section 11.D.05.b. states: "The GFCI device shall be calibrated to trip within the threshold values of 5 ma +/- 1 ma as specified in Underwriters Laboratory (UL) Standard 943." A variance from USACE has been granted allowing 10 ma, in lieu of 5 ma, for overseas activities that use 220 Volts (V)/50 hertz (Hz) electrical power.

### **1.15.3 TEMPORARY POWER - ELECTRICAL DISTRIBUTION BOXES**

EM 385-1-1 section 11.A.01.a. states, "All electrical wiring and equipment shall be a type listed by a nationally recognized testing laboratory for the specific application for which it is to be used." This includes temporary electrical distribution boxes. Locally manufactured electrical boxes will not be allowed. Only manufactured electrical distribution boxes that meet the European CE requirements, with 10 ma CE type GFCIs installed shall be allowed.

Contractors shall:

- a. Make no modifications that might void any CE or manufacturer certification.
- b. Test the installed systems to demonstrate that they operate properly and provide the 10 ma earth leakage protection.
- c. Ensure GFCIs will have an integral push-to-test function. The testing shall be performed on a regular basis.
- d. Check that proper grounding is checked regularly and flexible cords, connectors, and sockets inspected before each use.

## **1.16 HAZARDOUS MATERIALS**

Should the Contractor encounter asbestos or other hazardous materials, during the construction period of this contract, he shall immediately stop all work activities in the area where the hazardous material is discovered. The Contractor shall then notify the Contracting Officer; identify the area of danger; and not proceed with work in that area until given approval from the Contracting Officer to continue work activities. Hazardous material is considered to be asbestos, explosive devices, toxic waste, or material hazardous to health and safety. The Contractor shall secure the area from daily traffic until it is safe to resume normal activities.

### **1. SPARE PARTS**

#### **1.16.1 GENERAL**

The requirements of this clause are in addition to any requirements for the provision of specific spare parts to be provided by the Contractor included in Technical Provisions. The Contractor shall furnish spare parts under the provisions of this clause for all equipment for which O&M data is to be provided under Clause OPERATION AND MAINTENANCE (O&M) DATA of this contract. The term "spare parts" as used herein shall include spare parts, special tools and test equipment.

#### **1.16.2 SELECTION OF SPARE PARTS TO BE FURNISHED**

The Contractor shall provide a one (1) year's supply of spare parts based upon the Manufacturer's recommendations. The Contractor shall provide master parts lists and lists of special tools and test equipment as a part of the equipment O&M data required by Clause OPERATION AND MAINTENANCE (O&M) DATA. The master parts list shall include the supplier's price for each part.

#### **1.16.3 PROCUREMENT AND DELIVERY OF SPARE PARTS**

The Contractor shall procure and be responsible for delivery, receipt, handling, placing in storage, inventory, and turnover to the Contracting Officer all spare parts selected by the Contracting Officer. The Contractor is responsible to have one (1) year supply of manufacturer's recommended spare parts on site ready to turn over to the Contracting Officer at the time of acceptance of the facility.

##### **1.16.3.1 SHIPMENT AND DELIVERY**

The Contractor shall be responsible for the shipment and delivery of spare parts to the location on or near the site in Afghanistan as selected by the Contracting Officer. The Contractor shall provide all manpower and equipment required to receive and place into designated storage areas all spare parts purchased under this clause. The Contractor shall give the Contracting Officer thirty (30) calendar days notice of arrival at the site of the first shipment.

##### **1.16.3.2 TURNOVER OF SPARE PARTS**

The Contractor shall notify the Contracting Officer seventy-two (72) hours prior to delivery of spare parts to the designated storage area. The Contractor and the Contracting Officer will perform a joint inventory of the spare parts and the spare parts will be turned over to the Contracting Officer. Spare parts purchased under this clause shall not be used by the Contractor.

### **1.16.3.3 PARTS AND PACKAGE IDENTIFICATION**

Prior to shipment from point of purchase, each spare part shall be tagged or otherwise marked or labeled. Such labeling may be placed or affixed to the container, box or packaging in which spare parts are located when it is not feasible to place or affix such labeling directly on each spare part. Tags or labels shall include, but not necessarily be limited to; part number, description, parent equipment name and number location, project and/or other data as directed by the Contracting Officer.

### **1.16.3.4 PRESERVATION AND PACKAGING INSTRUCTION**

- a. Items ordered under this contract shall be preserved and packed for a minimum of three (3) years shelf life storage. All items shall be individually packaged except when the manufacturer specifies that the items are to be used in sets. Appropriate identification labels must be affixed to the items protective box or package. After the spare parts are packaged, the manufacturer shall weigh the spare parts and packaging and place the weight and size of the packaged container on the label with other information as outlined herein. Each item, not normally identified with manufacturer's name and part number, shall have an appropriate label affixed to it with manufacturer's name and part number.
- b. Machined spare parts shall be lubricated or coated in order to withstand extensive periods of storage in a highly corrosive atmosphere.
- c. Large items (greater than 22.7 kg (50 lbs.), or larger than 0.03 CM (one cubic foot) shall be packaged in waterproof wooden boxes and properly braced. Cushioning shall be used to prevent damage to the item and to the packaging material.
- d. Solid state components, such as diodes, transistors, integrated circuits or equipment consisting of such parts that can be damaged as a result of static electricity and other stray electro-magnetic fields shall be packaged in heat-sealed, aluminum foil, laminated, flexible packages.
- e. All other spare parts shall be packaged in heat sealed plastic bags or wrap. Delicate and more fragile items such as test equipment shall be cushioned or wrapped with transparent bubble wrap material prior to being inserted into the plastic package.

### **1.16.4 WARRANTY**

All spare parts provided by the Contractor under this clause are subject to the general warranty clauses of this contract.

### **1.16.5 PAYMENTS FOR SPARE PARTS**

Payments for spare parts specifically required in this contract shall be considered as part of those equipment costs and shall be included in bid items as appropriate. Payment for handling, delivery, inventory, turnover, customs, overhead or profit shall not be paid or allowed under this Contract Provision, and shall be included in the cost for installation of this equipment under the other appropriate bid items of this contract. Payment for the spare parts portion of the appropriate bid items will be made after the spare parts have been accepted at the site by the Contracting Officer. Payments for equipment costs under this clause shall constitute full payment for all cost of the spare parts and associated cost of preservation and packaging, and cost of surface shipment to the site. Other ancillary costs shall be included by the Contractor under the other appropriate bid items of this contract and no additional cost except as provided herein will be allowed.

## **1.17 OPERATION AND MAINTENANCE (O&M) DATA**

### **1.17.1 GENERAL**

The requirements contained herein are in addition to all shop drawings submission requirements stated in other

sections of the specifications. The Contractor shall include the provisions for all items required under this clause in all purchase orders and sub-contract agreements. Submittals required hereinafter will not relieve the Contractor of any responsibilities under the Warranty of Construction Provisions of this contract or under the various Guarantee Clauses of the Technical Provisions.

#### **1.17.2 SUBMITTALS**

The Contractor shall submit all items requiring submission of O&M data under this and other sections of these specifications in accordance with Section 01335 SUBMITTAL PROCEDURES FOR DESIGN/BUILD of the specifications.

#### **1.17.3 OPERATION AND MAINTENANCE (O&M) DATA**

The Contractor shall furnish operation and maintenance manuals for all facilities constructed under this contract. The manuals shall be loose leaf, indexed and shall consist of manufacturer's brochures, manufacturer's operation and maintenance manuals, service and repair manuals, catalogs, service bulletins, instruction charts, diagrams, other information as necessary to support the operation and maintenance of the end items of equipment, assemblies and systems. Each type of facility (housing, barracks, mosque, etc.) shall be covered by a separate manual (or manuals) consisting of all data pertaining to the equipment and/or systems within that facility. Identical equipment within a single major system shall require only one submittal of data. The Contractor shall furnish all O&M manuals to the Contracting Officer not less than thirty (30) calendar days prior to contract completion. Required number of submittals (number of sets) shall be as specified in Section 01335 SUBMITTAL PROCEDURES FOR DESIGN/BUILD.

#### **1.17.4 RECOMMENDED SPARE PARTS LIST**

The Contractor shall furnish a recommended spare parts list containing equipment manufacturers' recommendations for five (5) years; two (2) years and one (1) year spare parts stock levels in Afghanistan. Current unit price and effective date, lead time, shelf life for each individual part, and total cost of all recommended parts shall be furnished.

#### **1.17.5 SUPPLEMENTAL SUBMITTALS OF DATA**

After initial submittal of O&M manuals and until final acceptance of all equipment, the Contractor shall prepare and deliver to the Contracting Officer supplemental technical data as previously described for all changes, modifications, revisions and substitutions to equipment and components. For equipment or systems introduced into the contract under change order, or modified by change order, supplemental data shall be furnished within forty-five (45) calendar days after issuance of the change order. The supplemental data furnished shall be properly prepared and identified for insertion into the O&M manuals.

#### **1.17.6 FRAMED INSTRUCTIONS FOR SYSTEMS**

Approved wiring and control diagrams showing the complete layout of the entire system, including equipment, piping, valves and control sequence, framed under glass or in approved laminated plastic, shall be posted, where applicable, in all mechanical equipment rooms. In addition, detailed operating instructions explaining safe starting and stopping procedures for all systems shall be prepared in typed form along with the inspections required to insure normal safe operations. The instructions shall be framed as specified above for the wiring and control diagrams and posted beside the diagram. Proposed diagrams, instructions, and other sheets shall be submitted for approval prior to posting. Operating instructions shall be posted before acceptance testing of the systems and verified during acceptance testing.

#### **1.17.7 ADDITIONAL SUBMITTALS/RE-SUBMITTALS**

The Contracting Officer reserves the right to determine whether the above specified information, as furnished by the Contractor, is adequate and complete and to require such additional submittals by the Contractor as necessary to

insure that adequate information has been furnished to provide the satisfactory operation and maintenance of the various items of equipment and to fulfill the intent of the specifications. Additional submittals or resubmittals supplementing incorrect or incomplete data shall be made within thirty (30) calendar days after receiving notice by the Contracting Officer. All costs arising from these resubmissions shall be borne by the Contractor.

## **1.18 INSTRUCTIONS AND TRAINING FOR OPERATION AND MAINTENANCE**

### **1.18.1 GENERAL**

The Contractor shall be responsible for the instruction and training of operating and maintenance personnel as specified below and in the Technical Provisions of the specifications. Unless otherwise indicated in the Technical Provisions, operating and maintenance instructions shall be given for a minimum period as follows:

Title	Duration of Training
Mechanical Systems	5 Days
Electrical Systems	5 Days

### **1.18.2 OPERATION AND MAINTENANCE TRAINING**

The Contractor shall provide competent instructors for training of personnel designated by the Contracting Officer to operate mechanical and electrical building systems and equipment, perform the required preventive maintenance to minimize breakdown, and to perform necessary repairs when malfunction or breakdown of equipment occurs. Such training shall consist of classroom and on-the-equipment training for the period specified, which shall be completed prior to acceptance of a system or equipment, as applicable. The instructor(s) shall have no other duties during the period of training. Classroom instruction shall not exceed fifty percent (50%) of the total training time, with the balance devoted to on-the-equipment demonstration and familiarization. Emphasis will be given to both electrical and mechanical features, in accordance with approved training plans.

### **1.18.3 ARRANGEMENTS**

The training shall be for not less than the periods of time specified, five (5) days per week, and eight (8) hours per day, subject to review and approval by the Contracting Officer. Each individual training session shall be presented one time only, shall be videotaped in a television system compatible with the local area, and be scheduled in a manner acceptable to the Contracting Officer. At the completion of training, the videotapes shall become the property of the Government. In addition to the Contractor's requirements to video tape each training section, the Government reserves the right to record, in any manner, the subject training material, or training sessions given by the Contractor, without additional cost to the Government.

Recordings obtained will be used in future training by the Government. The operating and maintenance manual data, as specified to be furnished in these Special Clauses, shall be used as the base material for training.

### **1.18.4 SCHEDULING**

The Contractor shall contact the Contracting Officer for the purpose of preliminary planning, scheduling, and coordination of training, to maximize effectiveness of the training program for available operating and maintenance personnel. The Contractor shall initiate and make arrangements for such contact within thirty (30) calendar days after receipt of notification of award of contract; and shall include all significant times in scheduling and completing training in his PROJECT SCHEDULE. The Contractor shall provide a draft outline of training outline in sufficient detail to provide a broad indication of the type of scope of training to be given. It shall include but not be limited to; (a) a list of subjects to be presented; (b) estimated amounts of classroom and on-the-equipment instruction for each subject; (c) a list of minimum qualifications for instructors; and (d) discussions concerning the types and amounts of visual aids, reference materials, tools and test equipment, mock-up and other training materials that will be employed during training.

### **1.18.5 PRELIMINARY PLAN**

The Contractor shall submit seven (7) copies of an outline of his proposed training plan to the Contracting Officer for review and approval not later than 60 calendar days after award of this contract. The plan will be reviewed and coordinated with the content of the O&M manuals.

### **1.18.6 PLAN**

The Contractor shall submit seven (7) copies of his proposed training plan to the Contracting Officer for approval not later than ninety (90) calendar days prior to start of any training. The plan shall include the following; (a) a weekly outline showing overall form and design of training presentation; (b) a day-by-day schedule showing time intervals, the major and subordinate subjects to be covered in each, the name of the instructor(s) and qualification summary of each, and identification of related handouts; (c) summary of the number of hours of classroom and on-the-equipment training; (d) a list of reference materials to be provided by the Contractor to the trainees; and (e) a list and description of the training materials to be used, such as text, visual aids, mock-up, tools, etc. The Contractor shall be responsible for furnishing all training materials except the following: The Government will provide space, chairs, and tables for classroom training, and three (3) sets of the five (5) sets of O&M Manuals required by the Contractor per Section 01335 SUBMITTAL PROCEDURES FOR DESIGN/BUILD of the specifications. Provision of these manuals is solely for reference purposes, and in no way relieves the Contractor from providing all instruction and materials necessary for training personnel designated by the Government. All costs for resubmission of training plans, training materials, etc., as requested by the Contracting Officer shall be borne by the Contractor. Resubmittals shall be made within twenty (20) days of notice from the Contracting Officer.

### **1.18.7 ATTENDANCE ROSTER/TAC FORM 356**

The Contractor shall develop an attendance roster or a similar document indicating each student's attendance, prior to the start of each class, subject and/or topic. This includes both "Hands-On" and classroom training. It is strongly recommended that each student trained be required to sign this document at the beginning of each class day for each and every class, subject and/or topic taught on that day. The Contractor's failure to have student attendance verified in writing may be cause for the Government to order the Contractor to repeat schooling where evidence of attendance cannot be verified. No part of the time lost due to such repeat instruction shall be made the subject of claim for extension of time or for excess costs or damage by the Contractor. Within ten (10) working days after completion of Operation and Maintenance Training conducted in accordance with this clause and/or applicable Technical Provision section, the Contractor shall complete and submit TAC Form 356 "Operation and Maintenance Training Validation Certificate". The attendance roster shall be included as an attachment to TAC Form 356.

### **1.19 CONTRACTOR FURNISHED EQUIPMENT LISTS**

The Contractor shall furnish a list of all items, other than integral construction type items, furnished under the contract. Items such as furniture, drapes, rugs, vehicles, office machines, appliances, etc., shall fall under this category. The Contractor's list shall describe the item; give the unit price and total quantities of each. Model and serial numbers for equipment shall be provided when applicable. The Contractor shall keep an up-to-date register of all covered items and make this information available to the Contracting Officer at all times. Prior to acceptance, the Contractor shall submit the complete register to the Contracting Officer.

### **1.20 TIME EXTENSIONS**

#### **1.20.1 GENERAL**

This provision specifies the procedure for determination of time extensions for unusually severe weather in accordance with the Contract Clause 52.249-10 entitled DEFAULT (FIXED-PRICE CONSTRUCTION) APR 1984. The listing below defines the anticipated monthly unusually severe weather for the contract period and is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the geographic location of the project. The schedule of anticipated unusually severe weather will constitute the baseline for determining monthly weather time evaluations. Upon award of this contract and continuing throughout the contract each month, actual

unusually severe weather days will be recorded on a calendar day basis (including weekends and holidays) and compared to the monthly anticipated unusually severe weather in the schedule below. The term "actual unusually severe weather days" shall include days actually impacted by unusually severe weather. The Contractor's schedule must reflect the anticipated unusually severe weather days on all weather dependent activities.

Badghis Province - Qal-i-Naw

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
18	12	5	3	1	0	0	0	0	4	7	12

**1.20.2 WEATHER DELAYS**

The number of actual unusually severe weather days shall be calculated chronologically from the first to the last day in each month. Unusually severe weather days must prevent work for fifty percent (50%) or more of the Contractor's workday and delay work critical to the timely completion of the project. If the number of actual unusually severe weather days exceeds the number of days anticipated in the paragraph above, the Contracting Officer will determine whether the Contractor is entitled to a time extension. The Contracting Officer will convert any qualifying delays to calendar days and issue a modification in accordance with the Contract Clause 52.249-10 entitled DEFAULT (FIXED-PRICE CONSTRUCTION) APR 1984.

**1.20.3 OTHER DELAYS**

Construction delays due to full or partial base closures due to incidents such as demonstrations, civil unrest and outright attacks will be examined on an individual basis for consideration of time extensions.

**1.21 STANDARDIZATION**

Where two or more items of the same type or class of product, system or equipment furnished in this project are required, the units shall be products of the same manufacturer and shall be interchangeable when of the same size, capacity, performance characteristics, and rating. The only exception to this requirement is where the items are interchangeable due to conformance with industry standards (valves, fittings, etc.); they need not be by the same manufacturer. This requirement applies to all manufactured items in the project that normally require repair or replacement during the life of the equipment.

**1.22 COMPLIANCE WITH HOST-COUNTRY RULES AND CUSTOMS**

The laws of Host Country may prohibit access to certain areas of the country that are under military control. The Contractor shall furnish the Contracting Officer the names of personnel, type, and amounts of equipment, dates and length of time required at the site, and the purpose of entering the host country. It is understood that areas to which rights of entry are provided by the Host Government are to be used only for work carried out under the contract and no destruction or damages shall be caused, except through normal usage, without concurrence of the Host Government.

**1.22.1 CONTRACTOR'S RESPONSIBILITIES**

The following items are the sole responsibility of the Contractor to investigate, estimate as to cost, and assume the risk, as normally encountered by Contractors. The Contractor shall be responsible for determining the effect of the following on his own cost of performance of the contract and for including sufficient amount in the contract price:

- a. Official language and type of accounts required to satisfy the officials of the Local Government.
- b. Entry and exit visas, residence permits, and residence laws applicable to aliens. This includes any special requirements of the Host Government, including those required by local Labor Offices, which the Contractor may have to fulfill before an application for a regular block of visas will be accepted.

- c. Passports, health and immunization certificates, and quarantine clearance.
- d. Compliance with local labor and insurance laws, including payment of employer's share of contribution, collecting balance from employee and paying into insurance funds.
- e. Strikes, demonstrations and work stoppage.
- f. Collection through withholding and payment to local Government, of any Host Country income tax on employees subject to tax.
- g. Arranging to perform work in the Host Country, to import personnel, to employ non-indigenous labor, to receive payments and to remove such funds from the country.
- h. Operating under local laws, practices, customs and controls, and with local unions, in connection with hiring and firing, mandatory wage scales, vacation pay, severance pay, overtime, holiday pay, 7th day of rest, legal notice or pay in lieu thereof for dismissal of employees, slowdown and curtailed schedules during religious holidays and ratio of local labor employed in comparison to others.
- i. Possibility of claims in local bureaus, litigation in local courts, or attachment of local bank accounts.
- j. Compliance with workmen's compensation laws and contributions into funds. Provisions of necessary medical service for Contractor employees.
- k. Special license required by the local Government for setting up and operating any manufacturing plant in the Host Country, e.g. concrete batching, precast concrete, concrete blocks, etc.
- l. Sales within the host country of Contractor-owned materials, and equipment.
- m. Special licenses for physicians, mechanics, tradesmen, drivers, etc.
- n. Identification and/or registration with local police of imported personnel.
- o. Stamp tax on documents, payments and payrolls.
- p. Base passes for permanent staff, day laborers, motor vehicles, etc.
- q. Compliance with all customs and import rules, regulations and restrictions, including, but not limited to, local purchase requirements.

## **1.23 EMPLOYEE ACCESS TO PROJECT SITE**

### **1.23.1 EMPLOYEE IDENTIFICATION**

The Contractor shall be responsible for furnishing to each employee and for requiring each employee engaged on the work, to display identification as approved and directed by the Contracting Officer. Prescribed identification shall immediately be delivered to the Contracting Officer for cancellation upon release of any employee. When required, the Contractor shall obtain and provide fingerprints of persons employed on the project. Contractor and subcontractor personnel shall wear identifying markings on hard hats clearly identifying the company for whom the employee works.

#### **1.23.1.1 PREPARATION OF IDENTIFICATION BADGES**

The Contractor shall be required to prepare a written application inclusive color photographs and provide all materials and labor necessary to prepare an identification badge, laminated in plastic, containing the employee's name, badge number, color photo, height and weight, the name of the Contractor's organization and for requiring each employee engaged on the work to display this identification as directed by the Contracting Officer. The Contractor shall submit each application and draft badge through the Contracting Officer to the Base Security Office. A minimum of thirty-five workdays shall be allowed for Government review and certification of badges. The Base Security Office will certify each draft badge by signature, stamp, seal or any combination thereof. Upon certification by the Base Security Office, the badges will be returned to the Contractor for final preparation, lamination, and issuance. Badges shall not be taken out of country during periods of travel or absence. During such periods, the Contractor may be permitted to issue temporary identification badges.

#### **1.23.1.2 EMPLOYEE BACKGROUND AND HISTORICAL INFORMATION**

The Contractor shall be required to prepare and maintain personal background and historical information forms on each employee. These forms may be reviewed by the Base Security Office. The required information shall include but not necessarily be limited to the following:

- a. Full name.

- b. Place and date of birth.
- c. Three (3) current color photographs.
- d. Copy of Citizenship/Nationality identification.
- e. Copy of Passport.
- f. Copy of driver's license.
- g. Police Background Check.
- h. Work History.
- i. Personal background information.
- j. Copy of Work Permit and/or Visa.
- k. Permanent home of record and in-country address.
- l. Other information mandated by local law, the Base Security Regulations or that may be required to coordinate and process the necessary documentation with the government offices responsible for the approval.
- m. Registration, insurance company, policy number and expiration date for each vehicle.

### **1.23.2 IDENTIFICATION OF CONTRACTOR VEHICLES**

The Contractor shall be responsible for requiring each vehicle engaged in the work to display permanent vehicular identification as approved and directed by the Contracting Officer. If acceptable to the Base Security Office and approved by the Contracting Officer, the Contractor may institute a system of non-permanent temporary identification for one-time delivery and transit vehicles. Each Contractor vehicle, machine, piece of equipment, or towed trailers, shall show the Contractor's name such that it is clearly visible on both front doors of the vehicle and both sides of a towed trailer. A valid license plate shall be displayed at all times. Contractor vehicles operated on Government property shall be maintained in a good state of repair, shall be insured, and shall be registered in accordance with Afghan Law.

### **1.23.3 SECURITY PLAN**

The Contractor shall submit to the Contracting Officer a security plan as required in Contract Section 01040.

### **1.24 RADIO TRANSMITTER RESTRICTIONS**

To preclude accidental actuation of sensitive electronic equipment, the Contractor shall not use radio-transmitting equipment without prior approval of the Contracting Officer.

### **1.25 PUBLIC RELEASE OF INFORMATION**

#### **1.25.1 PROHIBITION**

There shall be no public release of information or photographs concerning any aspect of the materials or services relating to this bid, contract, purchase order, or other documents resulting there from without the prior written approval of the Contracting Officer.

#### **1.25.2 SUBCONTRACT AND PURCHASE ORDERS**

The Contractor agrees to insert the substance of this clause in all purchase orders and subcontract agreements issued under this contract.

### **1.26 ATTACHMENTS**

TAC FORM 61 - Accident Prevention Program Hazard Analysis

TAC FORM 356 - Operation and Maintenance Training Validation Certificate

## **2. LOCAL CLAUSES**

### **2.1 APPLICATION OF US CRIMINAL JURISDICTION**

Reference DODI 5525.11. The contractor is directed to provide all of its personnel working under this contract, and to require all of its subcontractors to provide their personnel, with written notification that - with the exception of nationals of Afghanistan and those ordinarily resident in Afghanistan - contractor and subcontractor personnel, and the dependents of contractor and subcontractor personnel who are residing with such personnel, may be subject to US criminal jurisdiction as provided for in the Military Extraterritorial Jurisdiction Act, 18 USC 3261-3267; see Section 3267(1)(A)(iii)(I) and (2)(A)(iii). A copy of the notice ***shall be furnished to the contracting officer upon award of the contract***, along with a certification by an authorized company representative attesting to the provision of the notification to contractor personnel.

### **2.2 ATTACKS FROM HOSTILE ENTITIES**

This contract is firm fixed-price. Costs incurred in the performance of project execution that arise from the attacks of hostile entities, such as costs arising from damage to or destruction of contractor equipment and facilities, and damage to or destruction of the project prior to Government acceptance, are the sole responsibility of the contractor. The Government makes no guarantee to provide the contractor with security, and bears no obligation to reimburse the contractor for costs arising from the attacks of hostile entities. When appropriate, the Contracting Officer may provide the contractor with an equitable adjustment with respect to time – but not cost – in accordance with clause 52.249-10; see 52.249-10(b)(1)(i) and (2).

### **2.3 INSTALLATION ACCESS AND BADGING**

This contract is firm fixed-price. It is the responsibility of the contractor to be knowledgeable of and to abide by any and all applicable installation access procedures and requirements, to include any and all badging procedures and requirements that may be necessary for contractor access to the project site. Such procedures and requirements may change over the course of contract performance; it is the responsibility of the contractor to plan accordingly in order to meet its existing obligations under this contract. The US Army Corps of Engineers, Afghanistan Engineer District, neither controls nor is responsible for any such installation access procedures, requirements or changes thereto.

### **2.4 CUSTOMS CLEARANCE**

Reference clauses 52.229-6 and 52.225-13. This contract is firm fixed-price. It is the responsibility of the contractor to be knowledgeable of and to abide by any and all applicable customs clearance procedures and requirements that may be necessary for the transportation of supplies and equipment into Afghanistan. Such procedures and requirements may change over the course of contract performance; it is the responsibility of the contractor to plan accordingly in order to meet its existing obligations under this contract. The US Army Corps of Engineers, Afghanistan Engineer District, neither controls nor is responsible for any such customs clearance procedures, requirements or changes thereto.

### **2.5 TRAVEL WARNINGS**

The contractor shall provide all personnel working under this contract, and shall require subcontractors to provide their personnel, with a written notification advising such personnel to be aware of US State Department Travel Warnings with respect to Afghanistan, available at <http://travel.state.gov>, in the event they wish to consider bringing their dependants into Afghanistan. A copy of the notice ***shall be furnished to the contracting officer upon award of the contract***, along with a certification by an authorized company representative attesting to the provision of the notification to contractor personnel. At no time, subject to the written approval of the contracting officer, may the contractor allow such dependants, or any other unauthorized individuals, to be present on the project site grounds, whether in transit or otherwise.

## **2.6 DRUG-FREE WORKFORCE**

Documentation of the contractor's drug-free workforce program as required by clause 252.223-7004(b) *shall be furnished to the contracting officer upon award of the contract.*

## **2.7 COMBATING TRAFFICKING IN PERSONS, COMMERCIAL SEX ACTS, FORCED LABOR**

A copy of the employee notification statement as required by clause 252.222-7006(d) *shall be furnished to the contracting officer upon award of the contract*, along with a certification by an authorized company representative attesting to the provision of the notification to contractor personnel.

# **3. GOVERNMENT FURNISHED MATERIALS AND EQUIPMENT**

The Contractor shall use Government Furnished Materials and Equipment (GFM&E) for authorized purposes only. Government Furnished Materials and Equipment are described in Section 01010-Scope of Work paragraph 3.0.

## **3.1.1 GFM&E AVAILABILITY**

All GFM&E shall be picked up by the Contractor at Qal-i-Naw FOB and transport/deliver to the site. Before accepting the GFM&E, the Contractor shall inspect GFM&E with the Contracting Officer Representative (COR). After acceptance of the GFM&E, the Contractor shall be responsible for the GFM&E.

## **3.1.2 DELIVERY PROCESS**

The Contractor shall be prepared to accept GFM&E at 120 days from NTP. At 150 days from NTP the Contractor shall have security, personnel, communications, inventory and controlling systems in place. The GFM&E will be available to be picked up by the Contractor during a period between 120 and 150 days from NTP. The Contractor shall coordinate with the COR for the pickup time and arrangements. The Contractor shall be responsible for loading the GFM&E at the FOB on the Contractor's vehicle(s); transporting/delivering the materials to the project site; and protection of the GFM&E during transport.

## **3.1.3 UNLOADING EQUIPMENT**

The Contractor shall be responsible for having all equipment necessary for unloading of the GFM&E at the jobsite. The Contractor shall coordinate with the COR for delivery time and arrangements.

## **3.1.4 GFM&E DELIVERY POC**

The COR will be the POC for all GFM&E. The COR will be identified with all contact information at NTP.

## **3.1.5 CONTRACTOR TAKING POSSESSION OF GFM&E**

The Government assumes responsibility for ensuring that the GFM&E satisfies contract specifications and has conducted QC spot checks of GFM&E prior to the Contractors taking possession.

The Contractor is considered to take custody of the GFM&E by signing the Form DD1149. The Contractor shall be responsible for all of the GFM&E in its custody. The Contractor shall retain custody of the GFM&E until one or more of the following occurs:

1. USACE accepts the completed project
2. Excess GFM&E is properly returned to Government custody
3. Scrap GFM&E is disposed of properly

### **3.1.6 CONTRACTOR'S GFM&E CONTROL SYSTEM**

The Contractor shall have in place a system of controls that provide for the care of GFM&E. Minimum standards for the care of GFM&E and contractor and subcontractor responsibilities are as follows:

1. GFM&E shall be properly identified and marked as GFM&E by the Contractor.
2. The Contractor shall provide appropriate shelter, covering or other appropriate protection from the elements for all GFM&E.
3. The Contractor shall provide appropriate security to maintain control of all GFM&E. The Contractor shall be responsible for all unusable GFM&E due to theft or damage once under the control of the Contractor.
4. Movement of GFM&E shall be coordinated via a system that allows for the chain of custody and location of GFM&E to be known at all times.
5. Subcontractors shall also be accountable for the location and disposition of GFM&E that has been transferred to their control.
6. Co-mingling of GFM&E and contractor property will be allowed when necessary for the performance of work associated with this solicitation.
7. The Contractor shall be able to trace and identify all GFM&E back to its originating container, as applicable.

### **3.1.7 INVENTORY AND REPORTING**

**The Contractor shall conduct and record a full inventory upon acceptance of GFM&E and shall provide the Government with copies of all inventories.**

The Contractor shall conduct and record full inventories of the GFM&E in its possession at the following times:

1. At 75% construction completion
2. At the completion of work
3. After the loss, damage, or destruction of GFM&E, the Contractor, shall submit a written schedule of procurement to replace items lost, damaged, or destructed to the Contracting Officer within (5 of days) of the event.

**-- END OF SECTION --**



**Table 1 DESIGN SUBMITTALS**

SUBMITAL	# OF DAYS FOLLOWING NTP	INCLUDED IN SUBMITTAL
10% Design Submittal	45	Geotechnical Subsurface Investigation Topographical survey 100% As Planned Network Analysis Schedule(NAS) Submittal Register
35% Design Submittal	90	Force protection design 100% Water well design 35% Site Plan 35% Grading and Stormwater Drainage Plan & Specifications 35% Utility Plans and Specifications 35% Site Electrical Plans and Specifications 35% Communication Plans and Specifications 35% Fuel Storage System Plans and Specifications 100% Foundation Designs
65% Design Submittal	135	65% Site/Civil design 65% Grading and Stormwater Drainage Plan & Specifications 65% Utility Plans and Specifications 65% Site Electrical Plans and Specifications 65% Communication Plans and Specifications 65% Fuel Storage System Plans and Specifications 100% Schedule of Long Lead Items Procurements in NAS
95% Design Submittal	180	95% plans and specifications
100% Design Submittal	215	100% construction documents

**B. PRE-CONSTRUCTION**

Subsequent to NTP, the Contractor shall submit his Accident Prevention Plan, Mine Clearance Safety Work Plan, and all personnel qualification submittals within 10 days following NTP. Upon approval of these plans, the Government may issue clearance for UXO / Mine Removal and Clearance ahead of topographic surveying and geotechnical subsurface investigation.

**C. CONSTRUCTION PHASE**

The Construction Phase will be initiated by the Clearance For Construction (CFC) letter issued by the Contracting Officer and instruction to baseline the As-Planned NAS. A CFC will be provided separately by the Contracting Officer for each phase of the work. The Government may give the Contractor authorization for the Construction Phase for portions of the work following review and approval of the particular design submittal. No work can begin on any phase of the process until an official CFC for that phase is issued.

Full Clearance for Construction	After acceptance of 100% construction documents
Complete Construction	within 540 days following NTP
All work required by this contract	within 540 days following NTP
Total Contract Period	<b>540 days</b>

The Required Period of Performance is stated in Calendar Days following the NTP and includes all design and construction priority milestones.

### 3.0

### PROGRESS MEETINGS

Weekly progress meetings will be held at which, as a minimum, the contractor's Project Manager, a representative of the designer, the site superintendent, Quality Control Manager, and Site Safety and Health Officer (SSHO) shall be present. The meetings will occur at the USACE Resident Office. The day for conducting meetings shall be mutually agreed to between the Contractor and the Government within 10 calendar days after receipt of the notice to proceed. The Contractor shall be a required participant in the progress meeting. Progress meeting shall consist of a written agenda of topics and issues to be discussed during the meeting and followed up with draft meeting minutes prepared by the Contractor. The draft meeting minutes shall be emailed out to all attendees one (1) day after the meeting for review and approval. The review and approval process will allow for mutual acceptance of the draft minutes as written, or editing to add, delete, and/or correct items that were covered in the weekly meeting. The edited draft meeting minutes shall be published and handed out by the Contractor at each following week's progress meeting. When all attendees agree the minutes have been properly edited; then those minutes become the official final minutes of the previous week's progress meeting. All attendees will be required to sign an attendance sheet that will become an attachment to the official final meeting minutes.

The progress meeting agendas shall at a minimum contain the following items (*Italic wording represents example input per item*):

1. Network Analysis Schedule and S-curve status. The Contractor shall provide an as-built NAS statused to a data date of the progress meeting in both digital XER file and hard copy illustrating both actualized stats bars and baseline bars on the same Gant chart.
  - a. *Dollar driven schedule how much will the Contractor need in the next three months*
  - b. *Status of the contract and funds*
2. Weather days for the last two weeks
3. Go over Punch/Discrepancy list Items
  - a. *Not in contract compliance*
  - b. *Methods of correction*
  - c. *Where does it fit in the schedule?*
  - d. *Is it holding up a critical path item?*
  - e. *Is it a critical path item?*
4. Status of stored materials
  - a. *When to fund stored materials and when to subtract materials from the stored state*
  - b. *Where is the item on the scheduled?*
5. Work performed since last progress meeting
  - a. *Last week did we do what we said we were going to do?*
  - b. *Is there some slippage according to schedule?*
6. Two week look ahead.
7. Submittal register open / closed items.
  - a. *Status of needed submittals*
  - b. *Missing/overdue*
8. Status of long lead items procurement
9. Visit any open items from previous week's agenda.
10. Pay estimate
  - a. *Questions*
  - b. *Concerns*
  - c. *Progress*
11. Status of safety plan and accident prevention
12. Review of the QCS program
  - a. *Questions*
  - b. *Problems*
  - c. *Observations*
13. Status and review of testing
  - a. *Concrete*
  - b. *Soil*
  - c. *Asphalt*
14. RFI's / RFC's

- a. New
  - b. Unanswered
15. RFP's
- a. New
  - b. Unanswered
16. Differing Site Conditions
17. Security issues
- a. Status of coordination with the Others/Local Sponsor, Any Item
18. Other

During the first progress meeting the agenda format will be reviewed and agreed to by all parties in attendance.

#### 4.0 CONSTRUCTION PRIORITY MILESTONES

Construction priority milestones shall be indicated on the contractor's network analysis schedule. Each feature of work shall be completed and commissioned on or before the milestone day indicated below. The commissioning of each system shall be coordinated by the Contractor including but not limited to which trades must be completed in other systems or provide temporary facilities to support the commissioning. Construction Priority Milestone facility work shall begin upon the clearance for construction and design approval of that feature of work.

The order of construction for all buildings and facilities shall be prioritized in accordance with the Construction Priority table as follows. All Work under this contract shall be completed and commissioned; each facility indicated shall be ready for beneficial occupancy in accordance with Tables 2.1 and 2.2 CONSTRUCTION PRIORITIES TABLE.

**Table 2.1 CONSTRUCTION PRIORITIES TABLE**

<b>PRIORITY 1: 200 Days Completion from NTP</b>		
<b>Summary of Work</b>	<b>Feature of Work</b>	<b>Reference to Appendix A Concept Plan and Appendix B</b>
<b>Site Preparation</b>	Site Preparation	NA
	Rough Site Grading and Storm Water Drainage	NA
	Force Protection Foundations	120 Force Protection Wall Fences, Gates & Barriers
	Schedule of long lead items procured	NA
<b>PRIORITY 2: 270 Days Completion from NTP</b>		
<b>Force Protection / Water Well</b>	Entry Control Points (ECP)	121 Primary ECP 122a-b Secondary ECPs
	Perimeter Wall	120 Force Protection Wall, Fences, Gates & Barriers
	Guard Tower(s)	106a-e Guard Tower (FP04A – 12 GSM), Concrete Walk & Fence
	Water well drilling	NA

	Well House, construction, and commissioning	109 Well House (U03-20 GSM)
<b>PRIORITY 3: 345 Days Completion from NTP</b>		
<b>Infrastructure/Utilities</b>	Potable Water Distribution System and Storage	Misc Site Details
	Water Storage Tank, Elevated	110 Water Tower (U05 – 20M)
	Wastewater Collection and Treatment System	119 Wastewater Treatment plant Misc Site Details
	Electrical Generation and Distribution System	NA
	Communication System	NA
	Fuel Storage, Generator Canopy, and Vehicle Fuel Point	124, 125 Fuel Storage Tanks & Fuel Point (U02), Generator, Canopy
	Building footprint grading	All structures
	Foundation installation	All structures
<b>PRIORITY 4: 450 Days Completion from NTP</b>		
<b>Facilities: Billeting, DFAC, Latrine</b>	Administration Building	100 Administration Building, Type 2 (1,446 GSM) AD13
	Dining Facility (DFAC)	101 DFAC, Type 2 (559 GSM)
	Open Bay Barracks	103 a-c Barracks Building ( B13 – 579 GSM)
	Senior/High Barracks	104 a-b Barracks Building ( B12 – 862 GSM)
	Female Barracks	126 Female Barracks (B25 - 280 GSM)
	Latrines	105 a-c Latrine Building, Std Design
<b>PRIORITY 5: 500 Days Completion from NTP</b>		
<b>Remaining Facilities (for the MSP, FD &amp; DHQ)</b>	Training Bldg	102 Training Bldg, Per Std Design
	Vehicle Maintenance Facility	112 a-b Vehicle Maintenance and POL (3 bay) (VM10 – 266 GSM)
	Warehouse Building, Small	113 a-b Warehouse (S06 -65 GSM)
	Secure Storage (ASP)	111 Secure Storage (S07-90 GSM)
	Trash Collection Point(s)	114 (2) Trash Collection Points (G01)
	Guard House	108 Guard House (FP07 - 50 GSM)

	Guard Shack(s)	107a-c Guard Shack (FP05 – 12 GSM)
	Small Arms Maintenance	115 Arms Storage (403GSM) Std Design
	Wood Stove Kitchen(s)	Wood Stove Kitchen(s)
	Generator and Fuel Storage Enclosure	Generator Enclosure per Section 01010 Par 2.3.8
	Aggregate Roadways/Driveways, Parking (within perimeter wall)	NA
	Access Road and Structures (outside perimeter wall)	NA
<b>PRIORITY 6: 540 Days Completion from NTP</b>		
	All remaining work: including but not limited to testing & commissioning, as-built drawings, and O&M manuals	NA

**--END OF SECTION--**

**SECTION 01335  
SUBMITTAL PROCEDURES**

**1.0 GENERAL**

**1.1 REFERENCE**

The publication listed below forms a part of this specification to the extent referenced. The publication is referenced to in the text by basic designation only.

**CONSTRUCTION SPECIFICATIONS INSTITUTE**

Manual of Practice

Construction Specifications Institute  
[http://www.csinet.org/s\\_csi/index.asp](http://www.csinet.org/s_csi/index.asp)  
601 Madison Street  
Alexandria, Virginia  
22314-1791

**NATIONAL INSTITUTE OF BUILDING SCIENCES (NIBS)**

Unified Master Reference List (UMRL)

National Institute of Building Sciences  
1090 Vermont Avenue, NW, Suite 700  
Washington, DC 20005-4905  
Email: [nibs@nibs.org](mailto:nibs@nibs.org)  
FAX: (202) 289-1092  
Tele: (202) 289-7800

**1.2 SUBMITTAL CLASSIFICATION**

Submittals are classified as follows.

**1.2.1 DESIGN SUBMITTALS**

Contractor furnished design submittals are the various design documents which primarily consist of field investigations, calculations, design analysis, drawings and specifications.

In addition, for each design submittal, the contractor shall submit all non-administrative modifications issued for the contract as part of the Design Submittal package to enable AED to validate that these modifications have been incorporated into this design submittal.

**Design submittals should only address Contract requirements not shown on plans and any specifications already furnished to the Contractor as part of this contract. Plans and specifications furnished to the Contractor shall NOT be included as part of any Design Submittal. The Contractor shall complete all work as shown in these furnished drawings without deviation, unless site conditions mandate changes (larger building foundations per geotechnical investigations, etc.).**

**Any and all proposed deviations from Government-provided designs must be submitted as a complete 35% design package at duration as stated in Section 00150.**

The Contractor shall clearly label and date all design submittals to reflect the current design stage and date of submission to the Government to avoid confusion between current and previous submittals. The Contractor shall not begin construction work until the Government has reviewed and approved the work presented in each Design Submittal, including complete resolution of all DrChecks comments, and the Contracting Officer has cleared work for construction. Clearance for construction shall not be construed as meaning Government approval. Unless otherwise indicated, the risk for the design is the sole responsibility of the Contractor.

The sole responsibility of ensuring that the design submittals comply with contract documents remains with the Contractor, in accordance with this section of the contract. The Government retains the right to comment on the design at any design stage, and the lack of Government comments at a given review cannot be used as a basis for the Contractor to fail to address the Government's comments on subsequent reviews, regardless of design stage. Furthermore, approval of incomplete designs will not relieve the Contractor of the responsibility for any error which may exist, and which may require rework or other appropriate adjustment to the contract terms, as determined at the sole discretion of the Government. It is the sole responsibility of the Contractor to ensure that submittals do or do not comply with the contract documents. Government review, clearance for construction, or approval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract. Government review, clearance for construction, or approval of post design construction submittals shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory.

As a minimum, design submittals shall be submitted at the following intervals:

- Preliminary design reports – 35%
- General Design review - 65%
- Cleared For Construction review - 100%

A Pre-design meeting will be conducted to distribute drawings to the Contractor, finalize and clarify technical information, and clarify other necessary information, if deemed necessary by the Government.

#### **1.2.1.1 PRELIMINARY DESIGN REPORTS – (35%)**

Review of this submittal is primarily to ensure that the Contractor has at a minimum provided all items necessary for wells and subsurface investigation, Geotechnical report, Survey, well design and test results, updated Master Plan. **Failure to do so at the satisfaction of the Government shall constitute grounds for withholding of all progress payments.**

a. Geotechnical Report:

Geotechnical Report indicating appropriate information for various site characteristics, soil parameters as determined by certified lab tests, allowable soil bearing capacities, correlation with foundation design parameters, and any changes in foundation design of structures furnished in the Contract; estimated settlement for building foundation loads; and all other project feature changes due to the Geotechnical Report conclusions.

Results of the site topographic survey which shall include highlighting of significant features (wadis, adjacent properties and structures, roads, etc.) to provide a detailed, overall understanding of the project site and surrounding area; demolition plan for existing site features;

b. Well design:

Well design at each project site location to include a determination of water demand, water availability evaluation, and water quality analysis produced from a test well. Water demand evaluation shall be determined based on the requirements of the 01010 Scope of Work and 01015 Technical Requirements. Water availability evaluation shall include data concerning study of existing water wells in the vicinity, study of hydrological data, and study of geological data. Well hydraulics data shall also be included from the test well or if available from vicinity wells. Water quality analysis shall include physical, chemical, and bacteriological analyses of water from either a test well or an existing well within the same aquifer of the proposed well.

Drawing for the well design shall include, at a minimum, material and dimensions of well pipe and casing, type and dimensions of screen, type and range of sizes of gravel surrounding screen and at bottom of well shaft, type of grouting for well seal, well pad, location and connection detail for hand pump if required by

the 1010. Also required would be a detail of the wellhead with all associated valves, pumps, flowmeters, and chlorination system.

c. **Site Grading and Drainage Plan:**

The Contractor shall design and submit a Site Grading and Drainage Plan showing the location of all required drainage structures. The Grading and Drainage Plan shall be properly contoured showing existing and proposed contour lines, swales and ditches, and building finished floor elevations. There shall be spot elevations shown at the beginning and end of all drainage structures, at inflection points, and spaced every 25 meters along the alignment. Proposed contour lines shall meet with existing contour lines on the Grading and Drainage Plan. The Grading and Drainage Plan shall be at a scale that all lines and structures can be easily seen and ascertained.

d. **Master Site Plan**

The Concept Plan attached in the Appendix is for conceptual purposes only and does not constitute a design. The Contractor shall prepare a site Master (Site) Plan based on information contained in this document. The Contractor shall participate in a Master Plan design charrette that shall be conducted at the Corps of Engineers Kandahar Area Office at Kandahar Airfield, if deemed necessary by the Government. If necessary, the Contractor shall modify and implement changes to the Master Plan based on the information gathered during the design charrette process. Current site conditions are only partially indicated in the Concept Plan. The Contractor is responsible to identify all buildings, facilities and site features.

The Contractor must verify all space requirements and code compliance in accordance of Section and Section 01015 of this contract. The final Master Plan shall be site-specific and it shall include the location of all temporary structures such as the construction office/storage containers and lay-down and construction debris removal areas. The Contractor shall indicate all other site features on the Master Plan regardless of whether they are indicated on the Government supplied Concept Plan or not. The Contractor shall include all information pertinent to this project into the Master Plan to achieve a complete design in accordance with the requirements of this document.

**1.2.1.2 GENERAL DESIGN (65%)**

This Design Submittal presents all information necessary to integrate the fully designed and detailed buildings and other project features to the project site. It is crucial that the submittal is complete and includes all components noted below and any other pertinent information not listed which the Contractor requires to enable construction to begin as soon as possible. As a minimum, for each Contract project location the submittal shall contain:

- a. Results of the site topographic survey which shall include highlighting of significant features (wadis, adjacent properties and structures, roads, etc.) to provide a detailed, overall understanding of the project site and surrounding area; demolition plan for any existing site structures which may be present; complete grading and drainage plan with existing grades, proposed grades, and building finished floor elevations based on Contract technical requirements.
- b. Any necessary adaptations of the Concept (Generic) Site Plan and detailed design drawings furnished with this Contract that might be required due to actual site constraints, to include: water supply/storage, disinfection location and distribution layout plan; wastewater collection or treatment layout plan including tie-in to all required buildings; electrical generation and distribution plan; connection of existing roads with ECP location(s); and any other changes required due to adjacent property or existing topography. As noted in Paragraph 1.2.1, this would also include proposed changes to the detailed drawings if, and only if, site conditions mandate revisions.
- c. 65 % complete drawings and specifications for site preparation work, utility construction, paving, foundation, water and wastewater features of all facilities.

- d. Complete design analysis, plans and specifications for any contract feature(s) not already provided in the Contract that the Contractor would like Partial Clearance for Construction on once the Design Submittal has been approved, including project components with long ordering, fabrication and delivery times.
- e. Outline of Construction Specification Sections to be used for other work yet to be submitted at the 95% Final Design Review submittal, and those Specification items requiring Government Approval (GA), unless 100% Technical Specifications were provided with the Contract.
- f. Preliminary drawing and details of any grease interceptors and oil-water separators required. Grease interceptors should either be gravity or hydro-mechanical types. Drawings would show sizing, depth, and all connecting piping. Design analysis shall include calculations for sizing both the interceptor/separator and connecting piping.
- g. Preliminary cross sections of roads and sidewalks, showing all essential dimensions, materials, layers, and proposed fore and back slopes of adjacent drainage features.
- h. All designs of site storm drainage structures, including calculations in the design analysis for sizing and sloping of pipe runs and ditches. Provide cross sections of drainage structures such as ditches and culverts.
- i. Design Analysis for any designed facility or feature of work.
- j. Construction drawings of all Work to required to be designed by Contractor to include floor plans, elevations, life safety plans, sections, finish and hardware schedules, plumbing and HVAC, electrical and communications as is applicable to particular design Work requirements in Section 01010 .

**1.2.1.3 FINAL DESIGN REVIEW/CLEARED FOR CONSTRUCTION SUBMITTAL (100%):**

The review of this submittal is primarily to insure that the contract documents and design analysis are proceeding in a timely manner and that the Contract requirements and design criteria are being correctly understood and adhered to. The submittal shall consist of the following:

1. Construction Specifications complete - all anticipated sections, edited to include only applicable requirements, if not provided as part of the Contract.
2. Construction Drawings complete with all 65% comments incorporated. The Contractor is expected to have completed all of his coordination checks and have the drawings in a design complete condition. The drawings shall be finalized at this time including the incorporation of any design review comments generated by all past design reviews. The drawings shall contain all the details necessary to assure a clear understanding of the work throughout construction.
3. The review of this submittal is primarily to insure that the contract documents and design analysis are complete and that the Contract requirements and design criteria are being correctly understood and adhered to. It is crucial that the submittal is complete and includes all components noted below and any other pertinent information not listed which the Contractor requires to enable construction to begin as soon as possible. As a minimum, for each Contract project location the submittal shall contain:
4. Geotechnical Report, indicating appropriate information for various site characteristics, soil parameters as determined by certified lab tests, allowable soil bearing capacities, correlation with foundation design parameters, and any changes in foundation design of structures furnished in the Contract; estimated settlement for building foundation loads; and all other project feature changes due to the Geotechnical Report conclusions.
5. Results of the site topographic survey which shall include highlighting of significant features (wadis, adjacent properties and structures, roads, etc.) to provide a detailed, overall understanding of the project site and surrounding area; demolition plan for existing site features; complete grading and drainage plan with

existing grades, proposed grades, and building finished floor elevations based on Contract technical requirements;

6. Any necessary adaptations of the Concept Plan and detailed design drawings furnished with this Contract that might be required due to actual site constraints, to include: water supply/storage location and distribution layout plan; wastewater collection or treatment location and tie-in to all required buildings; electrical generation and distribution plan; connection of existing roads with ECP location(s); and any other changes required due to adjacent property or existing topography. This would also include proposed changes to any furnished detailed drawings if site conditions or other requirements mandate revisions.
7. Complete drawings and details of any grease interceptors and oil-water separators required. Grease interceptors should either be gravity or hydro-mechanical types. Drawings would show sizing, depth, and all connecting piping. Design analysis shall include calculations for sizing both the interceptor/separator and connecting piping.
8. Complete cross sections of roads and sidewalks, showing all essential dimensions, materials, layers, and proposed fore and back slopes of adjacent drainage features.
9. Complete drawings of site storm drainage structures, including calculations in the design analysis for sizing and sloping of pipe runs and ditches. Provide cross sections of drainage structures such as ditches and culverts.
10. The HVAC specialist shall submit the complete HVAC analysis with equipment layout drawings. The HVAC analysis shall clearly state and the drawings clearly show the type of systems to be used and how the system will satisfy the specified indoor design conditions. The HVAC heating and cooling load calculations shall be prepared using recognized HVAC load analysis programs such as Trane "Trace" or Carrier "HAP". Psychrometric charts showing the air wet bulb and dry bulb temperatures at each section of the heat/cool unit during both design heating and cooling operation shall be provided.
11. Design Analysis complete.
12. Construction Specifications complete - all anticipated sections, edited to include only applicable requirements.
13. Construction Drawings complete. The Contractor is expected to have completed all of his coordination checks and have the drawings in a design complete condition. The drawings shall be finalized at this time. The drawings shall contain all the details necessary to assure a clear understanding of the work throughout construction.

Once the design documents have been "Cleared for Construction" by the Contracting Officer, the Contractor shall clearly identify each document by annotating it as "Cleared for Construction."

#### 1.2.2 **PARTIAL DESIGN SUBMITTALS**

In the interest of expediting construction, the Contracting Officer may approve partial design submittals, procurement of materials and equipment, as well as issue the Notice To Proceed (NTP) for construction of those elements of the design which have been cleared for construction. Such partial notices to proceed shall be solely at the discretion of the Contracting Officer. The Contractor must obtain the approval of the Designer of Record (DOR) and the Government's concurrence for any Contractor proposed revision to the professionally stamped and sealed design reviewed and Cleared for Construction by the Government, before proceeding with the revision. The Government reserves the right to non-concur with any revision to the design, which may impact furniture, furnishings, equipment selections or operations decisions that were made, based on the reviewed and cleared for construction design. Any revision to the design, which deviates from the contract requirements (i.e., the RFP and the accepted proposal), will require a modification, pursuant to the Changes clause, in addition to Government concurrence. The Government reserves the right to disapprove such a revision. Unless the Government initiates a

change to the contract requirements, or the Government determines that the Government furnished design criteria are incorrect and must be revised, any Contractor initiated proposed change to the contract requirements, which results in additional cost, shall strictly be at the Contractor's expense. The Contractor shall track all approved revisions to the reviewed and cleared for construction design and shall incorporate them into the As-Built design documentation, in accordance with Section 01780A, CLOSEOUT SUBMITTALS, Paragraphs 1.1 and 1.2, which lists all requirements associated with submission of editable CADD format As-Built (record Drawings) required as part of this contract. The Designer of Record shall document its professional concurrence on the As-Built (record drawings) for any revisions by affixing its stamp and seal on the drawings and specifications.

### **1.2.3 DEVIATIONS AND CHANGES TO THE STANDARD DESIGNS**

Contractor shall construct standard building designs as indicated. Any request to deviate or change the standard building designs must be due to changed site conditions ONLY and submitted to the AED Resident Office administering the contract. Contractor shall indicate the changes and provide a narrative justification for the changes proposed, but shall not proceed with deviations without written approval.

### **1.2.4 USE OF DRCHECKS<sub>SM</sub> FOR DESIGN SUBMITTAL COMMENT AND RESPONSE**

#### **1.2.4.1 DRCHECKS<sub>SM</sub> WEB LINK**

All AED Design Submittal review comments will be documented using the standard design review tool for the U.S. Army Corps of Engineers, a web-based application called "DrChecks<sub>SM</sub>". The web link to DrChecks<sub>SM</sub> is:

<https://www.projnet.org/projnet/binKornHome/index.cfm>

#### **1.2.4.2 DRCHECKS<sub>SM</sub> VENDOR IDENTIFICATION AND TUTORIAL**

Upon notification of award, the contractor shall immediately coordinate with the Chief, Engineering Branch, AED to acquire a vendor identification and a brief tutorial on the use of DrChecks<sub>SM</sub>. The contractor is responsible for providing their own DrChecks<sub>SM</sub> Administrator within their own design staff personnel to access and accomplish actions within DrChecks<sub>SM</sub>.

#### **1.2.4.3 NOTIFICATION OF DRCHECKS<sub>SM</sub> FILE ACCESS**

The Afghanistan Engineer District will complete a review at every Design Submittal stage for conformance with the technical requirements of the Contract and document all comments in DrChecks<sub>SM</sub>. At completion of the review, a notification will be issued to the Contractor by the Contracting Officer's representative that the particular DrChecks<sub>SM</sub> file will be opened to the Contractor. Until this time, the Contractor is not able to view any AED comments for that particular Design Submittal.

#### **1.2.4.4 FURTHER CONTRACTOR INFORMATION AFTER DRCHECKS<sub>SM</sub> REVIEWS**

See Paragraph 3.7.4, Government Review, for further procedures and requirements associated with Design Submittal reviews.

### **1.2.5 CONSTRUCTION SUBMITTALS**

#### **1.2.5.1 CONTRACTOR FURNISHED GOVERNMENT APPROVED CONSTRUCTION SUBMITTALS (GA)**

Government approved construction submittals are primarily related to plans (Contractor Quality Control, Accident Prevention, Resident Management System, Area Use, etc.), schedules (Project Schedule/Network Analysis), and certificates of compliance, reports and records/statements. They may also include proposed variations to approved design documents in accordance with the paragraph entitled "VARIATIONS".

In addition, GA construction submittals are required for the following:

a. CIVIL FEATURES

TESTING RESULTS: Data will include information on the locations and depths of all viable water supply sources at the site(s) involved and a water quantity and water quality analysis for each source from the Ministry of Public Health or other certified testing firm.

b. MECHANICAL FEATURES

EQUIPMENT SUBMITTALS: Manufacturer's standard catalog data, installation, Operation and Maintenance (O&M) manuals and construction details for water wells, water tanks, control valves, pipe insulation, water pumps, air handling units, condensers, variable air volume (VAV) boxes.

TESTING RESULTS: For water tanks, water pumps (including instrumentation), water piping, sprinkler systems, and oxygen systems, submit six (6) copies of each test containing the following information in bound letter-size booklets:

- 1) The date the tests were performed.
- 2) A list of equipment used, with calibration certifications.
- 3) A copy of measurements taken.
- 4) The parameters to be verified.
- 5) The condition specified for the parameter.
- 6) The inspection results, signed, dated, and certified by the installer. The certification shall state that required procedures were accomplished, that the procedures were conducted in compliance the plans and specifications.
- 7) A description of adjustments performed.

Individual reports shall be provided for storage tank tests, piping tests, system performance tests, high level alarm test, and the system leak tests. Drawings shall be folded blue lines, with the title block visible.

c. ELECTRICAL FEATURES

PRODUCT DATA and SHOP DRAWINGS: generators (and its auxiliaries), load bank, transformers, substations, panels/switchboards/motor control centers, lightning protection, receptacles, circuit breakers.

DESIGN DATA: lightning protection and grounding.

TEST DATA: Lightning protection and grounding.

GENERATOR TEST DATA

GENERATOR TESTING AND COMMISSION PLAN

d. ARCHITECTURAL FEATURES

PRODUCT DATA/CATALOGUE CUTS/SHOP DRAWINGS/SCHEDULES: Specialty doors and frames (fire rated, sound rated, bullet resistant, security, overhead rolling); door hardware; windows; metal roofing

(including fasteners, flashing, and accessories); building insulation; fire-rated and water-resistant gypsum board; and other specialty products (bullet resistant glazing/panels).

COLOR BOARD: Architectural finishes

PRODUCT DATA/CATALOGUE CUTS/INSTALLATION INSTRUCTIONS: Exterior Insulation and Finish System (EIFS)

SHOP DRAWINGS: Casework/Cabinetry

#### **1.2.5.2 FOR INFORMATION ONLY CONSTRUCTION SUBMITTALS (FIO)**

All submittals not requiring Designer of Record or Government approval will be for information only. These construction submittals shall be checked, stamped, signed and dated by the Contractor's Quality Control Engineer, certifying that such submittal complies with the contract requirements. All Contractor submittals shall be subject to review by the Government at any time during the course of the contract. Any Contractor submittal found to contain errors or omissions shall be resubmitted as one requiring "approval". No adjustment for time or money will be allowed for corrections required as a result of noncompliance with plans or specifications. Normally submittals For Information Only will not be returned. Approval of the Contracting Officer is not required on FIO submittals. These submittals will be used for information purposes. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications and will not prevent the Contracting Officer from requiring removal and replacement if nonconforming material is incorporated in the work.

#### **1.2.5.3 VARIATIONS**

After design submittals have been reviewed and cleared for construction by the Contracting Officer, no submittal for variation shall be considered by the Government.

#### **1.2.5.4 ADDITIONAL SHOP DRAWINGS AND SUBMITTALS**

In accordance with the paragraph entitled DESIGN DISCREPANCIES, the Government may request the Contractor to provide additional shop drawing and submittal type data subsequent to completion of the design.

#### **1.2.5.5 INCOMPLETE DESIGN**

The Contractor shall not use construction submittals as a means to supplant and/or supplement an incomplete design effort.

### **1.3 SUBMITTAL CERTIFICATION**

The CQC organization shall be responsible for certifying that all submittals and deliverables have been reviewed in detail for completeness, are correct, and are in strict conformance with the contract drawings, specifications, and reference documents.

#### **1.3.1 EFFECTIVE QUALITY CONTROL SYSTEM**

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with Contract Clause 52.236-21 SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION - ALTERNATE I, and SECTION 01451 CONTRACTOR QUALITY CONTROL.

### **1.3.1.1 ORGANIZATIONAL RESPONSIBILITY**

The quality control system shall cover all design, construction, subcontractor, manufacturer, vendor, and supplier operations at any tier, both onsite and offsite.

### **1.3.1.2 CQC SYSTEM MANAGER REVIEW AND APPROVAL**

Prior to submittal, all items shall be checked and approved by the Contractor's Quality Control (CQC) System Manager. If found to be in strict conformance with the contract requirement, each item shall be stamped, signed, and dated by the CQC System Manager. Copies of the CQC organizations review comments indicating action taken shall be included within each submittal.

### **1.3.1.3 DETERMINATION OF COMPLIANCE**

Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements by the Contracting Officer. The contractor shall submit all required documentation with submittals. The U.S. Army Corps of Engineer (USACE) will not accept partial submittals.

### **1.3.2 RESPONSIBILITY FOR ERRORS OR OMISSIONS**

It is the sole responsibility of the Contractor to ensure that submittals do or do not comply with the contract documents. Government review, clearance for construction, or approval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract.

### **1.3.2.1 GOVERNMENT REVIEW**

Government review, clearance for construction, or approval of post design construction submittals shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory.

### **1.3.3 SUBSTITUTIONS**

No submittals for the purpose of substituting materials or equipment specified in the contract drawings, specifications, and reference documents shall be considered by the Government.

### **1.3.4 ADDITIONAL SUBMITTALS**

In conjunction with Contract Clause 52.236-5 MATERIAL AND WORKMANSHIP, the Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work.

### **1.3.5 UNTIMELY AND UNACCEPTABLE SUBMITTALS**

If the Contractor fails to submit submittals in a timely fashion, or repetitively submits submittals that are incomplete or not in strict conformance with the contract documents, no part of the time lost due to such actions shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

### **1.3.6 STAMPS**

Stamps shall be used by the Contractor on all design and post design construction submittals to certify that the submittal meets contract requirements and shall be similar to the following:

Contractor (Firm Name)  
Contract Number  
Contract Name

I certify that this submittal accurate, is in strict conformance with all contract requirements, has been thoroughly coordinated and cross checked against all other applicable disciplines to prevent the omission of vital information, that all conflicts have been resolved, and that repetition has been avoided and, it is complete and in sufficient detail to allow ready determination of compliance with contract requirements by the Contracting Officer.

Name of CQC System Manager: \_\_\_\_\_

Signature of CQC System Manager: \_\_\_\_\_

Date: \_\_\_\_\_

#### 1.4 **ENGLISH LANGUAGE**

All specifications, drawings, design analysis, design calculations, shop drawings, catalog data, materials lists, and equipment schedules submitted shall be in the English language.

#### 1.5 **UNITS OF MEASUREMENT**

Design documents shall be prepared in accordance with the guidance offered in SECTION 01415 METRIC MEASUREMENTS.

The metric units used are the International System of Units (SI) developed and maintained by the General Conference on Weights and Measures (CGPM); the name International System of Units and the international abbreviation SI were adopted by the 11th CGPM in 1960.

##### 1.5.1 **DRAWINGS**

###### 1.5.1.1 **SITE LAYOUT**

All site layout data shall be dimensioned in meters or coordinates, as appropriate. All details and pipe sizes shall be dimensioned in millimeters.

EXAMPLE: Masonry openings shall be a U.S. module to suit a standard U.S. door. The dimensions of the opening shall be given in SI units. Metric dimensions for site plans shall be in meters and fraction thereof. Dimensions for all other drawings shall be in millimeters using hard metric designations (example: 12 meters = 12 000). Hard metric is defined as utilizing standard metric products and the use of measurements in increments of fifty (50) and one hundred (100) millimeters.

###### 1.5.1.2 **GEO-REFERENCE**

All site plans shall be geo-referenced using the WGS 1984 coordinate system, specifically the following: WGS 1984 UTM Zone 41 or 42 N as applicable. If the designer is not able to use the stated coordinate system the coordinate system used shall be correlated to the stated coordinate system. A table shall be provided within the site drawing set cross referencing the WGS84 system to that utilized. This is required to allow AES to incorporate the plans into GIS for storage, map production, and possible geospatial analysis of the different work sites.

##### 1.5.2 **DESIGN CALCULATIONS**

Calculations shall be in SI units to meet the requirements of the design. Quantities on the contract drawings stated in SI units shall also be stated in SI units in the design analysis to match the drawings.

##### 1.5.3 **SPECIFICATIONS**

All equipment and products shall be specified according to U.S. standards and described by appropriate units as required herein.

## 1.6 WITHHOLDING OF PAYMENT FOR SUBMITTALS

### 1.6.1 DESIGN SUBMITTALS

Payment for Design work will not be made in whole or in part until the Government has reviewed and cleared the design for construction.

### 1.6.2 CONSTRUCTION SUBMITTALS

Payment for materials incorporated in the work will not be made if required approvals have not been obtained. In event under separate clause of the contract, the Contractor is allowed partial or total invoice payment for materials shipped from the Continental United States (CONUS), and/or stored at the site, the Contractor shall with his request for such payment, submit copies of approvals (ENG Form 4025) certifying that the materials that are being shipped and/or stored have been approved and are in full compliance with the contract technical specifications.

## 2.0 PRODUCTS

### 2.1 GENERAL

The following are contract deliverables which expound upon and finalize the design parameters/requirements outlined within the contract documents. They shall be prepared in such a fashion that the Prime Contractor is responsible to the Government and not as an internal document between the Prime Contractor and its Subcontractors, Vendors, Suppliers, etc.

### 2.2 PROJECT NARRATIVE

The Project Narrative shall be a bound set and shall contain the contract Sections 01010 and 01015 (and any additional sections that are appropriate). The Section 01010 and 01015 shall be the latest version. Any subsequent changes to the contract shall be clearly marked and highlighted with explanation for the changes. The Project Narrative shall also contain the general description of the project and a discussion of the design approach and design features for the project.

### 2.3 DESIGN ANALYSIS

#### 2.3.1 SUBMITTAL

**Only design analyses associated with the features of this contract design by the Contractor shall be submitted for review.** It shall be written in the English language with SI units of measure. The design analysis is a written explanation of the project design which is expanded and revised (updated) as the design progresses. The design analysis shall contain all explanatory material giving the design rationale for any design decisions which would not be obvious to an engineer reviewing the final drawings and specifications. The design analysis contains the criteria for, and the history of, the project design, including criteria furnished by the Government, letters, codes, references, conference minutes, and pertinent research. Design calculations, computerized and manual, are included in the design analysis. Narrative descriptions of design solutions are also included. Written material may be illustrated by diagrams and sketches to convey design concepts. Catalog cuts and manufacturer's data for all equipment items, shall be submitted. Specific requirements for the design analysis, listed by submittal phase, are noted in Paragraph 1.2.1.

#### 2.3.2 FORMAT

Format of design analysis shall closely match the standard format referenced within this document.

## 2.4

### DESIGN CALCULATIONS

**Only calculations associated with the features of this contract designed by the Contractor shall be submitted for review**, unless site conditions mandate changes to drawings and specifications furnished with this Contract. All design calculations shall be presented such that they are easily understood, correlated with the requirements (Section 01010 and 01015 criteria; codes; all other applicable or pertinent criteria) and all final conclusions clearly documented and summarized. The Design Submittal must include complete information (Soil Report, percolation test results, concrete design strengths, steel material properties, electrical loads, heat gain/loss assumptions, etc.) necessary to support all design calculations in order to easily and efficiently verify the accuracy of this information and the resulting project components shown in plans and specifications.

#### 2.4.1

##### SUBMITTAL

When design calculations are voluminous, they shall be bound separately from the narrative part of the design analysis. Design calculations will include a title page, table of contents, and be indexed (tabbed) to separate distinct parts of the various analysis and design actions being accomplished to support plan drawings submitted. They shall be presented in a clear, consistent and legible format in order to quickly understand the analysis and design accomplished. Presentation shall be such that a person unfamiliar with the project features and associated analysis and design can quickly understand the overall design process and procedures, review the information in conjunction with the given set of plans and specifications, and verify the suitability of all information submitted.

All design calculations shall explain the source of loading conditions with assumptions and conclusions explained. The analysis and design methods shall also be explained, including assumptions, theories and formulae. Include applicable diagrams that are clearly explained and correlated with related computations, whether computer or hand generated. The design calculations shall include a complete and comprehensive list of the criteria (and date or version of the criteria) that the design/analysis will be compared to (codes, Corps of Engineers Engineering Regulations, Engineering Manuals, etc.). Within the separable elements of design calculations, the engineer shall cite the specific code or reference paragraph or section as appropriate to indicate conformance to requirements.

At the beginning of each project component design section, present a summary of all load conditions and combinations required per applicable code or Corps of Engineers manual or regulation. Then clearly identify the particular load case governing the design and clearly show how the particular analysis, construction materials to be used, and the specific design meet the governing load combination.

Calculation sheets shall carry the names or initials of the engineer and the checker and the dates of calculations and checking. No portion of the calculations shall be computed and checked by the same person.

#### 2.4.2

##### COMPUTER ANALYSIS

Provide a clear summary of all computer outputs and highlight in the outputs information used in the analysis and design accomplished elsewhere in the calculations.

If a computerized analysis or design program is used (either commercial software packages or unique, designer-written computer analysis/design tools), the computations shall provide clear reference to the software program and version being used and an explanation of the validity of the particular program to the given application (where has the program been used before, what input and output does the program provide, is the program a recognized Corps of Engineers or industry standard). If the program is proprietary to the Contractor (not recognized by the Corps of Engineers or industry), the Contractor shall provide a sample hand calculation to verify the results of one set of data generated by the computer program.

State exactly the computation performed by the computer. Include applicable diagrams, adequately identified. Provide all necessary explanations of the computer printout format, symbols, and abbreviations. Use adequate and consistent notation. Provide sufficient information to permit manual checks of the results.

Each set of computer printouts shall be preceded by an index and by a description of the computation performed. If several sets of computations are submitted, they shall be accompanied by a general table of contents in addition to the individual indices.

When the computer output is large, it shall be divided into volumes at logical division points. All final computer results used in design shall be separated from the total pages of computer output that might be included in the design calculations for ease of review.

## 2.5 SPECIFICATIONS

**Only specifications produced by the Contractor should be submitted for review.**

Specifications shall be prepared in accordance with the UFGS (Uniform Facilities Guide Specifications) format. Contractor-prepared specifications shall include as a minimum, all applicable specification sections referenced by the UFGS. Where the UFGS does not reference a specification section for specific work to be performed by this contract, Contractor shall be responsible for creating the required specification in the UFGS format.

### 2.5.1 USE OF UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS (Uniform Federal Guide Specifications) are required when U.S. products and systems are required or used. Current UFGS information may be obtained at the following location:

[http://www.wbdg.org/ccb/browse\\_org.php?o=70](http://www.wbdg.org/ccb/browse_org.php?o=70).

Specifications for UFGS are in SpecsIntact format. SpecsIntact is government sponsored software used to edit specifications for government contracts. The software is available at the following link:

<http://specsintact.ksc.nasa.gov/index.asp>.

### 2.5.2 QUALITY CONTROL AND TESTING

Any additional specifications deemed necessary by the Contractor shall include required quality control and further indicate all testing to be conducted by the Contractor, its subcontractors, vendors and/or suppliers.

### 2.5.3 AMBIGUITIES AND INDEFINITE SPECIFICATIONS

Ambiguities, indefinite specification requirements (e.g., highest quality, workmanlike manner, as necessary, where appropriate, as directed etc) and language open to interpretation is unacceptable.

### 2.5.4 INDUSTRY STANDARDS

#### 2.5.4.1 U.S. INDUSTRY STANDARDS

The Specifications shall be based on internationally accepted U.S. industry Standards. Customarily accepted publications may be found in the UNIFIED MASTER REFERENCE LIST (UMRL) which may be located at the following URL: <http://www.hnd.usace.army.mil/techinfo/UFGS/UFGSref.htm>.

To access the UMRL select the “Unified Facilities Guide Specifications” tab and scroll down to Unified Master Reference List (UMRL) (PDF version).

Examples of U.S. standards are: National Fire Protection Association (NFPA), International Building Code (IBC), American Concrete Institute (ACI), American Water Works Association (AWWA), ADAAG (ADA Accessibility Guidelines) for Buildings and Facilities, etc. Standards referenced shall be by specific issue; the revision letter, date or other specific identification shall be included.

This document lists publications referenced in the Unified Facilities Guide Specifications (UFGS) of the Corps of Engineers (USACE), the Naval Facilities Engineering Command (NAVFAC), the Air Force Civil Engineer Support Agency (AFCESA), and the guide specifications of the National Aeronautics and Space Administration (NASA). This document is maintained by the National Institute of Building Sciences (NIBS) based on information provided by the agencies involved and the standards producing organizations. The listing is current with information available to NIBS on the date of this publication.

Standards referenced in specifications and drawings prepared by the Contractor shall be by specific issue; the revision letter, date or other specific identification shall be included.

2.5.5 **AED DESIGN REQUIREMENTS DOCUMENTS**

AED Design Requirements (latest version) documents listed in section 01015, shall be adhered to in this contract. These documents are available from the COR. These documents shall be used as the basis for design and construction, and for selecting options within the United Facilities Guide Specifications (UFGS). It is the contractor’s option to use specifications contained in the AED Design Requirements Documents, when provided, or to adapt the UFGS specifications to match the requirements provided in the AED Design Documents and specifications. Site or project specific data and requirements in the AED Design Requirements documents shall supersede UFGS language where there are perceived conflicts.

2.6 **DRAWINGS**

2.6.1 **COMPUTER ASSISTED DESIGN AND DRAFTING (CAD)**

Computer Assisted Design and Drafting (CAD) is required for all Afghanistan Engineer District South contracts. Only personnel proficient in the preparation of CAD drawings shall be employed to modify the contract drawings or prepare new drawings. The CAD deliverables shall meet the requirements of the A/E/C CAD Standards (V 3.0 or newer). The A/E/C CAD Standards may be downloaded at the CAD/BIM Technology Center at the following link: <https://cadbim.usace.army.mil/default.aspx?p=s&t=13&i=4> or the website <http://www.aed.usace.army.mil/engineeringtop2010.asp> under the “Government Provided CAD Files” link.

The Contractor shall furnish all softcopy design submittals (and As-Builts) using software applications in either DWG format (Auto Desk, AutoCad Release 2009 or newer) or DGN format (Bentley Systems, MicroStation, version 8.0 or newer). Use of unregistered or student copies of software applications to prepare design drawings **IS NOT PERMITTED**. In addition, the Contractor is required to submit the softcopy design submittals in PDF (Adobe Acrobat) format.

CD media submitted containing the softcopy design submittals shall be organized per the instructions below and the diagram in Section 1335a:

CD Title:

Project Name and Location:

Project Number:

Submittal Number:

Date:

Contractor Name, Address, Telephone Number and email

Folders and Folder Contents/Structure:

Main Folder Name	Subfolders, Files and File Format	Description
Administrative	Multiple PDF files	Files shall include the contract, task order, approved modifications, approved BCDs, approved variations and non-administrative modifications (do not provide time extensions, COR appointments, and Requests for Information/responses, etc).
Design Analysis	One pdf file with identical contents as the printed document of the submittal.	All data, discussion, calculations and information presented in the printed Design analysis.
Specifications	One folder specifications in word format.	All specification sections including table of contents edited as appropriate

	One folder with specifications in pdf format.	for the submittal stage of the project <sup>2</sup> .
Geotechnical Report	One file in pdf format	All data, graphs, charts and tables generated during the geotechnical investigation.
PDF Drawings	One Binder of pdf files.	PDF Drawings. Files will be saved in a Binder and organized in the same order as indicated on the sheet index
CAD Drawings	DGN or DWG files organized in the following folders. Each folder shall contain only drawings pertaining to that discipline.  General (Cover Sheet/ Index of Drawings, Vicinity Maps) Civil Architectural Structural Mechanical Plumbing Electrical Telecommunications	CAD Drawings.  All referenced files are to be attached without drive or directories and placed in the same folder it is referencing. Do not save or use paths. Do not use live nesting when attaching reference files.

Notes:

1. The administrative folder shall provide documents submitted by the contractor and received from the COR related to the contract. These documents shall include Requests for Information related to design issues, Variation Requests, Modifications to the Contract. In addition, the folder shall contain a copy of the signed contract, relevant task orders and change orders.
2. DO NOT INCLUDE standard drawings or specifications provided to the Contractor as part of this document or as part of the contract.

2.6.2 **DRAWINGS**

Drawings shall be prepared in the English language with metric (SI) units of measure. All the drawings and details of the working drawings shall be adequately labeled, cross-referenced, and thoroughly checked and coordinated with other engineering disciplines. At the final design submittal (100%) the Contractor shall have incorporated all design review comments generated by previous design review(s), have completed all of the constructability and coordination comments, and have the drawings in a Ready-to-Build condition. The drawings shall be complete at this time and contain all the details necessary to ensure a clear understanding of the work throughout construction. Prior to submitting the 100% Final Design drawings, the Contractor shall follow the procedures as described in Section 3 of the AED Design Requirements for CAD Design Guide.

2.6.3 **DRAWING SIZE BORDER SHEETS**

All drawings shall be prepared in size "A1" border sheets (594mm by 841mm). Hardcopy design submissions may be printed on half size drawing sheets ("A3", 279 mm by 420 mm) for purposes of saving paper and for ease of review. If drawings are not readable in the half size reduction, the Contractor shall submit all drawings in A1 border sheets. All final contract drawing sets (As-Builts) shall be submitted on A1 border sheets. Drawing sheets shall be trimmed to specified size if necessary.

#### 2.6.4 SEQUENCE OF DESIGN DRAWINGS

Referencing the A/E/C CADD Standard (pg. 13, Table 2-1 of the A/E/C CADD standards) the sequence of drawings shall follow the sequence as shown below:

##### Discipline

1. General
2. Hazardous Materials
3. Survey/Mapping
4. Geotechnical
5. Civil
6. Landscape
7. Structural
8. Architectural
9. Interiors
10. Equipment
11. Fire Protection
12. Plumbing
13. Process
14. Mechanical
15. Electrical
16. Telecommunications
17. Resource
18. Other Disciplines
19. Sub-Contractor/Shop Drawings
20. Operations

#### 2.6.5 DRAWING FOLDER STRUCTURE

CADD files shall be organized in folder names as described in Paragraph 2.6.4. For multi-building projects, a folder of each building type shall be created and the applicable folders shown in each building type folder.

#### 2.6.6 DRAWING SHEET ASSEMBLY

CAD files will be organized in what is described as “**Option 1a**” (page 9 in the A/E/C CAD Standards Drawing Sheet Assembly manual), normally referred to as “Model Space and Paper Space” in Autodesk Autocad applications and “Design Model and Sheet Model” in Bentley Microstation applications. All files will be drawn consistently in the same manner using this option throughout the entire project.

#### 2.6.7 MODEL FILES

Model files represent the building’s physical layout and components such as floor plans, elevations and details. Model files shall be drawn to full size (1:1) in metric units in the default model view. Floor Plan Model files

represent one floor. Example: do not use one model drawing file to draw several floor plan drawings with several border files. One paper space layout shall be provided per plotted sheet. Model files being referenced into another shall have insertion coordinates (x,y,z) of 0,0,0 in model space. The exception for model files with insertion coordinates other than 0,0,0 shall be the civil site plans (using Georeferencing and real-world coordinates.) Dimensioning shall be in millimeters unless noted otherwise, drawn associatively, and not be “forced”. Example: if a wall is drawn 1:1, as 150 mm but the dimensioned number is modified to 200, this is unacceptable.

**2.6.8 BORDER SHEET FILES**

Border sheet files are referenced into drawing files (in Paper Space) for plotting and viewing purposes. Every border sheet file has a drawing area, Title Block information and sheet trim border. The Afghanistan Engineer District – South uses a common Title Block sheet border for each project. The project Title Block sheet border with "sheet independent" data is referenced into each drawing. When a drawing file is created, "sheet dependent" Title Block data, such as the Sheet Identification and Title, is added to the specific drawing file and located in Paper Space where the Title Block is referenced and viewed. AED-S Title Block drawings may be downloaded at : <http://www.aed.usace.army.mil/engineeringtop2010.asp> under the “Government Provided CAD Files” link.

**2.6.9 LAYER/LEVEL NAMES**

Layer or level files names shall follow the guidelines of the A/E/C CAD Standards V4.0. For AutoCAD, [discipline].dwt (drawing template files) shall be used to import the proper layers that will be inclusive of the correct line type, color, and line thickness of the respective layer. Templates to be used are found on the CAD/BIM Technology Center at the following link: <https://caddim.usace.army.mil/default.aspx?p=s&t=13&i=4>, or at the website: <http://www.aed.usace.army.mil/engineeringtop2010.asp> under the “Government Provided CAD Files” link.

**2.6.10 DRAWING FILE NAMING CONVENTION**

The sheet identifier will consist of the discipline designator, the sheet type designator and the sheet sequence number as referenced in the A/E/C CAD Standards V4.0.

**2.6.11 SHEET IDENTIFICATION BLOCK**

The sheet identifier will follow the format of the border sheet file. This will consist of the discipline designator, the sheet type designator and the sheet sequence number as referenced in the A/E/C CAD Standards Manual.

**2.6.12 DRAWING SCALES**

The scales indicated on the following list shall, in general, be used for all drawings. Bar scales shall be provided on drawings as printed copies may lose their plotted scale through generational copying.

<b>TYPICAL DRAWING SCALES</b>	
<b>DRAWING TYPE</b>	<b>METRIC</b>
SITE PLAN	1:200
	1:400
	1:500
	1:600
	1:700
	1:1000
	1:2000

	1:5000
	1:6000
	1:10000
	1:20000
FLOOR PLAN	1:50
	1:100
	1:200
ROOF PLAN	1:200
EXTERIOR ELEVATIONS	1:100
	1:200
INTERIOR ELEVATIONS	1:50
	1:100
CROSS SECTIONS	1:50
	1:100
	1:200
WALL SECTIONS	1:20
STAIR DETAILS	1:10
DETAILS	1:5

2.6.13 **SYMBOLS, LINE STYLES, & PATTERNS**

Approved symbols, line styles, and patterns shall be in accordance with AEC CAD Standard Release 3.0 or current version (see Appendix D of the A/E/C CADD Standards). The approved symbols, line styles, and patterns associated with AutoCAD software may be downloaded in the following link:

<https://tsc.wes.army.mil/products/standards/aec/aecstdsym.asp>

2.6.14 **PLOTTER PREPARED ORIGINAL DRAWINGS AND PDF FILES**

Design files shall be developed in anticipation of plotting on a monochrome, vector plotter. Line density shall be equivalent to that produced by black India ink: half tone plots are only acceptable where the half-tone color setting of RGB (red, green blue) settings equal a value of 153. (Please refer to the A/E/C CAD Standards). Drawings plotted in color are not acceptable. Manual changes to plotted originals are not acceptable. A separate Adobe PDF file shall be made of each drawing file oriented in "Landscape". Each PDF drawing file shall then be compiled into one "binder" PDF file for each set of drawings following the order of the Sheet Index.

2.6.15 **TITLE AND REVISION BLOCK**

Only AED-S Title and Revision Blocks are allowed. These are available at the website for download at: <http://www.aed.usace.army.mil/engineeringtop2010.asp> under the "Government Provided CAD Files" link.

2.6.16 **LEGENDS**

For each submittal, legends of symbols and lists of abbreviations shall be placed on the drawings. They shall include all of the symbols and abbreviations used in the drawing set, but shall exclude any symbols and abbreviations not used. Since many symbols are limited to certain design disciplines, there is a definite advantage to

the use of separate legends on the initial sheet of each design discipline or in the Standard Details package for each discipline. If legends have not been shown by discipline, a legend shall be placed on the first drawing.

#### 2.6.17 **LOCATION/COLUMN GRID**

To facilitate the location of project elements and the coordination of the various disciplines' drawings, all plans shall indicate a column line or planning grid, and all floor plans (except structural plans) shall show room numbers.

#### 2.6.18 **COMPOSITE AND KEY PLANS**

If the plan of a large building or structure must be placed on two or more sheets in order to maintain proper scale, the overall plan (key plan) shall be placed on one sheet at a smaller scale to accommodate entire building/site. Key plans shall be used not only to relate large scale plans to total floor plans but also to relate individual buildings to large complexes of buildings. This key plan with match lines shall be referenced on all segmented drawings and shall be placed in a convenient location to indicate the relative location of the represented plan area by crosshatching.

#### 2.6.19 **SPECIFICATIONS PLACED ON THE DRAWINGS**

Details of standard products or items which are adequately covered by specifications shall not be included on the drawings.

#### 2.6.20 **REVISIONS**

Drawing revisions shall be prepared only on the original CAD files. A revision history (located in the Title Block) is required on all sheets.

#### 2.6.21 **BINDING**

All volumes of drawing prints shall be firmly bound and shall have covers of heavier bond than the drawing sheets. If posts are used to fasten sheets together, the drilled holes on the bond edges of the sheets shall be on 8-1/2-inch centers.

#### 2.6.22 **GOVERNMENT PROVIDED FILES**

All CAD related files provided by the Government to the Contractor will be in either AutoCad or MicroStation formats.

The following files will be provided:

Afghanistan Engineering District-South Title Block sheet  
Cover and Index sheet files

Template files may be downloaded through the following website:

<http://www.aed.usace.army.mil/engineeringtop2010.asp> under the "Government Provided CAD Files" link.

If Contractor is unable to access this site, a CD will be provided upon request to the Project Manager.

### **3.0 EXECUTION**

#### **3.1 GENERAL**

##### **3.1.1 DESIGN CONCEPT COORDINATION MEETING**

Shortly after Notice To Proceed (NTP) the Government may require meeting(s) to review the Design Submittal process or discuss various aspects of the contract to enable prompt and efficient initiation of contract actions. Meeting(s) will be held to assure attention is focused on key project requirements (necessary Contractor design and Government review that is required to provide Construction Clearance), to discuss features and items of work that need to be submitted early due to long lead time items, or discuss other concepts/ideas that will help accelerate the contract work. Other Design Coordination meetings may be requested throughout the contract period if Government review of various Contractor Design Submittals indicate poor design and plan or specification quality in order to clearly explain the changes and improvements required of the contractor, assure understanding of Government comments, code references and required investigations and calculations, to move forward with acceptable design and satisfactory plans and specifications.

##### **3.1.2 GOVERNMENT DESIGN CHANGES**

Government design changes which do not increase construction costs shall be made at no charge to the Government. The Contracting Officer may request design submittals in addition to those listed when deemed necessary to adequately describe the work covered in the contract documents. Submittals shall be made in the respective number of copies and to the respective addresses set forth in the paragraph entitled SUBMITTAL PROCEDURE. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements.

#### **3.2 SUBMITTAL REGISTER**

##### **3.2.1 DESIGN SUBMITTALS**

The Contractor shall submit as part of his Project Schedule Design Submittal milestone dates. The Contractor shall post all actual dates of submittal actions (including clearance for construction) as they occur.

##### **3.2.2 CONSTRUCTION SUBMITTAL REGISTER (ENG FORM 4288)**

Attached to this section is ENG Form 4288 which the Contractor is responsible for developing for this contract. All design and construction submittals shall be shown on this register. The submittal register shall be the controlling document and will be used to control all submittals throughout the life of the contract. The Contractor shall maintain and update the register on a monthly basis for the Contracting Officer's approval.

#### **3.3 TRANSMITTAL FORM (ENG FORM 4025)**

The sample transmittal form (ENG Form 4025) attached to this section shall be used for submitting both design and construction submittals in accordance with the instructions on the reverse side of the form. These forms will be furnished to the Contractor. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care will be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

#### **3.4 PROGRESS SCHEDULE**

The Contractor shall prepare and submit a design progress schedule to the Contracting Officer. The Critical Path Method (CPM) of network calculation shall be used to generate the Project Schedule. The progress schedule shall show, as a percentage of the total design price, the various items included in the contract and the order in which the Contractor proposes to carry on the work, with dates on which he will start the features of the work and the contemplated dates for completing same. Significant milestones such as review submittals shall be annotated. The

Contractor shall assign sufficient technical, supervisory and administrative personnel to insure the prosecution of the work in accordance with the progress schedule. The Contractor shall correct the progress schedule at the end of each month and submit as required to the Contracting Officer. The approved Project Schedule shall be used to measure the progress of the work, to aid in evaluating time extensions, and to provide the basis of all progress payments.

### 3.5 SCHEDULING

#### 3.5.1 DESIGN SUBMITTALS

Adequate time (a minimum of fourteen (14) full calendar days exclusive of mailing time) shall be allowed for AES review and comment in DrChecks<sub>SM</sub>. **This time period starts on the next full day after delivery of the Design Submittal to both AES and the Area Office. If a Design Review is received by AES or the Area Office but not the other, the design review does not start until both AES and the Area Office have full design submittals.** If the Contractor fails to submit design submittals in a timely fashion, or repetitively submits design submittals that are not in strict conformance with the Contract documents, no part of the time lost due to such actions shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

#### 3.5.2 CONSTRUCTION SUBMITTALS

Contractor furnished Government Approved Construction Submittals (GA) for items noted in Paragraph 1.2.5 of this Section, or others as required by the COR, shall be submitted to the Area or Resident Office, per directions given at the Pre-Construction meeting. Adequate time (a minimum of fourteen (14) full calendar days exclusive of mailing time) shall be allowed for AED review and comment.

#### 3.5.3 POST DESIGN CONSTRUCTION SUBMITTALS

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of fourteen (14) full calendar days exclusive of mailing time) shall be allowed for review and approval. If the Contractor fails to submit post design construction submittals in a timely fashion, or repetitively submits submittals that are not in strict conformance with the Contract documents, no part of the time lost due to actions shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

### 3.6 SUBMITTAL PROCEDURE

#### 3.6.1 DESIGN SUBMITTALS

##### 3.6.1.1 AFGHANISTAN ENGINEER DISTRICT SOUTH (AES)

One (1) half-size hard copy and two (2) soft copies (electronic version) of all design submittals (calculations, reports of field tests, design analysis, plans, specifications, etc) shall be transmitted to the Government at the following address, by means of ENG Form 4025:

#### AFGHANISTAN ENGINEER DISTRICT SOUTH (AES)

- (1) DHL, FEDEX, UPS or any other courier service:
  - U.S. Army Corps of Engineers
  - Afghanistan Engineer District-South
  - Kandahar Air Field
  - USACE-TAS
  - APO AE 09355
  - Attention: Chief, Engineering Branch

The soft copy (electronic version) and CD case shall both be clearly labeled (hand written information is not acceptable – typed labels are required) with contract information (contract #, title, contractor name, specific design submittal stage including if it is a Resubmittal, date of submission, components of the submittal – design analysis, plans, specifications, and if more than one CD then state 1 of “X”, 2 of “X”, etc., anti-virus information below, etc.)

The Contractor shall scan the soft copy (electronic version) of each Design Submittal using most up-to-date version of recognized Industry-standard anti-virus software (Symantec, Norton, etc.) to insure that no viruses are contained in it prior to acceptance by AES. The label shall indicate it has been scanned for viruses and the anti-virus software and version clearly indicated.

### **3.6.1.2 RESIDENT/AREA ENGINEER OFFICE**

Complete design submittals shall be provided to the Area and/or Resident Engineer Office such that these are received **at the same time** as these submittals are delivered to the AES address in Para. 3.6.1.1. At the Pre-Construction meeting, the Contractor will be furnished the Area and/or Resident Office address to which these submittals shall be provided along with the number and size of hard and soft (electronic version) copies required for these offices. As per Paragraph 3.6.1.1, soft copies are to be properly labeled and checked for viruses by the contractor prior to delivery.

### **3.6.1.3 EDITABLE CAD FORMAT AS-BUILTS**

In accordance with Contract Clause 52.227-7022 GOVERNMENT RIGHTS (UNLIMITED), the Government has non-exclusive rights to use the design on other projects. Therefore, the As-Builts furnished to the Government must be in an editable format. See Section 01780A CLOSEOUT SUBMITTALS, Paragraphs 1.1 and 1.2, for all requirements associated with submission of editable CAD format As-Builts required as part of this contract.

### **3.6.2 POST DESIGN CONSTRUCTION SUBMITTALS**

One (1) copy of all post design construction submittals shall be transmitted to:

AFGHANISTAN ENGINEER DISTRICT SOUTH (AES)

(1) DHL, FEDEX, UPS or any other courier service:

U.S. Army Corps of Engineers  
Afghanistan Engineer District-south  
Kandahar Air Field  
USACE-TAS  
APO AE 09355  
Attention: Chief, Engineering Branch

### **3.6.3 SUBMITTAL NUMBERING SYSTEM**

Instructions on the numbering system to be used for construction submittals follows.

#### **3.6.3.1 SUBMITTALS**

Shop drawings and materials are listed on the Submittal Register (ENG Form 4288) as follows:

14. List is prepared according to contract specifications and drawings, picking up all items involved in the project.
- 15.
16. This list is divided into sections as indicated in the specifications. For example:
17.
  - Section 01015 "Technical Requirements"
  - Section 01335 "Design Submittals"

Section 02831	"Chain-Link Fence"
Section 02710	"Sub-drainage System"
Section 03300	"Concrete For Building Construction"
Section 04200	"Masonry"

### 3.6.3.2 NUMBERING PROCEDURES FOR TRANSMITTAL ON ENG FORM 4025

Each Specification Section will have various requirements for submittals (design information, product data, test reports, procedures, etc.) to the Government for Approval (GA) or For Information Only (FIO). Items from different Sections cannot be submitted on the same ENG Form 4025. When furnishing one or more items from the same Section at a given time, a single ENG Form 4025 can be used to identify and submit these items. Block ‘b’ of the 4025 entitled “DESCRIPTION OF ITEM SUBMITTED” should provide an accurate and unique description of each item being proposed by the Contractor. Item numbers (block “a” of the 4025 entitled “ITEM NO.”) will be automatically generated in QCS for each ENG Form 4025. QCS will track and automatically generate the “ITEM NO.” for all following ENG Form 4025s for the same Section number. To illustrate, a transmittal for the 65% Design Submittal required by Section 01335 might have the following Items:

ITEM NO. 1	Topographic Information
ITEM NO. 2	Geotechnical Report
ITEM NO. 3	Foundation Design
ITEM NO. 4	65% Plans
ITEM NO. 5	Outline of Construction Specifications to be used

If this was the first submittal furnished by the Contractor for Section 01335, then a Transmittal Number of 01335-1 would be generated using QCS. As new transmittals are generated in QCS, the last digit of the transmittal is increased incrementally, as follows:

Transmittal No. 01335-2
Transmittal No. 01335-3
Transmittal No. 01335-4

and so forth. The first transmittal submitted from each Specification Section will be “-1”, in other words, there will never be a “Transmittal No. 01335-0”.

The above illustration is true for all other Specification Sections included in the Request for Proposal or in the Construction Specifications compiled by the Contractor in the prosecution of work under the RFP.

### 3.6.3.3 RESUBMITTALS

Should the Contractor be required to resubmit any transmittal due to one or more items on that transmittal being Coded “C” (Cleared for Construction, except as noted in attached comments, Resubmission Required) or “E” (NOT Cleared for Construction, see attached comments, resubmission required) by the Government, QCS will be used to generate the same transmittal number followed by the number “-1” for the first re-submittal, “-2” for the second re-submittal, “-3” for the third re-submittal, etc.

As an example, assume the 65% Design Submittal is provided to the Government as Transmittal 01335-9. Due to omissions or errors in that Submittal which result in a Code “E” being given, then the subsequent 65% Design Re-submittal #1 would be “Transmittal 01335-9.1”. Should a re-submittal again be necessary, it would be Design Re-submittal #2 and would be submitted as “Transmittal 01335-9.2”.

The purpose of this system is to avoid deviations from the Submittal Register and to track submittals in both RMS and DrChecks<sub>SM</sub>. It should be noted that a new transmittal number following the above system CANNOT be generated in QCS unless the prior transmittal has been given a Code. If the Contractor is having difficulty generating the correct transmittal number, contact the COR to resolve the matter.

The Contractor use the above nomenclature and date of submission to the Government for Plan Cover Sheets; title blocks for all drawings; all Specification Cover Sheets; all specification pages; all Design Analysis Cover Sheets and associated pages; and similar labeling for all other documents included in the submittal.

See the attachment titled "1335a-Attachments-AES.pdf" (Figures 1-4) for required Title Block Required Annotations drawing guidance.

#### 3.6.4 **VARIATIONS**

If design or construction submittals show variations from the contract parameters and/or requirements due to site conditions, the Contractor shall justify such variations in writing, at the time of submission. Additionally, the Contractor shall also annotate block "h" entitled "variation" of ENG FORM 4025. After design submittals have been reviewed and cleared for construction by the Contracting Officer, no resubmittal for the purpose of substituting materials, equipment, systems, and patented processes shall be considered.

#### 3.6.5 **NON-COMPLIANCE**

The Contracting Officer will notify the Contractor of any detected noncompliance with the requirements of this specification. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the worksite, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

### 3.7 **REVIEW OF CONTRACTOR PREPARED DESIGN DOCUMENTS**

#### 3.7.1 **GENERAL**

The work under contract will be subject to continuous review by representatives of the Contracting Officer. Additionally, joint design review conferences with representation by all organizations having a direct interest in the items under review may be held. The Contractor shall furnish copies of all drawings and related documents to be reviewed at the review conference on or before the date indicated by the Government. Additional conferences pertaining to specific problems may be requested by the Contractor or may be directed by the Contracting Officer as necessary to progress the work. The Contractor shall prepare minutes of all conferences and shall furnish two copies to the Contracting Officer within seven (7) days after the conference.

#### 3.7.2 **INDEPENDENT DESIGN REVIEW**

The Contractor shall have someone other than the Designer or Design Team perform an independent technical review of all specifications, drawings, design analysis, calculations, and other required data prior to submission to the Government. This review shall insure the professional quality, technical accuracy, and the coordination of all design analysis, drawings and specifications, and other services furnished under this contract have been accomplished. Work must be organized in a manner that will assure thorough coordination between various details on drawings, between the various sections of the specifications, and between the drawings and specifications. The Contractor shall thoroughly cross-check and coordinate all work until he is professionally satisfied that no conflicts exist, vital information has not been omitted, and that indefinite language open to interpretation has been resolved. Upon completion of this review, the Contractor shall certify that each design submittal is complete, accurate, is in strict conformance with all contract requirements, that repetition has been avoided, that all conflicts have been resolved, and that the documents have thoroughly coordinated and cross checked against all the applicable disciplines to prevent the omission of vital information.

#### 3.7.3 **CONTRACTOR'S QUALITY CONTROL ORGANIZATION REVIEW**

The Contractor shall thoroughly review each submittal prior to submission to the Contracting Officer to assure it is complete, correct and unified. This review shall be for the purposes of eliminating errors, interferences, and inconsistencies, and of incorporating design criteria, review comments, specifications, and any additional

information required. The Contractor shall give evidence of such review of all items in each submittal ENG Form 4025, by annotating Column “g” (titled “For Contractor Use Code”) of this Form with the letter “A,” meaning the Contractor has reviewed it and is indicating it is “Approved as Submitted”. Design submittals submitted to the Contracting Officer without evidence of the above requirements or the Contractor's certified approval will be returned for resubmission. No part of the time lost due to such resubmissions shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

#### 3.7.4 GOVERNMENT REVIEW

18. Within 14 days after Notice to Proceed, the Contractor shall submit, for approval, a complete design schedule with all submittals and review times indicated in calendar dates. The Contractor shall update this schedule monthly. After receipt, the Government will be allowed fourteen (14) full days to review and comment on all Design Submittals, except as noted below. This time period starts on the next full day after delivery of the Design Submittal to AES.
19. If a design submittal is deficient (errors on ENG Form 4025; incorrect drawing title block information; missing or incomplete features required in the submittal; etc.), it will be returned immediately without further review for correction and resubmission. The review time will begin when the corrected submittal is received. The Contractor may be liable for liquidated damages owed to the Government for returned design submittals due to deficiencies.
20. The contractor shall not begin construction work until the Government has reviewed the Contractor's Design Submittal and cleared it for construction. Clearance for construction does not mean Government approval. Government review shall not be construed as a complete check but will evaluate the general design approach and adherence to contract parameters. The Government Review is often limited in time and scope. Therefore, the Contractor shall not consider any review performed by the Government as an excuse for incomplete work.
21. Upon completion of the review the Contractor will be notified by the Contracting Officer Representative that the DrChecks<sub>SM</sub> file is open for viewing and response to AES comments. The Contracting Officer will indicate whether the Design Submittal, or portions thereof, has or has not been cleared for construction using the following action codes:
  - A – Cleared for Construction
  - B – Cleared for Construction, except as noted in attached comments
  - C – Cleared for Construction, except as noted in attached comments, resubmission required
  - E - NOT Cleared for Construction, see attached comments, resubmission required
  - FX – Receipt acknowledged, does not comply as noted with contract requirements.

These codes shall NOT be used by the Contractor.

Design submittals Cleared for Construction by the Contracting Officer shall not relieve the Contractor from responsibility for any design errors or omissions and any liability associated with such errors, nor from responsibility for complying with the requirements of this contract.

##### 3.7.4.1 INCORPORATION OF GOVERNMENT REVIEW COMMENTS

22. The Contractor shall review each comment, furnish a complete response in DrChecks<sub>SM</sub> as to how the comment will be addressed in the Design Analysis, Plans and Specifications, or other Design Submittal stipulations required in this Contract. The Contractor will then incorporate each comment into the design

submittal along with other work required at the next Design Submittal stage. The Contractor shall furnish disposition of all comments in DrChecks<sub>SM</sub>, with the next scheduled submittal. The disposition shall identify action taken with citation of location within the relevant design document. Generalized statements of intention such as "will comply" or "will revise the specification" are not acceptable. During the design review process, comments will be made on the design submittals that will change the drawings and specifications. The Government will make no additional payments to the Contractor for the incorporation of comments. Review comments are considered part of the contract administration process.

23. If the Contractor disagrees technically with any comment or comments and does not intend to comply with the comment, he must clearly outline, with ample justification, the reasons for noncompliance within five (5) days after close of review period in order that the comment can be resolved.
24. The Contractor is cautioned that if he believes the action required by any comment exceeds the requirements of this contract, he should flag the comment in DrChecks<sub>SM</sub> as a scope change, and notify the COR in writing immediately.
25. If a design submittal is over one (1) day late in accordance with the latest design schedule, the Government review period may be extended 7 days. Submittal date revisions must be made in writing at least five (5) days prior to the submittal.

#### **3.7.4.2 CONFERENCES**

As necessary, conferences will be conducted between the Contractor and the Government to resolve review comments.

A review conference may be held at the completion of AES review and subsequent Contractor response for each design submittal. The review conference will be held at the Corps District Office in Kandahar, Afghanistan. The Contractor shall bring the personnel that developed the design submittal to the review conference.

#### **3.7.4.3 DESIGN DEFICIENCIES**

Design deficiencies noted by the Government shall be corrected prior to the start of design for subsequent features of work which may be affected by, or need to be built upon, the deficient design work.

#### **3.7.5 DESIGN DISCREPANCIES**

The Contractor shall be responsible for the correction of incomplete design data, omissions, and design discrepancies which become apparent during construction. The Contractor shall provide the Contracting Officer with a proposed recommendation for correcting a design error, within three (3) calendar days after notification by the Contracting Officer. The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the worksite, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor. Should extensions of design, fabrication plans and/or specific manufacturer's details be required as a result of a Government issued Change Order, the Government will make an equitable adjustment in accordance with Contract Clause 52.243-4 entitled CHANGES.

### **3.8 PHASED OR "FAST-TRACK" DESIGN**

#### **3.8.1 GENERAL**

If approved by the Government, design and construction sequencing may be effected on an incremental basis as each approved phase or portion (e.g., demolition, geotechnical, site work, exterior utilities, foundations,

substructure, superstructure, exterior closure, roofing, interior construction, mechanical, electrical, etc.) of the design is completed.

### 3.8.2 **SEQUENCE OF DESIGN-CONSTRUCTION (FAST-TRACK)**

After receipt of the Contract Notice to Proceed (NTP) the Contractor shall initiate design, comply with all design submission requirements and obtain Government review of each submission. The contractor may begin construction on portions of the work for which the Government has reviewed the final design submission and has determined satisfactory for purposes of beginning construction. The Contracting Officer will notify the Contractor when the design is cleared for construction. The Government will not grant any time extension for any design resubmittal required when, in the opinion of the Government, the initial submission failed to meet the minimum quality requirements as set forth in the contract.

### 3.8.3 **NOTICE-TO-PROCEED FOR LIMITED CONSTRUCTION**

If the Government allows the Contractor to proceed with limited construction based on pending minor revisions to the reviewed Final Design submission, no payment will be made for any in-place construction related to the pending revisions until they are completed, resubmitted and are satisfactory to the Government.

### 3.8.4 **IN-PLACE CONSTRUCTION PAYMENT**

No payment will be made for any in-place construction until all required submittals have been made, reviewed and are satisfactory to the Government.

### 3.8.5 **COMMENCEMENT OF CONSTRUCTION**

Construction of work may begin after receipt of the clearance for construction (Notice to Proceed) for each design phase. Any work performed by the Contractor prior to receipt of the clearance for construction, shall be at the Contractor's own risk and expense. Work cleared for construction that does not conform to the design parameters and/or requirements of this contract shall be corrected by the Contractor at no additional cost or time to the Government.

## 3.9 **CONDUCT OF WORK**

### 3.9.1 **PERFORMANCE**

Perform the work diligently and aggressively, and promptly advise the Contracting Officer of all significant developments.

### 3.9.2 **TELEPHONE CONVERSATIONS**

Prepare a summary, and promptly furnish a copy thereof to the Contracting Officer, of all telephone conversations relating to the design work under this contract.

### 3.9.3 **COOPERATION WITH OTHERS**

Cooperate fully with other firms, consultants and contractors performing work under the program to which this contract pertains, upon being advised by the Contracting Officer that such firms or individuals have a legitimate interest in the program, have need-to-know status, and proper security clearance where required.

### 3.9.4 **TECHNICAL CRITERIA**

All designs, drawings, and specifications shall be prepared in accordance with the contract documents and with the applicable publications referenced therein. As soon as possible, the Contractor shall obtain copies of all publications applicable to this contract. Availability of publications (where to purchase) is contained in Specification Section

01420 entitled: SOURCES FOR REFERENCE PUBLICATIONS. Any deviations from the technical criteria contained in the contract documents or in the applicable publications, including the use of criteria obtained from the user or other sources, must receive prior approval of the Contracting Officer. Where the technical criteria contained or referred to herein are not met, the Contractor will be required to conform his design to the same at his own time and expense.

### **3.9.5 CONFLICTS**

Any conflicts, ambiguities, questions or problems encountered by the Contractor in following the criteria shall be immediately submitted in writing to the Contracting Officer with the Contractor's recommendations.

Prior to submission to the Government the Contractor shall take appropriate measures to obtain clarification of design criteria requirements, to acquire all pertinent design information, and to incorporate such information in the work being performed.

Refer also to Section 00555 for order of Precedence.

### **3.9.6 DESIGN PRIORITIES**

The design of this project shall consider the remote location and harsh environment of this project and the impact this will have on sources of technical supply, the cost of construction, the low level of maintenance, and the difficulty of obtaining replacement parts. Unless stated otherwise in this contract, the following design priorities shall be followed.

#### **3.9.6.1 CONSTRUCTION LIFE SPAN**

Buildings and facilities shall be designed and constructed to serve a life expectancy of more than 25 years, to be energy efficient, and to have finishes, materials, and systems that are low maintenance and low life cycle cost.

#### **3.9.6.2 OPERABILITY**

Systems including but not necessarily limited to mechanical, electrical, communications, etc., must be simple to operate and easy to maintain.

#### **3.9.6.3 STANDARDIZATION**

Use of standardized materials, products, equipment, and systems is necessary to minimize the requirements for replacement parts, storage facilities, and service requirements.

#### **3.9.6.4 TOPOGRAPHIC SURVEYS, EASEMENTS, AND UTILITIES**

Unless otherwise stated in the contract, the Contractor will be responsible for detailed topographic mapping, available easements, and utility information for the project.

#### **3.9.6.5 HORIZONTAL AND VERTICAL CONTROL**

The mapping shall be based on the base coordinate system. If the base system cannot be found, the surveyor shall use any established monuments. If monuments have been destroyed or do not exist, an assumed horizontal and vertical datum shall be established, using arbitrary coordinates of 10,000n and 10,000e and an elevation of 1,000 meters. The horizontal and vertical control established on site shall be a closed loop with third order accuracy and procedures. Provide three (3) concrete survey monuments at the survey site. All of the control points established at the site shall be plotted at the appropriate coordinate point and shall be identified by name or number, and adjusted elevations. The location of the project site, as determined by the surveyor shall be submitted in writing to the Contracting Officer. The site location shall be identified by temporary markers, approved by the Contracting Officer before proceeding with the surveying work.

### **3.9.6.6 TOPOGRAPHY REQUIREMENTS**

A sufficient quantity of horizontal and vertical control shall be established to provide a detailed topographic survey at 1:500 scale with one quarter meter contour intervals minimum. Intermediate elevations shall be provided as necessary to show breaks in grade and changes in terrain.

The contours shall accurately express the relief detail and topographic shapes. In addition, 90 percent of the elevations or profiles interpolated from the contours shall be correct to within one-half of the contour interval and spot elevations shall be correct within plus or minus 20 millimeters.

Spot elevations affecting design of facilities shall be provided. Specifically, break points or control points in grades of terrain such as tops of hills, bottoms of ditches and gullies, high bank elevations, etc.

All surface and sub-surface structures features within the area to be surveyed shall be shown and identified on the topographic maps. In addition, these features shall be located by sufficient distance ties and labeled on the topographic sheets to permit accurate scaling and identification.

The location and sizes of potable, sanitary, electrical and mechanical utilities within the survey site shall be shown on the survey map. Sanitary manholes and appurtenances shall show top elevations and invert elevations.

### **3.9.7 OCCUPATIONAL SAFETY AND HEALTH ACT**

The facilities, systems, and equipment designed under this contract shall comply with the Occupational Safety and Health Act (OSHA), Code of Federal Regulations, Title 29, Chapter XVII, Parts 1910 and 1926. Any problems in incorporating these standards due to conflicts with other technical criteria shall be submitted to the Contracting Officer for resolution.

### **3.9.8 ASBESTOS CONTAINING MATERIALS**

Asbestos containing material (ACM) will not be used in the design of new structures or systems. In the event no other material is available which will perform the required function or where the use of other material would be cost prohibitive, a waiver for the use of asbestos containing materials must be obtained from AED.

#### **3.9.8.1 EXISTING CONSTRUCTION**

Asbestos containing materials (ACM) presently included in existing construction to be rehabilitated or otherwise modified as a result of this project shall be removed and a non-asbestos containing material substituted in lieu thereof.

#### **3.9.8.2 SUSPECTED ASBESTOS CONTAINING MATERIALS**

All such structures and systems shall be inspected to determine the presence or probable presence of ACM. When ACM is suspected, a documented survey will be performed. The survey will be developed into an abatement design and will be made a part of the design documents. In the event no other material is available which will perform the required function or the use of a substitute material would be cost prohibitive due to initial cost and tear-out of existing construction, a waiver for the retention of the asbestos containing material must be obtained from the Contracting Officer.

### **3.10 ATTACHMENTS**

The following attachments form an integral part of this specification:

ENG FORM 4025-R, Mar 95 - Transmittal of Shop Drawings, Equipment Data, Material Samples, or Manufacturer's Certificate of Compliance (2 pages)

ENG FORM 4288-R, Mar 95 - Submittal Register

Figure 1 – AES Title Block

Figure 2 – AES Management Block

Figure 3 – AES Issue Block & Required Notations

Figure 4 – Border Sheet Size

**-- END OF SECTION -**



## INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required number of copies.
2. Each transmittal shall be numbered consecutively in the space provided for "Transmittal No.". This number, in addition to the contract number, will form a serial number for identifying each submittal. For new submittals or resubmittals mark the appropriate box; on resubmittals, insert transmittal number of last submission as well as the new submittal number.
3. The "Item No." will be the same "Item No." as indicated on ENG FORM 4288-R for each entry on this form.
4. Submittals requiring expeditious handling will be submitted on a separate form.
5. Separate transmittal form will be used for submittals under separate sections of the specifications.
6. A check shall be placed in the "Variation" column when a submittal is not in accordance with the plans and specifications--also, a written statement to that effect shall be included in the space provided for "Remarks".
7. Form is self-transmittal, letter of transmittal is not required.
8. When a sample of material or Manufacturer's Certificate of Compliance is transmitted, indicate "Sample" or "Certificate" in column c, Section I.
9. U.S. Army Corps of Engineers approving authority will assign action codes as indicated below in space provided in Section I, column i to each item submitted. In addition they will ensure enclosures are indicated and attached to the form prior to return to the contractor. The Contractor will assign action codes as indicated below in Section I, column g, to each item submitted.

### THE FOLLOWING ACTION CODES ARE GIVEN TO ITEMS SUBMITTED

- |   |   |
|---|---|
| A -- Approved as submitted.   | E -- Disapproved (See attached).  |
| B -- Approved, except as noted on drawings.   | F -- Receipt acknowledged.  |
| C -- Approved, except as noted on drawings.<br>Refer to attached sheet resubmission required. | FX -- Receipt acknowledged, does not comply<br>as noted with contract requirements. |
| D -- Will be returned by separate correspondence.   | G -- Other (Specify)  |
10. Approval of items does not relieve the contractor from complying with all the requirements of the contract plans and specifications.

*(Reverse of ENG Form 4025-R)*



PROJECT INFO  
4 LINES ALLOWED

SHEET TITLE  
3 LINES ALLOWED

PROJECT ID BLOCK  
SHEET TITLE BLOCK

PROJECT NO.	PROJECT TITLE
INSTALLATION NAME OR LOCATION	
BUILDING TYPE	DRAWING TITLE

SHEET IDENTIFICATION  
BLOCK

SHEET SEQUENCE NUMBER

DISCIPLINE  
DESIGNATOR

SHEET REFERENCE NUMBER: <b>X-XXX</b> SHEET -- OF --
---

SHEET NUMBER

TOTAL NUMBER OF SHEETS

FIGURE 1 - AED TITLE BLOCK

MANAGEMENT BLOCK

DESIGNED BY: _____		DATE: xx-xx-xx	REV. ____
		DESIGN FILE NO. _____	
DWN BY: _____	CKD BY: _____		
REVIEWED BY: _____		DRAWING CODE: _____	
SUBMITTED BY: _____		FILE NAME: _____	
		PLOT SCALE: _____	
		PLOT DATE: xx-xx-xx	

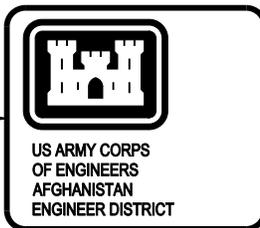
U.S. ARMY ENGINEER DISTRICT, AFGHANISTAN  
CORPS OF ENGINEERS  
APO AE 96338

AE DESIGN FIRM  
COMPANY LOGO  
COMPANY INFORMATION

FIGURE 2 - AED MANAGEMENT BLOCK

H

DESIGNER IDENTIFICATION  
BLOCK (DO NOT ALTER)



ISSUE BLOCK

SYMBOL	DESCRIPTION	DATE	APPR.	SYMBOL	DESCRIPTION	DATE	APPR.
	AS-BUILT SUBMITTAL	DATE					
	100% DESIGN SUBMITTAL	DATE					
	99% DESIGN RESUBMITTAL	DATE					
	99% DESIGN SUBMITTAL	DATE		△	REVISED AS-BUILT		
	65% DESIGN RESUBMITTAL	DATE		△	MOD P0003		
	65% DESIGN SUBMITTAL	DATE		△	MOD P0002		
	35% DESIGN SUBMITTAL	DATE		△	AMENDMENT P0001		
	DESCRIPTION	1 AUG 07					

FIGURE 3 - AED ISSUE BLOCK  
& REQUIRED NOTATIONS

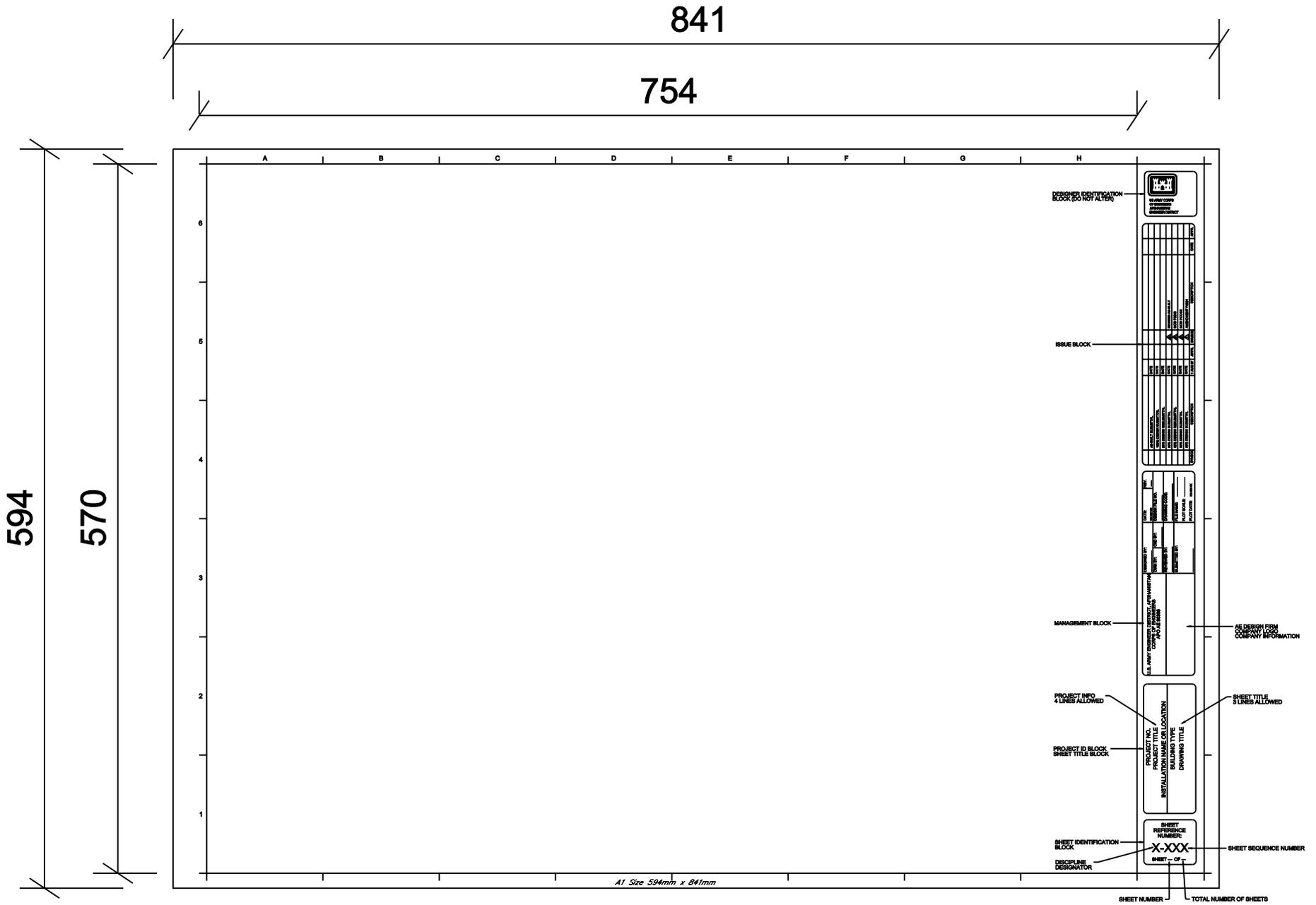
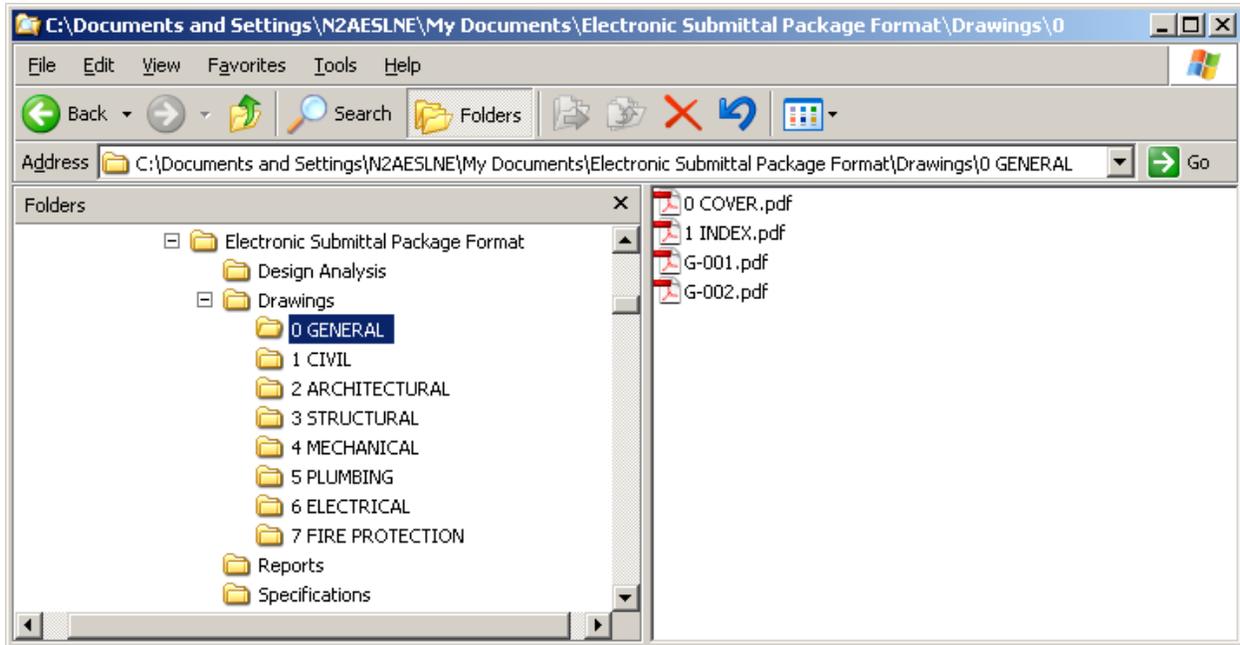


FIGURE 4 - BORDER SHEET SIZE

## ***ELECTRONIC SUBMITTAL DOCUMENT FORMAT***

**PART 1 - GENERAL:** Throughout the design process, the DB Contractor shall submit electronic packages for review at each Design Phase identified in the Request for Proposals. To facilitate reviews, submittal packages shall conform to the following file structure and format.

**1.1. File Structure:** Submittal packages that can be contained on a single disc shall use the file structure shown in Figure 1.



**Figure 1:** Submittal package file structure

**1.2. Design Analysis:** The design analysis directory shall contain all design analysis and calculation documents necessary for the current design stage. All design analysis and calculations shall be compiled into a single document containing a table of contents and page numbers. As additional analysis and calculation documents are created in progressive design phases, insert these documents into their appropriate section of the Design Analysis. Avoid lengthy appendices except in the case where numerical output sheets from analysis software are included. All documentation shall be organized by discipline: Civil, Architectural, Structural, Mechanical and Electrical.

**1.2.A.** Some projects requiring complex plumbing, communications and fire protection systems may require additional sections covering these specific systems. Note that water supply and sanitary sewer systems beyond 1.5 meters of the building envelope are Civil systems, not Plumbing systems.

**1.2.B.** If the project involves a compound comprised of several structures, clearly identify which building is being analyzed. In these cases, the major divisions of the Design Analysis shall be by discipline with subdivisions by building such that all

calculations for a particular discipline will be found in one section of the document. For example, a compound containing three separate buildings would have three separate seismic loading analysis calculations in the structural section.

**1.3. Drawings:** Drawings shall be arranged by discipline. Subdirectories shall be made corresponding to discipline only. Folders labeled for specific disciplines as shown in Figure 1 shall contain all drawings in the project applicable to that discipline. Note that these discipline specific folders are to contain only drawings and no other type of document. Drawings must be submitted in pdf form at a minimum. Files shall be named by reference number (i.e. C-101). If multiple file types for submittal drawings are provided, place all file types for each discipline in the same folder; do not subdivide the discipline specific folders for separate file types. Also, include a single pdf file containing all drawings in the project in this folder. The sheets in this file should follow the order indicated in the index sheet. This file should be named to indicate the contract number and submittal stage.

**1.3.A. GENERAL:** A folder labeled “0 GENERAL” shall contain the cover sheet, index sheet, list of legends and abbreviations sheet, project location and vicinity sheet, and site survey sheets.

**1.3.B. CIVIL:** A folder labeled “1 CIVIL” shall contain all site survey drawings and all civil drawings for the project. Note that the pipe networks for water supply systems, sanitary sewer systems and storm drainage systems are civil drawings, not plumbing drawings. Also note that gates, fences and small site structures are typically part of the civil discipline.

**1.3.C. ARCHITECTURAL:** A folder labeled “2 ARCHITECTURAL” shall contain all architectural drawings for the project. Note that life safety drawings denote architectural features and belong in this folder.

**1.3.D. STRUCTURAL:** A folder labeled “3 STRUCTURAL” shall contain all structural drawings for the project.

**1.3.E. MECHANICAL:** A folder labeled “4 MECHANICAL” shall contain all HVAC drawings for the project.

**1.3.F. PLUMBING:** A folder labeled “5 PLUMBING” shall contain all indoor plumbing systems (i.e. domestic water, waste & vent, LPG or propane, compressed air, diesel or fuel oil, etc.) for the project. Note that water supply and sanitary sewer systems beyond 1.5 meters of the building envelope are Civil systems, not Plumbing systems.

**1.3.G. ELECTRICAL:** A folder labeled “6 ELECTRICAL” shall contain all electrical drawings for the project. Note that communication and fire alarm systems are electrical systems and belong in this folder for most projects.

**1.3.H. FIRE PROTECTION:** A folder labeled “7 FIRE PROTECTION” shall contain all indoor fire protection systems (i.e. sprinklers, fire pumps, etc.) for the project.

**1.4. Reports:** The reports folder shall contain all certified reports required in the contract, including the Geotechnical Report, Water Quality Report and any other reports specifically called for in the contract. No subdirectories shall be created in this folder.

**1.5. Specifications:** All project specifications shall be contained in this folder. Include the project table of contents and name it so that it is easily identifiable (naming it "00000 Project Table of Contents" should ensure that it is at the top of the list). Specification sections should be named by number only so that they sort in ascending order as indicated on the project table of contents, or all project specifications shall be collated into a single file indexed at each section. No subdirectories shall be created in this folder.

**PART 2 - PRODUCTS:** (NOT APPLICABLE)

**PART 3 - EXECUTION:** (NOT APPLICABLE)

**- - END SECTION - -**

## **SECTION 01415 METRIC MEASUREMENTS**

### **1. REFERENCES**

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

#### ASTM INTERNATIONAL (ASTM)

ASTM E 621	(1994; R 1999e1) Use of Metric (SI) Units in Building Design and Construction (Committee E-6 Supplement to E380)
ASTM SI 10	(2002) American National Standard for Use of the International System of Units (SI): The Modern Metric System

### **2. GENERAL**

This project includes metric units of measurements. The metric units used are the International System of Units (SI) developed and maintained by the General Conference on Weights and Measures (CGPM); the name International System of Units and the international abbreviation SI were adopted by the 11th CGPM in 1960. A number of circumstances require that both metric SI units and English inch-pound (I-P) units be included in a section of the specifications. When both metric and I-P measurements are included, the section may contain measurements for products that are manufactured to I-P dimensions and then expressed in mathematically converted metric value (soft metric) or, it may contain measurements for products that are manufactured to an industry recognized rounded metric (hard metric) dimensions but are allowed to be substituted by I-P products to comply with the law. Dual measurements are also included to indicate industry and/or Government standards, test values or other controlling factors, such as the code requirements where I-P values are needed for clarity or to trace back to the referenced standards, test values or codes.

### **3. USE OF MEASUREMENTS IN SPECIFICATIONS**

Measurements in specifications shall be either in SI or I-P units as indicated, except for soft metric measurements or as otherwise authorized. When only SI or I-P measurements are specified for a product, the product shall be procured in the specified units (SI or I-P) unless otherwise authorized by the Contracting Officer. The Contractor shall be responsible for all associated labor and materials when authorized to substitute one system of units for another and for the final assembly and performance of the specified work and/or products.

#### **3.1 HARD METRIC**

A hard metric measurement is indicated by an SI value with no expressed correlation to an I-P value. Hard metric measurements are often used for field data such as distance from one point to another or distance above the floor. Products are considered to be hard metric when they are manufactured to metric dimensions or have an industry recognized metric designation.

#### **3.2 SOFT METRIC**

- a. A soft metric measurement is indicated by an SI value which is a mathematical conversion of the I-P value shown in parentheses (e.g. 38.1 mm (1-1/2 inches)). Soft metric measurements are used for measurements pertaining to products, test values, and other situations where the I-P units are the standard for manufacture, verification, or other controlling factor. The I-P value shall govern while the metric measurement is provided for information.

- b. A soft metric measurement is also indicated for products that are manufactured in industry designated metric dimensions but are required by law to allow substitute I-P products. These measurements are indicated by a manufacturing hard metric product dimension followed by the substitute I-P equivalent value in parentheses (e.g., 190 x 190 x 390 mm (7-5/8 x 7-5/8 x 15-5/8inches)).

### **3.3 NEUTRAL**

A neutral measurement is indicated by an identifier which has no expressed relation to either an SI or an I-P value (e.g., American Wire Gage (AWG) which indicates thickness but in itself is neither SI nor I-P).

### **3.4 COORDINATION**

Discrepancies, such as mismatches or product unavailability, arising from use of both metric and non-metric measurements and discrepancies between the measurements in the specifications and the measurements in the drawings shall be brought to the attention of the Contracting Officer for resolution.

### **3.5 RELATIONSHIP TO SUBMITTALS**

Submittals for Government approval or for information only shall cover the SI or I-P products actually being furnished for the project. The Contractor shall submit the required drawings and calculations in the same units used in the contract documents describing the product or requirement unless otherwise instructed or approved. The Contractor shall use ASTM SI 10 and ASTM E 621 as the basis for establishing metric measurements required to be used in submittals.

**-- END OF SECTION --**

**SECTION 01770  
CLOSEOUT PROCEDURES**

**1. GENERAL**

**1.1 SUBMITTALS**

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01335 SUBMITTAL PROCEDURES:

SD-10 Operation and Maintenance Data

Equipment/Product Warranty List; G

Submit Data Package 1 in accordance with Section 01781 OPERATION AND MAINTENANCE DATA.

SD-11 Closeout Submittals

As-Built Drawings; G

Record Of Materials; G

Equipment/Product Warranty Tag; G

**1.2 PROJECT RECORD DOCUMENTS**

**1.2.1 AS-BUILT DRAWINGS**

As built drawings shall be submitted in accordance with Section 01780A CLOSEOUT SUBMITTALS

**1.2.2 AS-BUILT RECORD OF MATERIALS**

Furnish a record of materials.

Where several manufacturers' brands, types, or classes of the item listed have been used in the project, designate specific areas where each item was used. Designations shall be keyed to the areas and spaces depicted on the contract drawing. Furnish the record of materials used in the following format:

MATERIALS DESIGNATION	SPECIFICATION	MANUFACTURER	MATERIALS USED (MANUFACTURER'S DESIGNATION)	WHERE USED

**1.3 EQUIPMENT/PRODUCT WARRANTIES**

**1.3.1 EQUIPMENT/PRODUCT WARRANTY LIST**

The Contractor shall develop a warranty management plan which shall contain information relevant to the clause Warranty of Construction. At least 30 days before the planned pre-warranty conference, the Contractor shall submit the warranty management plan for Government approval. The warranty management plan shall include all required actions and documents to assure that the Government receives all warranties to which it is entitled. The plan shall be in narrative form and contain sufficient detail to render it suitable for use by future maintenance and repair personnel, whether tradesmen, or of engineering background, not necessarily familiar with this contract. The term

"status" as indicated below shall include due date and whether item has been submitted or was accomplished. Warranty information made available during the construction phase shall be submitted to the Contracting Officer for approval prior to each monthly pay estimate. Approved information shall be assembled in a binder and shall be turned over to the Government upon acceptance of the work. The construction warranty period shall begin on the date of project acceptance and shall continue for the full product warranty period. A joint 4 month and 9 month warranty inspection shall be conducted, measured from time of acceptance, by the Contractor, Contracting Officer and the Customer Representative. Information contained in the warranty management plan shall include, but shall not be limited to, the following:

- a. Roles and responsibilities of all personnel associated with the warranty process, including points of contact and telephone numbers within the organizations of the Contractors, subcontractors, manufacturers or suppliers involved.
- b. Listing and status of delivery of all Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, and for all commissioned systems such as fire protection and alarm systems, sprinkler systems, lightning protection systems, etc.
- c. A list for each warranted equipment, item, feature of construction or system indicating:
  1. Name of item.
  2. Model and serial numbers.
  3. Location where installed.
  4. Name and phone numbers of manufacturers or suppliers.
  5. Names, addresses and telephone numbers of sources of spare parts.
  6. Warranties and terms of warranty. This shall include one-year overall warranty of construction. Items which have extended warranties shall be indicated with separate warranty expiration dates.
  7. Cross-reference to warranty certificates as applicable.
  8. Starting point and duration of warranty period.
  9. Summary of maintenance procedures required to continue the warranty in force.
  10. Cross-reference to specific pertinent Operation and Maintenance manuals.
  11. Organization, names and phone numbers of persons to call for warranty service.
  12. Typical response time and repair time expected for various warranted equipment.
- d. The Contractor's plans for attendance at the 4 and 9 month post-construction warranty inspections conducted by the Government.
- e. Procedure and status of tagging of all equipment covered by extended warranties.
- f. Copies of instructions to be posted near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

### **1.3.2 PERFORMANCE OF WARRANTY WORK**

In the event the Contractor fails to commence and diligently pursue any construction warranty work required, the Contracting Officer will have the work performed by others, and after completion of the work, will charge the remaining construction warranty funds of expenses incurred by the Government while performing the work, including, but not limited to administrative expenses.

Following oral or written notification of required construction warranty repair work, the Contractor shall respond in a timely manner. Written verification will follow oral instructions. Failure of the Contractor to respond will be cause for the Contracting Officer to proceed against the Contractor.

**1.3.3 PRE-WARRANTY CONFERENCE**

Prior to contract completion, and at a time designated by the Contracting Officer, the Contractor shall meet with the Contracting Officer to develop a mutual understanding with respect to the requirements of this section. Communication procedures for Contractor notification of construction warranty defects, priorities with respect to the type of defect, reasonable time required for Contractor response, and other details deemed necessary by the Contracting Officer for the execution of the construction warranty shall be established/reviewed at this meeting. In connection with these requirements and at the time of the Contractor's quality control completion inspection, the Contractor shall furnish the name, telephone number and address of a licensed and bonded company which is authorized to initiate and pursue construction warranty work action on behalf of the Contractor. This point of contact will be located within the local service area of the warranted construction, shall be continuously available, and shall be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any of its responsibilities in connection with other portions of this provision.

**1.3.4 WARRANTY TAGS**

At the time of installation, each warranted item shall be tagged with a durable, oil and water resistant tag approved by the Contracting Officer. Each tag shall be attached with a copper wire and shall be sprayed with a silicone waterproof coating. The date of acceptance and the QC signature shall remain blank until project is accepted for beneficial occupancy. The tag shall show the following information.

- a. Type of product/material \_\_\_\_\_
- b. Model number \_\_\_\_\_
- c. Serial number \_\_\_\_\_
- d. Contract number \_\_\_\_\_
- e. Warranty period \_\_\_\_\_ from \_\_\_\_\_ to \_\_\_\_\_
- f. Inspector's signature \_\_\_\_\_
- g. Construction Contractor \_\_\_\_\_  
 Address \_\_\_\_\_  
 Telephone number \_\_\_\_\_
- h. Warranty contact \_\_\_\_\_  
 Address \_\_\_\_\_  
 Telephone number \_\_\_\_\_
- i. Warranty response time priority code \_\_\_\_\_
- j. **WARNING - PROJECT PERSONNEL TO PERFORM ONLY OPERATIONAL MAINTENANCE DURING THE WARRANTY PERIOD.**

**1.4 MECHANICAL TESTING AND BALANCING**

All contract requirements for testing/adjusting/balancing shall be fully completed, including all testing, prior to contract completion date. The time required to complete all testing/adjusting/balancing is included in the allotted calendar days for completion.

**1.5 FINAL CLEANING**

The premises shall be left broom clean. Stains, foreign substances, and temporary labels shall be removed from surfaces. Carpet and soft surfaces shall be vacuumed. Equipment and fixtures shall be cleaned to a sanitary condition. Filters of operating equipment shall be replaced. Debris shall be removed from roofs, drainage systems, gutters, and downspouts. Paved areas shall be swept and landscaped areas shall be raked clean. The site shall have

waste, surplus materials, and rubbish removed. The project area shall have temporary structures, barricades, project signs, and construction facilities removed. A list of completed clean-up items shall be submitted on the day of final inspection.

**-- END OF SECTION --**

**SECTION 01780A  
CLOSEOUT SUBMITTALS**

**1. GENERAL**

**1.1 SUBMITTALS**

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01335 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

As-Built Drawings G

Drawings showing final as-built conditions of the project. The local language of Afghanistan, Pashto or Dari shall be added to project As-Built drawings. The final CADD as-built drawings shall consist of three (3) sets of electronic CADD drawing files in the specified format, and one (1) set of full size and one (1) set of half size paper copies of the approved as-built drawings. One electronic copy of the As-Built drawings and the paper copies of the As-Built drawings shall be delivered to the O&M Regional Site manager at the Resident Office or Area Office responsible for contract administration. Two electronic copies of the As-Built drawings shall be mailed or delivered to the KAF O&M Branch.

SD-03 Product Data

As-Built Record of Equipment and Materials G

Two copies of the record listing the as-built materials and equipment incorporated into the construction of the project.

Warranty Management Plan G

One set of the warranty management plan containing information relevant to the warranty of materials and equipment incorporated into the construction project, including the starting date of warranty of construction. The Contractor shall furnish with each warranty the name, address, and telephone number of each of the guarantor's representatives nearest to the project location.

Warranty Tags G

Two record copies of the warranty tags showing the layout and design.

Final Cleaning

Two copies of the listing of completed final clean-up item

**1.2 PROJECT RECORD DOCUMENTS**

**1.2.1 AS-BUILT DRAWINGS**

This paragraph covers as-built drawings complete, as a requirement of the contract. The terms "drawings," "contract drawings," "drawing files," "working as-built drawings" and "final as-built drawings" refer to contract drawings which are revised to be used for final as-built drawings.

**1.2.1.1 GOVERNMENT FURNISHED MATERIALS**

One set of electronic CADD files in the specified software and format revised to reflect all bid amendments will be provided by the Government at the preconstruction conference for projects requiring CADD file as-built drawings.

### 1.2.1.2 WORKING AS-BUILT AND FINAL AS-BUILT DRAWINGS

- a. The Contractor shall revise 2 sets of paper drawings by red-line process to show the as-built conditions during the prosecution of the project. These working as-built marked drawings shall be kept current on a weekly basis and at least one set shall be available on the jobsite at all times. Changes from the contract plans which are made in the work or additional information which might be uncovered in the course of construction shall be accurately and neatly recorded as they occur by means of details and notes. Final as-built drawings shall be prepared after the completion of each definable feature of work as listed in the Contractor Quality Control Plan (Foundations, Utilities, Structural Steel, etc., as appropriate for the project). The working as-built marked prints and final as-built drawings will be jointly reviewed for accuracy and completeness by the Contracting Officer and the Contractor prior to submission of each monthly pay estimate. If the Contractor fails to maintain the working and final as-built drawings as specified herein, the Contracting Officer will deduct from the monthly progress payment an amount representing the estimated cost of maintaining the as-built drawings. This monthly deduction will continue until an agreement can be reached between the Contracting Officer and the Contractor regarding the accuracy and completeness of updated drawings. The working and final as-built drawings shall show, but shall not be limited to, the following information:
  - b. The actual location, kinds and sizes of all sub-surface utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, the as-built drawings shall show, by offset dimensions to two permanently fixed surface features, the end of each run including each change in direction. Valves, splice boxes and similar appurtenances shall be located by dimensioning along the utility run from a reference point. The average depth below the surface of each run shall also be recorded.
  - c. The location and dimensions of any changes within the building structure.
  - d. Correct grade, elevations, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from contract plans.
  - e. Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor; including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.
  - f. The topography, invert elevations and grades of drainage installed or affected as part of the project construction.
  - g. Changes or modifications which result from the final inspection.
  - h. Where contract drawings or specifications present options, only the option selected for construction shall be shown on the final as-built prints.
  - i. If borrow material for this project is from sources on Government property, or if Government property is used as a spoil area, the Contractor shall furnish a contour map of the final borrow pit/spoil area elevations.
  - j. Systems designed or enhanced by the Contractor, such as HVAC controls, fire alarm, fire sprinkler, and irrigation systems.
  - k. Modifications (change order price shall include the Contractor's cost to change working and final as-built drawings to reflect modifications) and compliance with the following procedures.
    1. Directions in the modification for posting descriptive changes shall be followed.

2. A Modification Circle shall be placed at the location of each deletion.
3. For new details or sections which are added to a drawing, a Modification Circle shall be placed by the detail or section title.
4. For minor changes, a Modification Circle shall be placed by the area changed on the drawing (each location).
5. For major changes to a drawing, a Modification Circle shall be placed by the title of the affected plan, section, or detail at each location.
6. For changes to schedules or drawings, a Modification Circle shall be placed either by the schedule heading or by the change in the schedule.
7. The Modification Circle size shall be 12.7 mm 1/2 inch diameter unless the area where the circle is to be placed is crowded. Smaller size circle shall be used for crowded areas.

### **1.2.1.3 DRAWING PREPARATION**

The as-built drawings shall be modified as may be necessary to correctly show the features of the project as it has been constructed by bringing the contract set into agreement with approved working as-built prints, and adding such additional drawings as may be necessary. These working as-built marked prints shall be neat, legible and accurate. These drawings are part of the permanent records of this project and shall be returned to the Contracting Officer after approval by the Government. Any drawings damaged or lost by the Contractor shall be satisfactorily replaced by the Contractor at no expense to the Government.

### **1.2.1.4 COMPUTER AIDED DESIGN AND DRAFTING (CADD) DRAWINGS**

- a. Only personnel proficient in the preparation of CADD drawings shall be employed to modify the contract drawings or prepare additional new drawings. Additions and corrections to the contract drawings shall be equal in quality and detail to that of the originals. Line colors, line weights, lettering, layering conventions, and symbols shall be the same as the original line colors, line weights, lettering, layering conventions, and symbols. If additional drawings are required, they shall be prepared using the specified electronic file format applying the same graphic standards specified for original drawings. The title block and drawing border to be used for any new final as-built drawings shall be identical to that used on the contract drawings. Additions and corrections to the contract drawings shall be accomplished using CADD files. The Contractor will be furnished "as-designed" drawings in AutoCAD Release 2007 or Microstation VM format compatible with a Windows XP operating system. The electronic files will be supplied on compact disc, read-only memory (CD-ROM). The Contractor shall be responsible for providing all program files and hardware necessary to prepare final as-built drawings.
- b. Prior to submittal of the first design submittal involving CADD drawings, the Contractor shall prepare one typical CADD drawing for the project and furnish, via ENG Form 4025, the electronic CADD drawing file for review and approval by the Contracting Officer. All Government comments involving changes to this single drawing shall be accomplished and resubmittal(s) made until the Government is satisfied that all CADD Standards are being followed and all subsequent drawings will also be in compliance with these Standards.
- c. When final revisions have been completed, the cover sheet drawing shall show the wording "RECORD DRAWING AS-BUILT" followed by the name of the Contractor in letters at least 5 mm high. All other contract drawings shall be marked either "As-Built" drawing denoting no revisions on the sheet or "Revised As-Built" denoting one or more revisions. Original contract drawings shall be dated in the revision block.
- d. After Government approval of all of the working as-built drawings for a phase of work, the Contractor shall prepare the final CADD as-built drawings for that phase of work and submit two sets of full size paper copy prints of these drawings for Government review, comparison with approved red-line marked up drawings, and approval. The Government will promptly return one set of prints annotated with any necessary corrections to the CADD file(s) if corrections are required prior to approval. Within 20 days

of substantial completion of all phases of work, the Contractor shall submit the final as-built drawing package for the entire project. The submittal shall consist of one set of electronic files on compact disc, read-only memory (CD-ROM), one set of full size paper prints and one set of the approved working as-built drawings. They shall be complete in all details and identical in form and function to the contract drawing files supplied by the Government. Any transactions or adjustments necessary to accomplish this is the responsibility of the Contractor. The Government reserves the right to reject any drawing files it deems incompatible with the CADD system. Upon approval by the Government of the final as-built drawing package for the entire project, the Contractor shall provide the number of as-built copies noted in Paragraph 1.1 of this Section.

e. Paper prints, drawing files and storage media submitted will become the property of the Government upon final approval. Failure to submit final as-built drawing files and marked prints as specified shall be cause for withholding any payment due the Contractor under this contract. Approval and acceptance of final as-built drawings shall be accomplished before final payment is made to the Contractor.

**1.2.1.5 PAYMENT**

No separate payment will be made for as-built drawings required under this contract, and all costs accrued in connection with such drawings shall be considered a subsidiary obligation of the Contractor.

**1.2.2 AS-BUILT RECORD OF EQUIPMENT AND MATERIALS**

The Contractor shall furnish one copy of preliminary record of equipment and materials used on the project 15 days prior to final inspection. This preliminary submittal will be reviewed and returned 2 days after final inspection with Government comments. Two sets of final record of equipment and materials shall be submitted 10 days after final inspection. The designations shall be keyed to the related area depicted on the contract drawings. The record shall list the following data:

Furnish the record of materials used in the following format:

MATERIALS DESIGNATION	SPECIFICATION	MANUFACTURER	MATERIALS USED (MANUFACTURER'S DESIGNATION)	WHERE USED

**1.2.3 FINAL APPROVED SHOP DRAWINGS**

The Contractor shall furnish final approved project shop drawings 30 days after transfer of the completed facility.

**1.2.4 CONSTRUCTION CONTRACT SPECIFICATIONS**

The Contractor shall furnish final as-built construction contract specifications, including modifications thereto, 30 days after transfer of the completed facility.

**1.2.5 REAL PROPERTY EQUIPMENT**

The Contractor shall furnish a list of installed equipment furnished under this contract. The list shall include all information usually listed on manufacturer's name plate. The "EQUIPMENT-IN-PLACE LIST" shall include, as applicable, the following for each piece of equipment installed: description of item, location (by room number), model number, serial number, capacity, name and address of manufacturer, name and address of equipment supplier, condition, spare parts list, manufacturer's catalog, and warranty. A draft list shall be furnished at time of transfer. The final list shall be furnished 30 days after transfer of the completed facility.

## **1.3 WARRANTY MANAGEMENT**

### **1.3.1 WARRANTY MANAGEMENT PLAN**

The Contractor shall develop a warranty management plan which shall contain information relevant to the clause Warranty of Construction. At least 30 days before the planned pre-warranty conference, the Contractor shall submit the warranty management plan for Government approval. The warranty management plan shall include all required actions and documents to assure that the Government receives all warranties to which it is entitled. The plan shall be in narrative form and contain sufficient detail to render it suitable for use by future maintenance and repair personnel, whether tradesmen, or of engineering background, not necessarily familiar with this contract. The term "status" as indicated below shall include due date and whether item has been submitted or was accomplished. Warranty information made available during the construction phase shall be submitted to the Contracting Officer for approval prior to each monthly pay estimate. Approved information shall be assembled in a binder and shall be turned over to the Government upon acceptance of the work. The construction warranty period shall begin on the date of project acceptance and shall continue for the full product warranty period. A joint 4 month and 9 month warranty inspection shall be conducted, measured from time of acceptance, by the Contractor, Contracting Officer and the Customer Representative. Information contained in the warranty management plan shall include, but shall not be limited to, the following:

- a. Roles and responsibilities of all personnel associated with the warranty process, including points of contact and telephone numbers within the organizations of the Contractors, subcontractors, manufacturers or suppliers involved.
- b. Listing and status of delivery of all Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, and for all commissioned systems such as fire protection and alarm systems, sprinkler systems, lightning protection systems, etc.
- c. A list for each warranted equipment, item, feature of construction or system indicating:
  1. Name of item.
  2. Model and serial numbers.
  3. Location where installed.
  4. Name and phone numbers of manufacturers or suppliers.
  5. Names, addresses and telephone numbers of sources of spare parts.
  6. Warranties and terms of warranty. This shall include one-year overall warranty of construction. Items which have extended warranties shall be indicated with separate warranty expiration dates.
  7. Cross-reference to warranty certificates as applicable.
  8. Starting point and duration of warranty period.
  9. Summary of maintenance procedures required to continue the warranty in force.
  10. Cross-reference to specific pertinent Operation and Maintenance manuals.
  11. Organization, names and phone numbers of persons to call for warranty service.
  12. Typical response time and repair time expected for various warranted equipment.
- d. The Contractor's plans for attendance at the 4 and 9 month post-construction warranty inspections conducted by the Government.
- e. Procedure and status of tagging of all equipment covered by extended warranties.
- f. Copies of instructions to be posted near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

### **1.3.2 PRE-WARRANTY CONFERENCE**

Prior to contract completion, and at a time designated by the Contracting Officer, the Contractor shall meet with the Contracting Officer to develop a mutual understanding with respect to the requirements of this section. Communication procedures for Contractor notification of construction warranty defects, priorities with respect to the type of defect, reasonable time required for Contractor response, and other details deemed necessary by the Contracting Officer for the execution of the construction warranty shall be established/reviewed at this meeting. In connection with these requirements and at the time of the Contractor's quality control completion inspection, the Contractor shall furnish the name, telephone number and address of a licensed and bonded company which is authorized to initiate and pursue construction warranty work action on behalf of the Contractor. This point of contact will be located within the local service area of the warranted construction, shall be continuously available, and shall be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any of its responsibilities in connection with other portions of this provision.

### **1.3.3 CONTRACTOR'S RESPONSE TO CONSTRUCTION WARRANTY SERVICE REQUIREMENTS**

Following oral or written notification by the Contracting Officer, the Contractor shall respond to construction warranty service requirements in accordance with the "Construction Warranty Service Priority List" and the three categories of priorities listed below. The Contractor shall submit a report on any warranty item that has been repaired during the warranty period. The report shall include the cause of the problem, date reported, corrective action taken, and when the repair was completed. If the Contractor does not perform the construction warranty within the timeframes specified, the Government will perform the work and backcharge the construction warranty payment item established.

- a. First Priority Code 1. Perform onsite inspection to evaluate situation, and determine course of action within 4 hours, initiate work within 6 hours and work continuously to completion or relief.
- b. Second Priority Code 2. Perform onsite inspection to evaluate situation, and determine course of action within 8 hours, initiate work within 24 hours and work continuously to completion or relief.
- c. Third Priority Code 3. All other work to be initiated within 3 work days and work continuously to completion or relief.
- d. The "Construction Warranty Service Priority List" is as follows:
  - Code 1-Air Conditioning Systems
    - 1) Recreational support.
    - 2) Air conditioning leak in part of building, if causing damage.
    - 3) Air conditioning system not cooling properly.
  - Code 1-Doors
    - 1) Overhead doors not operational, causing a security, fire, or safety problem.
    - 2) Interior, exterior personnel doors or hardware, not functioning properly, causing a security, fire, or safety problem.
  - Code 3-Doors
    - 1) Overhead doors not operational.
    - 2) Interior/exterior personnel doors or hardware not functioning properly.
  - Code 1-Electrical
    - 1) Power failure (entire area or any building operational after 1600 hours).
    - 2) Security lights
    - 3) Smoke detectors
  - Code 2-Electrical

- 1) Power failure (no power to a room or part of building).
- 2) Receptacle and lights (in a room or part of building).

Code 3-  
Electrical  
Street lights.

- Code 1-Gas
- 1) Leaks and breaks.
  - 2) No gas to family housing unit or cantonment area.

- Code 1-Heat
- 1) Area power failure affecting heat.
  - 2) Heater in unit not working.

- Code 2-Kitchen Equipment
- 1) Dishwasher not operating properly.
  - 2) All other equipment hampering preparation of a meal.

- Code 1-Plumbing
- 1) Hot water heater failure.
  - 2) Leaking water supply pipes.

- Code 2-Plumbing
- 1) Flush valves not operating properly.
  - 2) Fixture drain, supply line to commode, or any water pipe leaking.
  - 3) Commode leaking at base.

Code 3 –Plumbing  
Leaky faucets.

- Code 3-Interior
- 1) Floors damaged.
  - 2) Paint chipping or peeling.
  - 3) Casework.

Code 1-Roof Leaks  
Temporary repairs will be made where major damage to property is occurring.

Code 2-Roof Leaks  
Where major damage to property is not occurring, check for location of leak during rain and complete repairs on a Code 2 basis.

Code 2-Water (Exterior)  
No water to facility.

Code 2-Water (Hot)  
No hot water in portion of building listed.

Code 3-All other work not listed above.

### **1.3.4 WARRANTY TAGS**

At the time of installation, each warranted item shall be tagged with a durable, oil and water resistant tag approved by the Contracting Officer. Each tag shall be attached with a copper wire and shall be sprayed with a silicone

waterproof coating. The date of acceptance and the QC signature shall remain blank until project is accepted for beneficial occupancy. The tag shall show the following information.

- a. Type of product/material\_\_\_\_\_.
- b. Model number\_\_\_\_\_.
- c. Serial number\_\_\_\_\_.
- d. Contract number\_\_\_\_\_.
- e. Warranty period\_\_\_\_\_ from\_\_\_\_\_ to\_\_\_\_\_.
- f. Inspector's signature\_\_\_\_\_.
- g. Construction Contractor\_\_\_\_\_.  
Address\_\_\_\_\_.  
Telephone number\_\_\_\_\_.
- h. Warranty contact\_\_\_\_\_.  
Address\_\_\_\_\_.  
Telephone number\_\_\_\_\_.
- i. Warranty response time priority code\_\_\_\_\_.
- j. WARNING - PROJECT PERSONNEL TO PERFORM ONLY OPERATIONAL MAINTENANCE DURING THE WARRANTY PERIOD.

**1.4 MECHANICAL TESTING, ADJUSTING, BALANCING, AND COMMISSIONING**

Prior to final inspection and transfer of the completed facility; all reports, statements, certificates, and completed checklists for testing, adjusting, balancing, and commissioning of mechanical systems shall be submitted to and approved by the Contracting Officer as specified in applicable technical specification sections.

**1.5 FINAL CLEANING**

The premises shall be left broom clean. Stains, foreign substances, and temporary labels shall be removed from surfaces. Carpet and soft surfaces shall be vacuumed. Equipment and fixtures shall be cleaned to a sanitary condition. Filters of operating equipment shall be replaced. Debris shall be removed from roofs, drainage systems, gutters, and downspouts. Paved areas shall be swept and landscaped areas shall be raked clean. The site shall have waste, surplus materials, and rubbish removed. The project area shall have temporary structures, barricades, project signs, and construction facilities removed. A list of completed clean-up items shall be submitted on the day of final inspection.

**1.6 OPERATION AND MAINTENANCE MANUALS**

Two electronic copies in English of all Operation and Maintenance (O&M) manuals shall be submitted as follows:

U.S. Army Corps of Engineers  
Afghanistan Engineering District – South  
Att:, O&M

Kandahar Air Field, Afghanistan  
APO, AE 09355

One hard paper copy and an electronic copy of the O&M manuals in English, Pashto, and Dari shall be delivered to the O&M Regional Site manager at the Resident Office or Area Office responsible for contract administration.

Operation manuals and maintenance manuals shall be provided in a common volume, complete, clearly differentiated and separately indexed.

**-- END OF SECTION --**

**SECTION 01781  
OPERATION AND MAINTENANCE DATA**

**1. GENERAL**

**1.1 SUBMISSION OF OPERATION AND MAINTENANCE DATA**

Submit Operation and Maintenance (O&M) Data specifically applicable to this contract and a complete and concise depiction of the provided equipment, product, or system. Organize and present information in sufficient detail to clearly explain O&M requirements at the system, equipment, component, and subassembly level. Include an index preceding each submittal. Submit in accordance with this section and Section 01335 SUBMITTAL PROCEDURES.

**1.1.1 PACKAGE QUALITY**

Documents must be fully legible. Poor quality copies and material with hole punches obliterating the text or drawings will not be accepted.

**1.1.2 PACKAGE CONTENT**

Data package content shall be as shown in the paragraph titled "Schedule of Operation and Maintenance Data Packages." Comply with the data package requirements specified in the individual technical sections, including the content of the packages and addressing each product, component, and system designated for data package submission.

**1.1.3 CHANGES TO SUBMITTALS**

Manufacturer-originated changes or revisions to submitted data shall be furnished by the Contractor if a component of an item is so affected subsequent to acceptance of the O&M Data. Changes, additions, or revisions required by the Contracting Officer for final acceptance of submitted data, shall be submitted by the Contractor within 30 calendar days of the notification of this change requirement.

**1.2 TYPES OF INFORMATION REQUIRED IN O&M DATA PACKAGES**

**1.2.1 OPERATING INSTRUCTIONS**

Include specific instructions, procedures, and illustrations for the following phases of operation:

**1.2.1.1 SAFETY PRECAUTIONS**

List personnel hazards and equipment or product safety precautions for all operating conditions.

**1.2.1.2 OPERATOR PRESTART**

Include procedures required to set up and prepare each system for use.

**1.2.1.3 STARTUP, SHUTDOWN, AND POST-SHUTDOWN PROCEDURES**

Provide narrative description for Startup, Shutdown and Post-shutdown operating procedures including the control sequence for each procedure.

#### **1.2.1.4 NORMAL OPERATIONS**

Provide narrative description of Normal Operating Procedures. Include Control Diagrams with data to explain operation and control of systems and specific equipment.

#### **1.2.1.5 EMERGENCY OPERATIONS**

Include Emergency Procedures for equipment malfunctions to permit a short period of continued operation or to shut down the equipment to prevent further damage to systems and equipment. Include Emergency Shutdown Instructions for fire, explosion, spills, or other foreseeable contingencies. Provide guidance and procedures for emergency operation of all utility systems including required valve positions, valve locations and zones or portions of systems controlled.

#### **1.2.1.6 OPERATOR SERVICE REQUIREMENTS**

Include instructions for services to be performed by the operator such as lubrication, adjustment, inspection, and recording gage readings.

#### **1.2.1.7 ENVIRONMENTAL CONDITIONS**

Include a list of Environmental Conditions (temperature, humidity, and other relevant data) that are best suited for the operation of each product, component or system. Describe conditions under which the item equipment should not be allowed to run.

### **1.2.2 PREVENTIVE MAINTENANCE**

Include the following information for preventive and scheduled maintenance to minimize corrective maintenance and repair.

#### **1.2.2.1 LUBRICATION DATA**

Include preventative maintenance lubrication data, in addition to instructions for lubrication provided under paragraph titled "Operator Service Requirements":

- a. A table showing recommended lubricants for specific temperature ranges and applications.
- b. Charts with a schematic diagram of the equipment showing lubrication points, recommended types and grades of lubricants, and capacities.
- c. A Lubrication Schedule showing service interval frequency.

#### **1.2.2.2 PREVENTIVE MAINTENANCE PLAN AND SCHEDULE**

Include manufacturer's schedule for routine preventive maintenance, inspections, tests and adjustments required to ensure proper and economical operation and to minimize corrective maintenance. Provide manufacturer's projection of preventive maintenance work-hours on a daily, weekly, monthly, and annual basis including craft requirements by type of craft. For periodic calibrations, provide manufacturer's specified frequency and procedures for each separate operation.

### **1.2.3 CORRECTIVE MAINTENANCE (REPAIR)**

Include manufacturer's recommended procedures and instructions for correcting problems and making repairs.

### **1.2.3.1 TROUBLESHOOTING GUIDES AND DIAGNOSTIC TECHNIQUES**

Include step-by-step procedures to promptly isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or require replacement.

### **1.2.3.2 WIRING DIAGRAMS AND CONTROL DIAGRAMS**

Wiring diagrams and control diagrams shall be point-to-point drawings of wiring and control circuits including factory-field interfaces. Provide a complete and accurate depiction of the actual job specific wiring and control work. On diagrams, number electrical and electronic wiring and pneumatic control tubing and the terminals for each type, identically to actual installation configuration and numbering.

### **1.2.3.3 MAINTENANCE AND REPAIR PROCEDURES**

Include instructions and a list of tools required to repair or restore the product or equipment to proper condition or operating standards.

### **1.2.3.4 REMOVAL AND REPLACEMENT INSTRUCTIONS**

Include step-by-step procedures and a list required tools and supplies for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings and adjustments required. Instructions shall include a combination of text and illustrations.

### **1.2.3.5 SPARE PARTS AND SUPPLY LISTS**

Include lists of spare parts and supplies required for maintenance and repair to ensure continued service or operation without unreasonable delays. Special consideration is required for facilities at remote locations. List spare parts and supplies that have a long lead-time to obtain.

### **1.2.4 CORRECTIVE MAINTENANCE WORK-HOURS**

Include manufacturer's projection of corrective maintenance work-hours including requirements by type of craft. Corrective maintenance that requires completion or participation of the equipment manufacturer shall be identified and tabulated separately.

### **1.2.5 APPENDICES**

Provide information required below and information not specified in the preceding paragraphs but pertinent to the maintenance or operation of the product or equipment. Include the following:

### **1.2.6 PARTS IDENTIFICATION**

Provide identification and coverage for all parts of each component, assembly, subassembly, and accessory of the end items subject to replacement. Include special hardware requirements, such as requirement to use high-strength bolts and nuts. Identify parts by make, model, serial number, and source of supply to allow reordering without further identification. Provide clear and legible illustrations, drawings, and exploded views to enable easy identification of the items. When illustrations omit the part numbers and description, both the illustrations and separate listing shall show the index, reference, or key number that will cross-reference the illustrated part to the listed part. Parts shown in the listings shall be grouped by components, assemblies, and subassemblies in accordance with the manufacturer's standard practice. Parts data may cover more than one model or series of equipment, components, assemblies, subassemblies, attachments, or accessories, such as typically shown in a master parts catalog.

### **1.2.6.1 WARRANTY INFORMATION**

List and explain the various warranties and include the servicing and technical precautions prescribed by the manufacturers or contract documents in order to keep warranties in force. Include warranty information for primary components such as the compressor of air conditioning system.

### **1.2.6.2 PERSONNEL TRAINING REQUIREMENTS**

Provide information available from the manufacturers that is needed for use in training designated personnel to properly operate and maintain the equipment and systems.

### **1.2.6.3 TESTING EQUIPMENT AND SPECIAL TOOL INFORMATION**

Include information on test equipment required to perform specified tests and on special tools needed for the operation, maintenance, and repair of components.

### **1.2.6.4 CONTRACTOR INFORMATION**

Provide a list that includes the name, address, email, and cell phone telephone number of the General Contractor and each Subcontractor who installed the product or equipment, or system. For each item, also provide the name address email, and cell phone telephone number of the manufacturer's representative and service organization most convenient to the project site. Provide the name, address, address email, and cell phone number of the product, equipment, and system manufacturers.

## **2. EXECUTION**

### **2.1 TRAINING**

Unless provided for elsewhere, the Contractor shall provide operational and maintenance training for all systems furnished under this contract in accordance with this section. The training shall not take place until the operation and maintenance manuals are submitted and approved.

Training will be given to personnel responsible for the operation and maintenance of the system at the installation. Orient training to the specific system being installed under this contract. Use operation and maintenance manual as the primary instructional aid in contractor provided activity personnel training. Manuals shall be delivered for each trainee with two additional sets delivered for archiving at the project site. Submit a training course schedule, syllabus, and training materials 14 days prior to the start of training. Obtain approval of the training course before beginning that phase of training. Furnish a qualified instructor approved by the system manufacturer to conduct training for the specific system. Manuals need to be translated and provided in Pashtu and Dari to the attendees.

Training manuals shall include an agenda, defined objectives and a detailed description of the subject matter for each lesson. Furnish audio-visual equipment and all other training materials and supplies. A training day is defined as 8 hours of classroom or lab instruction, including two 15 minute breaks and excluding lunch time, Monday through Friday, during the daytime shift in effect at the training facility. For guidance, the Contractor should assume the attendees will have a high school education.

The Contractor shall video record the training session on CD/DVD and provide the recordings to the Government.

**-- END OF SECTION --**

**SECTION 01 35 26  
SAFETY AND OCCUPATIONAL HEALTH REQUIREMENTS**

**REVISED OCTOBER 2011**

**[RFP EDITORS – NEED TO DO A WORD SEARCH OF YOUR VARIOUS RFP SECTIONS AND REPLACE ANY REFERENCE TO 01525 WITH THIS 01 35 26. TEDIOUS, BUT WE HAVE NO CHOICE.]**

1. GENERAL

For contractor safety on projects associated with this program, compliance with EM 385-1-1 safety requirements will be the long-term goal reached by growing a safety culture. This compliance will, by necessity, be achieved through a phased-in process. In the Commander's letter at the preface of the EM 385-1-1, he acknowledges that in OCONUS locations, strict compliance with the manual may not be possible – and through the hazard analysis process, safety measures can be developed to attain the same degree of safety. The latest edition of EM385-1-1 in effect at the time of contract award shall be followed for the duration of the contract.

This specification consists of two parts:

1) Sections 1.1 through 3.12.1, which are the standard safety specifications for work in Afghanistan Engineer District South and;

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A10.32	Personal Fall Protection - Safety Requirements for Construction and Demolition Operations
ANSI Z359 (2010)	Safety Requirements for Personal Fall Arrest Systems
ASME B30.3(1996)	Construction Tower Cranes

ASME INTERNATIONAL (ASME)

ASME B30.22(2000)	Articulating Boom Cranes
ASME B30.5(2004)	Mobile and Locomotive Cranes

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 10(2002)	Portable Fire Extinguishers
NFPA 241(2000)	Safeguarding Construction, Alteration, and Demolition Operations
NFPA 51B(2003)	Fire Prevention During Welding, Cutting, and Other Hot Work
NFPA 70(2011)	National Electrical Code
NFPA 70E(2010)	Electrical Safety in the Workplace

U.S. ARMY CORPS OF ENGINEERS (USACE)

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910	Occupational Safety and Health Standards (OSHA)
29 CFR 1910.146	Permit-required Confined Spaces
29 CFR 1915	Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment
29 CFR 1919	Gear Certification
29 CFR 1926	Safety and Health Regulations for Construction
29 CFR 1926.500	Fall Protection

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with SECTION SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

- Accident Prevention Plan (APP); G, District Safety Office
- Activity Hazard Analysis (AHA); G, District Safety Office
- Crane Critical Lift Plan; G, District Safety Office
- Proof of qualification for Crane Operators; G, District Safety Office
- UXO/Demining Safety Work Plan; G, District Safety Office

SD-06 Test Reports

- Reports: Submit reports as their incidence occurs, in accordance with the requirements of the paragraph entitled, "Reports."
- Accident Reports
- Monthly Exposure Reports
- Crane Reports
- Regulatory Citations and Violations

SD-07 Certificates

- Confined Space Entry Permit
- Contractor Safety Self-Evaluation Checklist; G, District Safety Office
- UXO/Demining Clearance Certificate; G, District Safety Office

Submit one copy of each permit/certificate attached to each Daily Quality Control Report.

Certification of UXO clearance. Where excavations are to be performed in areas known or suspected to contain explosives, unexploded munitions, or military ordnance, surface and subsurface clearance by qualified explosive ordnance disposal (EOD) personnel shall be accomplished prior to excavation work. Clearance certificates must be forwarded to the TAS UXO QA Safety specialist, prior to the start of construction. If the site does not have an associated clearance certificate, the site will require an UXO/mine clearance conducted to meet the certification of UXO clearance requirements EM 385-1-1 section 25.A.01.m.

Before initiation of work at the job site, all Accident Prevention Plans, Demining plans, and any other safety related plans shall be reviewed by the TAS Safety Office.

## 1.2 DEFINITIONS

- a. Competent Person for Fall Protection- A person who is capable of identifying hazardous or dangerous conditions in the personal fall arrest system or any component thereof, as well as their application and use with related equipment, and has the authority to take prompt corrective measures to eliminate the hazards of falling.
- b. High Visibility Accident- Any mishap which may generate publicity and/or high visibility.
- c. Medical Treatment- Treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even through provided by a physician or registered personnel.
- d. Qualified Person for Fall Protection- A person with a recognized degree or professional certificate, extensive knowledge, training and experience in the field of fall protection who is capable of performing design, analysis, and evaluation of fall protection systems and equipment.
- e. Recordable Injuries or Illnesses- Any work-related injury or illness that results in:
  - (1) Death, regardless of the time between the injury and death, or the length of the illness;
  - (2) Days away from work (any time lost after day of injury/illness onset);
  - (3) Restricted work;
  - (4) Transfer to another job;
  - (5) Medical treatment beyond first aid;
  - (6) Loss of consciousness; or
  - (7) A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (1) through (6) above.
- f. "USACE" property and equipment specified in USACE EM 385-1-1 should be interpreted as Government property and equipment.

## 1.3 DRUG PREVENTION PROGRAM

Conduct a proactive drug and alcohol use prevention program for all workers, prime and subcontractor, on the site. Ensure that no employee uses illegal drugs or consumes alcohol during work hours. Ensure there are no employees under the influence of drugs or alcohol during work hours. After accidents, collect blood, urine, or saliva specimens and test the injured and involved employees for the influence of drugs and alcohol. A copy of the test shall be made available to the Contracting Officer upon request.

#### 1.4 REGULATORY REQUIREMENTS

In addition to the detailed requirements included in the provisions of this contract, work performed shall comply with USACE EM 385-1-1.

#### 1.5 SITE QUALIFICATIONS, DUTIES AND MEETINGS

##### 1.5.1 PERSONNEL QUALIFICATIONS

##### 1.5.1.1 SITE SAFETY AND HEALTH OFFICER (SSHO)

Site Safety and Health Officer (SSHO) shall be provided at the work site at all times to perform safety and occupational health management, surveillance, inspections, and safety enforcement for the Contractor. The Contractor Quality Control (QC) person cannot be the SSHO on this project.

The SSHO shall meet the following requirements: Certification card for 30-hour OSHA construction safety class or equivalent within the last 3 years. SSHO must be fluent in English and the local language for communication with the GDA. Competent person training as needed.

Site Safety and Health Officer (SSHO) shall meet the requirements of EM 385-1-1

1. The SSHO is also required to have five (5) years of construction industry safety experience or three (3) years if he/she possesses a Certified Safety Professional (CSP) or safety and health degree. (For complex or high hazard projects, the SSHO shall have a minimum of ten (10) years of safety-related work with at least five (5) years experience on similar type projects.

2. The SSHO(s), as a minimum, must have completed the 30-hour OSHA Construction safety class or as an equivalent, 30 hours of formal construction safety and health training covering the subjects of the OSHA 30-hour course (see Appendix A, paragraph 4.b. in EM385-1-1 applicable to the work to be performed and given by qualified instructors.

3. SSHOs shall maintain this competency through 24 hours of formal safety and health related coursework every four (4) years.

The SSHO shall have the following level of experience:

1. A minimum of 5 years safety work on similar projects.
2. 30-hour OSHA construction safety class or equivalent within the last 5 years.
3. An average of at least 24 hours of formal safety training each year for the past 5 years.
4. Competent person training as needed.

##### 1.5.1.2 COMPETENT PERSON FOR CONFINED SPACE ENTRY

Provide a competent person meeting the requirements of EM 385-1-1 who is assigned in writing by the Government Designated Authority (GDA) to assess confined spaces and who possesses demonstrated knowledge, skill and ability to:

- a. Identify the structure, location, and designation of confined and permit-required confined spaces where work is done;
- b. Calibrate and use testing equipment including but not limited to, oxygen indicators, combustible gas indicators, carbon monoxide indicators, and carbon dioxide indicators, and to interpret accurately the test results of that equipment;
- c. Assess hazardous conditions including atmospheric hazards in confined space and adjacent spaces and specify the necessary protection and precautions to be taken;
- d. Determine ventilation requirements for confined space entries and operations;
- e. Assess hazards associated with hot work in confined and adjacent space and determine fire watch requirements; and,

- f. Maintain records required.

### 1.5.1.3 CRANE OPERATORS

Crane operators shall meet the requirements in USACE EM 385-1-1, Section 16.B.

### 1.5.2 PERSONNEL DUTIES

#### 1.5.2.1 SITE SAFETY AND HEALTH OFFICER (SSHO)/SUPERINTENDENT

- a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Safety inspection logs shall be attached to the Contractors' daily quality control report.
- b. Conduct mishap investigations and complete required reports. Maintain an accident/injury log such as the OSHA Form 300 or host nation equivalent, and Daily Production reports for prime and sub-contractors.
- c. Be on site at all times while work is being performed.
- d. Attend the pre-construction conference, pre-work meetings including preparatory inspection meeting, and periodic in-progress meetings.
- e. Implement and enforce accepted APPS and AHAs.
- f. Maintain a safety and health deficiency tracking system that monitors outstanding deficiencies until resolution. A list of unresolved safety and health deficiencies shall be posted on the safety bulletin board.
- g. Ensure sub-contractor compliance with safety and health requirements.

Failure to perform the above duties will result in dismissal of the superintendent and/or SSHO, and a project work stoppage. The project work stoppage will remain in effect pending approval of a suitable replacement.

### 1.5.3 MEETINGS

#### 1.5.3.1 PRECONSTRUCTION CONFERENCE

- a. Contractor representatives who have a responsibility or significant role in accident prevention on the project shall attend the preconstruction conference. This includes the project superintendent, site safety and health officer, quality control supervisor, or any other assigned safety and health professionals who participated in the development of the APP (including the Activity Hazard Analyses (AHAs) and special plans, program and procedures associated with it).
- b. The Contractor shall discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Contracting Officer's representative as to which phases will require an analysis. In addition, a schedule for the preparation, submittal, review, and acceptance of AHAs shall be established to preclude project delays.
- c. Deficiencies in the submitted APP will be brought to the attention of the Contractor at the preconstruction conference, and the Contractor shall revise the plan to correct deficiencies and re-submit it for acceptance. Work shall not begin until there is an accepted APP.
- d. The functions of a Preconstruction conference may take place at the Post-Award Kickoff meeting for Contracts.

### 1.5.3.2 SAFETY MEETINGS

Shall be conducted and documented as required by EM 385-1-1. Minutes showing contract title, signatures of attendees and a list of topics discussed shall be attached to the Contractors' daily quality control report.

## 1.6 TRAINING

### 1.6.1 NEW EMPLOYEE INDOCTRINATION

New employees (prime and sub-contractor) will be informed of specific site hazards before they begin work. Documentation of this orientation shall be kept on file at the project site.

### 1.6.2 PERIODIC TRAINING

Provide Safety and Health Training in accordance with USACE EM 385-1-1 and the accepted APP. Ensure all required training has been accomplished for all onsite employees.

### 1.6.3 TRAINING ON ACTIVITY HAZARD ANALYSIS (AHA)

Prior to beginning a new phase, training will be provided to all affected

## 1.7 ACCIDENT PREVENTION PLAN (APP)

The Contractor shall use a qualified person to prepare the written site-specific APP in both English and in the host nation language. Prepare the APP in accordance with the format and requirements of USACE EM 385-1-1 and as supplemented herein. A TAS Minimum Basic Outline for Contractor APP Template is provided at the end of this section. Cover all paragraph and subparagraph elements in USACE EM 385-1-1, Appendix A, "Minimum Basic Outline for Accident Prevention Plan". Specific requirements for some of the APP elements are described below. The APP shall be job-specific and shall address any unusual or unique aspects of the project or activity for which it is written. The APP shall interface with the Contractor's overall safety and health program. Any portions of the Contractor's overall safety and health program referenced in the APP shall be included in the applicable APP element and made site-specific. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out. The APP shall be signed by the person and firm (senior person) preparing the APP, the Contractor, the on-site superintendent, the designated site safety and health officer.

In addition to following the requirements defined by EM 385-1-1, the Contractor shall submit for approval as part of the APP a DBA Insurance Plan describing how the requirements in Section 00 80 00 Special Clauses paragraph 2.11 will be met including:

- (1) properly and promptly submit an injury claim within seven days of the incident,
- (2) provide Resident/Area Engineer with copies of submitted claim
- (3) gathering contact information of workers and their family,
- (4) follow-up on claim's status,
- (5) provided weekly claims report status to the Resident/Area Engineer,
- (6) providing prompt payment to an injured worker, or the family of a deceased worker, and
- (7) provide Resident/Area Engineer confirmation that payment has been provided from DBA insurance provider.

Submit the APP to the Contracting Officer 15 calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP.

Once accepted by the Contracting Officer, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP will be cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified.

Once work begins, changes to the accepted APP shall be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSHO and quality control manager. Should any hazard become evident, stop work in the area, secure the area, and develop a plan to remove the hazard. Notify the Contracting Officer within 24 hours of discovery. In the interim, all necessary action shall be taken to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public, and the environment.

Copies of the accepted plan will be maintained at the Contracting Officer's office and at the job site.

The APP shall be continuously reviewed and amended, as necessary, throughout the life of the contract. Unusual or high-hazard activities not identified in the original APP shall be incorporated in the plan as they are discovered.

#### 1.7.1 EM 385-1-1 CONTENTS

In addition to the requirements outlines in Appendix A of USACE EM 385-1-1, the following is required:

- a. Names and qualifications (resumes including education, training, experience and certifications) of all site safety and health personnel designated to perform work on this project to include the designated site safety and health officer and other competent and qualified personnel to be. The duties of each position shall be specified.
- b. Qualifications of competent and of qualified persons. As a minimum, competent persons shall be designated and qualifications submitted for each of the following major areas: excavation; scaffolding; fall protection; hazardous energy; confined space; health hazard recognition, evaluation and control of chemical, physical and biological agents; personal protective equipment and clothing to include selection, use and maintenance.
- c. Confined Space Entry Plan. Develop a confined space entry plan in accordance with USACE EM 385-1-1, Section 34, and any other federal, state and local regulatory requirements identified in this contract. Identify the qualified person's name and qualifications, training, and experience. Delineate the qualified person's authority to direct work stoppage in the event of hazardous conditions. Include procedure for rescue by contractor personnel and the coordination with emergency responders. (If there is no confined space work, include a statement that no confined space work exists and none will be created.)
- d. Crane Critical Lift Plan. Prepare and sign weight handling critical lift plans for lifts over 75 percent of the capacity of the crane or hoist (or lifts over 50 percent of the capacity of a barge mounted mobile crane's hoists) at any radius of lift; lifts involving more than one crane or hoist; lifts of personnel; and lifts involving non-routine rigging or operation, sensitive equipment, or unusual safety risks. The plan shall be submitted 15 calendar days prior to on-site work and include the requirements of USACE EM 385-1-1, paragraph 16.H. and the following:
  - (1) For lifts of personnel, the plan shall demonstrate compliance with the requirements of EM 385-1-1, Section 16.T.
  - (2) For barge mounted mobile cranes, barge stability calculations identifying barge list and trim based on anticipated loading; and load charts based on calculated list and trim. The amount of list and trim shall be within the crane manufacturer's requirements.
- e. Fall Protection and Prevention (FP&P) Plan. The plan shall be site specific and address all fall hazards in the work place and during different phases of construction. It shall address how to protect and prevent workers from falling to lower levels when they are exposed to fall hazards above 1.8 m (6 feet). A qualified person for fall protection shall prepare and sign the plan. The plan shall include fall protection and prevention systems, equipment and methods employed for every phase of work,

responsibilities, assisted rescue, self-rescue and evacuation procedures, training requirements, and monitoring methods. Fall Protection and Prevention Plan shall be revised every six months for lengthy projects, reflecting any changes during the course of construction due to changes in personnel, equipment, systems or work habits. The accepted Fall Protection and Prevention Plan shall be kept and maintained at the job site for the duration of the project. The Fall Protection and Prevention Plan shall be included in the Accident Prevention Plan (APP).

#### 1.8 ACTIVITY HAZARD ANALYSIS (AHA)

The Activity Hazard Analysis (AHA) format shall be in accordance with USACE EM 385-1-1, and shall be written in both English and the host nation language. Submit the AHA for review at least 15 calendar days prior to the start of each phase. The Contractor shall format subsequent AHAs as amendments to the APP. The analysis should be used during daily inspections to ensure the implementation and effectiveness of the activity's safety and health controls.

The AHA list will be reviewed periodically (at least monthly) at the Contractor supervisory safety meeting and updated as necessary when procedures, scheduling, or hazards change.

The activity hazard analyses shall be developed using the project schedule as the basis for the activities performed. Any activities listed on the project schedule will require an AHA. The AHAs will be developed by the contractor, supplier or subcontractor and provided to the prime contractor for submittal to the Contracting Officer.

#### 1.9 DISPLAY OF SAFETY INFORMATION

Within 1 calendar day after commencement of work, erect a safety bulletin board at the job site. The safety bulletin board shall include information and be maintained as required by EM 385-1-1, section 01.A.06.

#### 1.10 SITE SAFETY REFERENCE MATERIALS

Maintain safety-related references applicable to the project. Maintain applicable equipment manufacturer's manuals.

#### 1.11 EMERGENCY MEDICAL TREATMENT

Contractors will arrange for their own emergency medical treatment. The Government has no responsibility to provide emergency medical treatment. Military medical clinics may provide emergency treatment for serious injuries; the contractor is responsible for coordination with the local military medical clinic prior to mobilization.

#### 1.12 REPORTS

##### 1.12.1 ACCIDENT REPORTS

For recordable injuries, illnesses and property damage accidents resulting in at least \$2,000 in damages, the Prime Contractor shall conduct an accident investigation to establish the root cause(s) of the accident and complete the USACE Accident Report Form 3394 and provide the report to the Contracting Officer within 5 calendar day(s) of the accident. The Contracting Officer will provide copies of any required or special forms.

##### 1.12.2 ACCIDENT NOTIFICATION

Notify the Contracting Officer as soon as practical, but not later than eight hours, after any accident meeting the definition of Recordable Injuries or Illnesses or High Visibility Accidents, property damage equal to or greater than \$2,000. Information shall include contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (to include type of construction equipment used, PPE used, etc.). For all accidents involving a fatality, permanent total disability, hospitalization of three or more persons, or property damage of \$200,000 or more, the Contractor shall promptly suspend all operations at the scene of the accident and notify the Resident Engineer of the occurrence.

The Contractor shall immediately provide for the rescue and/or care of the injured. Except in situations where safety may be compromised, access to the area shall be restricted and the scene left undisturbed until investigated by a Government appointed board of investigation and until the Contractor is authorized to resume operations.

### 1.12.3 MONTHLY EXPOSURE REPORTS

Monthly exposure reporting to the Contracting Officer is required to be attached to the monthly billing request. This report is a compilation of employee-hours worked each month for all site workers, both prime and subcontractor. The Contracting Officer will provide copies of any special forms.

### 1.12.4 CRANE REPORTS

Submit crane inspection reports required in accordance with USACE EM 385-1-1, Appendix I and as specified herein with Daily Reports of Inspections.

### 1.13 HOT WORK

Prior to performing "Hot Work" (welding, cutting, etc.) or operating other flame-producing/spark producing devices, a written permit shall be requested from the Installation. **CONTRACTORS ARE REQUIRED TO MEET ALL CRITERIA BEFORE A PERMIT IS ISSUED.** The Contractor will provide at least two (2) six kilogram ABC rated extinguishers for normal "Hot Work". All extinguishers shall be current inspection tagged, approved safety pin and tamper resistant seal. It is also mandatory to have a designated FIRE WATCH for any "Hot Work" done at this activity. The Fire Watch shall be trained in fire fighting techniques and remain on-site for a minimum of 120 minutes after completion of the task or as specified on the hot work permit.

When starting work in the facility, Contractors shall require their personnel to familiarize themselves with the location of the nearest fire alarm boxes and place in memory the emergency phone numbers. **ANY FIRE, NO MATTER HOW SMALL, SHALL BE REPORTED TO THE RESPONSIBLE FIRE DIVISION/DEPARTMENT IMMEDIATELY.**

## 2. EXECUTION

### 2.1 CONSTRUCTION AND/OR OTHER WORK

Before initiation of work at the job site, an accident prevention plan, written by the Contractor for the specific work and hazards of the contract and implementing in detail the pertinent requirements of EM 385-1-1, will be reviewed and found acceptable by designated Government personnel. Specific requirements for development of the accident prevention plan are found in sections 01.A and Appendix A of EM 385-1-1.

Before beginning each activity involving a type of work presenting hazards not experienced in previous project operations or where a new work crew or subcontractor is to perform the work, activity hazard analysis (AHA) shall be prepared by the Contractor performing the work activity. See paragraph 01.A.13 of EM 385-1-1.

The Contractor shall require subcontractors to submit their plan of operations showing methods they propose to use in accomplishing major phases of work.

The Contractor shall be prepared to discuss the plans in conferences convened by the Contracting Officer prior to starting work on each major phase of operation. Plans shall include all pertinent information such as layout of haul roads, access roads, storage areas, electrical distribution lines, methods of providing minimum exposure to overhead loads, and methods of access to work areas. The plan for accomplishing the initial work phase shall be submitted within 15 calendar days after award of the contract. Plans for subsequent major phases of work shall be submitted not later than 15 calendar days prior to initiation of work on each major phase.

All areas where construction, demolition, alteration, building, or similarly related activities take place, all workers shall have the following minimum personal protective clothing and equipment:

1. Short sleeve shirt.
2. Long trousers.

3. Steel-toed safety boots.
4. Hard hat.
5. Eye protection

Eye and face protection equipment shall meet the requirements of ANSI/ American Society of Safety Engineers (ASSE) Z87.1, and bear a legible and permanent "Z87" logo to indicate compliance with the standard. Eye and face protection equipment shall be distinctly marked to facilitate identification of the manufacturer and provides side protection.

Persons involved in activities that subject the hands to injury (for example, cuts, abrasions, punctures, burns, chemical irritants, toxins, vibration, and forces that can restrict blood flow) shall select and use hand protection appropriate for the hazard in accordance with ANSI/International Safety Equipment Association (ISEA) 105.

Protective equipment shall be of heat, fire, chemical, and/or electrical-resistive material when conditions require protection against such hazards.

#### 2.1.1 FALLING OBJECT PROTECTION

All areas must be barricaded to safeguard employees. When working overhead, barricade the area below to prevent entry by unauthorized employees. Construction warning tape and signs shall be posted so they are clearly visible from all possible access points. When employees are working overhead all tools and equipment shall be secured so that they will not fall. When using guardrail as falling object protection, all openings shall be small enough to prevent passage of potential falling objects.

#### 2.1.2 HAZARDOUS MATERIAL USE

Each hazardous material must receive approval prior to being brought onto the job site or prior to any other use in connection with this contract. Allow a minimum of 10 working days for processing of the request for use of a hazardous material. Any work or storage involving hazardous chemicals or materials must be done in a manner that will not expose Government or Contractor employees to any unsafe or unhealthful conditions. Adequate protective measures must be taken to prevent Government or Contractor employees from being exposed to any hazardous condition that could result from the work or storage. The Prime Contractor shall keep a complete inventory of hazardous materials brought onto the work-site. Approval by the Contracting Officer of protective measures and storage area is required prior to the start of the work.

#### 2.1.3 HAZARDOUS MATERIAL EXCLUSIONS

Notwithstanding any other hazardous material used in this contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation (with the exception of radioactive material and devices used in accordance with USACE EM 385-1-1 such as nuclear density meters for compaction testing and laboratory equipment with radioactive sources) as well as materials which contain asbestos, mercury or polychlorinated biphenyls, di-isocyanates, lead-based paint are prohibited. The Contracting Officer, upon written request by the Contractor, may consider exceptions to the use of any of the above excluded materials.

#### 2.1.4 UNFORESEEN HAZARDOUS MATERIAL

The design should have identified materials such as PCB, lead paint, and friable and non-friable asbestos. If material, not indicated, that may be hazardous to human health upon disturbance during construction operations is encountered, stop that portion of work and notify the Contracting Officer immediately. Within 14 calendar days the Government will determine if the material is hazardous. If material is not hazardous or poses no danger, the Government will direct the Contractor to proceed without change. If material is hazardous and handling of the material is necessary to accomplish the work, the Government will issue a modification pursuant to "FAR 52.243-4, Changes" and "FAR 52.236-2, Differing Site Conditions."

## 2.2 FALL HAZARD PROTECTION AND PREVENTION PROGRAM

The Contractor shall establish a fall protection and prevention program, for the protection of all employees exposed to fall hazards. The program shall include company policy; identify responsibilities, education and training requirements, fall hazard identification, prevention and control measures, inspection, storage, care and maintenance of fall protection equipment and rescue and evacuation procedures.

### 2.2.1 TRAINING

The Contractor shall institute a fall protection training program. As part of the Fall Hazard Protection and Prevention Program, the Contractor shall provide training for each employee who might be exposed to fall hazards. A competent person for fall protection shall provide the training. Training requirements shall be in accordance with USACE EM 385-1-1, section 21.B.

### 2.2.2 FALL PROTECTION EQUIPMENT

The Contractor shall enforce use of the fall protection equipment designated for each specific work activity in the Fall Protection and Prevention Plan and/or AHA at all times when an employee is on a surface 1.8 m (6 feet) or more above lower levels. Fall protection systems such as guardrails, personnel fall arrest system, safety nets, etc., are required when working within 1.8m (6 feet) of any leading edge. Personal fall arrest systems are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, Elevating Work Platforms/Scissors Lifts: Scissors lifts shall be equipped with standard guardrails. In addition to the guardrail provided, if the scissor lift is equipped with a manufactured anchorage, a restraint system shall be used in addition to guardrails. Lanyards used with the restraint system shall be sufficiently short to prohibit workers from climbing out of, or being ejected from, the platform.

#### 2.2.2.1 PERSONAL FALL ARREST EQUIPMENT

Personal fall arrest equipment, systems, subsystems, and components shall meet ANSI Z359.1 or European Union equivalent. Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest body support device. Body belts may only be used as a positioning device system (for uses such as steel reinforcing assembly and in addition to an approved fall arrest system). Harnesses shall have a fall arrest attachment affixed to the body support (usually a Dorsal D-ring) and specifically designated for attachment to the rest of the system. Only locking snap hooks and carabiners shall be used. Webbing, straps, and ropes shall be made of synthetic fiber. The maximum free fall distance when using fall arrest equipment shall not exceed 1.8 m (6 feet). The total fall distance and any swinging of the worker (pendulum-like motion) that can occur during a fall shall always be taken into consideration when attaching a person to a fall arrest system.

### 2.2.3 FALL PROTECTION FOR ROOFING WORK

Fall protection controls shall be implemented based on the type of roof being constructed and work being performed. The roof area to be accessed shall be evaluated for its structural integrity including weight-bearing capabilities for the projected loading.

#### a. Low Sloped Roofs:

- (1) For work within 1.8 m (6 feet) of an edge, on low-slope roofs, personnel shall be protected from falling by use of personal fall arrest systems, guardrails, or safety nets. A safety monitoring system is not adequate fall protection and is not authorized.
- (2) For work greater than 1.8 m (6 feet) from an edge, warning lines shall be erected and installed in accordance with USACE EM 385-1-1.

b. Steep-Sloped Roofs: Work on steep-sloped roofs requires a personal fall arrest system, guardrails with toe-boards, or safety nets. This requirement also includes residential or housing type construction.

#### 2.2.4 EXISTING ANCHORAGE

Existing anchorages, to be used for attachment of personal fall arrest equipment, shall be certified (or re-certified) by a qualified person for fall protection in accordance with ANSI Z359.1 or European Union equivalent. Existing horizontal lifeline anchorages shall be certified (or re-certified) by a registered professional engineer with experience in designing horizontal lifeline systems.

#### 2.2.5 HORIZONTAL LIFELINES

Horizontal lifelines shall be designed, installed, certified and used under the supervision of a qualified person for fall protection as part of a complete fall arrest system which maintains a safety factor of 2.

#### 2.2.6 GUARDRAILS AND SAFETY NETS

Guardrails and safety nets shall be designed, installed and used in accordance with EM 385-1-1 or Host Nation requirements, whichever is more stringent.

#### 2.2.7 RESCUE AND EVACUATION PROCEDURES

When personal fall arrest systems are used, the contractor must ensure that the mishap victim can self-rescue or can be rescued promptly should a fall occur. A Rescue and Evacuation Plan shall be prepared by the contractor and include a detailed discussion of the following: methods of rescue; methods of self-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility. The Rescue and Evacuation Plan shall be included in the Activity Hazard Analysis (AHA) for the phase of work, in the Fall Protection and Prevention (FP&P) Plan, and the Accident Prevention Plan (APP).

### 2.3 SCAFFOLDING

Employees shall be provided with a safe means of access to the work area on the scaffold. Climbing of any scaffold braces or supports not specifically designed for access is prohibited. Access to scaffold platforms greater than 6 m in height shall be accessed by use of a scaffold stair system. Vertical ladders commonly provided by scaffold system manufacturers shall not be used for accessing scaffold platforms greater than 6 m in height. The use of an adequate gate is required. Contractor shall ensure that employees are qualified to perform scaffold erection and dismantling. Do not use scaffold without the capability of supporting at least four times the maximum intended load or without appropriate fall protection as delineated in the accepted fall protection and prevention plan. Stationary scaffolds must be attached to structural building components to safeguard against tipping forward or backward. Special care shall be given to ensure scaffold systems are not overloaded. Side brackets used to extend scaffold platforms on self-supported scaffold systems for the storage of material are prohibited. The first tie-in shall be at the height equal to 4 times the width of the smallest dimension of the scaffold base. Work platforms shall be placed on mud sills. Scaffold or work platform erectors shall have fall protection during the erection and dismantling of scaffolding or work platforms that are more than six feet. Delineate fall protection requirements when working above six feet or above dangerous operations in the Fall Protection and Prevention (FP&P) Plan and Activity Hazard Analysis (AHA) for the phase of work.

### 2.4 EQUIPMENT

#### 2.4.1 MATERIAL HANDLING EQUIPMENT

- a. Material handling equipment such as forklifts shall not be modified with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions.
- b. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions.
- c. Operators of forklifts or power industrial trucks shall be trained/licensed in accordance with Host Nation requirements.

#### 2.4.2 WEIGHT HANDLING EQUIPMENT

- a. Cranes and derricks shall be equipped as specified in EM-385-1-1 section 16.
- b. The Contractor shall notify the Contracting Officer 15 days in advance of any cranes entering the activity so that necessary quality assurance spot checks can be coordinated. Contractor's operator shall remain with the crane during the spot check.
- c. The Contractor shall comply with the crane manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Erection shall be performed under the supervision of a designated person. All testing shall be performed in accordance with the manufacturer's recommended procedures.
- d. Under no circumstance shall a Contractor make a lift at or above 90% of the cranes rated capacity in any configuration.
- e. When operating in the vicinity of overhead transmission lines, operators and riggers shall be alert to this special hazard and shall follow the requirements of USACE EM 385-1-1 section 11.
- f. Crane suspended personnel work platforms (baskets) shall not be used unless the Contractor proves to the satisfaction of the Contracting Officer that using any other access to the work location would provide a greater hazard to the workers or is impossible. Personnel shall not be lifted with a line hoist or friction crane.
- g. Portable fire extinguishers shall be inspected, maintained, and recharged.
- h. All employees shall be kept clear of loads about to be lifted and of suspended loads.
- i. The Contractor shall use cribbing when performing lifts on outriggers.
- j. The crane hook/block must be positioned directly over the load. Side loading of the crane is prohibited.
- k. A physical barricade must be positioned to prevent personnel from entering the counterweight swing (tail swing) area of the crane.
- l. Certification records which include the date of inspection, signature of the person performing the inspection, and the serial number or other identifier of the crane that was inspected shall always be available for review by Contracting Officer personnel.
- m. Written reports listing the load test procedures used along with any repairs or alterations performed on the crane shall be available for review by Contracting Officer personnel.
- n. Certify that all crane operators have been trained in proper use of all safety devices (e.g. anti-two block devices).
- o. Take steps to ensure that wind speed does not contribute to loss of control of the load during lifting operations. Prior to conducting lifting operations the contractor shall set a maximum wind speed at which a crane can be safely operated based on the equipment being used, the load being lifted, experience of operators and riggers, and hazards on the work site. This maximum wind speed determination shall be included as part of the activity hazard analysis plan for that operation.

#### 2.5 EXCAVATIONS

The competent person for excavations performed as a result of contract work shall be on-site when excavation work is being performed, and shall inspect, and document the excavations daily prior to entry by workers. The competent person must evaluate all hazards, including atmospheric, that may be associated with the work, and shall have the resources necessary to correct hazards promptly. All excavations shall conform to the requirements of Section 25 of EM 385-1-1.

The competent person for excavations performed as a result of contract work shall be on-site when excavation work is being performed, and shall inspect the excavation, the adjacent areas, and protective systems daily; before each work shift; throughout the work shifts as dictated by the work being done; after every rainstorm; after other events that could increase hazards, e.g., snowstorm, windstorm, thaw, earthquake, etc.; when fissures, tension cracks, sloughing, undercutting, water seepage, bulging at the bottom or other similar conditions occur; when there is a change in size, location or placement of the spoil pile; and where there is any indication or change in adjacent structures. The competent person shall be able to demonstrate the following: training, experience, and knowledge of, soil analysis, use of protective systems; and requirements of EM 385-1-1 and 29 CFR 1926 Subpart P. They also need the ability to detect conditions that could result in cave-ins, failures in protective systems, hazardous atmospheres, and other hazards including those associated with confined spaces. They shall have the authority to take prompt corrective measures to eliminate existing and predictable hazards and stop work when required.

#### 2.5.1 UTILITY LOCATIONS

Prior to any excavation, all underground utilities in the work area must be positively identified by the contractor utilizing a) a private utility locating service in addition to any station locating service, and/or b) a metal and/or cable-detecting device along the route of the excavation. All underground utilities discovered will be flagged a distance of one-half (1/2) meter on each side of the location, and any markings made during the utility investigation must be maintained throughout the contract.

Damage occurring to existing utilities, when the above procedures are not followed, will be repaired at the Contractor's expense.

#### 2.5.2 UTILITY LOCATION VERIFICATION

The Contractor must physically verify underground utility locations by hand digging using wood or fiberglass handled tools when any adjacent construction work is expected to come within three feet of the underground system. Digging within 0.61 m (2 feet) of a known utility must not be performed by means of mechanical equipment; hand digging shall be used. If construction is parallel to an existing utility the utility shall be exposed by hand digging every 30.5 m (100 feet) if parallel within 1.5 m (5 feet) of the excavation.

#### 2.5.3 SHORING SYSTEMS

Trench and shoring systems must be identified in the accepted safety plan and AHA. Manufacture tabulated data and specifications or registered engineer tabulated data for shoring or benching systems shall be readily available on-site for review. Job-made shoring or shielding shall have the registered professional engineer stamp, specifications, and tabulated data. Extreme care must be used when excavating near direct burial electric underground cables.

#### 2.5.4 TRENCHING MACHINERY

Trenching machines with digging chain drives shall be operated only when the spotters/laborers are in plain view of the operator. Operator and spotters/laborers shall be provided training on the hazards of the digging chain drives with emphasis on the distance that needs to be maintained when the digging chain is operating. Documentation of the training shall be kept on file at the project site.

#### 2.6 UTILITIES WITHIN CONCRETE SLABS

Utilities located within concrete slabs or pier structures, bridges, and the like, are extremely difficult to identify due to the reinforcing steel used in the construction of these structures. Whenever contract work involves concrete chipping, saw cutting, or core drilling, the existing utility location must be coordinated with station utility departments in addition to a private locating service. Outages to isolate utility systems shall be used in circumstances where utilities are unable to be positively identified. The use of historical drawings does not alleviate the contractor from meeting this requirement.

## 2.7 ELECTRICAL

### 2.7.1 CONDUCT OF ELECTRICAL WORK

Underground electrical spaces must be certified safe for entry before entering to conduct work. Cables that will be cut must be positively identified and de-energized prior to performing each cut. Positive cable identification must be made prior to submitting any outage request for electrical systems. Arrangements are to be coordinated with the Contracting Officer and Station Utilities for identification. The Contracting Officer will not accept an outage request until the Contractor satisfactorily documents that the circuits have been clearly identified. Perform all high voltage cable cutting remotely using hydraulic cutting tool. Energized work may never be performed without prior authorization. An energized work permit shall be submitted to GDA for acceptance in accordance with 385-1-1, Section 11.A02.c. When racking in or live switching of circuit breakers, no additional person other than the switch operator will be allowed in the space during the actual operation. Plan so that work near energized parts is minimized to the fullest extent possible. Use of electrical outages clear of any energized electrical sources is the preferred method. When working in energized substations, only qualified electrical workers shall be permitted to enter. When work requires Contractor to work near energized circuits as defined by the NFPA 70, high voltage personnel must use personal protective equipment that includes, as a minimum, electrical hard hat, safety shoes, insulating gloves with leather protective sleeves, fire retarding shirts, coveralls, face shields, and safety glasses. In addition, provide electrical arc flash protection for personnel as required by NFPA 70E. Insulating blankets, hearing protection, and switching suits may also be required, depending on the specific job and as delineated in the Contractor's AHA.

### 2.7.2 PORTABLE EXTENSION CORDS

Portable extension cords shall be sized in accordance with manufacturer ratings for the tool to be powered and protected from damage. All damaged extension cords shall be immediately removed from service. Portable extension cords shall meet the requirements of NFPA 70 or European Union equivalent.

## 2.8 WORK IN CONFINED SPACES

The Contractor shall comply with the requirements in Section 34 of USACE EM 385-1-1. Any potential for a hazard in the confined space requires a permit system to be used.

- a. Entry Procedures. Prohibit entry into a confined space by personnel for any purpose, including hot work, until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the work intended and that all potential hazards are controlled or eliminated and documented. All hazards pertaining to the space shall be reviewed with each employee during review of the AHA.
- b. Forced air ventilation is required for all confined space entry operations and the minimum air exchange requirements must be maintained to ensure exposure to any hazardous atmosphere is kept below its' action level. Ventilation shall conform to the requirements of Section 06.G of 385-1-1.
- c. Ensure the use of rescue and retrieval devices in confined spaces greater than 1.5 m (5 feet) in depth. Conform to Section 34 of USACE EM 385-1-1.
- d. Sewer wet wells require continuous atmosphere monitoring with audible alarm for toxic gas detection.
- e. Include training information for employees who will be involved as entrants and attendants for the work. Conform to Section 34 of USACE EM 385-1-1.
- f. Daily Entry Permit. Post the permit in a conspicuous place close to the confined space entrance.

## 2.9 CRYSTALLINE SILICA

Grinding, abrasive blasting, and foundry operations of construction materials containing crystalline silica, shall comply with USACE EM 385-1-1, Appendix 06.H. The Contractor shall develop and implement effective exposure control and elimination procedures to include dust control systems, engineering controls, and establishment of work area boundaries, as well as medical surveillance, training, air monitoring, and personal protective equipment.

## 2.10 DEMOLITION

### 2.10.1 DEMOLITION PLAN

The Contractor shall submit a written demolition plan for all demolition work to be carried on the site. In addition, the demolition plan shall be signed by a Professional Registered Engineer and meet the requirements of the Corps of Engineers Safety and Health Manual, EM 385-1-1, section 23. The demolition plan shall be submitted to the COR at least 1 week before the beginning of the work, including structural calculations for the demolition, if necessary. The demolition work shall not begin before the Contractor has received a written approval from the COR.

### 2.10.2 PROTECTION OF PERSONNEL

During the demolition work the Contractor shall continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the demolition site. No area, section, or component of floors, roofs, walls, columns, pilasters, or other structural element will be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while workers remove debris or perform other work in the immediate area.

### 2.10.3 PROTECTION OF STRUCTURES

Floors, roofs, walls, columns, pilasters, and other structural components that are designed and constructed to stand without lateral support or shoring, and are determined to be in stable condition, shall remain standing without additional bracing, shoring, or lateral support until demolished, unless directed otherwise by the COR. The Contractor shall ensure that no elements determined to be unstable are left unsupported and shall be responsible for placing and securing bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, or demolition work performed under this contract.

Interior concrete or masonry walls shall be demolished from the top down unless a Registered Engineer can demonstrate that an alternate method poses no additional safety hazards

## 2.11 HOUSEKEEPING

### 2.11.1 CLEAN-UP

The Contractor shall be responsible for cleaning up. The Contractor shall require his personnel to keep the immediate work site clean of all dirt and debris resulting from work under this contract. Accumulated dirt and debris shall be hauled off and disposed of in accordance with local law and at least once a week by the Contractor. Additionally, all debris in work areas shall be cleaned up daily or more frequently if necessary. Construction debris may be temporarily located in an approved location; however garbage accumulation must be removed each day.

Stairwells used by the Contractor during execution of work shall be cleaned daily. Cloths, mops, and brushes containing combustible materials shall be disposed of or stored outside of the buildings in tight covered metal containers. Paints and thinners shall not be poured into inlets of the interior or exterior sewage system. Paint, stains, and other residues on adjacent surfaces or fixtures caused by the Contractor shall be carefully removed and cleaned to original finish. Upon completion of the work, the Contractor shall remove all construction equipment, materials and debris resulting from the work. The entire work site and the area used by Contractor personnel shall be left clean.

**-- END OF SECTION --**