

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT			1. CONTRACT ID CODE J	PAGE OF PAGES 1 122
2. AMENDMENT/MODIFICATION NO. 0004	3. EFFECTIVE DATE 20-Oct-2007	4. REQUISITION/PURCHASE REQ. NO.		5. PROJECT NO.(If applicable)
6. ISSUED BY AFGHANISTAN ENGINEER DISTRICT US ARMY CORPS OF ENGINEERS KABUL APO AE 09356	CODE W917PM	7. ADMINISTERED BY (If other than item 6) See Item 6		
8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)		X	9A. AMENDMENT OF SOLICITATION NO. W917PM-07-R-0102	
		X	9B. DATED (SEE ITEM 11) 13-Oct-2007	
			10A. MOD. OF CONTRACT/ORDER NO.	
			10B. DATED (SEE ITEM 13)	
CODE	FACILITY CODE			
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS				
<input checked="" type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer <input type="checkbox"/> is extended, <input checked="" type="checkbox"/> is not extended. Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning <u>1</u> copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12. ACCOUNTING AND APPROPRIATION DATA (If required)				
13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.				
A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).				
C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
D. OTHER (Specify type of modification and authority)				
E. IMPORTANT: Contractor <input type="checkbox"/> is not, <input type="checkbox"/> is required to sign this document and return _____ copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.) This amendment accomplishes the followings: 1. Answers questions from prospective Offerors. 2. Sections 00110 and 00120 are deleted in their entirety and replaced with new sections 00110 and 00120. The result of this is to change all occurrences of "cost/price" to "price". Additionally, section 00120, part B.2. last sentence is amended to read "The non-pricing Volume I factors taken together have significantly more weight compared to the pricing factor (Volume II) in the evaluation and selection process. Finally, Section 00110 part 1.2 Notes and Section 00120 part 1.3 Notes are added, both of which address joint ventures, teaming arrangements and credit for experience and past performance for others. 3. Section 00010 Proposal Schedule Notes is modified to add note number 11. Also, a revised Proposal schedule is provided with the addition of items 0008 and 0009. 4. Sections 01010 and 01015 are deleted and replaced in their entirety.				
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.				
15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)		
		TEL: _____ EMAIL: _____		
15B. CONTRACTOR/OFFEROR _____ (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY _____ (Signature of Contracting Officer)	16C. DATE SIGNED 27-Oct-2007	

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION 00010 – PROPOSAL SCHEDULE (REVISED 26 OCTOBER 2007)

Section 00010 - Solicitation Contract Form

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001	BASE PROPOSAL FFP FOB: Destination				
SUBTOTAL AMOUNT (ITEMS 000101 – 000103)				NET AMT	<hr/>

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000101	DESIGN COSTS FFP FOB: Destination				
				NET AMT	<hr/>

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000102	SITE SURVEY/MASTER PLANNING FFP FOB: Destination				
					<hr/>
					NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000103	AS-BUILT DRAWINGS FFP Not to exceed \$50,000.00 FOB: Destination				
					<hr/>
					(Not to exceed \$50,000)

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0002	MOBILIZATION / DEMOBILIZATION FFP FOB: Destination				
					<hr/>
					NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0003	GRADING FFP FOB: Destination				
				NET AMT	<hr/>

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0004	SITE DEVELOPMENT / IMPROVEMENTS FFP FOB: Destination				
SUBTOTAL AMOUNT (ITEMS 000401 – 000406)				NET AMT	<hr/>

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000401	WATER FFP Water well, storage and distribution system. FOB: Destination				
				NET AMT	<hr/>

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000402	SEWAGE FFP Sewage treatment plant and sewer system. FOB: Destination				

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000403	POWER FFP Prime power plant, distribution and fuel system FOB: Destination				

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000404	FORCE PROTECTION PERIMETR FFP FOB: Destination				

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000405	ROAD NETWORK FFP FOB: Destination				

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000406	SOLID WASTE COLLECTION POINT FFP FOB: Destination				

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0005	BUILDINGS & BUILDING COMPLEXES FFP Infantry battalions and DFAC. FOB: Destination				

SUBTOTAL AMOUNT (ITEMS 000501 – 000512) NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000501	INFANTRY BATTALION COMPLEX A FFP FOB: Destination				
					<hr/>
					NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000502	INFANTRY BATTALION COMPLEX B FFP FOB: Destination				
					<hr/>
					NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000503	INFANTRY BATTALION COMPLEX C FFP FOB: Destination				
					<hr/>
					NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000504	DFAC NUMBER 1 FFP FOB: Destination				
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					NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000505	BOQ FACILITIES FFP FOB: Destination				
					<hr/>
					NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000506	EMBEDDED TRAINING TEAM FACILITIES FFP FOB: Destination				
					<hr/>
					NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000507	COMMUNICATION BUILDING FFP FOB: Destination				
					<hr/>
					NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000508	VEHICLE REFUELING POINT FFP FOB: Destination				
					<hr/>
					NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000509	BUNKERS FFP FOB: Destination				
					<hr/>
					NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000510	ANTI-VEHICLE TRENCH FFP FOB: Destination				

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000511	SPARE PARTS FFP Not to exceed \$50,000 FOB: Destination				

(Not to exceed \$50,000.00)

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000512	USACE HOUSING AND SUPPORT OFFICE FFP FOB: Destination				

NET AMT

TOTAL BASE PROPOSAL (ITEMS 0001 – 0005)

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0006	PERFORMANCE INCENTIVE FFP EARLY COMPLETION INCENTIVE (a) If the Contractor completes the work before the completion date specified in the contract ("contract completion date"), the Government shall pay an early completion incentive to the Contractor in the amount of \$5,500 for each calendar day before the contract completion date that the work is completed. (b) This incentive shall not be construed as accelerating the Contractor. (c) The total incentive shall not exceed \$275,000 which is equivalent to completing the work fifty (50) days before the contract completion date. DO NOT PROPOSE ON THIS ITEM FOB: Destination				

(Do Not Propose)

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0007 OPTION	OPTION - ENTRANCE ROAD FFP FOB: Destination	1	Lump Sum		

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0008 OPTION	OPTION- PAVED ROADS FFP FOB: Destination	1	Lump Sum		
NET AMT					_____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0009 OPTION	OPTION- GENERATOR(S) FFP Generator(s) for power plant. Propose price of one generator. More than one generator may be awarded. FOB: Destination	1	Lump Sum		
NET AMT					_____

TOTAL OPTIONS (ITEMS 0007 – 0008) _____

PROPOSAL TOTAL AMOUNT BASE + OPTIONS (ITEMS 0001 – 0009) _____

PROPOSAL SCHEDULE NOTES

PROPOSAL SCHEDULE NOTES

1. Offeror shall submit prices on all items.
2. Only one contract for the entire schedule will be awarded under this solicitation. This project will be awarded as a lump sum contract. This Proposal Schedule is an accounting tool for allocating funds to applicable budget.
3. Costs associated with this project shall include design and construction costs, site development, and utility installation.

4. DESIGN COSTS DEFINITION: Design costs shall consist of preparation of master planning and site designs, plans, design analysis, drawings, and specifications.
5. NON-DESIGN COSTS DEFINITION: Non-design costs shall include the following: initial site visits; field, topographic, property, boundary, utility, and right-of-way surveys; subsurface explorations and borings; feasibility, functional, and economic studies and other investigations; preparation or verification of as-built drawings; preparation of general and development criteria; preparation of general and feature design memoranda; services of consultants where not specifically applied to the preparation of working drawings or specifications; construction phase services; models, renderings, or photographs of completed designs; reproduction of designs for review purposes; and travel and per diem allowances in connection with the above excludable services.
6. COST LIMITATION: The established design cost limitation for all Design Costs, as defined in paragraph 4, shall not exceed 6 percent of the total construction cost.
7. SEPARATION OF WORK: All work for Design and Construction shall be included in all Proposal Items.
8. EVALUATION OF OPTIONS: The award will be made to the offeror whose proposal represents the best overall value to the Government. For pricing purposes the Government will evaluate both the Base Proposals and Option Proposals. The Government is not obligated to exercise the options.
9. EXERCISE OF OPTIONAL BID ITEMS: Optional bid items (if any) may, at the option of the Government, be added to the contract at any time within 120 calendar days after award of Base Proposal.
10. COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK: The following order of work shall apply before start of optional bid items: All base bid contract line items shall be 75 percent construction complete or more prior to commencing construction work of any of the optional bid items. All base bid line items shall be complete before any of the awarded optional bid items.
11. DO NOT add a separate line item for the DBA Supplemental Insurance. DBA Supplemental Insurance Must be allocated based on the Labor Cost for each line item. Your Proposal may be considered materially deficient if you fail to comply with the directions above.

-END OF SECTION-

SECTION 00100 - BIDDING SCHEDULE/INSTRUCTIONS TO BIDDERS

The following have been modified:

SECTION 00110

**SECTION 00110
PROPOSAL PREPARATION
PART 1 - GENERAL**

A. PROPOSAL PREPARATION. Instructions for the preparation and organization of each proposal are included herein. The proposal submittal shall include **(a) one original and three copies of Volume I and (b) one original and two copies of Volume II.** The Volume II proposal shall be sealed in a single package separate from the Volume I and Volume II proposals and both packages shall be clearly marked. The proposal shall be submitted as required herein and elsewhere in the RFP.

Volume I shall be typed, with numbered pages and sections tabbed. A cover sheet shall identify the offeror and the project and the second sheet shall be a table of contents. The Volume I proposal is limited to no more than 50 single-sided or 25 double-sided pages, printed on 8-1/2" x 11" sheets, not including the cover sheet, designs/sketches, table of contents and letters of recommendation / evaluations / related certificates. Do not use condensed print. Do not submit any extraneous materials with your proposal.

1. VOLUME I – MANAGEMENT-TECHNICAL PROPOSAL PREPARATION

1.1 Content. The Management/Technical proposal shall include the information as described below and shall be presented in the sequence listed.

1.1.1 Factor 1 - Past Evaluations/Performance. For the projects listed under Paragraph 1.1.2, Factor 2 - Experience, provide the following information (Attachment 1):

- Project Manager's (Point of Contact) name, telephone, email
- List the problems encountered and the corrective actions taken
- List of change orders and circumstances associated with them
- Construction time duration beyond the contract time and why.
- Construction cost in dollars beyond the contract amount and why.
- Safety record and accident report
- The offeror may also provide letters of recommendation, references, performance evaluations or other evidence of successful performance of the project.

*** The Government reserves the right to contact any other sources that can be used to determine the experience of the offeror.

The Source Selection Evaluation Board may attempt to contact the references provided in the list of projects. They may also contact Government personnel who have worked with the offerors. References comments may affect the scoring of proposals. It is important to verify that the points of contact listed are still available at the phone number and addresses provided and that they are individuals who have sufficient knowledge of the project and your performance to be able to offer meaningful comments.

In the event that an offeror does not have a record of past performance, a written explanation of the reasons why no record is available is requested. In the case of an offeror without a record of

relevant past performance or for whom information on past performance is not available, the offeror will not be evaluated favorably or unfavorably on past performance. A neutral rating with unknown risk will be assigned.

1.1.2 Factor 2 – Experience. Demonstrate the experience of the team, including sub-contractors, on projects similar to that described in this RFP which use the design-build process. Provide a list of no more than ten similar and relevant design-build projects underway or completed in the last **five** years that best demonstrates your experience. The list of projects shall include the following information (Attachment 2):

- Project name and location.
- Nature of firm's responsibility (design/build or design or construction).
- Project owner's name, address, telephone, email (to be contacted by the Government).
- Contractor a prime or sub-contractor for this project
- Project completion date (estimated if in progress)
- Total Cost (Design and Construction)
- Brief explanation that illustrates your design/build capabilities and relevant job experiences.

1.1.3 Factor 3 - Project Management

The Project Management Plan shall include the following (Attachment 3):

- The team structure described with an organizational chart (Attachment 4) to include:
 - o Key design personnel names and their title
 - o Key construction personnel and their title.
- The quality control process for the design work.
- The quality control process for construction work.
- The interaction process with the Corps of Engineers and the roles that the team members will have in dealing with;
 - o Processes for resolving problems like modifications to the contract (design and construction).
 - o Resolving potential design or construction delays
 - o Reviewing and approving submittals
 - o Attending progress meetings and facilitating contract completion and closeout.
 - o Process to control cost over runs while maintaining the project budget during design and construction.

1.1.4. Factor 4 – Personnel and Equipment Resources

1.1.4.1 - Personnel. Provide professional resume data on the following individuals who will be key personnel on the project team. Key personnel identified in this section should be senior working-level people who will be involved in design and construction on a day-to-day basis, as opposed to departmental level supervisors or executives. By identifying these personnel, the offeror makes a commitment that, barring unforeseen circumstances; they are the personnel who shall be assigned to the project. All key personnel shall have a minimum of **five** years of professional experience. (Attachment 5)

- Project Manager for design and for construction
- Quality Control Manager
- Project Architect
- Senior Structural Engineer

- Senior Civil Engineer
- Senior Mechanical Engineer
- Senior Electrical Engineer
- Fire Protection Engineer
- Construction Superintendent
- Construction Foreman (if different from above)

Information to be provided for key personnel should be limited to no more than **one page** per person and shall include: (Attachment 5)

- Name and title
- Project assignment
- Name of firm with which associated
- Years experience with this firm and with other firms
- Education degree(s), year, specialization
- Active registration, year first registered
- Other experience and qualifications relevant to the proposed project
- Provide the proposed use of Afghan contractors and labor in numbers or percentages.

1.1.4.2 – Equipment Resources. Provide equipment resources to be utilized for this project (i.e. offices, shops, warehouses, machinery, construction tools, vehicles, loaders, etc.) and other resources (i.e. cooperating companies supplying materials and/or services)

2. VOLUME II - PRICE PROPOSAL PREPARATION

2.1 Proposal Schedule. Offerors shall provide a signed cover letter stating the contents of their proposal and complete the Proposal Schedule by filling out the pricing data blanks. An executable Proposal Schedule is included in Section 00010 herein. Overhead and profit shall be applied proportionally to each category and shall not be required to be shown separately. The proposal shall include allowances in the Price Proposal and shall schedule any contingency for weather delays for severe weather in accordance with weather requirements. All costs and prices shall be firm.

B. CLARIFICATIONS AND FINAL PROPOSAL REVISION:

1. General. Any conflicting criteria which cannot be resolved by the terms of this RFP shall be brought to the attention of the Government by the offeror as part of the written clarification requirement of the proposal. In the absence of such request for clarification, the offeror shall perform to the most beneficial criteria as determined by the Government.
2. Clarifications Prior to Proposal Due Date. In the event that clarifications are required prior to submitting the proposal, contact the individuals listed on the RFP letter. All RFP holders shall be advised of significant clarifications affecting the scope of the project.
3. Clarifications Submitted with Proposals. If clarifications remain at the time and date that proposals are due, written clarifications may be included in the proposal for consideration by the Government. Clarifications submitted with proposals shall clearly identify the understanding of the RFP documents and how this understanding is reflected in the cost proposal. Extensive qualifications, exclusions and exceptions in the form of clarifications may be considered by the Government to be non-responsive and may be grounds for rejection of the proposal.
4. Final Proposal Revision(s):
 - 4.1 The Government intends to award a contract on the basis of the initial offers received without further discussions or negotiations. Offers should contain the offeror's best terms from a cost and management standpoint.

4.2 The Government may contact those firms whose proposals are within the competitive range and conduct discussions/negotiations concerning their proposal. Following resolution of the discussions/negotiations, offerors in the competitive range shall be given the opportunity to submit their Final Proposal Revision (otherwise known as 'Best and Final offer').

-- End of Section --

SECTION 00120

**SECTION 00120
PROPOSAL EVALUATION AND CONTRACT AWARD
PART 1 – GENERAL**

A. BASIS FOR AWARD. The Government intends to make one award for completion of the subject project. The award will be made to the offeror whose proposal represents the best overall value to the Government. Competing proposals shall be evaluated against the requirements of the solicitation in order to assess strengths, weaknesses and associated risks and deficiencies. The tradeoff process of evaluation between non-price and price aspects of the offerors' proposals will be used to determine those offers that may result in award of a contract. Implicit in the Government's evaluation and selection process is its willingness to accept other than the lowest priced offers.

B. PROPOSAL EVALUATION.

B.1 Proposals will be evaluated by a Source Selection Evaluation Board (SSEB). The SSEB will be composed of Corps of Engineers personnel and possibly a customer representative. The identity of SSEB members is confidential and members will not be available for contact or discussion prior to submission of proposals.

B.2 The Volume I (Management Technical) factors are listed in descending order of importance. Sub-factors under each factor are of equal importance. The factors and sub-factors will be evaluated and assigned merit ratings using the adjectives of excellent (E), good (G), satisfactory (S), marginal (M), and unsatisfactory (U). The non-pricing Volume I factors taken together have significantly more weight to the pricing factor (Volume II) in the evaluation and selection process.

B.3 Templates. Model templates are provided in this RFP as a possible format available to assist offerors in the preparation of their proposals. Use of the template format is not required. Sections 110 and 120 of this RFP govern and the templates do not supplant or substitute the requirements stated in these sections.

1. VOLUME 1 – MANAGEMENT-TECHNICAL PROPOSAL EVALUATION CRITERIA.

1.1 Content

1.1.1 Factor 1 – Past Evaluations/Performance. This factor may be evaluated by contacting references for **customer satisfaction** and review of **quality performance** evaluations or other information provided by the offeror or obtained by the Government. The evaluators will consider the **relevance** of the past performance information and the success achieved on past projects to determine the rating. In the event that an offeror does not have a record of past performance evaluations, a written explanation of the reasons why no record is available is requested. In the case of an offeror without a record of relevant past performance evaluations or for whom information on past performance is not available, the offeror will not be evaluated favorably or unfavorably on this factor. A neutral rating will be assigned.

Proposals with the most convincing evidence will receive the highest ratings.

1.1.2 Factor 2 - Experience. The Government will evaluate the relevant work experience of the contractor's company and designer, including subcontractors, on projects similar to that described in this RFP which use the design-build process. Contractor experience with similar relevant projects (type of construction, dollar value, design-build method, complexity) will receive a higher rating than those with dissimilar or non-relevant projects.

Proposals with the most convincing evidence will receive the highest ratings.

1.1.3 Factor 3 – Project Management Plan.

The Government will evaluate and rate the Project Management Plan which will include the contractor's and designer's key personnel professional qualifications and relevant work experience, the company's quality control procedures, their ability to team work (engineers, sub-contractors and the government), their ability to handle cost controls and managing construction time tables completion, their ability to resolve problems and describe their interactions with the Corps of Engineers. The Plan will also address how the offeror will adequately manage the project described in this RFP in light of any other ongoing projects and contractual commitments it may have within Afghanistan.

Offers which deviate from RFP specifications or requirements may be considered weak or deficient.

Proposals with the most convincing evidence will receive the highest ratings.

1.1.4 Factor 4 – Personnel and Equipment Resources.

1.1.4.1 Personnel. The Government will evaluate the qualifications and experience of contractor's & designer's personnel for this project. Contractor personnel with experience with **similar relevant** projects (type of construction, dollar value, design-build method, complexity) will receive a higher rating than those with dissimilar or non-relevant project experience. The use of Afghan workers will be evaluated and will have a positive influence on the evaluation.

Proposals will also address how the offeror will have adequate personnel for the project described in this RFP in light of any other ongoing projects and contractual commitments it may have within Afghanistan.

Proposals with the most convincing evidence will receive the highest ratings.

1.1.4.2 Equipment Resources.–The Government will evaluate the adequacy of the offeror's equipment resources to successfully complete the project.

Proposals will also address how the offeror will have adequate equipment for the project described in this RFP in light of any other ongoing projects and contractual commitments it may have within Afghanistan.

Proposals with the most convincing evidence will receive the highest ratings.

1.2 Format. Proposal will be evaluated based on adherence to format requirements of Section 00110, Proposal Preparation.

2. VOLUME II - PRICE PROPOSAL PREPARATION. The Government will evaluate whether the Volume II price proposals are complete and reasonable. The price proposals will not be assigned adjective ratings but will be assigned a confidence/risk rating. The government will evaluate the proposed pricing and supporting information to determine the reasonableness and completeness of the proposed price.

C. METHOD OF PROPOSAL EVALUATION

C.1 Proposals will be reviewed to determine if they contain the required minimum procurement and technical data. Incomplete proposals may be eliminated. All forms shall be filled in and all requested data must be provided.

C.2 After the compliance review, the SSEB will begin evaluation and scoring the factors and sub-factors set forth herein. The Price proposal information will be evaluated (not scored) with regard to reasonable and complete pricing and associated risks.

C.3 If necessary, a competitive range may be determined. The competitive range will consist of all proposals which are considered to have a reasonable chance of being selected for award. However, the offeror is reminded that the Government intends to award without discussions and that their best offer should be provided with the initial proposal. After the determination of the competitive range, written and/or oral discussions may be conducted with all offerors within the competitive range. Upon completion of written and/or oral discussions, Final Proposal Revision will be requested.

C.4 The Government may reject any or all proposals and waive minor informalities or minor irregularities in proposals.

D. SELECTION and AWARD. Award will be made to the offeror that, in the judgment of the Contracting Officer, provides the best combination of management and technical capability and reasonable cost. The Government reserves the right to make award to other than the lowest cost offeror.

-- End of Section --

(End of Summary of Changes)

The following items are applicable to this modification:

SECTION 00100 - BIDDING SCHEDULE/INSTRUCTIONS TO BIDDERS
QUESTIONS & ANSWERS

Questions & Answers

1. Question: Are we to provide a design project manager and a construction project manager?

Answer: You don't have to provide a design project manager but there should be someone in the organization that is in charge of the design. A construction project manager should be designated for the project.

2. Question: Are the Key Personnel listed in the solicitation required to be on-site during operations that involve their specific discipline?

Answer: Only the QA and Safety managers are required to be onsite at all times. However, the construction superintendent should almost always be there. The other key personnel should be onsite during operations that involve their specific discipline.

3. Question: Are we required to provide cost back-up as part of the Cost/Price proposal?

Answer: Cost back-up as part of the cost/price proposal is not required.

4. Question: Is the "Price/Certification Submittal" listed in the Instructions to Offerors, page 14 of 285, the same as "Volume II – Cost/ Price Proposal" listed in Section 00110?

Answer: "They are the same."

5. Question: Where are we to include the Defense Base Act Insurance rates information?

Answer: Item 11 is added to section 00010 Proposal Notes as follows:

"11. DO NOT add a separate line item for the DBA Supplemental Insurance. DBA Supplemental Insurance must be allocated based on the Labor Cost for each line item. Your Proposal may be considered materially deficient if you fail to comply with the directions above."

6. Question: The template for the organization chart provided in Amendment 0003 indicates Key Personnel by identifying them with asterisks. There is a conflict between the Key Personnel indicated in the organization chart and the list of Key Personnel provided in Factor 4. Please clarify.

Answer: "The templates are clearly marked "guidance only". Please make your proposal in response to the factors."

7. Question: The Key Personnel list differs between: a. Amendment 3, Factor 4, Subfactor 1 Personnel; b. the Amendment 3 Contractor's Organization Chart (Note 1); and, c. the Key Personnel listed on page 20 of the RFP. Please confirm the correct list of Key Personnel to be identified for this project.

Answer: The Key Personnel listed on page 20 of the RFP are listed there because we want to know their experience level. That particular proposal section should include all the personnel on page 20 of the RFP.

8. Question: Are 11" x 17" foldouts permissible for charts and graphics, and if so are they considered one or two pages for page-count purposes?

Answer: 11" x 17" foldouts are permissible for charts and graphics and should be considered one page for page counting purposes.

**9- Question: "The size of each items of building is not clear example: regional hospital size you need or for how money section of it.
10- specification of each sections"**

Answer: There is not a hospital in this proposal. The identified medical clinic is listed as a future project for the master planning and power load design for this contract. All buildings and site work to be constructed under this contract are clearly defined in the Request for Proposal (RFP).

**11. Question: For construction:
"Which kinds of material should be used in the construction."**

Answer: The material requirements are specified in sections 01010 and 01015.

12. Question: What is the Project (Solicitation) exact name? In some place is calling like as ANA Garrison and in some drawing is calling like as ANA Brigade!?! So, which is of these names shall be used in documentation? And any differences between ANA Kunduz Brigade and ANA Jalalabad Garrison in volume or capacity?! Or its the same type of Brigade?!

Answer: The exact name is ANA Garrison Jalalabad and that is what shall be used in the documentation. Section 4 of the solicitation lists the volume of the buildings and estimates of the capacity of the facility.

13. Question: We have been studying the tender documents for Design and Construction of Campus Facility for ANA Garrison at Jalalabad. We have the following question:

In Infantry battalion complexes A, B and C, Type A and Type B barracks are defined. The number of Type A barracks for each complex is 4 according to SOW, but 5 Type A barracks are

drawn in the general site plan for each complex. What is the number of Type A barracks for each infantry battalio?

Answer: The correct numbers are the ones in the scope of work, section 01010.

14. Question: How much grading is required?

Answer: The amount of grading is dependent on the design you submit to us.

15. Question: Do the buildings have to be the same elevation or can they be tiered?

Answer: The buildings can be tiered, based on the contractors' design proposal to the Corps. Section 01010, paragraph 4.1.2, defines the minimum building floor elevations above the flood elevation.

16. Question: Does a survey / topographic need to be done?

Answer: Yes, the RFP states that the contractor shall prepare a survey and topographic map.

17. Question: Do we have to site the buildings per the plan in the RFP?

Answer: No, you can site adapt the plan to your own design. Reference the list of contract items to be constructed in the solicitation and as listed below. Of course, the distances between the buildings must comply with the safety and fire codes.

18. Question: Can the existing buildings be used?

Answer: Yes, all the buildings on site can be used, to include the four connex containers that are currently on site. The buildings that were built by the previous contractor were their mobilization buildings.

19. Question: Can we have access to the area before the bids close?

Answer: Yes, you can have access to the area. The guard has been instructed to allow potential bidders access to the site.

20. Question: Please provide clarification regarding the apparent discrepancy between the SOW and the attached drawing for the Jalalabad Garrison. For example, based on SOW, the total square footage for the Infantry Battalion Complex is 5600 SQ.FT.; however, based on the gross square footage on the drawings is 3922 SQ. FT. Should we base the proposal on the SOW or the attached drawings?

Answer: The scope of work in the solicitation describes the square footage of the proposed facility.

20. Question: How are the proposals graded?

Answer: Please review the Section 00110 for proposal preparation and Section 00120 for proposal evaluation.

21. Question: What are the base items, option items and future items for this project?

Answer: The base items, option items and future items are outlined in 01010, Scope of Work, section 4. SUMMARY OF WORK/CONTRACTOR REQUIREMENTS.

The following is a list of items **that will be built** under the contract and are base items:

- 4.1 Master Planning/Site Surveys
- 4.2 Demolition and Grading
- 4.3 Water System
- 4.4 Sanitary Sewer System
- 4.5 Prime Power Plant/Distribution System/Fuel System
- 4.6 Force Protection Perimeter
- 4.7 Road Network
- 4.8 Solid Waste Collection Point
- 4.9 Infantry Battalion Complex (A)
 - Battalion HQ
 - Type A Barracks (4 each)
 - Type B Barracks (5 each)
 - Toilet/Shower Building
 - Battalion Storage
 - POL Building
 - Motor Pool
 - Solid Waste Collection Point
- 4.10 Infantry Battalion Complex (B) 240 days
 - Battalion HQ
 - Type A Barracks (4 each)
 - Type B Barracks (5 each)
 - Toilet/Shower Building
 - Battalion Storage
 - POL Building
 - Motor Pool
 - Solid Waste Collection Point
- 4.11 Infantry Battalion Complex (C)
 - Battalion HQ
 - Type A Barracks (4 each)
 - Type B Barracks (5 each)
 - Toilet/Shower Building
 - Battalion Storage
 - POL Building
 - Motor Pool

- Solid Waste Collection Point
- 4.12 DFAC Number 1
- 4.13 BOQ Facilities
- Type A (1 each)
 - Type B (3 each)
- 4.14 Embedded Training Team Facility
- Barracks (5 each)
 - MWR
 - Storage Facility
 - DFAC Number 2
 - Interpreter Barracks
 - Interpreter MWR
 - Interpreter DFAC Number 3
- 4.15 Communications Building
- 4.16 Vehicle Re-fueling Point
- 4.17 Bunkers
- 4.18 Anti-vehicle Trench
- 4.19 Spare Parts 240 days
- 4.20 COE Housing and Office

The following list of features and facilities are to be Master Planned, **but not designed or constructed under this contract**. However, these facilities/features are to be included in design of all utility systems (including distribution systems) and road networks. These are **FUTURE ITEMS**:

Planned Facilities to be Master Planned and Required to have Utility Connections as Referenced in Paragraph 2.2 of this Section:

DPW Shop Building
Detention Center
Solid Waste Collect and Disposal Area
Fire Station
Community Center
Helipad
Combat Support (CS) Battalion
Type A Barracks (3 each)
Type B Barracks (5 each)
Toilet/Shower/Laundry Building
Battalion HQ
CS Maintenance Bldg
Battalion Storage
POL Building
Motor Pool
Solid Waste Collection Point
Combat Support Services (CSS) Battalion
Type A Barracks (2 each)

Type B Barracks (3 each)
Toilet/Shower/Laundry Building
Battalion HQ
CSS Maintenance Bldg
Battalion Storage
POL Building
Motor Pool
Solid Waste Collection Point
Central Receiving Warehouse
Training Building
Arms Storage Building
Ammunition Supply Point (including access road); 1500M from brigade site
Medical Clinic
Class VIII Warehouse
Sports Field, Soccer Field, and Reviewing Stand
Road from Main Highway to Base (4.6km)
Co-generation Water Heating System
Ranges (including access road)
RPG Range
Pistol Range
Grenade Launcher Range
Rifle Range
Heavy Machine Gun Range
81 mm Mortar Range
Mosque
Brigade and Garrison Battalions
Type B Barracks (3 each)
Toilet/Shower/Laundry Building
Brigade HQ Building
Garrison HQ Building
Arms Storage Building
Motor Pool
Vehicle Maintenance Garage
BOQs for Garrison, CS, CSS Battalions 3 BOQs Type B, 1 BOQ Type A

The following is a list of **optional items** that may be built at the discretion of USACE:

- Option 2: Entrance Road
- Option 3: Pave roads within the base bid areas.
- Option 4: Additional Generator at the power plant.

Please note that Option one is an incentive clause for early completion.

22. Question: How are the proposals graded?

Answer: Please refer to SECTION 00120, PROPOSAL EVALUATION AND CONTRACT AWARD for information on how proposals are graded.

23. Question: What is the size of the compound?

Answer: Section 4.1 of the Scope of Work, 01010 states that the size of the compound is approximately 700m x 1000m.

24. Question: Can the bridge that was washed out on the road to the site be repaired under the contract or is there another way into the site?

Answer: This question is being considered by USACE but no answer is forthcoming at this time.

25. Question: What is the length of the road referenced in the proposal?

Answer: The length of the optional entrance road is shown in Section 01010 (5 kilometers.).

SECTION 00110

SECTION 00110

PROPOSAL PREPARATION

PART 1 - GENERAL

A. PROPOSAL PREPARATION. Instructions for the preparation and organization of each proposal are included herein. The proposal submittal shall include **(a) one original and three copies of Volume I and (b) one original and two copies of Volume II.** The Volume II proposal and all copies thereof shall be sealed in a single package separate from the Volume I proposal and all copies thereof, and both packages shall be clearly marked. The proposal shall be submitted as required herein and elsewhere in the RFP.

Volume I shall be typed, with numbered pages and sections tabbed. A cover sheet shall identify the offeror and the project and the second sheet shall be a table of contents. The Volume I proposal is limited to no more than 50 single-sided or 25 double-sided pages, printed on 8-1/2" x 11" sheets, not including the cover sheet, designs/sketches, table of contents and letters of recommendation / evaluations / related certificates. Do not use condensed print. Do not submit any extraneous materials with your proposal.

1. VOLUME I – MANAGEMENT-TECHNICAL PROPOSAL PREPARATION

1.1 Content. The Management/Technical proposal shall include the information as described below and shall be presented in the sequence listed.

1.1.1 Factor 1 - Past Evaluations/Performance. For the projects listed under Paragraph 1.1.2, Factor 2 - Experience, provide the following information (Attachment 1):

- Project Manager's (Point of Contact) name, telephone, email
- List the problems encountered and the corrective actions taken
- List of change orders and circumstances associated with them
- Construction time duration beyond the contract time and why.
- Construction cost in dollars beyond the contract amount and why.
- Safety record and accident report
- The offeror may also provide letters of recommendation, references, performance evaluations or other evidence of successful performance of the project.

The Source Selection Evaluation Board may attempt to contact the references provided in the list of projects. They may also contact Government personnel who have worked with the offerors. References' comments may affect the scoring of proposals. It is important to verify that the points of contact listed are still available at the phone number and addresses provided and that they are individuals who have sufficient knowledge of the project and your performance to be able to offer meaningful comments.

In the event that an offeror does not have a record of past performance, a written explanation of the reasons why no record is available is requested. In the case of an offeror without a record of relevant past performance or for whom information on past performance is not available, the offeror will not be evaluated favorably or unfavorably on past performance. A neutral rating with unknown risk will be assigned.

1.1.2 Factor 2 – Experience. Demonstrate the experience of the team, including sub-contractors, on projects similar to that described in this RFP which use the design-build process. Provide a list of no more than ten similar and relevant design-build projects underway or completed in the last **five** years that best demonstrates your experience. The list of projects shall include the following information (Attachment 2):

- Project name and location.
- Nature of firm's responsibility (design/build or design or construction).
- Project owner's name, address, telephone, email (to be contacted by the Government).
- Contractor a prime or sub-contractor for this project
- Project completion date (estimated if in progress, as well as current portion completed)
- Construction cost
- Brief explanation that illustrates your design/build capabilities and relevant job experiences.

1.1.3 Factor 3 - Project Management

The Project Management Plan shall include the following (Attachment 3):

- The team structure described with an organizational chart (Attachment 4) to include:
 - Key design personnel names and their titles;
 - Key construction personnel names and their titles;
- The quality control process for both design work;
- The quality control process for construction work;
- The interaction process with the Corps of Engineers and the roles that the team members will have in dealing with;
 - Processes for resolving problems like modifications to the contract (design and construction);
 - Resolving potential design or construction delays
 - Reviewing and approving submittals;
 - Attending progress meetings and facilitating contract completion and closeout;
 - Process to control cost over runs while maintaining the project budget during design and construction.

1.1.4. Factor 4 – Personnel and Equipment Resources

1.1.4.1 - Personnel. Provide professional resume data on the following individuals who will be

key personnel on the project team. Key personnel identified in this section should be senior working-level people who will be involved in design and construction on a day-to-day basis, as opposed to departmental level supervisors or executives. By identifying these personnel, the offeror makes a commitment that, barring unforeseen circumstances; they are the personnel who shall be assigned to the project. All key personnel shall have a minimum of **five** years of professional experience. (Attachment 5)

- Project Manager for design and for construction
- Quality Control Manager
- Project Architect
- Senior Structural Engineer
- Senior Civil Engineer
- Senior Mechanical Engineer
- Senior Electrical Engineer
- Fire Protection Engineer
- Construction Superintendent
- Construction Foreman (if different from above)

Information to be provided for key personnel should be limited to no more than **one page** per person and shall include: (Attachment 5)

- Name and title
 - Project assignment
 - Name of firm with which associated
 - Years experience with this firm and with other firms
 - Education degree(s), year, specialization
 - Active registration, year first registered
 - Other experience and qualifications relevant to the proposed project
-
- Provide the proposed use of Afghan contractors and labor in numbers or percentages.

1.1.4.2 – Equipment Resources. Provide equipment resources to be utilized for this project (i.e. offices, shops, warehouses, machinery, construction tools, vehicles, loaders, etc.) and other resources (i.e. cooperating companies supplying materials and/or services)

1.2 Notes

1.2.1 Joint Ventures and Teaming Arrangements. Any contractors submitted in the proposal as part of a joint venture must submit a legally binding joint venture agreement. The Government will not evaluate the capability of any contractors that are not included in the joint venture agreement. Joint ventures must include a copy of the legal joint venture signed by an authorized officer from each of the firms comprising the joint venture with the chief executive of each entity identified and a translation in English, if the original agreement is in a language other than English. Incomplete evidence of a joint venture results will not be considered.

If submitting a proposal as a Joint Venture, the experience, past performance, management plan and equipment submittal of each of the Joint Venture Partners can be submitted for the Joint Venture Entity. The experience for each Joint Venture Partner will be considered the experience of the Joint Venture entity.

The proposal may receive a higher rating if the proposal contains evidence of the Joint Venture Entity working successfully together previously on relevant projects.

1.2.2 Credit For Others. If an Offeror wishes to be credited with a subcontractor or supplier, i.e. a firm that is not the prime contractor or part of the joint venture, a letter of commitment signed by the subcontractor must be submitted. The commitment letter must be submitted even if the firm is in some way related to a joint venture partner (for example, the subcontractor is a subsidiary of a joint venture partner, or a subsidiary of a firm to which the joint venture partner is also a subsidiary). In regard to the Experience and Past Performance factors, if an Offeror submits projects demonstrating experience in one of the factors or sub-factors, and that project was completed by a subcontractor, a subsidiary, or a supplier, as opposed to the prime or one of the joint venture partners, the Offeror **MUST** submit a signed letter of commitment from the contractor who performed and completed the work. If a letter of commitment is not submitted, the experience will not be considered.

2. VOLUME II - PRICE PROPOSAL PREPARATION

2.1 Proposal Schedule. Offerors shall provide a signed cover letter and complete the Proposal Schedule by filling out the pricing data blanks. An executable Proposal Schedule is included in Section 00010 herein. Overhead and profit shall be applied proportionally to each category and shall not be required to be shown separately. The proposal shall include allowances in the Price Proposal and shall schedule any contingency for weather delays for severe weather in accordance with weather requirements. All prices shall be firm.

B. CLARIFICATIONS AND FINAL PROPOSAL REVISION:

1. General. Any conflicting criteria which cannot be resolved by the terms of this RFP shall be brought to the attention of the Government by the offeror as part of the written clarification requirement of the proposal. In the absence of such request for clarification, the offeror shall perform to the most beneficial criteria as determined by the Government.

2. Written Clarification Requirement: In the event that clarifications are required prior to submitting the proposal, contact the individuals listed on the RFP letter; such contact shall be in writing. All RFP holders shall be advised of significant clarifications affecting the scope of the project.

3. Clarifications Submitted with Proposals. If ambiguities remain in the RFP at the time and date that proposals are due, written clarifications may be included in the proposal for consideration by the Government. Clarifications submitted with proposals shall clearly identify the understanding of the RFP documents and how this understanding is reflected in the cost

proposal. Qualifications, exclusions and exceptions in the form of clarifications may be considered by the Government to be non-responsive and may be grounds for rejection of the proposal.

4. Final Proposal Revision(s):

4.1 The Government intends to award a contract on the basis of the initial offers received without further discussions or negotiations. Offers should contain the offeror's best terms from a cost and management standpoint.

4.2 The Government may contact those firms whose proposals are within the competitive range and conduct discussions/negotiations concerning their proposal. Following resolution of the discussions/negotiations, offerors in the competitive range shall be given the opportunity to submit their Final Proposal Revision (otherwise known as 'Best and Final offer').

-- End of Section --

SECTION 00120

SECTION 00120

PROPOSAL EVALUATION AND CONTRACT AWARD

PART 1 – GENERAL

A. BASIS FOR AWARD. The Government intends to make one award for completion of the subject project. The award will be made to the offeror whose proposal represents the best overall value to the Government. Competing proposals shall be evaluated against the requirements of the solicitation in order to assess strengths, weaknesses and associated risks and deficiencies. The tradeoff process of evaluation between non-cost/price and cost/price aspects of the offerors' proposals will be used to determine those offers that may result in award of a contract. Implicit in the Government's evaluation and selection process is its willingness to accept other than the lowest priced offers.

B. PROPOSAL EVALUATION.

B.1 Proposals will be evaluated by a Source Selection Evaluation Board (SSEB). The SSEB will be composed of Corps of Engineers personnel and possibly a customer representative. The identity of SSEB members is confidential and members will not be available for contact or discussion prior to submission of proposals.

B.2 The Volume I (Management Technical) factors are listed in descending order of importance. Sub-factors under each factor are of equal importance. The factors and sub-factors will be evaluated and assigned merit ratings using the adjectives of excellent (E), good (G), satisfactory (S), marginal (M), and unsatisfactory (U). The non-pricing Volumes (I, Management-Technical taken together) have significantly more weight compared to the pricing factor (Volume II) in the evaluation and selection process.

B.3 Templates. Model templates are provided in this RFP as a possible format available to assist offerors in the preparation of their proposals. Use of the template format is not required. Sections 110 and 120 of this RFP govern and the templates do not supplant or substitute the requirements stated in these sections.

1. VOLUME 1 – MANAGEMENT-TECHNICAL PROPOSAL EVALUATION CRITERIA.

1.1 Content

1.1.1 Factor 1 – Past Evaluations/Performance. This factor may be evaluated by contacting references for **customer satisfaction** and review of **quality performance** evaluations or other information provided by the offeror or obtained by the Government. The evaluators will consider the **relevance** of the past performance information and the success achieved on past projects to determine the rating. In the event that an offeror does not have a record of past performance evaluations, a written explanation of the reasons why no record is available is requested. In the case of an offeror without a record of relevant past performance evaluations or for whom

information on past performance is not available, the offeror will not be evaluated favorably or unfavorably on this factor. A neutral rating will be assigned.

Proposals with the most convincing evidence will receive the highest ratings.

1.1.2 Factor 2 - Experience. The Government will evaluate the relevant work experience of the contractor's company and designer, including subcontractors, on projects similar to that described in this RFP which use the design-build process. Contractor experience with similar relevant projects (type of construction, dollar value, design-build method, complexity, applicable standards such as EMS 385-1-1) will receive a higher rating than those with dissimilar or non-relevant projects.

Proposals with the most convincing evidence will receive the highest ratings.

1.1.3 Factor 3 – Project Management Plan.

The Government will evaluate and rate the Project Management Plan which will include the contractor's and designer's key personnel professional qualifications and relevant work experience [we didn't ask for this in Factor 3 in Section 00110; instead it seems more in line with Factor 4.], the company's quality control procedures, their ability to team work (engineers, subcontractors and the government), their ability to handle cost controls and managing construction time tables completion, their ability to resolve problems and describe their interactions with the Corps of Engineers. The Plan will also address how the offeror will adequately manage the project described in this RFP in light of any other ongoing projects and contractual commitments it may have within Afghanistan.

Offers which deviate from RFP specifications or requirements may be considered weak or deficient.

Proposals the most convincing evidence will receive the highest ratings.

1.1.4 Factor 4 – Personnel and Equipment Resources.

1.1.4.1 Personnel. The Government will evaluate the qualifications and experience of contractor's & designer's personnel for this project. Contractor personnel with experience with **similar relevant** projects (type of construction, dollar value, design-build method, complexity) will receive a higher rating than those with dissimilar or non-relevant project experience. Other personnel including the use of Afghan workers will be evaluated, with greater credit being given for Afghan workers unless logistics of using foreign workers is fully detailed.

Proposals will also address how the offeror will have adequate personnel for the project described in this RFP in light of any other ongoing projects and contractual commitments it may have within Afghanistan.

Proposals with the most convincing evidence will receive the highest ratings.

1.1.4.2 Equipment Resources. The Government will evaluate the adequacy of the offeror's equipment resources to successfully complete the project.

Proposals will also address how the offeror will have adequate equipment for the project described in this RFP in light of any other ongoing projects and contractual commitments it may have within Afghanistan.

Proposals with the most convincing evidence will receive the highest ratings.

1.2 Format. Proposal will be evaluated based on adherence to format requirements of Section 00110, Proposal Preparation.

1.3 Notes

1.3.1 Joint Ventures and Teaming Arrangements. Any contractors submitted in the proposal as part of a joint venture must submit a legally binding joint venture agreement. The Government will not evaluate the capability of any contractors that are not included in the joint venture agreement. Joint ventures must include a copy of the legal joint venture signed by an authorized officer from each of the firms comprising the joint venture with the chief executive of each entity identified and a translation in English, if the original agreement is in a language other than English. Incomplete evidence of a joint venture results will not be considered.

If submitting a proposal as a Joint Venture, the experience, past performance, management plan and equipment submittal of each of the Joint Venture Partners can be submitted for the Joint Venture Entity. The experience for each Joint Venture Partner will be considered the experience of the Joint Venture entity.

The proposal may receive a higher rating if the proposal contains evidence of the Joint Venture Entity working successfully together previously on relevant projects.

1.3.2 Credit For Others. If an Offeror wishes to be credited with a subcontractor or supplier, i.e. a firm that is not the prime contractor or part of the joint venture, a letter of commitment signed by the subcontractor must be submitted. The commitment letter must be submitted even if the firm is in some way related to a joint venture partner (for example, the subcontractor is a subsidiary of a joint venture partner, or a subsidiary of a firm to which the joint venture partner is also a subsidiary). In regard to the Experience and Past Performance factors, if an Offeror submits projects demonstrating experience in one of the factors or sub-factors, and that project was completed by a subcontractor, a subsidiary, or a supplier, as opposed to the prime or one of the joint venture partners, the Offeror **MUST** submit a signed letter of commitment from the contractor who performed and completed the work. If a letter of commitment is not submitted, the experience will not be considered.

2. VOLUME II - PRICE PROPOSAL PREPARATION. The Government will evaluate whether the Volume II price proposals are complete and reasonable. The price proposals will not be assigned adjective ratings but will be assigned a confidence/risk rating. The government will evaluate the proposed pricing and supporting information [what supporting information are we requesting? Where is this requested?] to determine the reasonableness and completeness of the proposed price.

C. METHOD OF PROPOSAL EVALUATION

C.1 Proposals will be reviewed to determine if they contain the required minimum procurement and technical data [what data are we referring to here?]. Incomplete proposals may be eliminated. All forms shall be filled in and all requested data must be provided.

C.2 After the compliance review, the SSEB will begin evaluation and scoring the factors and sub-factors set forth herein. The Price proposal information will be evaluated (not scored) with regard to reasonable and complete pricing and associated risks.

C.3 If necessary, a competitive range may be determined. The competitive range will consist of all proposals which are considered to have a reasonable chance of being selected for award. However, the offeror is reminded that the Government intends to award without discussions and that their best offer should be provided with the initial proposal. After the determination of the competitive range, written and/or oral discussions may be conducted with all offerors within the competitive range. Upon completion of written and/or oral discussions, Final Proposal Revision will be requested.

C.4 The Government may reject any or all proposals and waive minor informalities or minor irregularities in proposals.

D. SELECTION and AWARD. Award will be made to the offeror that, in the judgment of the Contracting Officer, provides the best combination of management and technical capability and reasonable cost. The Government reserves the right to make award to other than the lowest cost offeror, price and other factors considered under the provision of “best value” to the Government.

-- End of Section --

SECTION 00800 - SPECIAL CONTRACT REQUIREMENTS
SECTION 01010

SECTION 01010
Revised 26 October 2007
SCOPE OF WORK

1. GENERAL

The project consists of the design, site-adaptation, and construction of a new campus facility for the ANA Garrison's use in Jalalabad, Afghanistan. Refer to site coordinates for approximate site location. The project is defined as the design, material, labor, and equipment to construct buildings, parking, utilities and other infrastructure features for three new infantry battalions to include: barracks, battalion HQs, and storage buildings for three battalions; Dining Facility DFAC, Embedded Training Team Compound (ETTC) and Interpreters' Compound (IC) facilities; prime power plant and electrical distribution system; communication system, sanitary sewer collection system (no holding tanks allowed); waste water treatment; solid waste collection points; development of a raw water source (i.e. ground source water wells); installation of water well pump(s); potable water booster pumps and associated controls; installation of a water distribution system; construction of ground storage tanks; and design and construct a paved road network inside of the compound to include POV and military vehicle parking areas. The contractor shall perform a geotechnical investigation for the building foundations. Site photographs are contained in Appendix A to this Section. The work within this contract shall meet and be constructed in accordance with current U.S. design and International Building Codes (IBC), Life Safety Codes (NFPA-101), Force Protection and security standards. A partial listing of references is included herein:

IBC, International Building Codes 2003
NFPA 101, Life Safety Codes
UFC 4-010-01, DoD Minimum Anti-Terrorism Standards for Buildings.

1.1 ENGLISH LANGUAGE REQUIREMENT

All information shall be presented in English. The Contractor shall have a minimum of one English-speaking representative to communicate with the COR at all times when work is in progress.

1.2 SUBMITTALS

Submittals and a Submittal Register are required as specified in Section 01335 of the Basic Contract.

1.3 CQM TRAINING REQUIREMENT

Before project design and construction can commence, the Contractor's Quality Control Manager is required to have completed the U.S. Army Corps of Engineers CQM course, or equivalent. The Construction Trades Training Center (CTTC) in Jalalabad, Afghanistan provides a course that satisfies the requirement. Courses are offered at regular intervals. For enrollment and course information contact CTTC at the following:

Mhd. Haris
e-mail: mharis@afghanreconstruction.org
Telephone: 0700 08 0602

Pervaiz
e-mail: adpzmuj@yahoo.com
Telephone: 0700 61 3133

2. LOCATION

2.1 All work under this task order is for the design, site-adaptation, and construction of ANA Brigade facilities at Jalalabad, Afghanistan. Approximate coordinates are:

Latitude: 34.526546 N
Longitude: 70. 349318 E

Latitude: 34.526414 N
Longitude: 70. 360210 E

Latitude: 34.517531 N
Longitude: 70. 349158 E

Latitude: 34.526414 N
Longitude: 70. 360050 E

Altitude: The Site has rolling hills. The elevation varies from approximately 621 (meters) to 650 (meters). See appendices for aerial of site.

2.2 The Contractor shall provide and maintain all Field Office facilities, housing, equipment and servicing as defined in Section 01060, paragraph 1.13 Special Facilities and Services.

2.3 Work shall be executed in accordance with the Technical Requirements in Section 01015, all solicitation requirements, and the attached schematic building layouts.

2.4 Building designs and specifications for Designs are in the Contract. These government-provided designs and specification documents are in various states of completion. Some buildings/features in the scope of work are brand new and have no drawings available, while other buildings/features require design revisions to the government provided documents. For existing designs, the Contractor shall revise the existing design drawings or to create new design drawings as required to meet the requirements and criteria contained in the task order. For new facility design effort, the Contractor shall prepare complete designs and specifications for all buildings and systems for review and approval by the Government. All designs and specifications created by the Contractor shall become the property of the Government and may be used in the future by the Government for construction of similar facilities without further compensation to the Contractor. The Contractor shall site-adapt the existing designs to assure that the designs reflect the requirements of the task order, making all changes as required. The Contractor shall provide all design submittals (Design Analyses, Specifications Design Drawings, etc.) for all contract facilities/features at the 35%, 65% and 100% stage. In addition to printed full-sized copies, the Contractor shall provide electronic versions of all design documentation in AUTOCAD 2006 (version) to the AED in Kabul and the Resident Office. Files shall be arranged on a CD with each facility clearly identified as a separate subdirectory, with all files for that facility contained in that subdirectory. Each disk shall have an adhered printed label listing contents. Hand-written labels are unacceptable.

3. UNEXPLODED ORDNANCE (UXO)

3.1 UXO REMOVAL AND CLEARANCE

Contractor IS NOT responsible for clearance/removal.

The contractor shall search for, identify and clear all mines and unexploded ordnance (UXO) from the entire site. The contractor may only provide clearance/removal services via UN Mine Action Center (MAC) accredited entities, and clearance shall be accomplished to the anticipated foundation depth as indicated in the contract. Clearance/removal may only be undertaken in accordance with International Mine Action Standards (IMAS). When mines and/or UXO's are identified, the Contractor shall place them in a location in accordance with IMAS. The work shall proceed in phases, concurrently with other construction efforts as determined by the contractor. Work will not commence until in any area that has not been cleared. The contractor shall provide the Government a clearance certificate approved by the MAC indicating that the site is clear of mines and UXO's and is available for construction operations to proceed.

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 from the UNMACA MAC.

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

4. SUMMARY OF WORK/CONTRACTOR REQUIREMENTS

The Contractor shall design, site-adapt, and construct the facilities as a design-construct contract and shall be in accordance with the requirements stated in Section 01015: TECHNICAL REQUIREMENTS and as contained in this and other task order Sections. Refer to attachment following this section for more specifics for required spaces. The design and construction work shall include but not be limited to that shown within attached table and described herein.

All requirements set forth in the Scope of Work, but not included in the Technical Requirements, shall be considered as set forth in both, and vice versa. Provide cooling for all the facilities unless otherwise stated in Section 01010 or 01015. Do not provide heating for facilities unless otherwise stated in Section 01010 or 01015. All toilets shall be eastern; with the exception of the ETTC camp where western style toilets are required. All eastern toilets shall face north or south.

All standard construction amenities and details such as heating, lighting, site drainage, utility connections, etc. shall be implied as a design and construction requirement. Drawings referenced are contained in Section 01015. Concrete walkways are required to connect all buildings, facilities, and features such as parking lots, power plants, etc.

The design and construction work shall include but not be limited to the following sub-paragraphs.

In general, this project consists of designing, site adaptation, and constructing of the facilities/features listed in the table below. Note that Optional Item 1 can be exercised within 120 days after award of the contract.

4.1 Master Planning/Site Surveys	60 days
4.2 Demolition and Grading	60 days
4.3 Water System	300 days
4.4 Sanitary Sewer System	300 days
4.5 Prime Power Plant/Distribution System/Fuel System	300 days
4.6 Force Protection Perimeter	300 days
4.7 Road Network	300 days
4.8 Solid Waste Collection Point	300 days
4.9 Infantry Battalion Complex (A)	300 days
•Battalion HQ	
•Type A Barracks (4 each)	
•Type B Barracks (5 each)	
•Toilet/Shower Building	
•Battalion Storage	
•POL Building	
• Motor Pool	
•Solid Waste Collection Point	
4.10 Infantry Battalion Complex (B)	300 days
•Battalion HQ	
•Type A Barracks (4 each)	

• Type B Barracks (5 each)	
• Toilet/Shower Building	
• Battalion Storage	
• POL Building	
• Motor Pool	
• Solid Waste Collection Point	
4.11 Infantry Battalion Complex (C)	300 days
• Battalion HQ	
• Type A Barracks (4 each)	
• Type B Barracks (5 each)	
• Toilet/Shower Building	
• Battalion Storage	
• POL Building	
• Motor Pool	
• Solid Waste Collection Point	
4.12 DFAC Number 1	300 days
4.13 BOQ Facilities	300 days
• Type A (1 each)	
• Type B (3 each)	
4.14 Embedded Training Team Facility	300 days
• Barracks (5 each)	
• MWR	
• Storage Facility	
• DFAC Number 2	
• Interpreter Barracks	
• Interpreter MWR	
• Interpreter DFAC Number 3	
4.15 Communications Building	300 days
4.16 Vehicle Re-fueling Point	300 days
4.17 Bunkers	300 days
4.18 Anti-vehicle Trench	300 days
4.19 Spare Parts	300 days
COE Housing and Office Support	60 days Refer to Section 01060, Paragraph 1.13
4.20 OPTION 2 – Entrance Road	300 days after exercise of this option
OPTION 3- Pave roads within the Base Bid areas	300 days after exercise of this option
OPTION 4- Additional Generator at the Power Plant	300 days after exercise of option

The following table lists facilities/features that are to be Master Planned, but not designed or constructed under this contract. However, these facilities/features are to be included in design of all utility systems (including distribution systems) and road networks.

Planned Facilities to be Master Planned and Required to have Utility Connections as Referenced in Paragraph 2.2 of this Section

DPW Shop Building
Detention Center

486 SM
130 SM

Solid Waste Collect and Disposal Area

Fire Station	190 SM
Community Center	900 SM
Helipad	184 SM
Combat Support (CS) Battalion	
Type A Barracks (3 each)	1248 SM
Type B Barracks (5 each)	2080 SM
Toilet/Shower/Laundry Building	416 SM
Battalion HQ	
CS Maintenance Bldg	800 SM
Battalion Storage	800 SM
POL Building	25 SM
Motor Pool	
Solid Waste Collection Point	
Combat Support Services (CSS) Battalion	
Type A Barracks (2 each)	832 SM
Type B Barracks (3 each)	1248 SM
Toilet/Shower/Laundry Building	416 SM
Battalion HQ	
CSS Maintenance Bldg	800 SM
Battalion Storage	800 SM
POL Building	25 SM
Motor Pool	
Solid Waste Collection Point	
Central Receiving Warehouse	1520 SM
Training Building	1202 SM
Arms Storage Building	350 SM
Ammunition Supply Point (including access road)	3900 SM; 1500M from brigade site
Medical Clinic	900 SM
Class VIII Warehouse	800 SM
Sports Field, Soccer Field, and Reviewing Stand	
Road from Main Highway to Base (4.6km)	
Co-generation Water Heating System	
Ranges (including access road)	
RPG Range	
Pistol Range	
Grenade Launcher Range	
Rifle Range	
Heavy Machine Gun Range	
81 mm Mortar Range	
Mosque	785 SM
Brigade and Garrison Battalions	
Type B Barracks (3 each)	1248 SM
Toilet/Shower/Laundry Building	416 SM
Brigade HQ Building	552 SM
Garrison HQ Building	990 SM
Arms Storage Building	
Motor Pool	
Vehicle Maintenance Garage	1395 SM
BOQs for Garrison, CS, CSS Battalions	3 BOQs Type B, 1 BOQ Type A

4.1 MASTER PLANNING, SITE SPECIFIC SURVEYS, & SUBMITTALS

4.1.1 The Jalalabad site is approximately 700 meters X 1000 meters. The Master Plan shall indicate a 700 X 1000 meter site with 300 X 1000 meter expansion space; see paragraph 2 for grid coordinates. The Master Site Plan shall include all locations of construction, office/storage, containers, lay down and construction debris removal area, and mobilization area. The development of the master plan will include participation in a charrette that will be conducted at the Corps of Engineers Headquarters Office in Kabul. The charrette shall be scheduled by the Government to occur within ten (10) calendar days of notice to proceed. The programmatic Master Site Plan shall be submitted to the Government no later than twenty (20) days after Notice to Proceed. Site specific adaptations of the programmatic Master Site Plan shall be submitted to the Government according to the schedule provided above. The master plan shall include the siting for the facilities/features in this contract and those planned facilities/features listed above. The infrastructure (roads, sidewalks, parking, utility systems, etc.) design loads and construction shall be for a full garrison, with an estimated population of 4,000 personnel. A generic site plan is provided in Section 01015 TECHNICAL REQUIREMENTS.

4.1.2 SITE SPECIFIC SURVEYS & SUBMITTALS

The Contractor shall perform a geotechnical investigation as defined in Section 01015, perform a topographic survey of the site; adapt the programmatic Master Site Plan to the conditions applicable for specific locations; prepare a complete grading and drainage plan with existing grades, proposed grades, and building finished floor elevations based on the technical requirements; prepare a landscaping plan; prepare a water distribution layout plan; and prepare a wastewater collection layout plan. If there is a requirement for on-site demolition, the Contractor shall prepare a demolition plan. The Contractor shall not locate facilities in wadis or dry river beds. The finish floor elevation of all facilities and slabs shall be a minimum of 150 mm above flood elevations or river banks, whichever is at the highest elevation. The contractor will provide drawings and details to describe any adaptations to the standard designs provided. At a minimum, submittals shall include: the geotechnical investigation report; drawings, details and calculations associated with well construction; and drawings, details and calculations associated with sanitary sewer and leach field construction. The schedule for delivery of site-specific submittals is included above at paragraph 4.1.1, General Requirements for Facilities.

4.2 DEMOLITION AND GRADING

Minor site demolition is required prior to construction of new work. Grading at the site is required and shall conform to requirements within references herein.

Native crushed stone 100 mm thick shall be placed around all buildings, from the building wall or building landscaping out 2m and all areas of anticipated foot or vehicle traffic to reduce erosion and to provide dust control. Concrete walkways shall be installed between buildings and parking areas.

4.3 WATER SYSTEM AND FACILITIES

4.3.1 Contractor shall design and construct a complete water supply, pumping, storage and distribution system with valves, fittings, bends and related accessories for optimum system performance. Design and construction includes installation of water service piping from the supply line with connection to the end user facility. The Contractor will not be responsible for the construction of service lines from Contractor installed distribution lines to future facilities. Refer to Section 01015.

4.3.2 Design a potable water system, to include siting for groundwater well, drilling of groundwater well and installation of well pump with building. Include installation of hydro-pneumatic water storage tank, service booster pumps with building, ground storage tank(s) (GST), and underground pipe distribution system, sized for the entire base build out Master Plan of 4,000 occupants. Ground storage volume shall be a minimum of one day's storage equal to the Average Daily Demand (ADD). Assume that the well shall be constructed to deliver a minimum 345-414 kPa 50-60 pounds per square inch (psi) at a flow rate that is twice the required daily demand. The storage tanks shall provide capacity for a minimum of 100 percent of the required daily demand based on 155 L/capita/day (41

gal/capita/day). The distribution system shall be designed to provide a minimum 276 kPa (40 psi) at ground level at all points in the systems. Minimum pressures of 207 kPa (30 psi), under peak domestic flow conditions, can be tolerated in small areas as long as all peak flow requirements can be satisfied. Maximum water pressures in distribution mains and service lines shall not exceed 520 kPa (75 psi) at ground elevation. Maximum pressure of 100 psi can be allowed in small, low lying areas not subject to high flow rates and surge pressures. Per customer, fire flow and irrigation systems shall not be included in design calculations. Provide an enclosed water well house.

4.4 SANITARY SEWER SYSTEM AND TREATMENT PLANT

4.4.1 The Contractor shall design and construct a complete sanitary sewer gravity collection system to include a pressure system if necessary. Design and construction includes sanitary sewer service piping from the sanitary sewer collection piping to the user facility. Design and construction shall also include conveyance of raw sewage to a treatment plant for processing of sludge and proper disposal of treated effluent. The Contractor will not be responsible for the construction of service lines from Contractor installed distribution lines to future facilities. Refer to Section 01015.

4.4.2 The system shall consist of all the necessary ancillary items appurtenances such as manholes, cleanouts and building service connections plus other standard fittings for optimum system performance. The sewerage system may require the use of a sewage lift station & force main to overcome irregular terrain, natural or manmade barriers or other obstructions that cannot be traversed using a gravity system. However, the contractor must maximize the design for optimum efficiency using gravity flow. The sanitary sewer collection system shall connect to the proposed wastewater treatment facility described in Section 01015 of this technical requirement. The sanitary sewer system shall be designed to accommodate future expansion. System capacity shall be calculated based on a hydraulic waste load that is equivalent to 80 percent of the Required Daily Demand for the water system as specified in these technical requirements, or as 33 gallons per capita per day (gpcd), whichever is greater. A geotechnical investigation of the proposed sewage treatment site is required and the contractor shall design the sewage treatment system to be compatible with site and soil conditions. Wastewater treatment shall be a cost feasible pre-fabricated packaged system conventional activated sludge, (aeration tanks with sedimentation) method. As an alternative to a packaged treatment system the Contractor may consider stabilization pond(s), (facultative type) a desirable low maintenance, cost effective system. The sewage collection system and wastewater treatment system and effluent disposal shall be designed to accommodate the total facility compound population as specified in the Scope of Work *plus* 25% and verified by the contractor.

4.5 SITE ELECTRICAL POWER PLANT, DISTRIBUTION, AND FUEL SYSTEM

4.5.1 POWER SYSTEM: The Contractor shall utilize power plant design provided and complete all required design to construct a fully functional power plant in accordance with the contract technical requirements, to include fuel storage system and underground electrical distribution. The contractor shall design ~~and construct~~ a site power distribution system to include power distribution to all future Master Planned facilities. The site Primary power distribution shall be 15KV ~~manhole~~ duct bank system. Secondary power distribution shall be pad mounted transformer substations (PTS). Each PTS shall be a standard manufactured substation with a secondary distribution switchboard. Each substation switchboard shall have a secondary distribution circuit breaker for each facility, to include all future Master Planned facilities. The Contractor shall provide secondary distribution manhole or hand hole duct bank distribution system to each facility to be constructed, to include all future Master Planned facilities, from the PTS switchboard. The Contractor shall provide a 100mm conduit stubbed out from the closest manhole or hand hole (**within the roadway right of way at the limits**) for each future facility. **The Contractor will not be responsible for the construction of service lines from Contractor installed distribution lines to future facilities.** Each 100mm conduit shall have a pull string, be capped off, and have a duct bank marker above the conduit. The Power Plant Building type shall be Pre-Engineered metal buildings on concrete slab with equipment pads with reinforced CMU walls. Reference the enclosed design. All electrical design and installation shall meet NEC (NFPA 70) requirements. Electrical receptacles shall be provided as indicated in section in 01015, Technical Requirements. Conductors and circuits shall be sized for the specific loads. All wiring shall be run and pulled through conduits. The power plant shall include prime power generators, switchgear, and all appurtenances necessary to meet the electrical demand. Provide space in the prime power plant for two future additional generators to include all

necessary equipment pads and connection conduits.

Construct power plant facility according to design requirements. Construct a power distribution system, provide and install generators sized to supply power demand to all Base Bid Contract Items, according to the design and master plan.

4.5.2 Power Plant ~~GENERATORS~~: Design a complete Prime Power Plant and power distribution system for all Base Bid Contract Items on the Master Plan. ~~Contractor shall provide generators based on the N+2 concept. Where 'N' would be the required number of generator(s) and '2' being a 'stand by' unit. Generation shall supply 125% of the maximum calculated demand load plus the stand by generator in reserve.~~ Generator size is not to exceed 1MW (1,000kW); in the event more than one generator is required to handle the entire load, the generators shall be provided with a synchronizer-switch, so that when total power demanded from one generator reaches 90% of the generators maximum, an additional generator shall automatically start and supplement the running generators, sharing the load between the generators equally.

4.5.3 PERMANENT ELECTRICAL POWER FUEL SUPPLY

The Contractor shall provide bulk fuel storage capacity based on 30 days full-load operation for current base bid requirements. After testing generators, Contractor shall provide a full supply of fuel to the tanks at the time of turnover to the Government; all fuel tanks shall be turned over to the Government in a full condition. All the fuel tanks will be inside a concrete reinforced containment wall and water tight wall to contain any fuel spillage. The volume of the concrete reinforced wall shall be 110% of the fuel tank capacity and shall be 600 mm above top of fuel tank. Provide a 50 mm diameter drain pipe with a valve thru the wall to drain water that may have accumulated inside after a rain. Provide chain link fence and gates around entire fuel storage facility. Provide chain link fence with gates, C-wire, heavy duty hasp and locks at all fuel storage tanks and openings to prevent theft.

If the contractor cannot provide permanent power on schedule, temporary power shall be provided to the facilities.

4.6 FORCE PROTECTION MEASURES

The Contractor shall design and construct force protection measures to include masonry or stone walls, primary and secondary Entry Control Points (ECPs), guard towers, guard houses, illumination system, and communication systems. The designer shall incorporate force protection 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 be in accordance with Joint Security Directorate Antiterrorism/Force Protection Guide, March 2002.

4.6.1 Perimeter Wall

Base size is 700 meters X 1000 meters. Design and construct a Force Protection Perimeter Fence (3400 meters); approximately 1,600 meters of stone wall and 1,800 meters chain link fence. Provide two (2) gates minimum into compound; with guard towers at 275 meter maximum intervals. Provide a Guard Tower at each opening in the perimeter (one at the main gate, one each corner, and one at the alternate gate); and a Reception Building at the main gate. See Section 01015 for additional Force Protection requirements. Note: The perimeter wall/fence does not extend around the 300 X 1000 expansion area discussed in paragraph 4.1.

Native stone masonry walls shall be constructed around the perimeter of the site. The height of the walls shall measure at least 2.5 meters from the inside and outside grades. The wall shall be topped with barbed wire outriggers and single-coil concertina style razor wire. The ground grade shall slope away from the wall for at least 5 meters and shall be kept a minimum of 2.5 meters below the top of wall for a minimum distance of 10 meters. The wall shall be designed to keep all pedestrian and truck traffic outside the compound from having a visual line of site into the compound.

4.6.1.1 Gates

The gates shall be swing type gates of 3.65 m wide x 2.4 m high leafs, constructed of steel plates, steel tube frame, and 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 sufficient anchor mounted to the exterior masonry walls, to support each gate leaf. Provide a locking mechanism that holds the gates together when in the closed position as well as a drop bolt that engages a steel sleeve embedded in the pavement.

4.6.2 Primary Entry Control Point

The Primary ECP shall include a paved entrance, manually operated, sliding steel gate; a guard house; vehicle drop arm barriers; passive anti-ram barriers; and jersey barriers placed in serpentine pattern to prevent high speed vehicle entry into compound. Provide a rejection lane after vehicle inspection and before entering the compound. Also included is a Reception Building.

4.6.3 Secondary Entry Control Point

The Secondary ECP shall include a paved entrance, manually operated, sliding steel gate; a guard house; vehicle drop arm barriers; and passive anti-ram barriers. Provide a rejection lane after vehicle inspection and before entering the compound.

4.6.4 Guard Towers

The Contractor shall design and construct guard towers at each inside corner of the force protection walls, at the main gate, and at the secondary gate. Guard towers shall be a minimum of 3m x 3m in size. The guard tower shall be designed and located so that the outside of the perimeter wall can be observed from two sides of the tower windows. The floor height shall be elevated as to allow the window sill to be 0.5m above the top of the wall. The guard tower shall be constructed of reinforced CMU walls with a metal door and horizontal sliding windows with metal window frame, 1400mm high x 1200mm wide. Glazing for the windows shall be a 16mm thick laminated glass. Windows shall be located on all 4 sides to provide a 360 degree viewing area. Windows shall not be screened. The guard tower must meet force protection requirements. The tower shall be supported on reinforced concrete footings. Footings shall be located below the frost line or a minimum of 800 mm, whichever is greater. The roof shall have a gutter and downspout system to evacuate rain accumulation. The down spout shall run the entire height of the tower and drain at the finished ground level to a splash block. Entry to the tower shall be through a lockable security door. Guard Tower shall have heating-using split pack heat pump units. Guard towers shall be provided with general lighting and shall be fitted with one 360-degree omni-directional searchlight. One weather-resistant duplex receptacle shall be provided as required for general use. The area in the immediate exterior vicinity of the guard tower shall be provided with an all weather non-slip surface and shall be graded to sufficiently drain away from structure. Provide gutters and downspouts or slope the roof away from the guard house entry way and stairs.

Illuminate the exterior of the compound. Position lights to provide overlapping coverage and to avoid illuminating guard positions. Do not use white lights inside guard towers. Use red, blue, or black lenses in interior guard tower lighting.

For communications, provide rigid metal conduit, two RJ-45 phone jacks with Category 5e, four pair UTP cable back to a protected entrance terminal in the telephone terminal cabinet.

Force Protection measures also include 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 and Joint Security Directorate Antiterrorism/Force Protection Guide, March 2002.

4.6.5 Guard House

Guard House design shall be shall be 200 mm reinforced concrete slab and ceiling. Walls shall be fully grouted CMU. Provide metal roof and eaves to match other building on compound. A general space shall be provided for 2 guards within Guard House. Windows shall be sliding 16 mm laminated glass in steel frames. All other spaces mentioned in standard design shall be provided elsewhere within the site. Areas in immediate outside vicinity of guard hut shall be provided with an all weather non-slip surface and shall be graded to sufficiently drain away from building and pedestrian areas. Building shall have concrete slab with foundation below frost line. Category 5e dual

RJ-45 outlets for voice and data and duplex receptacles shall be provided. Provide built in counter with 2 file drawers and pencil drawers. Provide electric wall mounted split-pack units. Area in immediate outside vicinity of guard house shall be lighted. Provide bullet-proof entry doors.

4.6.6 Reception Building

Reception Building is 88 SM and design shall be 200 mm reinforced concrete slab and ceiling. Walls shall be fully grouted CMU. Provide metal roof and eaves to match other building on compound. The functional areas within this facility are a waiting area with toilet and sink, a guard room with shower, toilet and sink and a reception office. Windows shall be sliding 16 mm laminated glass in steel frames. Areas in immediate outside vicinity of guard hut shall be provided with an all weather non-slip surface and shall be graded to sufficiently drain away from building and pedestrian areas. Building shall have concrete slab with foundation below frost line. Communication/Data and duplex receptacles shall be provided. Provide electric wall mounted split-pack heat pump units. Area in immediate outside vicinity of guard house shall be lighted. Provide bullet-proof entry doors.

4.7 ROAD NETWORK AND SIDEWALKS

The Contractor shall design and construct a 7.3 meter wide entrance road, 150mm thick compacted aggregate base course material compacted to 95% maximum density placed above 150mm of scarified sub-grade compacted to 95% maximum density. The Contractor shall design and construct the entire road and parking network. The asphalt concrete roads shall be designed to carry traffic of a 7 ton three-axle vehicle. A storm drainage system shall also be included. The road layout shall provide access to entry control points, parking lots, fuel points, generator yard, domestic water and wastewater treatment plant facilities, power generator plant and solid waste collection points. Road design shall be designed per Section 01015, Technical Requirements. Roadways and sidewalks are required as shown on attached drawings and shall be designed and constructed based upon recommendations from geotechnical analysis as required herein. **The Contractor shall construct the entire road, all necessary culvert repairs and replacements, and parking network gravel sub-base for the entire master planned area.**

The Contractor shall design and provide landscaping for the compound. Design and provide a network of concrete sidewalks to connect the buildings. Sidewalks shall be wide enough to be used as fire-lane/ service roads. Provide outdoor benches, lighting, and gathering areas.

4.8 SOLID WASTE COLLECTION POINT

The Contractor shall design, in a location convenient for easy removal, a solid waste collection point. It shall be located inside the compound walls. The solid waste collection point shall be a 1.8 m X 1.8 m concrete pad with a 1.8 meter tall chain link fence around the perimeter. One side shall have a 1.2 m wide gate entrance. The solid waste collection point shall have a metal roof covering.

4.9 INFANTRY BATTALION COMPLEX (A)

Design and construct an Infantry Battalion capable of supporting 687 personnel (645 enlisted) (42 Officers will be billeted at the BOQ). Complex shall consist of the following buildings: 4- "A" Type Barracks; 5- "B" Type Barracks; 1- Toilet/Shower/Laundry Building; 1- Battalion Headquarters Building w/Battalion and Company Command Center; 1- Battalion Storage Building; 1 – Motor Pool; 1- POL Storage Building; 1- Solid Waste Collection Point. The barracks, toilet/shower building, and battalion HQs building shall be provided with evaporative cooling unit with ceiling fans with provision for future addition of diesel heat and fuel storage. Command Centers inside Battalion HQ shall be provided with split-pack heat pumps. Additional Barracks, Battalion HQ, Toilet/Shower/Laundry Building, Battalion Storage Building, and Motor Pool criterion is provided in paragraphs 5.1, 5.2, 5.3, 5.4, 5.5, and 5.8 of this section.

4.10 INFANTRY BATTALION COMPLEX (B)

Design and construct an Infantry Battalion capable of supporting 687 personnel (645 enlisted) (42 Officers will be billeted at the BOQ). Complex shall consist of the following buildings: 4- "A" Type Barracks; 5- "B" Type Barracks; 1- Toilet/Shower/Laundry Building; 1- Battalion Headquarters Building w/Battalion and Company Command Center; 1- Battalion Storage Building; 1 – Motor Pool; 1- POL Storage Building; 1- Solid Waste Collection Point. The barracks, toilet/shower building, and battalion HQs building shall be provided with evaporative cooling unit with ceiling fans with provision for future addition of diesel heat and fuel storage.

Command Centers inside Battalion HQ shall be provided with split-pack heat pumps. Additional Barracks, Battalion HQ, Toilet/Shower/Laundry Building, Battalion Storage Building, and Motor Pool criterion is provided in paragraphs 5.1, 5.2, 5.3, 5.4, 5.5, and 5.8 of this section.

4.11 INFANTRY BATTALION COMPLEX (C)

Design and construct an Infantry Battalion capable of supporting 688 personnel (645 enlisted) (42 Officers will be billeted at the BOQ). Complex shall consist of the following buildings: 4- “A” Type Barracks; 5- “B” Type Barracks; 1- Toilet/Shower/Laundry Building; 1- Battalion Headquarters Building w/Battalion and Company Command Center; 1- Battalion Storage Building; 1 – Motor Pool; 1- POL Storage Building; 1- Solid Waste Collection Point. The barracks, toilet/shower building, and battalion HQs building shall be provided with evaporative cooling unit with ceiling fans with provision for future addition of diesel heat and fuel storage. Command Centers inside Battalion HQ shall be provided with split-pack heat pumps. Additional Barracks, Battalion HQ, Toilet/Shower/Laundry Building, Battalion Storage Building, and Motor Pool criterion is provided in paragraphs 5.1, 5.2, 5.3, 5.4, 5.5, and 5.8 of this section.

4.12 DFAC NUMBER 1, DINING FACILITY AND STORAGE YARD

Supplement existing designs, based on Sections 01010 and 01015 and construct a new Dining Facility (DFAC) 2,088 m² with 1512 m² Dining Room seating for 1,000 persons. Design shall be for an open-clear span facility (may have one row of columns in center of room), using insulated modular building construction with CMU walls 3 meters min A.F.F. All structural members shall have a fire resistance of at least 1 hour corresponding with construction type 2A as defined in the International Building Code. All floors in building shall be terrazzo, except utility type rooms. Provide at front entry a concrete sidewalk and covered canopy to match roof construction, length 20 meters. Provide and construct a detached Wood Burning Stove Kitchen Annex building, near the entrance to the DFAC kitchen, with wood burning stoves, and covered storage area for the wood. The siting of a future Training Building shall be located adjacent, but at least 60 feet away from the DFAC for use during population surges. The DFAC and the Training building will eventually have a canopy between them. The Contractor shall assure that the DFAC can accommodate a future canopy. Exact layout will be confirmed at Design Charette. Size grates full door width by one (1) meter long. Provide 3 flag poles at main entry. The Contractor shall design and construct one (1) collection point suitable for solid waste disposal temporary storage area adjacent to the DFAC. This building shall be Pre-engineered Metal Building with upper wall and roof constructed of insulated metal panels. The lower walls shall be reinforced insulated CMU. Provide evaporative Cooling unit with ceiling fans with provision for future addition of diesel heat and fuel storage. Additional DFAC criteria is provided in paragraph 5.6 of this section.

4.13 BACHELOR OFFICERS QUARTERS – BOQ BUILDINGS

Site adapt and construct 1 Type A BOQ and 3 Type B BOQs. All BOQs shall be constructed of reinforced insulated concrete plastered walls, with metal roofs. Design and construct a Bachelor Officer Quarters complex with double loaded 1500 mm corridors built to the following space requirements. Provide housing for the officers with shared toilets, the shared toilets shall be grouped in one area on the corridor shall be constructed with a toilet/shower/sink. Provide evaporative Cooling unit with ceiling fans with provision for future addition of diesel heat and fuel storage. Senior officer BOQ shall be provided with split-pack heat pumps for year-round comfort.

	for 1 Battalion	for 3 Battalions	for 1 Battalion	for 3 Battalions	Total 3 Battalions
Rank	O2-O3		O4-O5		
No, Personnel	38	114	4	12	126
Room Size	14 SM		14 SM		
Occupancy	Double		Single		
Toilet/Shower	7:1		4:1		

Sink Ratio

	For the Base
Senior Officers	O6-O7
No, Personnel	4

Note: O2-O5 officers will be housed in Type B BOQs. O6-O7 officers will be housed in Type A BOQs.

4.14 EMBEDDED TRAINING TEAM COMPOUND (ETTC) FACILITIES:

Near center of Brigade provide ETTC consisting of stone force protection wall with two separate 2400 mm steel gates, parking for 200 vehicles and a guard tower at each corner, all utilities water, sewer, and electricity shall be connected to base utilities. Provide HVAC as specified for each building.

1) **ETTC Facilities:** All buildings, except as noted below, shall be constructed of reinforced insulated concrete plastered walls, with metal roofs. Windows shall be 6 mm laminated glazing set in heavy duty aluminum frames. Barracks and toilet facilities shall be built separately for men and women (80% Men and 20% Women). Provide five (5) Barracks with double loaded corridors built to the following space requirements. Sleeping rooms for ten (10) Officers @15 m² net per sleeping area, one-hundred sixty-five (165) enlisted @ 7.5 m² net per sleeping area. Fifty (50) KBR personnel @ 7.5 m² net per sleeping area. Provide shower, sink and toilet facilities for 250 persons @ 1/10. Provide one (1) Morale, Welfare and Recreation (MWR) building @ 200 m². Provide Storage Building 100 m². The MWR Facility shall be constructed with CMU walls on the reinforced concrete slab. The Storage building shall be a pre-engineered building anchored to a concrete slab. Each barracks facility shall include a laundry room. The contractor shall construct the ETTC laundry facility to include utilities to support the installation of ten commercial washers, minimum 30 pounds capacity and ten commercial dryers. Barracks shall be provided with evaporative cooling and ceiling fans with provision for future addition of diesel heat and fuel storage. The MWR facility shall be provided with split pack heat pump units, for air conditioning/heating. Provide 1 collection point for solid waste temporary solid waste storage. Provide Master Plan and space for expansion in camp for a total population of 450 trainers.

2) **DFAC Number 2:** Facility shall be a western style kitchen for ETTC forces in the compound with commercial grade tables and commercial grade metal stackable chairs for 120 occupants. Stoves and ovens shall be commercial propane. Kitchen shall be sized to prepare food for 250 people. This facility shall provide cafeteria-style feeding and a short order grill next to a heated serving line w/sneeze guard 8 meter length min. Provide toilets, (2 separate) hand wash area with a stainless steel 2 meter pot sink, food service with all stainless fixtures and shelves and prep sinks/tables, dry storage, walk-in freezer, walk-in refrigerator, stainless self-serve counter, beverage counter, self-service cold-drink refrigerator w/sliding doors, and loading dock. Dining facility shall be 400 m² minimum. Provide an adequate grease trap with clean out to collect discharge from the kitchen area prior to discharging into the sewer system. Provide at front entry a concrete sidewalk and covered canopy to match roof. Provide evaporative Cooling unit with ceiling fans with provision for future addition of diesel heat and fuel storage.

3) **INTERPRETER FACILITIES:** Locate adjacent to the ETTC Facility. Provide separate compound consisting of stone force protection wall per Section 2.5 Force Protection Perimeter with two 2400 mm steel gates, all utilities water, sewer, and electricity shall be connected to base utilities. All floors in building shall be terrazzo, except utility type rooms and buildings. The barracks buildings shall be constructed of reinforced fully grouted CMU with metal roofs. Provide Barracks with double loaded corridor built to the following space requirements; sleeping rooms for 50 Translators @ 7.5 m² net per sleeping area @ 6.0 m² minimum. Provide shower, sink and eastern toilet facilities for 50 persons @ 1/10 and a storage room for janitor supplies and mop sink. Provide one (1) Morale, Welfare and Recreation (MWR) Building @ 75 m². The MWR Facility shall be a pre-engineered facility anchored to a reinforced concrete slab. Provide 50 m² Office Space, Minimum. Walk-off grates shall be provided at all exterior doors with removable galvanized steel grates and dirt wells, size full door width by one (1) meter long. Barracks shall be provided with evaporative cooling and ceiling fans with provision for future addition of diesel heat and fuel storage. Provide electric wall mounted split-pack heat pump units in the MWR facility.

4) **DFAC Number 3:** This building shall be Pre-engineered Metal Building with upper wall and roof constructed of insulated metal panels. The lower walls shall be reinforced insulated CMU. Facility shall be a western style kitchen for ETTC Interpreters in the compound with commercial grade tables and commercial grade metal stackable chairs for 30 occupants. Stoves and ovens shall be commercial propane. This facility shall provide cafeteria-style feeding and a short-order grill next to heated serving line w/sneeze guard. Kitchen shall be sized to prepare food for 50 people. Provide two public toilets, hand wash area, food service with all stainless fixtures and shelves, dry storage, walk-in freezer, walk-in refrigerator, stainless self-serve counter and beverage counter, stainless steel prep sinks and wash pot sinks and, self-service cold-drink refrigerator w/sliding doors and loading dock. Dining facility shall be 120 m² minimum size. Provide an adequate grease trap with clean out to collect discharge from the kitchen area prior to discharging into the sewer system. Provide at front entry a concrete sidewalk and covered canopy to match roof. Provide evaporative Cooling unit with ceiling fans with provision for future addition of diesel heat and fuel storage.

4.15 COMMUNICATIONS BUILDING AND DISTRIBUTION SYSTEM

The facility will serve as the installation's center for telecommunications, switching, and automation networking (including internet service) and shall have year-round climate control in all rooms for the sensitive electronic equipment. A communication building shall have an uninterruptible power supply (UPS) room with ventilation to outdoors. Power to the building shall meet the ultimate demand load plus 25% spare capacity, but shall not be less than a 250 Amp service. A grounding grid tested to 5 ohms or less shall be distributed throughout the UPS and equipment rooms.

Provide a communications room having raceways/duct backs going to each facility requiring communications; those to be used in the future will have a pull string. Manhole/handhole systems shall have no more than 150 meters between access points. All voice telephone wiring, data and emergency wiring, including any planned or future fiber optical runs, will originate and/or terminate in this communications center.

Provide a 3m x 5m roof covered concrete pad outside the UPS room with a backup generator with an adjacent 2m x 3m concrete pad with a spill dike for a 500 gallon or larger fuel tank. Backup generator shall be sized to meet the ultimate demand load of the communications building, plus 25% spare capacity. A 15cm diameter or larger conduit shall connect the generator pad to the UPS room and shall use long sweep elbows totaling no more than 180 degrees for any bends. Backup generator for Communications building shall be in addition to the generator required in paragraph 4.5 above. When sizing the generator, ensure it is de-rated for altitude and temperature in accordance with manufacturer's recommendations for the site conditions

All buildings (except guard houses and towers) shall have a communication room to house all telephone and computer network equipment. All Barracks shall have cable in accordance with section 01015. Each office will have at least two phone outlets using category 5e, RJ-45 outlets or better and at least two outlets for computer connections, There shall be a 25-pair 24 AWG copper UTP cable ringing the base perimeter to connect all guard towers and houses with redundant paths so that communications are maintained even if a cable is cut. Outside plant building telephone and data cabling shall be RUS PE89 24AWG, Gel filled, and RUS type PE 90, Single mode fiber optic cable. Inside plant cable and termination hardware shall be at minimum category 5e.

In any communication related office or room required raised flooring, IF used, the raised flooring shall be all steel interchangeable square panels 600mm X 600 mm, with 450 mm clear space below finish floor. Assembly shall be designed for the highest earthquake zone. Design shall be bolted stringer capable of withstanding a 12,500 lb. uniform load and a 500 lb. rolling load. Provide Four (4) panel lifting devices. Provide bonded anti-static raised floor assembly and flooring.

Electrical service to the building shall be underground.

Provide voice and NIPR Net LAN drops (category 5e RJ-45 dual voice/data) in each of the living areas for all barracks and all offices in the buildings.

4.16 VEHICLE REFUELING POINT

The Contractor shall provide for a total capacity of 40,000 liters of diesel storage and 10,000 liters of MOGAS storage; complete with concrete containment floor and walls, power, and dispensing pumps.

The Contractor shall design and construct a low profile vehicle re-fueling point, as specified in Section 01015, capable of storing 40,000 liters of diesel and 10,000 liters of MOGAS. The fuel point shall consist of one 25,000 liter tank of diesel and another dual compartment 25,000 liter tank, of which, 15,000 liter would be used for diesel and 10,000 liters would be used for MOGAS. Additional Vehicle re-fueling criteria is provided in paragraph 5.7 of this section.

4.17 CONCRETE BUNKERS

Provide Concrete Bunkers though out compound; with seating for 1200 persons. Site and grade so water cannot stand inside bunkers. Provide 150 mm base course of gravel under sandbags.

4.18 ANTI VEHICLE TRENCH

Provide an anti-vehicle trench (3 meters wide X 2 meters deep) around perimeter of Brigade and Ammo Supply Point. Ditch shall be adjacent to all force protection fences and walls. Ditch shall be 5 meters from perimeter fences and walls. Design anti-vehicle trenches to drain and not hold water after rainfall.

4.19 SPARE PARTS

The Contractor shall provide a six (6) months supply of all spare parts for all facilities and all systems as recommended by the various manufacturer's instructions. Prior to purchase the contractor shall forward the lists of spare parts with pricing, by vendor to the Government for approval. A set budget amount of \$50,000.00 has been established for spare parts.

4.20 OPTION 2 – ENTRANCE ROAD

Provide 1.0 meter wide, aggregate base shoulder 150mm thick @ 2.0% slope on both sides of the roadway. This entrance road will be 5 km in length.

4.21 Option 3- Pave the roads in accordance with the design criteria described in this Section and in Section 1015.

4.22 Option 4- Procure and install an additional generator to match the capacity of each of the generators procured and installed under the base bid and according to the criteria specified in this Section and Section 1015. This optional line item may be exercised multiple times.

5. ADDITIONAL CRITERIA

5.1 INFANTRY BATTALION BARRACKS

The Contractor shall design and construct barracks facilities based on the total population of three infantry battalions (complex A, B & C) and the areas shown in the following table. Barracks for ordinary personnel shall be open bay. Barracks for middle, high ranking, and senior personnel shall be individual rooms. Enlisted Barracks and Middle, High, and Senior Barracks may be conjoined but shall be segregated by walls and shall have separate entrance/exits. Contractor shall also design and provide electrical room, janitor closet, mechanical room, stairways, toilet rooms, showers, and break room.

Net Sleeping Area per Soldier with Breakdown by Rank (NSM)

Rank		
E1-E6	Open Bay	5SM
E-7	Two to room	14SM
E-8	private room	12SM
E-9	private room	12SM
02 to O3	Two to room	14SM
04 & 05	private room	14 SM
06	Private room	52 SM

Department / Rank	E1-E6	E-7	E-8	E-9	06	05	04	03	02	Total E1-E9	Total O2-6
Infantry Battalion Complex A	613	23	7	2	1	1	3	14	24	645	43
Infantry Battalion Complex B	613	23	7	2	1	1	3	14	24	645	43
Infantry Battalion Complex C	613	23	7	2	1	1	3	14	24	645	43
TOTAL	1839	69	21	6	3	3	9	42	72	1935	129

The Contractor shall incorporate the following special features into the barracks:

- 1) Ceiling fans shall be designed for summer ventilation.
- 2) Provide evaporative Cooling unit with ceiling fans with provision for future addition of diesel heat and fuel storage.
- 3) Each barracks shall have a dedicated storage area sized to 0.5 SM per person assigned to the barracks.

5.2 BATTALION HQ BUILDING

1) **Battalion Command Center:** Construct a 28 SM Battalion Command Center with a high security door. This room shall be located near the Battalion staff offices. The Battalion Commander shall be provided with a bedroom and shower/toilet room next to his office in the Battalion HQ Building. In addition to standard electrical outlets in the room, provide a dedicated electrical circuit with 8 double receptacle electrical outlets in the appropriate locations to support the unit's assigned communications equipment. All inside plant telephone wiring shall originate and/or terminate in this room. Communications duct banks with cable installed linked to this room shall be designed and constructed to serve each building in the compound, including the Company Command Center and the guard towers. Install a 50mm conduit passing from the Battalion Command Center to the roof of the building. The roof penetration shall have a weatherproof box on top and shall be flashed or patched as necessary to prevent water leakage. Split pack air conditioning heat pumps, in addition to ceiling fans, shall be provided for the Battalion Command Center. The A/C shall be sized to accommodate 4 personnel with 4 computers and 6 radios.

2) **Company Command Center:** Construct a 28 SM Company Command Center with a high security door. This room shall be located near the Company staff offices. In addition to standard electrical outlets in the room, provide a dedicated electrical circuit with 8 two-receptacle electrical outlets to support the unit's assigned communication

equipment. Install a 50mm (2") conduit passing from the Company Command Center to the roof. The roof penetration shall have a weatherproof box on top and shall be flashed or patched as necessary to prevent water leakage. The facility in general shall be cooled using an evaporative Cooling unit with ceiling fans. Split Pack heat pump units, in addition to ceiling fans, shall be provided for the Company Command Center. The A/C shall be sized to accommodate 4 personnel with 4 computers and 6 radios.

3) Arms Storage Area: Arms Storage Area: Provide a weapons storage area in the rear of Battalion HQ building. The area shall have three equal separate spaces with walls and heavy duty metal doors and framed lockable door to each 8 RPGs, 8 Machine Guns, and all long-arm weapons for each person assigned to both the Battalion and Company. Provide storage within the facility for all Battalion and Company ammunition and ordinance. Provide wooden racks for storing long-arm weapons vertically. Racks shall not be furnished with locking bars. The Arms Storage Room shall be sized at 320 SM. Provide 18.6 SM (200 sf) room inside the arms room for secure storage of evidence and confiscated money or narcotics. This room shall have its own separate key. The facility shall be of solid reinforced concrete (200 mm thick concrete roof slab and solid CMU wall) with no windows, high security door, and explosion-proof lighting. Note this Arms storage room is not shown on the concept drawings.

5.3 TOILET, SHOWER, ABLUTION, AND LAUNDRY BUILDING

5.3.1

Sink ratio	1:10
Shower Ratio	1:8
Toilet Ratio	1:10
Ablution Area	1:20

The Contractor shall design and construct a toilet, shower, ablution, laundry building. The Contractor shall incorporate the following special features into the building:

- All sinks shall be trough type constructed of block and concrete with ceramic tile exterior and lining capable of withstanding abuse.
- Provide evaporative coolers with supplemental cooling coil to maintain 27.8 C indoor conditions during the summer with provision for future addition of diesel heat and fuel storage.
- Shower stalls shall be large enough to allow room to dress and undress between an outer and inner shower curtain no less than 2m x 1.5m and shall have a solid door on the outside.
- All toilets shall be eastern style with wall-mounted hose bib on the right side of the occupant as he faces the stall door. Urinals are not required. Face all toilets in the North/South axis for cultural reasons.
- Drainage for the entire facility, including showers shall be accomplished using a sloping floor leading to trench drains.
- Showers shall contain a single mixing valve for hot and cold water mixing and a wall mounted shower head.
- Electric hot water heaters shall be installed to provide hot water to the showers and sinks.
- The building shall be constructed with exhaust fans to ventilate steam to the outside environment and, where required, insulated piping to prevent freezing of water pipes in winter.
- All water lines inside of the building shall be galvanized steel and surface mounted... All hot water and cold water piping shall be insulated and provided with stainless steel protective covers.
- Accessories shall include but not limited to; toilet paper holders, soap dishes, curtains and curtain rods, robe hooks, mirrors, paper towel dispenser, metal shelf, and grab bars.
- The laundry function shall have a laundry trough sink, janitor/storage room. The laundry room is not shown on the current plans and shall be added to the facility.
- Provide clothes line for drying outside each barracks building. 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). Minimize amount of turnbuckle take-up used

for dimensional adjustment so 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 approx. 1 mm (1/32 inch), 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.

- Provide evaporative Cooling unit with ceiling fans with provision for future addition of diesel heat and fuel storage.
- Provide a janitor room with a mop sink.
- The Contractor shall design and construct a laundry room at the end of the Toilet/Shower/Ablution/Laundry Building and incorporate the following special features into the toilet/shower building. The room shall have laundry trays to wash clothes. Drying the clothes will be done outside on clothes lines. The building annex for the Laundry room is not shown on the design drawings, and must be designed by the contractor.

5.3.2 Ablution

Ablution areas shall contain hot and cold water spigots with a flexible 1.5m spray hose mounted below the control valves with a back flow prevented fitting at the hose bib and hanger. Ablution areas shall be provided with low flow water devices. Ablutions shall be provided at a 1:20 ratio and based upon the entire population of men and of women having their own ablution.

5.4 BATTALION STORAGE WAREHOUSE

Construct Storage Building (800 m²). Design shall be for open bay facilities, provide 3 meter CMU walls and pre engineered insulated building. Provide office with 52 inch ceiling fan. Provide two 5 meter X 5 meter high roll up doors, or as detailed in the enclosed design drawings. Building shall have 5 meter high unobstructed space. Provide bollards at all vehicle doors, two each jamb.

5.5 MOTOR POOL

The Contractor shall design and construct a motor pool and unit vehicle parking area to accommodate 26 SUV's and eight motorcycles. A separate 9SM utility building and separate 9SM POL building storage building shall also be provided. Provide a yard hydrant, electrical power, lighting, and compressed air service. Provide gravel surfaced parking areas.

5.6 DINING FACILITY No.1

- 1) Floor drains shall be incorporated into the dining area with the floor sloped to drain.
- 2) Trench type floor drains shall be installed in the kitchen cooking and dishwashing areas.
- 3) Hand wash stations in the entry vestibule shall be provided. Trough type sinks shall be used.
- 4) Install a large wash basin with a low rim height designed for washing very large pots.
- 5) The Contractor shall provide space and electrical outlets for future installation of walk-in refrigerators and walk-in freezers.
- 6) Fire protection is to be provided by fire extinguishers throughout the facility at easily accessible locations.

7) The Contractor shall design and construct a chain-link fenced storage yard for food and install facilities for the storage of both dry goods and refrigerated items.

Dining Facility Propane Storage- Provide Propane Storage for four (4) weeks operation assuming all stoves are in operation at the highest fuel consumption rate. Provide full tanks when project is turned over to Client.

5.7 VEHICLE RE-FUELING

- The fueling area shall have a metal roof awning covering it;
- Fuel point facility shall be enclosed by a chain link fence, with two 7.3m wide lockable vehicle gates
- 8.6 SM building to be used by the operator and located near the exit gate;
- The fuel point facility shall be paved with a compacted crushed aggregate surface sloped for proper drainage;
- Reinforced concrete slab adjacent to the fueling point, where vehicles can park while fueling, with a minimum 1% slope in three directions and 150mm curb along the slab on the sloped side to contain fuel spills;
- Bollards to protect the tanks from vehicles;
- Provide electrical service to the tank units as per the manufacturer's recommendations;
- The fuel tanks and fueling dispensers shall be approved by the Contracting Officer. The tank shall be equipped with all standard items with the following items:
 - 1) flame shield and fire guard tank option;
 - 2) the system shall include two diesel dispensers with dual hoses and one gasoline dispenser with dual hoses;
 - 3) one of the two tanks shall be a dual compartment tank;
 - 4) all tanks shall be factory pre-wired; meeting UL Standards 142 and 2085, and UFC Appendix IIF, Ballistic Protection; Internal tank lining.
 - 5) the pump package shall be submersible pump, grounding, and overflow protection,

The Contractor shall design and construct the 8.6sm fuel point facility building. The building shall consist of reinforced concrete foundation and floor slab; reinforced concrete masonry walls; a steel-framed sloping roof; metal door; and three horizontal sliding windows, with one facing the fueling point and one on each perpendicular wall. The building shall have heating and cooling with split pack unit that shall be able to maintain 20 degrees Celsius and lighting.

5.8 GENERAL CRITERIA

5.8.1 Heating, Ventilation, and Air conditioning (HVAC)

Environmental control of the facilities shall be achieved by HVAC equipment proposed by the contractor and approved by the U.S. Government. See section 01015 for scope of work required.

5.8.2 Life Safety

Design and Construct circulation pathways and exit stairs in accordance with building code references herein. Fire sprinkler system is not required. The facility shall comply with all other safety requirements as required within references. Smoke detectors and fire alarm systems shall be installed in accordance with requirements herein.

5.8.3 Lighting

General lighting shall be provided as indicated and shall meet recommendations from IESNA for each building type and function within each building. Design and installation shall meet NFPA 70 (NEC) requirements.

Exterior lighting shall be high intensity discharge luminaries on 10 meter high minimum spun aluminum or galvanized steel poles. If to be installed on an existing installation, type of luminaries shall match existing predominant type within installation.

Searchlights shall be provided as indicated and shall be equivalent to the following:

- prison grade
- nickel reflectors (bullet resistant)
- 65 million candlepower (1000 watts)
- manual operation from below with one hand
- xenon lamp
- weatherproof design

5.8.4 Electrical

All electrical design and installation shall meet NEC (NFPA 70) requirements. Electrical receptacles shall be provided as indicated. Conductors and circuits shall be sized for the specific loads. Generated voltage shall be or 220/380v 50Hz. Contractor shall design all interior electrical systems as described in section 01015, Technical Requirements, and shall design and install any required exterior lighting, as described in section 01015.

5.8.5 Fencing and Barricades

Fencing shall consist of the types shown or described herein. Barricades shall consist of either HESCO Bastion Container barriers or concrete type. Barricades shall be as shown. Refer Drawings for required types and locations. Barricades are not intended to resist a certain horizontal load and are not required to be permanently anchored to ground.

5.8.6 Foundation Design

Foundations, including subgrade, shall be designed and constructed based on recommendations from geotechnical investigation required herein.

5.8.7 Special Concerns to be Complied With

- Provide at all exterior doors at all buildings concrete stoops with walk-off grates having removable galvanized steel grates and dirt wells provide boot scraper for boot cleaning.
- All building walls will be insulated and rated R-13 and all roofing systems shall be rated R-20.
- Provide a janitor room with a mop sink in all building facilities. The janitor rooms in the BOQs and barracks shall not have mop sinks.
- Provide storage in all BOQs and Barracks at .5 SM per person in each barracks.
- All building shall have a sloped metal roof, 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. See Section 010115 for roof specifications and warranty.
- Barracks shall be spaced far enough apart to minimize noise (minimum 15 meters between barracks).
- Building construction shall maximize the use of local construction material and techniques while meeting all RFP and seismic requirements.
- All Barracks and Admin areas lighting shall be designed and constructed to provide a uniform level of minimum lighting in accordance with Section 01015 throughout the buildings. Fluorescent lighting shall be installed throughout barracks buildings.

- The toilet/shower facilities shall be located with toilets facing North/South away from Mecca, for cultural reasons.
- Do not provide urinals for cultural reasons..
- Showers shall contain a valve for hot and cold water mixing. There shall be a showerhead mounted high on the wall and an additional spigot with a flexible 1.5 m spray hose mounted below the control valves with a hanger. The showerhead and the spigot shall each have a valve so that flow can be diverted to each. Showers shall be provided with low flow water devices.
- All sinks for the buildings and the central toilet/shower facilities shall be 1.8m wide trough type constructed poured in place concrete with ceramic tile exterior and stainless steel lining capable of withstanding abuse. Maximum width is 1.8m. Individual troughs shall serve only three (3) individuals with 3 spigots with hot and cold water and two drains.
- Install carbon monoxide (CO) monitors in large occupancy areas, sleeping areas and enclosed facilities. If all the windows and doors are closed and there is no provision for intake air, there is a possibility of carbon monoxide built up in the rooms. These CO monitors/alarms shall be hard-wired for reliability and to prevent pilferage.
- No connex boxes will be allowed for facilities of any sort.

6. COMPLETION OF WORK

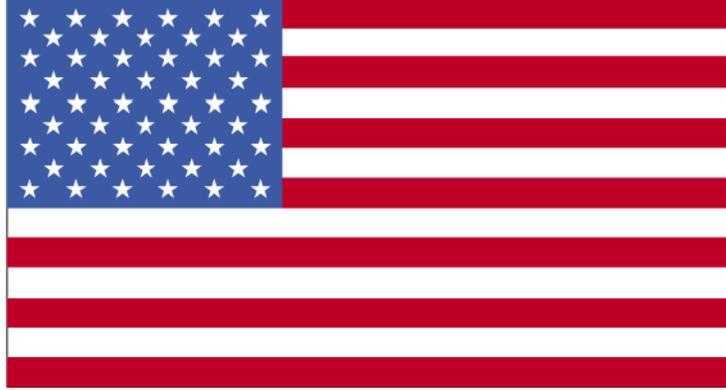
6.1 All work required under this contract shall be completed within **300** calendar days from Notice to Proceed for site work.

Review Section 00150 for Schedule requirements. The Charette shall consist of the Customer, Contractor, Design Team and U.S. Army Corps of Engineers personnel to finalize design Completion of construction documents for 100%, after approval of a preliminary facility layout and landscape plan, the Contractor may commence Site Work. Contractor will prosecute the work diligently, and complete the entire work, ready for use. The time stated for completion shall include final cleanup of the premises. The Contractor shall survey site and verify the existing conditions and report to the Contracting Officer any interface problems that could potentially impact this work. The Contractor shall be responsible for submittals and developing and performing all operational and acceptance testing. Contractor shall construct the facilities as a Design-Build construction contract and shall be in accordance with all codes, regulations, and requirements stated in the task order documents.

6.2 All primary construction facilities, such as, barracks, power plant, all headquarters buildings, and DFAC facilities will display both the flag of the Peoples Islamic Republic of Afghanistan and the United States of America.

EXAMPLE: MARKING (NOT TO SCALE)





از طرف دولت امریکا
برای مردم افغانستان

From the People of the United States
to the People of Afghanistan

Attachments:

Appendix A: Jalalabad Site Photographs

-- End of Section --

SECTION 01015

SECTION 01015
REVISED 26 October 2007
TECHNICAL REQUIREMENTS

1. GENERAL

1.1 The Contractor's design and construction must comply with technical requirements contained herein. The Contractor shall provide design and construction using the best blend of cost, construction efficiency, system durability, ease of maintenance and environmental compatibility.

1.2 These design and product requirements are minimum requirements. The Contractor is encouraged to propose alternate design or products (equipment and material) that are more commonly used in the region; will be equally or more cost effective or allow for more timely completion, but furnish the same system durability, ease of maintenance and environmental compatibility. The Contractor will be required to submit information as requested by the Contracting Officer to make a comparison of the proposed alternate. All variations 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)

1.4.1.1 UXO/Mine Discovery During Project Construction

It is the responsibility of the Contractor to be aware of the risk of encountering UXO and to take all actions necessary to assure a safe work area to perform the requirements of this contract. If during construction, the contractor becomes aware of or encounters UXO or potential UXO, the contractor shall immediately stop work at the site of encounter, 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. 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.

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.

NOTE: For previous UXO/mine information, the following points of contact from the UN Mine Action Center of Afghanistan are provided:

Mohammad Sediq, Chief of Operations,
Email: sediq@unmaca.org
Cell: +93 070 295207

Hansie Heymans, Chief Information Officer,
Email: hansie@unmaca.org
Cell: +93 070 294286

1.4.1.2 Explosives Safety

1.4.1.2.1 General Safety Considerations

General safety considerations applicable to personnel, both essential and non-essential, at project sites where UXO may be encountered include:

- a. Do not carry fire or spark-producing devices.
- b. Do not conduct explosive or explosive-related operations without approved procedures and proper supervision and UXO safety support.
- c. Do not become careless by reason of familiarity with UXO or the reported probability level of UXO contamination.
- d. Do not conduct explosive or potentially explosive operations during inclement weather.
- e. Avoid contact with UXO except during UXO clearance operations.
- f. Conduct UXO-related operations during daylight hours only.
- g. Employ the "buddy system" at all times.

1.4.1.2.2 Activity Hazard Analysis (AHA) briefings

- a. Activity Hazard Analysis's shall be prepared in accordance with the Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1.
- b. Hazard analyses will be prepared and briefed by personnel that are knowledgeable in UXO and explosives safety standards and requirements. These personnel should understand the specific operational requirement and hazard analysis methodologies. A hazard analysis will be performed for each activity to determine the significance of any potential explosive-related hazards. Explosive residues may be discovered or exposed during UXO operations in the form of powder or various granular and powder based pellets. These contaminants can enter the body through the skin or by ingestion if proper personal hygiene practices are not followed. Explosive fillers such as white phosphorus are dangerously reactive in air and acute exposure can result in serious injury to the skin, eyes, and mucous membranes. They are also a fire hazard.

Safety requirements (or alternatives) that will either eliminate the identified hazards, mitigate or control them to reduce the associated risks to an acceptable level will be developed. The adequacy of the operational and support procedures that will be implemented to eliminate, control, or abate identified hazards or risks will then be evaluated and a second risk assessment completed to verify that a satisfactory safety level has been achieved.

1.4.1.2.3 Notification of Noncompliance

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 work site, 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. The Contractor shall make no part of the time lost due to such stop orders the subject of claim for extension of time or for excess costs or damages.

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. This list is not exhaustive and is not necessarily complete.

AABC - Associated Air Balance Council (National Standards for total System Balance)
ACI 318 Building Code Requirements for Structural Concrete (latest edition), American Concrete Institute
Air Force Manual 32-1071, Security Engineering, volumes 1-4, 1 May 1994
American Water Works Association, ANSI/AWWA C651-99 standard
ARI - Air Conditioning and Refrigeration Institute
ASCE 7-02, Minimum Design Loads for Buildings and Other Structures, 2002
ASHRAE - American Society of Heating, Refrigeration and Air-Conditioning Engineers
ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy
ASHRAE Standard 62.1-2004, Ventilation for Acceptable Indoor Air Quality
ASHRAE Standard 62.2-2004, Ventilation and Acceptable Indoor Air Quality for Low-Rise Residential
ASHRAE Standard 90.1-2001, Energy Standard for Buildings Except Low-Rise Residential Buildings
ASHRAE Standard 90.2-2004 with 2006 supplement, Energy-Efficient Design of Low-Rise Residential Buildings
ASME - American Society for Mechanical Engineering
ASTM - American Society for Testing and Materials
AWS - American Welding Society
DCID 6/9 Physical Security Standards for Sensitive Compartmented Information Facilities
DCID 1/21, Manual for Physical Security Standards For Sensitive Compartmented Information Facilities (SCIF).
EIA ANSI/TIA/EIA-607: (1994) Commercial Building Grounding/Bonding Requirement Standard.
Factory Mutual (FM) Approval Guide-Fire Protection (2002).
IBC - International Building Codes, 2003 (and its referenced codes including those inset below)
IFGC – International Fuel Gas Code
IMC – International Mechanical Code
IPC – International Plumbing Code
Lighting Handbook, IESNA, latest edition
MIL-HDBK-1190, Facility Planning and Design Guide
Codes and Standards of the National Fire Protection Association (NFPA)
[as applicable and enacted in 2002 or later, unless otherwise noted].
National Electrical Safety Code (NESC), Institute of Electrical and Electronic Engineers (IEEE C2), 2002 edition
NFPA 10, Portable Fire Extinguishers, 2007 edition
NFPA 54, National Fuel Gas Code, 2002
NFPA 58, Liquefied Petroleum Gas Code, 2004
NFPA 70, National Electrical Code, 2002 edition
NFPA 72, National Fire Alarm Code, 2007 edition
NFPA 75, Standard for the Protection of Information Technology Equipment
NFPA 90A, Air Conditioning and Ventilating Systems, 2002 edition
NFPA 101, Life Safety Code, 2006 edition
NFPA 110, Standard for Emergency and Standby Power Systems, 2005 edition
Plumbing and Drainage Institute (PDI-WH-201) water hammer arrestors
SMACNA - Sheet Metal and Air Conditioning Contractors' National Association, Standards and Guides, latest editions
International Mine Action Standards, latest edition; (see <http://www.mineactionstandards.org> for copy of standards)
TM 5-802-1 Economic Studies
UFC 1-200-01, Design: General Building Requirements, 20 June 2005
UFC 1-300-07A Design Build Technical Requirements
UFC 3-230-03a, Water Supply, 16 Jan 2004

UFC 3-230-04a, Water Distribution, 16 Jan 2004
UFC 3-230-06a, Subsurface Drainage, 16 Jan 2004
UFC 3-230-07a, Water Supply: Sources and General Considerations, 16 Jan 2004
UFC 3-230-08a, Water Supply: Water Treatment, 16 Jan 2004
UFC 3-230-09a, Water Supply: Water Storage, 16 Jan 2004
UFC 3-230-10a, Water Supply: Water Distribution, 16 Jan 2004
UFC 3-230-13a, Water Supply: Pumping Stations, 16 Jan 2004
UFC 3-230-17FA, Drainage in Areas Other than Airfields, 16 Jan 2004
UFC 3-240-03N, Operation and Maintenance: Wastewater Treatment System Augmenting Handbook, 16 Jan 2004
UFC 3-240-04a, Wastewater Collection, 16 Jan 2004
UFC 3-240-09A Domestic Wastewater Treatment 22 June 2007
UFC 3-250-01FA pavement Design for Roads, Streets, Walks and open Storage Areas
UFC 3-250-3 Standard Manual Practice for Flexible Pavements, May 01
UFC 3-260-01, Airfield and Heliport Planning and Design, 1 Nov 2001 with changes dated 19 May 2006
UFC 3-260-02, Pavement Design for Airfields, 30 June 2001
UFC 1-300-09N, Design Procedures, 25 May 2005
UFC 3-310-01, Structural Load Data, 25 May 2005
UFC 3-400-01, Design: Energy Conservation, 5 July 2002
UFC 3-400-02, Design: Engineering Weather Data, 28 Feb. 2003
UFC 3-410-01FA Heating, Ventilating and Air Conditioning, Change 1, 15 May 2003
UFC 3-410-02A, HVAC Control Systems. 15 May 2003
UFC 3-420-01, Design: Plumbing Systems, 25 Oct. 2004
UFC 3-420-02FA, Design: Compressed Air, 15 May 2003
UFC 3-430-01FA, Heating and Cooling Distribution Systems, 27 July 2003
UFC 3-430-05FA, Design: Gas Distribution, 15 May 2003
UFC 3-450-01, Design: Noise and Vibration Control, 15 May 2003
UFC 3-460-01, Design: Petroleum Fuel facilities, 16 Jan 2004
UFC 3-501-03N, Electrical Engineering Preliminary Considerations, 16 Jan 2004
UFC 3-520-01, Interior Electrical Systems, 10 June 2002
UFC 3-530-01AN, Design: Interior and Exterior Lighting and Controls, 19 Aug 2005
UFC 3-540-04N Design: Diesel Electric Generating Plants, 16 Jan 2004
UFC 3-550-03FA Design: Electrical Power Supply and Distribution Systems, 1 Mar 2005
UFC 3-600-01, Design: Fire Protection Engineering for Facilities, 26 Sept 2006
UFC 4-010-01, Design: Minimum DoD Antiterrorism Standards for Buildings, 22 Jan 2007
UFC 4-010-02, DoD Minimum Antiterrorism Standoff Distances for Buildings, 19 Jan 2007
UFC 4-020-01FA, Security Engineering: Project Development, 1 Mar 2005
UFC 4-020-02FA, Security Engineering: Concept Design, 1 Mar 2005
UFC 4-020-03FA, Security Engineering: Final Design, 1 Mar 2005
UFC 4-020-04FA, Electronic Security Systems: Security Engineering, 1 Mar 2005
UFC 4-021-01, Design and O&M: Mass Notification Systems, draft 1 May 2006
Underwriters' Laboratories (UL) Fire Protection Equipment Directory (2002)
UL Standards (as applicable)
UL 710, Exhaust Hood for Commercial Cooking Equipment, latest edition
UL 737, Fireplace Stoves, latest edition
UL 752, Bullet Resisting Equipment, 2000 or later
USCINCCENT OPORD 97-1

The publications to be taken into consideration shall be those of the most recent editions. 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.

2. SITE DEVELOPMENT:

2.1 GENERAL

The project includes furnishing all materials, equipment and labor for constructing water, sanitary sewer and storm sewer service lines, as applicable, and connecting to the existing sewer networks.

2.2 ENVIRONMENTAL PROTECTION

2.2.1 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.

2.2.2 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.

2.2.3 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.

2.2.4 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.

2.3 CIVIL SITE DEVELOPMENT

2.3.1 SITE PLAN

The contractor shall locate the facilities in general agreement with the drawings included and any requirements in the Scope of Work 01010. All buildings, roads, parking areas, entry control points, guard towers, wall, fence, utility structures, and other 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 site plans and master 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 42 S

2.3.2 DEMOLITION (NOT USED)

2.3.3 GRADING AND DRAINAGE

The contractor will provide all necessary site grading to insure adequate drainage so that no areas will be flooded due to a rainfall of a 10-year frequency. Drainage of the area should be compatible with the existing terrain. Building floor elevation shall be a minimum 150mm above grade and slope away from the building on all sides at a minimum of 5% for 3 meters.

2.3.4 PAVING

2.3.4.1 Roads

Paved roads design are required within the base camp area. All pre-existing conditions are undeveloped land with gentle slopes, without substantial vegetation and with natural drainage channels of moderate size and spacing that are dry most of the time. All roads shall be of hot mix flexible asphalt concrete wearing surface 7.3 meters (24 feet) wide, unless otherwise noted, graded for proper drainage, provided with necessary drainage structures and completed with prescribed surfaces in accordance with applicable sections of TM 5-822-2 and TM 5-822-5 standards. The compound (cantonment area) roads sections shall have 200 mm (8 inch) compacted base course minimum and shall be surfaced wearing course with a minimum 50 mm (2 inch) hot mix asphalt concrete, unless otherwise noted. 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. The Contractor shall construct gravel subbase roads, complete site grading and installation of all required drainage structures, to serve the Base Bid Contract.

2.3.4.2 Bridges and Site Grading Plan

Preliminary investigation indicates the contractor may need to construct bridges major drainage structures within the garrison compound. The Contractor shall notify the Contracting Officer immediately if initial site survey determines that area hydrology requires major drainage structures or bridges. The contractor shall design a site grading plan that provides positive drainage and minimizes the requirement for major structures in a cost effective manner.

2.3.4.3 Parking Areas and Motor Pools

Contractor shall construct parking and storage areas using aggregate surface. Subgrade shall be 150mm (6 inches) minimum in depth scarified and compacted to 95% proctor density. Aggregate base shall be 150mm (6 inches). Aggregate Base Course (ABC) material must be well graded, durable aggregate 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 presented in ASTM D 1557 or equivalent DIN, BS, or EN standards.

2.3.5 Entry Control Point

2.3.5.1 Exterior Compound Wall

Design and construct a Force Protection Perimeter Stone Wall perimeter Fence per Scope of Work Section 01010 and RFP. All foundations shall extend below the frost line to frost depth (min 800 mm), top of wall shall be 2500 mm from finish grade to high point of concrete cap, and align with top of chain link. Provide detail/elevation at fence indicating how fence will transition from level to slope and over ridges. The stone walls will need vertical reinforcing and horizontal reinforcing to resist wind and seismic loads. The vertical reinforcing must be adequately anchored or lapped into the wall footing. The footing must be sized to resist sliding and overturning from the design loads. Install outriggers and single-strand concertina wire on top of the wall. The walls shall measure at least 2500 mm high with a thickness of the walls not less than 600 mm.

2.3.5.2 Gates and Fence

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. Post sizes shall be as shown on drawings.

The gates shall be sliding type. Vehicle gates shall be a pair of 3.65 m wide x 2.4 m high leafs, constructed of a steel tube frame and steel tube intermediate posts and rails. Design and construct a Force Protection entry gates

heavy steel frame, with minimum 25 mm steel skin and matching man gate with view port. Gates shall swing from one meter square reinforced concrete columns covered with stone to match fence. Provide reinforced grade beam across gateway flush with pavement to lock gates with flush mounted vertical sliding bolts, bolts shall be 50 mm diameter solid steel. The design of the gates shall insure that it is dimensionally stable, square, true and planar. Provide a locking mechanism that holds the gates together when in the closed position as well as a drop bolt that engages a steel sleeve embedded in the pavement. Provide side gate door for individual access through the sliding gate with a peek hole.

2.3.5.3 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 inch) centers. The stainless steel core wire shall have a 2.5 mm (0.098 inch) 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.

2.3.5.4 Outriggers

Outrigger supporting arms shall be “Y” shaped with post securely embedded into the top of the wall. Posts shall conform to ASTM F 1083, Pipe, Steel, Hot Dipped Zinc Coated (Galvanized) Welded.

2.3.5.5 Vehicle Barriers

2.3.5.5.1 Active Barriers - Drop Arm Gates

The height of the beam shall be a minimum of 30 inches above finished grade. The crash beam must be capable of blocking a minimum road width of 4.0 meters. The crash beam shall be manually raised and lowered with less than 30 pounds of force. The end of the crash beam should include a locking pin with padlock acceptance for securing the beam when it is in the down position capable of stopping large (10,000 lb.) trucks, in addition to heavy duty steel gates into the Brigade.

Additional active barriers shall be tire shredder type with manual latch down capability. Shredders shall extend the entire width of the roadway opening where installed.

2.3.5.5.2 Passive Barriers

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.

2.3.6 CIVIL UTILITIES

2.3.6.1 General

The design of the water and sanitary systems shall be sized to provide flow and discharge based on a fixture unit basis. The design drawings shall show all utility lines, line sizes, valves, manholes, disinfection systems, and applicable details associated with water and sanitary system designs. Specifications covering water lines, valves, pumps, controls, sanitary sewers and storm sewers shall be submitted as part of the design and shall require standard materials that are available in-country. Contractor shall install and connect exterior sanitary sewer collection and water supply piping to service connection points of each facility requiring such.

2.3.6.2 Water

2.3.6.2.1 General Water

Infrastructure design (groundwater wells, booster pumps, storage tanks, transmission piping and distribution piping networking) and construction shall serve the demand based on full build out population of the ANA base camp. The Contractor shall install water distribution mains, branches, laterals, lines and service connections to include all pipe, valves, fittings and appurtenances. Exterior water line construction shall include service to all buildings as described in the Scope of Work Section 01010. The required Average Daily Demand (ADD) approximation is derived from 155 liters per capita per day (lpcd) equivalent to 41 gpcd. 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 any building or facility for which a water supply is provided for landscaping purposes.

2.3.6.2.2 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. Raw water quality criteria for Water Quality and Criteria Standards, and shall address the following: PH, turbidity, conductivity, oxidation reduction potential, total dissolved solids, color, odor, total coliform /fecal coliform (bacteria) an indicator of the presence of E. coli. These baseline parameters are a partial list as presented in TM5-813-3/AFM 88-10 APPENDIX A.

2.3.6.2.3 Well House

At new wells or springs, construct a permanent well house with concrete slab floor. The floor of the well house shall slope away from the casing approximately 3 mm per 300 mm (1/8" per foot). Top of the concrete slab (finish floor elevation) of well house shall be 300 mm or 12 inches above the expected high water mark or flood plain level and be about 30 meters from the edge of a stream or drainage channel bank. The well house design should be such that the well pump, motor and drop pipe could be removed readily. The well house shall protect valves and pumping equipment plus provide freeze protection for the pump discharge piping beyond the check valve. The well house shall be insulated and a heating unit installed. The well shall be protected from unauthorized use by a security fence with lockable gate. Provide outriggers, barbed wire and concertina wire on fence and gate.

2.3.6.2.4 Raw Water Disinfection

Contractor shall perform disinfection of the well water in accordance with AWWA A 100 or equivalent. 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.

2.3.6.2.5 Service Booster Pumps (Direct-Pressure System)

Contractor shall provide a booster pump station 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). For conditions of low demand and to prevent short cycling of primary pumps, provide a low demand jockey pump with capacity of one-third (1/3) of the Average Daily Demand (ADD). Each booster pump, two (2), shall be capable of delivering 2 times (2x) the ADD. Provide suitable expansion tank. 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.

2.3.6.2.6 Ground Water Storage Tank (GST)

Contractor shall provide a circular steel or circular concrete ground storage reservoir (GST) to be located on the ground surface. Volume of the GST shall be a minimum storage volume of a full days demand. The Contractor shall verify storage volume requirements based on final design population. The storage facility shall be located above drainage areas and locations subject to flooding as approved by the Contracting Officer. The storage facility 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.

2.3.6.2.7 Disinfection & Chlorination System

Use hypochlorite compounds for disinfection. A hypo-chlorinator shall be used to feed a sodium hypochlorite solution of 5-15% available chlorine into the system. Hypochlorite compound may be a liquid or solid form. The hypo chlorination system shall consist of a chemical solution tank for hypochlorite, diaphragm-type pump, power supply, water pump, pressure switch and storage tank (optional hydro-pneumatic/storage). The pump shall feed a hypochlorite solution in proportion to the water demand. The hypo-chlorinator 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. 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 0.2-0.4mg/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.

2.3.6.2.8 Chlorine Shelter

Contractor shall furnish a shelter as per chlorine manufacturer's installation requirements. The Contractor shall provide manufacturers catalog information and shop drawing to the Contracting Officer for approval.

2.3.6.3 Water Distribution System

2.3.6.3.1 General

The Contractor shall provide a water distribution system described as follows: Pipe diameters used in the network shall be 300mm (12 inch), 250mm (10 inch), 200mm (8 inch), 150mm (6 inch) and 100mm (4 inch), as calculated, using ductile iron (DI) conforming to AWWA C151, installed in accordance with C 600 or polyvinyl chloride (PVC) as per ASTM D 1784 and 1785. All pipes and joints shall be capable of at least 1.03 Mpa (150 psi) and 1.38 (200psi) hydrostatic test pressure unless otherwise specified. Pipes should be adequate to carry the maximum quantity of water at acceptable velocities 0.9 to 1.5m/sec (3 to 5 ft/sec) at maximum flows not to exceed 2.8m/sec (9.2ft/sec) with working pressures of 240kPa (35psi) to 350kPa (50psi). Minimum pressure shall be 140kPa (20psi) to all points of the distribution system and maximum pressure shall be 690kPa (100psi). If high pressures (greater than 690kPa) cannot be avoided, pressure-reducing valves shall be used. Water service connections to buildings shall vary from 19mm, 25mm or 38mm to 75mm, as calculated, depending on the usage requirement. 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. After choosing piping material type, use similar piping materials for all buildings for efficiency of future maintenance activities. The distribution network shall be laid out in a combination grid and looped pattern with dead ends not exceeding 30m (99 feet). Dead end sections shall not be less than 150mm (6 inch) 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 150mm (6 inch) in diameter. Water supply distribution shall connect to a building service at a point approximately 1.5m (5 feet) outside the building or structure to which the service is required. Adequate cover must be provided for frost protection. A minimum cover of 800mm (2'-8") is required to protect the water distribution system against freezing. Water lines less than 1.25 meters (4 feet) deep under road crossings shall have a reinforced concrete cover of at least 150 mm (6 inch) thickness around the pipe.

2.3.6.3.2 Pipe

The Contractor shall provide pipe of adequate strength, durability and be corrosion resistant with no adverse effect on water quality. The exterior surface of the pipe must be corrosion resistant. If the pipe is installed underground

pipe shall be encased with polyethylene in accordance with AWWA C105. Water distribution pipe material shall be PVC or Ductile Iron (DI). Ductile iron pipe shall conform to AWWA C104, etal. DI fittings shall be suitable for 1.03MPa (150psi) 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. Fittings and specials shall be cement mortar lined (standard thickness) in accordance with C104. 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, etal, Schedules 40, 80 and 120. PVC 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, All pipe and joints shall be capable of 1.03 Mpa (150psi) working pressure and 1.38 Mpa (200psi) hydrostatic test pressure.

2.3.6.3.3 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 the concrete thrust blocking, unless otherwise approved.

2.3.6.3.4 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 1.03 MPa (150 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.

2.3.6.3.5 Leakage Test

Reference AWWA C600 (DI) pipe or AWWA C605 (PVC) - Leakage test shall be conducted after the pressure tests have been satisfactorily completed. The duration of each leakage test shall be at least 2 hours and during the test the water line shall be subjected to not less than 1.03 MPa (150psi). 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 34.5kPa (5 psi) of the specified leakage test pressure after the pipe has been filled with water and the air expelled. Pipe installation will not be accepted if leakage exceeds the allowable leakage, which is determined by the following formula:

$L = 0.0001351ND (P \text{ raised to } 0.5 \text{ power})$ 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. Leakage and pressure testing shall not be conducted until thrust block curing is complete.

2.3.6.3.6 Bacteriological Disinfection

2.3.6.3.6.1 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 1.0 ppm. During the flushing period, each fire hydrant on the line shall be opened and closed several times.

2.3.6.3.6.2 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.

2.3.6.3.6.3 Acceptance Requirements

The disinfection shall be repeated until tests indicate the absence of pollution for at least 2 full days. The unit will not be accepted until satisfactory bacteriological results have been obtained.

2.3.6.3.7 Time for making Tests

Except for joint material setting or where concrete thrust blocks necessitate a 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.

2.3.6.3.8 Concurrent 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. a. Pressure test and leakage test may be conducted concurrently, b. 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.

2.3.6.3.9 Valves

Valves (Gate valves w/box) shall be placed at all pipe network tee 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 3600 mm (12 feet). Gate valves shall be in accordance with AWWA C 500 and/or C509. Butterfly valves (rubber seated) shall be in accordance with 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, 1 meter (3'-4") square, for all valve boxes.

2.3.6.3.10 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.

2.3.6.3.11 Blow-Off Valves

The Contractor shall provide 40-50mm (1-5/8" – 2") 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.

2.3.6.3.12 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. Thrust blocking shall follow AWWA C600 with concrete cured to exceed 17.25MPa (2,500psi) compressive strength.

2.3.6.13 Building Water Service Connections and Service Lines

Service connections and service line pipe will be installed in as direct a path as possible from the distribution main to the building served and will enter the building on the side closest to the distribution main. Service line connections will be installed below the frost depth. If the distribution main pipe diameter and wall thickness is adequate, smaller service lines may be connected to the main by direct drilling and tapping. Larger service connections (greater than 2 inch (50mm)) may necessitate the installation of tees or special branch connections. Service connections being made under pressure will use a tapping machine, tapping valve and sleeve. The Contractor shall install all base bid and future service connections on the main water supply pipe. Service connection points for future service shall be valved, plugged and terminated at the road ROW LINE or UTILITY EASEMENT LINE as applicable (within the contract (base bid) areas at a point closest to the future facilities). Contractor shall clearly identify all future service connection points. Future water service lines to future buildings will be installed by others. Service piping shall extend to a point (1.5m) from the building or facility, then connected to the building plumbing 1.5m point outside the building.

2.3.6.4 Sanitary Sewer

2.3.6.4.1 General

There are no functional or salvageable sanitary sewer collection, treatment or disposal facilities at this site. 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. If maps are not available, or do not provide satisfactory information or sufficient detail of the site, field surveys shall be performed. Sanitary sewers less than 1.25 meters (4 feet) under road crossings shall have reinforced concrete cover at least 150 mm (6 inch) thick around the pipe.

Exterior sanitary sewer system construction shall include service to all buildings as described in the Scope of Work Section 01010. Sanitary sewer collection, pumping, treatment and effluent disposal and sludge treatment facility, shall be designed to accommodate the full base "build-out" population, (current proposed plus future). 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. 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:

- 1) Follow slopes of natural topography,
- 2) avoid routing sewers through areas which require extensive restoration or underground demolition,
- 3) Avoid areas of high groundwater and placement of sewer below the groundwater table,
- 4) locate manholes at change in direction, size or slope of gravity sewers,
- 5) use straight sections between manholes, curved alignment shall not be permitted,
- 6) locate manholes at intersections of streets where possible,
- 7) avoid placing manholes where the tops will be submerged or subject to surface water inflow,
- 8) evaluate alternative sewer routes where applicable,
- 9) verify that final routing selected is the most cost effective alternative that meets service requirements.

In the event that facilities to be provided under the contract must be occupied prior to completion of permanent wastewater infrastructure, the Contractor will be responsible for providing temporary portable shower and bathroom facilities.

2.3.6.4.2 Protection of Water Supplies

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

2.3.6.4.3 Sanitary sewers shall be located no closer than 15m (50 feet) horizontally to water wells or reservoirs to be used for potable water supply.

2.3.6.4.4 Sanitary sewers shall be no closer than 3 m (10 feet) horizontally to potable water lines; where the bottom of the water pipe will be at least 300mm (12 inches) above the top of the sanitary sewer, horizontal spacing shall be a minimum of 1.8 m (6 feet).

2.3.6.4.5 Sanitary sewers crossing above potable water lines shall be constructed of suitable pressure pipe or fully encased in concrete for a distance of 2.7m (9 feet) 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 meter (3 feet) horizontally to the crossing, unless the joint is encased in concrete.

2.3.6.4.6 Quantity of Wastewater

The Contractor shall verify the average daily flow considering both resident (full occupancy) and non-resident (8hr per day) population. The average daily flow will represent the total waste volume generated over a 24-hour period, and shall be based on the total population of the facility and usage rate of 41 gallons per capita day (water usage). The wastewater flow rate shall be calculated as approximately 80% of water volume and usage rate as specified in Part 2.3.6.2.. Design criteria guideline shall be based on average influent wastewater characteristics as BOD of 200mg/l, SS of 200mg/l.

2.3.6.4.7 Gravity Sewer

Sanitary sewers shall be designed to flow at 90 to 95 percent full. Sanitary sewer velocities shall be designed to provide a minimum velocity of 0.6 meters per second (mps) or 2.0 feet per second (fps) at the ADD flow rate and a minimum velocity of 0.8 to 1.05 mps (2.5-3.5fps) at the peak diurnal flow rate. In no case shall the velocity drop below 0.3 mps, (1.0 fps) to prevent settlement of organic solids suspended in the wastewater. Pipe slopes shall be sufficient to provide the required minimum velocities and depths of cover on the pipe. 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 (2'-8") will be required to protect the sewer against freezing.

2.3.6.4.8 Manholes

The Contractor shall provide standard depth manholes (MH), (depth may vary) an inside dimension of 1.2 meters (4 feet). Manholes shall be made of cast-in-place reinforced concrete with reinforced concrete cover following AASHTO M199 or ASTM C478. Alternate precast manhole option shall taper to a 750 mm (30-inch) cast iron frame that provides a minimum clear opening of 600 mm (24 inches). In every case, the manholes, frames and covers shall be traffic rated, ASSHTO HS20-44 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.

2.3.6.4.8.1 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.

2.3.6.4.8.2 Spacing

The distance between manholes must not exceed 120 m (400 ft) in sewers of less than 460 mm (18 inches) in diameter. For sewers 460 mm (18 inches) and larger, and for outfalls from wastewater treatment facilities, a spacing of up to 180 m (600 ft) is allowed provided the velocity is sufficient to prevent the sedimentation of solids.

2.3.6.4.8.3 Pipe Connections

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

2.3.6.4.8.4 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 (15inch) or less in diameter. PVC shall be certified as meeting the requirements of ASTM D 1784, cell Class 12454 B. Unplasticized polyvinyl chloride (U-PVC) for water supply shall conform to BS, EN, 1452-2:2000. the minimum pipe pressure requirement is 150 psi or 10.0 bar. Non-pressure rated underground drainage and sewerage pipe shall meet BS EN 1401-1;1998.

2.3.6.4.8.5 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.

2.3.6.4.8.6 Joints

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

2.3.6.4.8.7 Branch Connections

Branch connections shall be made by use of regular fittings or solvent-cemented saddles as approved. Saddles for PVC pipe shall conform to Table 4 of ASTM D 3034.

2.3.6.4.8.8 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.

2.3.6.4.8.9 Steps for Manholes

Steps shall be cast iron, polyethylene coated, at least 15 mm (5/8 inch) thick, not less than 400mm (16 inches) in width, spaced 300 mm (12 inches) on center.

2.3.6.4.9 The minimum depth of the cover over the pipe crown shall be 0.8m (2'-8").

2.3.6.4.10 Building Sewer Service Connections and Service Lines

Service connections and service piping shall be installed in as direct a path as possible from the main sanitary or service lateral. Service connection standard fittings shall extend to the road ROW LINE or UTILITY EASEMENT LINE and the standard "wye" fitting or "MH w/ stub out" shall be plugged and clearly identified for the future service connection. The Contractor shall install all base bid and future connection fittings on the main collector line. Future service piping to future buildings will be installed by others. Sanitary sewer service piping shall extend to a point (1.5m) from the building then connected if the building plumbing at the 1.5m point outside the building. 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 31m from the building cleanout. Cleanouts shall be provided outside of the building. Service connection lines will be a minimum of 100 mm (4 inch) diameter and laid at a minimum 1% grade, but up to 2% as design parameters dictate. Service laterals shall be 150 mm (6 inch) and sloped to maintain the minimum velocity as described in paragraph "Gravity Sewer."

2.3.6.4.11 Cleanouts

Cleanouts must be installed on all sewer-building connections to provide a means for inserting cleaning rods into the underground pipe. Install manufactured wye fittings. Preferably the cleanout will be of the same diameter as the building sewer, and never be smaller than 100 mm (4 inch). Inspection chambers will not be permitted.

2.3.6.4.12 Field Quality Control

2.3.6.4.12.1 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, ASTM 969.

Low-pressure air tests: Perform tests as follows: 1) 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; 2) 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; 3) 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.

2.3.6.4.13 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.

2.3.6.4.14 Wastewater Treatment Plant Facilities

- a) Wastewater Treatment Using Package Plant Processes
- b) Alternative Wastewater Treatment Using Stabilization Pond(s) (facultative)

a) The Contractor shall provide a packaged treatment plant (pre-engineered) system to serve 4,000 personnel on a 24-hour basis. The Contractor will determine the best treatment technology whether it be conventional activated sludge, extended aeration, contact stabilization, complete mix or moving bed biofilm reactor process. The above mentioned processes are essentially modifications of the conventional activated sludge process. Nominal capacity shall be based on the water usage rate of 41 gpcd on the average daily flow rate of (adjusted to 80% of 164,000gpd) or 134,000gpd flowrate. The sewage treatment plant shall be capable of achieving a consistent water quality effluent equal to 30 mg/l Biological Oxygen Demand (BOD) and 30mg/l of Total Suspended Solids (TSS) with a pH discharge requirement of 6.5 -8.5.

b) As an alternative to the engineered package unit(s), the Contractor may elect to design an aerated stabilization pond (facultative type) to serve 4,000 personnel on a 24-hour basis. Basic general requirements for sewage aerated stabilization pond shall include the following:

The Contractor shall provide an aerated stabilization pond treatment system with a nominal capacity (adjusted to 80% of 164,000 gpd) or 131,200 gpd flowrate based on water usage rate of 41 gpcd operating 24 hours a day. The Contractor shall verify and adjust flow rate considering local customs and traditions. The Contractor shall coordinate the selection of the aerated stabilization pond design with the Contracting Officer through the submittal process. The aerated stabilization pond shall be capable of achieving a water quality effluent equal to 30mg/l Biochemical Oxygen Demand (BOD) and 30mg/l Total Suspended Solids (TSS) with a pH of 6.5 to 8.5.

The Contractor shall provide yard hydrants, hose and hose cabinet to facilitate the washing of the unit equipment or pond facility. The aerated stabilization pond shall be equipped with a means of draining the system for maintenance. The Contractor shall insure that engineering, construction and maintenance is handled by experienced engineers,

trained installers and qualified technicians, respectively. Individual equipment and every component shall be manufactured by manufacturers that have back-up spare parts in stock.

Dining Hall, Kitchen/mess facilities shall incorporate preliminary treatment with use of grease traps prior discharge into the sanitary sewer collection system. Grease traps will connect to the sanitary sewer collection system.

Upon completion of the packaged or aerated stabilization pond installation, whichever is most feasible, the Contractor shall check the system in the presence of the Manufacturer's Representative and Contracting Officer according to prescribed manufacturer's check procedures (O&M Manual). Upon clearance, the Contractor shall perform initial start up and initial operation, also in the presence of the MR and CO. The Contractor will operate the treatment facility for the contractual period performing all daily and weekly O&M tasks as recommended by the manufacturer's O&M Manual. The Contractor shall utilize the services of qualified operators, approved by the Contracting Officer, preferably trained Afghan Nationals, but imported specifically for that purpose, if necessary. During routine O&M, the Contractor shall perform all sampling and testing necessary to ensure proper daily operations and to optimize the system efficiency in achieving required effluent standards. During this performance period, the Contractor shall ensure that all prudent Log Records of daily O&M (repairs, inflow cycle, aeration cycles, effluent flow cycle and condition, etc.) are clearly, accurately and consistently recorded. The Contractor shall establish classroom training for USACE and Afghanistan National Army facility authorities and will establish long-term on-job-training (3 months) for a minimum of three local Nationals with the goal to turn over O&M to their capable services at the end of the Contractor's period of performance.

2.3.6.4.15 Sludge Handling and Disposal (Sludge Drying Beds)

The Contractor shall prepare an operation and maintenance plan for sludge disposal and removal. Drying of the sludge in beds may take at least 12 weeks in the winter and 6 weeks in the summer. The operation and maintenance plan shall be submitted for Contracting Officer's review and approval.

2.3.6.5 Effluent Pond

The Contractor shall construct an effluent holding pond to receive the treated effluent. The pond shall have an over flow device. The purpose of the effluent pond is to allow for pumping of treated water into irrigation trucks for site watering and road dust control or other possible use. Treated effluent shall be directed to a natural or manmade drainage way and must not be allowed to pond spread on the ground surface.

2.3.6.6 Wastewater Laboratory Space and Equipment

The Contractor shall provide a wastewater laboratory space and furnish certain pieces of basic laboratory equipment that are used to perform routine sampling and analyses. The laboratory must be set up to accommodate sufficient space for the keeping of record data and arrange data in an orderly manner. Equipment and devices shall be adequate to conduct grab samples and composite samples. Equipment to be provided shall be sufficient to sample and analyze dissolved gases (DO), coliforms, residual chlorine, temperature and pH. A desk, work bench and chair with proper lighting shall be provided for the operator to carry out his routine daily duties.

2.3.6.7 Storm Sewer Systems

Oil/water separators shall be utilized for all drains from industrial sites and garage maintenance facilities. Separators shall be installed as close as possible from the drain location. Storm sewer system shall not be mixed with sanitary sewer system and shall be in accordance with UFC 3-240-03, latest edition.

3. ARCHITECTURAL REQUIREMENTS

3.1 GENERAL

All material approved shall become standardized material to be used throughout the facilities under contract. 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 building 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. All building exterior walls shall be constructed with reinforced CMU, insulated concrete sandwich panels, reinforced concrete or approved equivalent, except for the guard towers and guard houses which shall be fully grouted CMU walls, with concrete ceiling and floors.

3.2 DESIGN CRITERIA

The Codes, Standards, and Regulations listed herein shall be used in the construction of this project. The publications shall be the [referenced [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

NFPA-101- National Fire Protection Association, Life Safety Code.

3.3 LIFE SAFETY/ FIRE PROTECTION/ HANDICAPPED ACCESSIBILITY

To the extent possible, all facilities will be designed in accordance with recognized industry standards for life safety and building egress. An adequate fire alarm system, fire extinguishers, and smoke alarms shall all be included as required. If a sprinkler system is required by building code, a waiver will have to be obtained before construction notice to proceed is issued. However, due to the lack of adequate water volume and pressure, sprinkler systems may not be feasible. The facility shall comply with all other safety requirements of NFPA 101. In keeping with the intended function of these facilities, handicapped accessibility will not be incorporated into this project. Due to the war contingency requirement, it is assumed that only able-bodied military and civilian personnel will use the facilities listed herein.

3.4 ANTITERRORISM/ FORCE PROTECTION

Force protection/anti-terrorism measures for this location shall be followed and incorporated into this project in accordance with the referenced DoD Regulations. Information regarding force protection may be found herein and at the following link: www.tisp.org/files/pdf/dodstandards.pdf

3.5 CONCRETE

Place 150 mm (6") of capillary water barrier below areas to receive a concrete slab on properly compacted soil free of organic material. Concrete flooring in wet areas shall slope to the floor drain and not allow for water to puddle. Concrete slabs in all areas shall not be placed prior to inspection and approval of piping and sub-surface by the Contracting Officer. Foundation trenches shall be level and free of loose material. Trenches shall be inspected and approved by the Contracting Officer prior to placing of any concrete foundations. See paragraph 5 for structural characteristics of concrete and reinforcing steel for foundations and slabs.

3.5.1 INSULATED CONCRETE SANDWICH WALL SYSTEM

As an option to standard masonry construction, the Contractor may construct walls of single story buildings using an insulated concrete sandwich wall system. The insulated concrete sandwich wall system shall be field fabricated and composed of a 76 mm (3 inch) expanded polystyrene core that spans in a single piece from floor elevation to top of wall elevation. The polystyrene core shall have a welded wire fabric, 50 mm x 50 mm (2 inch x 2 inch) mesh, 2.52mm (12.5 gauge) wire, attached to both faces of the polystyrene core. The welded wire mesh shall be installed at 13mm from the face of the polystyrene core. The welded wire mesh on each face shall be attached to each other and the polystyrene core with diagonal truss wires. Apply sprayed concrete (shotcrete) to a minimum thickness of 45mm (1-3/4 inch) or as structural calculations require, whichever is greater. Method of placing the shotcrete shall be in conformance with ACI 506R-85. Concrete finishing shall be done by appropriate hand tools (darby, trowel, etc.) to provide the desired finish effect.

3.6 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. Concrete masonry units (CMU) for exterior walls shall be either 190 mm or 290 mm wide x 390 mm x 190 mm high as shown on drawings. All cells shall be fully grouted in exterior walls. 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.

3.7 METAL

3.7.1 METAL WINDOW SILLS

Galvanized metal window sills, 1 mm (20 gauge), 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 windowsill 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 6mm to the exterior and not allow water to puddle.

3.7.2 STEEL COOK TOP – DFAC

Provide steel cook top in kitchen minimum thickness of 10 mm. Provide circular cut outs. Consult with the Contracting Officer for the diameter of circular cutouts. Provide steel infill plates for all cut out openings. Cook top can be made of several pieces for ease of handling. Adjacent plates shall be tight fitting to each other.

3.7.3 PASS-THROUGH COUNTER TOP - DFAC

Provide 1.6 mm (16 gauge) stainless steel, or 40 mm marble, pass through counter tops at openings between the kitchen and dining area. Edges shall be turned down 30 mm and corners shall be welded and ground smooth. Provide anchor angles welded to the bottom of the counters to anchor tops to masonry walls below. Provide six (6) anchors on the Dish Return Counter, three (3) on each side of the wall. Provide eight (8) anchors on the Serving Counter, four (4) on each side of the wall. Anchor angles to wall with masonry expansion sleeves and stainless steel screws. Counter tops are to be 600 mm wide x length of opening shown.

3.8 CARPENTRY

3.8.1 WOOD PURLINS

If Contractor chooses to utilize wood purlins, provide and install roof purlins of natural wood, locally available material 1 meter on center securely wedged between steel H structural joists. Tightly fit 30 mm boards over roof structure and nail into wood purlins. New roofing shall extend a minimum of 300 mm past the exterior surface of the wall.

3.8.2 Wood Fascia & Soffit

If Contractor chooses to utilize water proof wood fascia and soffit boards, provide and install 30 mm fascia and soffit boards. The water proof Wood boards shall be planed and smooth ready for paint finish. Soffit shall extend 300 mm out from exterior wall surface. Extend fascia board down past bottom of soffit a minimum of 6 mm for water drip. Extend roof decking out over fascia a minimum of 20 mm. Provide a 40 mm drip flashing over edge of roof decking so that it extends past bottom of decking on all sides of the building. Provide continuous soffit venting of all overhangs at both bottom and top of roof slope.

3.8.3 Wood Battens

If Contractor chooses to utilize wood ceiling batten strips, wood ceiling batten strips, 20 mm x 60 mm, shall be nailed to the bottom of the wood purlins. Battens shall be spaced at 400 mm on center (or per UBC requirements if sheetrock is substituted for plaster). This is for the support of a plaster ceiling.

3.9 ROOFING AND WEATHERPROOFING

3.9.1 SLOPED ROOFS

On sloping roofs provide and install .70 mm (24 gauge) galvanized steel in either corrugated or standing seam design. Metal roofing shall be anchored to the steel "Z" purlins or wood deck sub-surface using exposed fasteners at 300 mm on center at all seams and at 600 mm on center in the panel field. Fasteners shall be placed at the top of the corrugation taking care not to dent panel. Roof sealant or adhesive shall be placed over each anchor head. Roofing system shall include all edge, ridge and penetration flashings necessary for a watertight installation and as described in this section. Roofing shall be galvanized mil finish. Panels shall be overlapped two corrugations side to side and be continuous sheets from ridge to eave. Provide continuous ridge vents on all gable roofs.

3.9.2 LOW SLOPE ROOFS

Provide and install 3 ply built up roofing over concrete deck. Contractor may propose to the Contracting Officer an alternate roofing system with justification for consideration and alternate pricing. Concrete roof deck shall slope 21mm per m.

3.9.2.1 Built-up Roofing System shall not be permitted nor any type of flat roof system.

Insulation: 5cm (2 inch) thick extruded polystyrene rigid thermal insulation boards, conforming DIN, EN 13164 BS, EN 13164, $k=0.2$ @ 75 degrees F mean temperature, 2.82 kg/sq cm (40 lbs/sq in) compressive strength, hydrophobic, Type VI.

3.9.2.2 Insulation Installation

Comply with insulation manufacturer's instructions and recommendations for handling, installing, and bonding or anchoring insulation to substrate. Insulation boards shall be installed loose, without glue, in staggered manner. Attention should be paid not to leave separation along edges. Where overall insulation thickness is 50 mm (2 inches) or greater, install required thickness in two layers with joints of second layer offset from joints of first layer a minimum of 300 mm (12 inches) each direction. Trim surface of insulation where necessary at roof drains so completed surface is flush with drain ring. Polyester felt or geotextile shall be installed over insulation layers as a filter layer to prevent the passage of fines in gravel layer to lower strata.

3.9.2.3 Composition Flashing And Stripping

A. Install composition flashing at cant strips, at other sloping and vertical surfaces, at roof edges, and at penetrations through roof. Install composition flashing in accordance with membrane manufacturers specifications. Nail or provide other forms of mechanical anchorage of composition flashing to vertical surfaces as recommended by manufacturer of primary roofing materials.

B. Install composition stripping where metal flanges are set on roofing. Provide not less than two plies of woven glass-fiber fabric, each set in a continuous coating of roofing cement and extended onto the deck 100 mm to 150 mm (4 inches and 6 inches), respectively. Except where concealed by aggregate surfacing or elastic flashing, apply a heavy coating of roofing cement over composition stripping.

C. Roof Drains: Fill clamping ring base with a heavy coating of roofing cement. Set built up roofing membrane in to the clamping ring base and fix the drain top on it.

D. Allow for expansion of running metal flashing and edge trim that adjoins roofing. Do not seal or bond built-up roof membrane or composition flashing and stripping to metal flanges that are over 914 mm (3 feet) in length.

E. Counterflashings: Counterflashings, cap flashings, expansion joints and similar work to be coordinated with built-up roofing work, are specified in other sections of these specifications.

F. Roof Accessories: Miscellaneous sheet metal accessory items, including insulation vents and other devices and major items of roof accessories to be coordinated with built-up roofing work.

3.9.2.4 Gravel Layer – No gravel will be allowed on any roof systems.

3.9.3 FLASHING AND SHEET METAL

3.9.3.1 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.

3.9.3.2 Steel Sheet, Zinc-Coated (Galvanized)

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

3.9.3.3 Aluminum wall capping and expansion joint profiles.

Aluminum wall capping conforming to ASTM B 209 M, DIN 18339, BS or EN Standards.

3.9.3.4 General

Downspouts shall be designed and fabricated on site. Unless otherwise specified or indicated, exposed edges shall be folded back to form a 13 mm (1/2 inch) hem on the concealed side, and bottom edges of exposed vertical surfaces shall be angled to form drips. Bituminous cement shall not be placed in contact with roofing membranes other than built-up roofing.

3.9.3.5 Wall, Floor, Ceiling Expansion Joints Over Plaster

Expansion joints shall be provided as specified in ASTM, DIN 18339, BS or EN Standards.

3.9.3.6 Connections and Jointing

3.9.3.6.1 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.

3.9.3.6.2 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.

3.9.3.6.3 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.

3.9.3.7 Downspouts

Downspouts shall be installed as indicated. Downspouts shall be rigidly attached to the building. Supports for downspouts shall be spaced according to manufacturer's recommendations.

3.9.3.8 Flashing

Flashing shall be installed at locations indicated and as specified below. Sealing shall be according to the flashing manufacturer's recommendations. Flashings shall be installed at intersections of roof with vertical surfaces and at projections through roof, except that flashing for heating and plumbing, including piping, roof and floor drains, and for electrical conduit projections through roof or walls are specified in other sections. Except as otherwise indicated, counter flashings shall be provided over base flashings. Perforations in flashings made by masonry anchors shall be installed on top of joint reinforcement. Lashing shall be formed to direct water to the outside of the system.

3.9.3.8.1 Through-wall Flashing

Through-wall flashing includes sill, lintel, and spandrel flashing. The flashing shall be laid with a layer of mortar above and below the flashing so that the total thickness of the two layers of the mortar and flashing are the same thickness as the regular mortar joints. Flashing shall not extend further in to the masonry backup wall than the first mortar joint. Joints in flashing shall be lapped and sealed. Flashing shall be one piece for lintels and sills.

3.9.3.8.2 Lintel Flashing

Lintel flashing shall extend the full length of lintel. Flashing shall extend through the wall one masonry course above the lintels and shall be bent down over the vertical leg of the outer steel lintel angle not less than 50 mm, or shall be applied over top of masonry and pre-cast concrete lintels. Bed joints of lintels at joints shall be under laid with sheet metal bond breaker.

3.9.3.8.3 Sill Flashing

Sill flashing shall extend the full width of the sill and not less than 100 mm beyond ends of sill except at joint where the flashing shall be terminated at the end of the sill.

3.9.3.9 Wall Capping

Wall Capping shall be installed according to the manufacturer's recommendations.

3.9.4 SEALANTS

3.9.4.1 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.

3.9.4.2 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.

3.9.4.3 Floor Joint Sealant

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

3.9.4.4 Primers

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

3.9.4.5 Backstops

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

3.9.4.6 Cleaning Solvents

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

3.9.4.7 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 calk or sealant prior to applying new sealant. For surface types not listed below, the sealant manufacturer shall be contacted for specific recommendations.

3.9.4.8 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.

3.9.4.9 Primer

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.

3.9.4.10 Bond Breaker

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.

3.9.4.11 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 can not 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 the 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.

3.9.4.12 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.

3.9.4.13 Final Cleaning

Upon completion of sealant application, remove remaining smears and stains and leave the work in a clean and neat condition.

- a. Masonry and Other Porous Surfaces: Immediately scrape off fresh sealant that has been smeared on masonry and rub clean with a solvent as recommended by the sealant manufacturer. Allow excess sealant to cure for 24 hour then remove by wire brushing or sanding.
- b. Metal and Other Non-Porous Surfaces: Remove excess sealant with a solvent-moistened cloth.

3.10 WINDOWS, DOORS & GLAZING

3.10.1 WINDOWS

3.10.1.1 Materials

A. 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/mm² ultimate tensile strength and not less than 1.5 mm thick at any location for main frame and sash members.

B. 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.

1. Reinforcement: Where fasteners screw-anchor into aluminum less than 0.125 inch thick, reinforce the interior with aluminum or nonmagnetic stainless steel to receive screw threads or provide standard non-corrosive pressed-in splined grommet nuts.

2. 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.

C. 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.

D. Compression-Type Glazing Strips and Weatherstripping: Unless otherwise indicated, and at the manufacturer's option, provide compressible stripping for glazing and weatherstripping such as molded EPDM or neoprene gaskets.

E. 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.

F. Wire Fabric Insect Screen shall be permanently fixed to the exterior, except for guard towers.

3.10.1.2 Hardware

A. General: 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.

3.10.1.3 Fixed, Casement, Projected and Horizontal Sliding Windows

Provide window units meeting UL 752, level 5, but no less than 16 mm laminated single glazed. This standard shall apply to all window units within guard shack, guard house, guard tower, and guard rooms in Headquarters Building. Provide cam action sweep sash lock and keeper at meeting rails. All other glazing shall be minimum 5mm laminated single glazed.

3.10.1.4 Fabrication

Provide horizontally sliding aluminum windows with factory finish in all buildings to fit the masonry openings. Window openings shall be provided with insect screening permanently fixed to the exterior. Provide a locking device on the interior of each window. Provide anchors on each side of the frame into the adjoining masonry, 3 on each side. Provide weather stripping system for all exterior windows and doors.

3.10.1.5 Finishes

Apply baked enamel in compliance with paint manufacturer's specifications for cleaning, conversion coating, and painting.

1) Color: White meeting the requirements of DIN 50018

3.10.1.6 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.

3.10.1.7 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 weathertight 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.

3.10.1.8 Adjusting

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

3.10.1.9 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.

3.10.2 DOORS

All exterior doors shall be heavy duty metal doors with metal frames. Interior door shall be hollow metal doors with hollow metal frames.

All glazed doors shall have 6 mm laminated glazing in the upper half of the door. Heavy gauge metal exterior doors are required for security of unmanned buildings, such as water treatment building, power station, warehouses, and other buildings requiring higher security. Commercial duty lock sets and hardware shall be used on all doors. Provide (3) hinges 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. All glazing in or adjacent to doors shall be tempered per IBC. Provide weather stripping system for all exterior doors.

3.10.2.1 PVC Doors

PVC doors and PVC door frames are for interior wet room use only. PVC may be used for bathrooms, shower rooms, and toilets rooms.

3.10.2.2 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.

3.10.2.2.1 Accessories

3.10.2.2.2 Louvers

a. 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 0.9 mm thick steel and louver blades of a minimum 0.6 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.

b. 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.

3.10.2.2.3 Astragals

For pairs of exterior steel doors which will not have aluminum astragals or removable mullions, provide overlapping steel astragals with the doors. For interior pairs of fire rated and smoke control doors, provide stainless steel astragals complying with NFPA 80 for fire rated assemblies and NFPA 105 for smoke control assemblies.

3.10.2.2.4 Moldings

Provide moldings around glass of interior and exterior doors. Provide non-removable moldings on outside of exterior doors and on corridor side of interior doors. Other moldings may be stationary or removable. Secure inside moldings to stationary moldings, or provide snap-on moldings. Moldings shall interlock at intersections and shall be fitted and welded to stationary moldings.

3.10.2.2.5 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.

3.10.2.2.6 Welded Frames

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

3.10.2.2.7 Mullions and Transom Bars

Mullions and transom bars shall be closed or tubular construction and shall member with heads and jambs butt-welded thereto or knock-down for field assembly. Bottom of door mullions shall have adjustable floor anchors and spreader connections.

3.10.2.2.8 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 fasteners approximately 300 to 400 mm on centers. Miter molded shapes at corners. Butt or miter square or rectangular beads at corners.

3.10.2.2.9 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.

3.10.2.2.10 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.

- a. Masonry: Provide anchors of corrugated or perforated steel straps or 5 mm diameter steel wire, adjustable or T-shaped;
- b. Completed openings: Secure frames to previously placed concrete or masonry with expansion bolts

3.10.2.2.11 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.

3.10.2.2.12 Weather-stripping, Integral Gasket

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. Insert gasket in groove after frame is finish painted.

3.10.2.2.13 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.

3.10.2.2.14 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 galvanized steel without primer. Where coating is removed by welding, apply touchup of factory primer.

3.10.2.2.15 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 indicated. 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 calking compound.

3.10.2.2.16 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.

3.10.2.2.17 Installation

a. 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.

b. Doors

Hang doors in accordance with clearances specified in SDI A250.8. After erection and glazing, clean and adjust hardware.

c. Fire and Smoke Doors/Frames

Install fire doors and frames, including hardware, in accordance with NFPA 80.

3.10.2.2.18 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 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.

3.10.2.2.19 NO Wood Doors will be allowed

3.10.2.3 Overhead Coiling Doors

Doors shall be fabricated from interlocking cold-rolled slats, designed to withstand building wind loading and be installed with wind locks. Slats shall be continuous for the width of the door. For doors not exceeding 4.27 m, slats shall be flat-profile design, with a depth of not less than 15.9 mm, a center to center width not more than 69.9 mm, and not less than a 1.21 mm uncoated thickness. Provide weather stripping for door-head and door jamb guides, and a bottom astragal. Weather stripping and astragal shall be natural rubber or neoprene rubber. Curtain jamb guides shall be fabricated from a combination of steel angles of sufficient size to retain curtain against the specified wind. Guides shall be fabricated from structural quality steel angles. Door shall have manufacturer's standard five pin tumbler locks; keyed. Doors shall be counterbalanced by an adjustable, steel, helical torsion spring mounted around a steel shaft in a spring barrel and connected to the door curtain with the required barrel rings. Hoods shall be fabricated from steel sheets with a minimum yield strength of 227.5 MPa.

Counterbalance-barrel components shall be as follows:

- Spring barrels shall be hot-formed structural-quality carbon steel, welded or seamless pipe. Pipe shall be of sufficient diameter and wall thickness to limit deflection to a maximum of 1/360 of the span.
- Counterbalance springs shall be oil-tempered helical steel springs designed with a safety factor of 4. Springs shall be sized to counterbalance the weight of the curtain at any point of its travel, and shall be capable of being adjusted to counterbalance not less than 125% of the normal curtain load. Spring adjustment shall be arranged in such a way that the curtain need not be raised or lowered to secure the adjustment.
- Counterbalance shafts shall be case-hardened steel of the proper size to hold the fixed ends of the spring and carry the torsion load of the spring.

Barrel plugs shall be fabricated from cast steel machined to fit the ends of the barrel. Plugs shall secure the ends of the spring to the barrel and the shaft.

Barrel rings shall be fabricated from malleable iron of the proper involute shape to coil the curtain in a uniformly increasing diameter.

Shaft bearings shall be factory sealed ball bearings of the proper size for load and shaft diameters.

Door operators shall consist of an endless steel hand chain, chain-pocket wheel and guard, and a geared reduction unit of at least a 3:1 ratio. Required pull for operation shall not exceed 16 kg. Chain hoists shall have a self-locking mechanism allowing the curtain to be stopped at any point in its upward/downward travel and to remain in that position until moved to the fully open or closed position. Hand chains shall be cadmium-plated alloy steel with a yield point of at least three times the required hand-chain pull. Pretreated zinc-coated steel sheets shall be given the manufacturer's standard prime coat and an enamel finish coat applied to the exterior face after forming.

After installation, doors, track, and operating equipment will be examined and tested for general operation and weather against the specified wind pressure, and weather resistance. Doors that fail the required tests shall be adjusted and retested. Doors that have been adjusted and fail subsequent tests shall be removed and replaced with new doors at no additional cost.

Provide bollards at all overhead door corners to protect against vehicles damaging the door frames.

3.10.3 GLAZING

ASTM C 1036, or ASTM C 1172 or equal.

3.10.3.1 Tempered Glass

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.

3.10.3.2 Laminated Glass

Shall be 6-mm thick glass for all single pane exterior windows, skylights and glazed doors which consist of two nominal 3-mm annealed glass panes bonded together with a minimum of a 0.75-mm polyvinyl-butyl interlayer. For insulating glass units, use 6 mm laminated glass for the inner pane as a minimum per the Unified Facilities Criteria, DoD Minimum Antiterrorism Standards for Buildings.

ASTM C 1036, or ASTM C 1172 or equal.

3.10.3.3 Glazing Accessories

3.10.3.3.1 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.

3.10.3.3.2 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.

3.10.3.3.3 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.

3.10.3.3.4 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.

3.10.3.3.5 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.

3.10.3.3.6 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.

3.10.3.3.7 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.

3.10.3.3.8 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.

3.10.3.3.9 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.

3.10.3.4 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.

3.11 FINISHES

All finishes, colors and materials in existing building and new buildings shall match. See Section 01335 for color submittals required. Provide color boards with all materials for COR approval prior to ordering materials.

The exterior of all buildings shall be stucco. 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 1 cm thick. Allow 7 days to cure. The second coat shall be finish stucco, smooth finish, approximately 1 cm 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 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. Color to be selected by the Contracting Officer from the color board provided by the Contractor.

3.11.1 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 .06% lead by weight color to be selected by the Contracting Officer from the color board provided by the Contractor.

3.11.2 Ceilings of Barracks, and Headquarters, shall be plaster applied in 2 coats over wire mesh, which is to be stapled to the 20 mm x 60 mm wood battens. Paint ceiling with 2 coats of flat white, with less than .06% lead by weight. Gypsum board may be used in lieu of plaster but framing supports for Gypsum board shall be as follows: For ½" thick gypsum board structural fastener supports shall be not further apart than 400 mm. If gypsum board is thicker follow guidelines in ASTM C 840 for supports and fastener frequency.

Ceilings of Dining Facility shall be exposed concrete painted with 2 coats of flat white, with less than .06% lead by weight.

3.11.3 Paint all exposed wood fascia, soffit, and doors with 2 coats of gloss enamel, white.

3.11.4 Exposed exterior steel trim, frames, doors and pipe railings: 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.

3.11.5 Exposed wood trim, frames and doors: 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

3.11.6 Tile: 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.

3.11.6.1 Floors in wet areas shall be 300 mm x 300 mm terrazzo tile with thin set mortar. Joints shall be 2-3 mm. Waterproof gray grout shall be applied the full depth of the tile. Floors shall slope, minimum 1/50, to floor drains. Slope shall be obtained with sloping mortar bed of minimum 20 mm thickness. Provide continuous waterproofing membrane beneath sloping mortar bed, turn up wall 300 mm behind wall base. Membrane shall be fully sealed at joints and shall shed water into body of floor drain. Color of tile shall be selected by the Contracting Officer from samples provided by the Contractor.

3.11.6.2 Floors in administration areas, living quarters, corridors, and all rooms unless otherwise stated shall be 300 mm x 300 mm terrazzo tile with thin set mortar. Joints shall be 2-3 mm. Waterproof gray grout shall be applied the full depth of the tile. Color of tile shall be selected by the Contracting Officer from samples provided by the Contractor.

3.11.6.3 Walls in wet areas shall be tiled with 150 mm x 150 mm glazed ceramic tile up to 2 meters above the floor to include interior of toilet stalls, showers and behind sinks. Joints shall be 2-3 mm. Waterproof gray grout shall be applied full depth of the tile. Grout shall cure for 72 hours and then be sealed with a commercial grout sealant in two coats. Color of tile shall be selected by the Contracting Officer from samples provided by the Contractor.

3.11.6.4 The ablution drain areas shall be recessed below the floor level 200 mm and lined with ceramic tile. Ceramic tile shall extend up the wall past the water spigots to a height of 2 m above finished floor. Seats shall be formed concrete with terrazzo tile finish to match the floor, 300 mm x 300 mm x 300 mm high finished dimensions. Color of ceramic tile shall be selected by the Contracting Officer from samples provided by the Contractor. Spacing between tiles shall be similar to terrazzo tile.

3.11.6.5 All other floors are to be completely cleaned and sealed epoxy. Color to be selected by the Contracting Officer from samples provided by the Contractor.

Kitchen in Dining Facility shall be covered with terrazzo flooring. Walls in kitchen shall be ceramic tile up to 2 m above finished floor. Floor in Dining area shall be terrazzo tile.

3.12 SPECIALTIES

3.12.1 Mirrors

0.6 m x 0.9 m, 6 mm plate glass shall be mounted above all lavatories. Mount bottom of mirrors 1.1m above finished floor.

3.12.2 Toilet Paper Holders

Toilet paper holders, stainless steel, shall be installed approximately 200 mm above floor in Eastern Toilets 600 mm above floor.

3.12.3 Shower Curtain Rods & Shower Curtain

Shower curtain rods, stainless steel, heavy duty, 18 gauge shall be mounted between the screen walls of each shower stall. Mount rod at 2.0 m above finished floor. Provide a shower curtain with support rings for each shower stall.

3.12.4 Grab Bars

Stainless steel grab bars, heavy duty, 18 gauge, 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.

3.12.4 Paper Towel Dispensers

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

3.12.5 Light Duty Metal Shelf

Provide a 600 mm long, light duty stainless steel shelf and brackets over each lavatory.

3.12.6 Robe hooks on all toilet and shower stalls required.

3.13 COLD STORAGE ROOMS

3.13.1 Contractor shall provide the Contracting Officer shop drawings for approval of appropriately sized walk-in refrigerators and freezer to include proposed manufacturer, construction details, manufacturer's instructions, evacuation and charging procedures, operation and maintenance date, start-up and initial operational tests.

3.13.2 Walk-in coolers shall be panel type modular construction. Doors shall be swing type. Refrigeration equipment shall be remote located on the exterior of the building. Provide a temperature/ alarm system. Provide interior lighting with exterior switch. Floors of cool rooms shall be insulated panelized construction from the manufacturer of the cool rooms. The concrete floor will not be depressed.

3.13.3 Refrigeration piping shall be annealed or hard drawn seamless copper tubing in conformance with ASTM B280. Refrigeration systems shall be remote type.

3.13.4 Electrical characteristics shall match local power 400v/3ph/50Hz and 220v/1ph/50Hz.

3.13.5 Preservation and packing shall be commercial grade.

3.13.6 Provide a recording thermometer.

3.13.7 Provide temperature alarm with connector to remote temperature alarm.

3.13.8 Provide outdoor condensing unit cover and security fence or wall to protect outside units. Provide condensing unit outdoor controls for operation down to -18 degrees C ambient temperature.

3.13.9 Refrigeration Equipment

Refrigeration equipment shall be designed for remote installation. Design units for 16 to 18 hour operation at the indicated interior temperature in -18 degree C ambient temperature. Capacities, air delivery, and dimensions shall be as indicated. Remote condensing units shall be factory fabricated and rated in accordance with UL303 and ARI 365. Provide with motor, air cooled condenser, receiver, compressors, mounted on a common base. Compressors shall be hermetic type. Evaporators shall be factory fabricated and rated in accordance with UL 412 and ARI 420. Forced convection, unit cooler type, made to suspend from the ceiling panels, with forced air discharged parallel to the ceiling. Provide with air circulating motor, multi-fin tube type coil and grille assembled within a protective housing. Air circulation motors shall be lifetime sealed, and the entire unit-cooler assembly shall be accessible for cleaning. Provide a drip pan and drain connection. When the cold storage room is used for freezing, provide an automatic electric heat defrosting system. Provide a timer type defrost controllers.

3.13.9.1 Provide condensate drain lines and drains below freezer floors with electric heating cable, thermostatically controlled to maintain 10 degrees C at zero flow rate. Cable shall be sized in accordance with manufacturer's recommendations.

3.13.9.2 Submit a copy of installation instructions to the Contracting Officer covering both assembly and installation of the refrigeration equipment prior to start of work. Start up and initially operate the systems upon completion of the installation of the equipment and refrigerant piping. Adjust the safety and automatic controls to place them in operating sequence. Record manufacturer's recommended readings hourly. Operational test shall cover a period of not less than 24 hours. Upon completion of Operational test the systems shall be performance tested. Test duration shall not be less than 8 hours. Test shall include the following information to be in the report with conclusions regarding the adequacy of the systems:

Time, dates and duration of tests:

- Inside dry-bulb and wet-bulb temperatures maintained in each room during the tests employing recording instruments calibrated before the tests.
- Outside dry-bulb and wet-bulb temperatures obtained from recording instruments calibrated and checked hourly with a sling psychrometer.
- Evaporator and condenser entering and leaving temperatures taken hourly with the compressors in operation.
- The make, model, and capacity of each evaporator and condensing unit.
- Voltmeter and ammeter readings for condensing units and evaporators.

3.13.9.3 Provide chart showing the layout of the refrigeration systems, including piping, valves, wiring, and control mechanisms. Submit printed instructions covering the maintenance and operation of refrigeration equipment. Tag shutoff valves in accordance with the instructions. Provide any special tools necessary for repair and maintenance of the systems.

3.13.10 Remove any packing material. Wash and clean floors, walls, ceilings and equipment inside of cool rooms. Wash and clean exposed surfaces on outside.

3.13.11 Upon completion of the work and at a time designated by the Contracting Officer, provide instruction to designated personnel in the operation and maintenance of each refrigeration system. The period of instruction shall not be less than one 8-hour day.

3.14 STANDARDS

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

Concrete	210.0 kg./sq.cm (f'c) cylinder strength @ 28 days (ASTM-. C 31M)
Steel Reinforcement	4218.0 kg./sq.cm(Fy= 60.0 ksi),yield strength.
Welded Wire Fabric	ASTM A185
Anchor Bolts	ASTM A307 using A36 steel.
Concrete Masonry Units	ASTM C90, Type I (normal wt, moisture Cntrl).
Mortar	ASTM C270, Type S (Ultimate compressive strength of 130.0 kg/sq. cm.)
Proportion	1 part cement, 0-1/2 part lime and 4-1/2 parts aggregate
Grout	ASTM C476 (Slump between 200 mm to 250 and Compressive Strength
	14 MPa (2000 psi) at 28 days.
Joint Reinforcement	Standard 9 gage minimum, Ladder Type

Structural Steel ASTM A36: 2530.0 kg./sq.cm (Fy = 36,000psi)
Welding AWS (American Welding Society) D1.1-2002.

4. STRUCTURAL

4.1 GENERAL

The project consists of various structures. The new buildings shall be provided with a reinforced concrete slab foundation that is properly placed on suitable compacted ground area and shall be in accordance with the recommendations from the geotechnical investigation. The reinforced concrete foundation shall be designed by the Contractor. Building foundations shall be founded a minimum of 800 mm below grade. The following facilities shall be structurally designed by the contractor: Battalion HQ Building, BOQ Facilities (BOQ Facility Type A, BOQ Facility Type B), Barracks (Type A), Barracks (Type B), Shower /Toilet, Battalion Storage, Motor Pool, Communications Building, Bunkers and the Reception Building.

4.2 DESIGN

Design shall be performed and design documents signed by a registered professional architect and/or engineer. Calculations shall be in SI (metric) units of measurements. All components of the building 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. All building exterior walls shall be constructed with reinforced CMU, shotcrete 3-D panels, or reinforced concrete unless otherwise stated in sections 1010 or 1015. All required documents, including drawings, specifications, and design analysis, shall be prepared in accordance with Section 01335 Submittal Procedures for Design Build Projects. Specific submittal requirements in these sections supplement the requirements of Section 01335.

The design analysis shall include detailed calculations and any additional information required, and the information listed below, when applicable.

All structures and all parts 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.

4.3 DEAD AND LIVE LOADS

Dead loads consist of the weight of all materials of construction incorporated in the buildings. Live loads used for design shall be in accordance with the Structural Load Data, UFC-3-310-01, as referenced herein.

4.4 WIND LOADS

Wind loads shall be calculated using a "3-second gust" wind speed of 135 km/hr.

4.5 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 $S_1 = 0.51g$.

4.6 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, latest edition. A minimum cylinder 28 day compressive strength of 21 MPa (3000 psi) shall be used for design and construction of all concrete, except that 24 MPa (3500 psi) shall be used for Shotcrete applications. Reinforcing steel shall be deformed bars conforming to American Society for Testing and Materials (ASTM) publication ASTM a 615, Deformed and Plain Billet-Steel Bars for Concrete Reinforcement. Concrete at or below grade shall have maximum water-cement ration of 0.50. No concrete shall be placed when the ambient air temperature exceeds 32 degrees C (90 degrees F) unless

an appropriate chemical retardant is used. In all cases when concrete is placed at 32 degrees C (90 degrees F) or hotter it shall be covered and kept continuously wet for a minimum of 48 hours. Concrete members at or below grade shall have a minimum concrete cover over reinforcement of 75 mm (3 inch).

The cementations materials shall be Portland cement in combination with silica fume. Silica fume shall consist of not less than 7.0 percent of the cementations material by mass and not more than 9.0 percent. The silica fume shall conform to ASTM C1240-60a. The total cementations materials content shall be at least 390 kg/cubic meter. Admixtures shall consist of air entraining admixture and a high-range water reducing admixture (HRWRA). Concrete used for cradles and encasement shall have a compressive strength of 17 MPa (2500 psi) minimum at 28 days. The dosage of the HRWRA shall be determined during mixture proportioning study. Concrete shall use ASTM C150-05 Type V cement and shall have a water cement ratio less than or equal to 0.45 and a maximum water-soluble chloride ion content for corrosion protection of 0.15 percent by mass of the portland cement content of the concrete. Where aggregates are alkali reactive, as determined by Appendix XI of ASTM C1260-05a, cement containing less than 0.60 percent by mass alkalis (as Na₂O equivalent) shall be used. Concrete members at or below grade shall have a minimum concrete cover over reinforcement of 75 millimeters.

For additional requirements see Section 03100 STRUCTURAL CONCRETE FORMWORK, Section 03256 HYDROPHILIC RUBBER WATERSTOPS, Section 03300 CAST-IN-PLACE STRUCTURAL CONCRETE and Section 03200 CONCRETE REINFORCEMENT.

4.7 MASONRY

Masonry shall be designed and constructed in accordance with the provisions of Building Code Requirements for Masonry Structures, ACI 530/ASCE 5/TMS 402, latest editions. Mortar shall be Type S and conform to ASTM C 270, latest edition. Masonry shall not be used below grade, unless for fully grouted and reinforced foundation stem walls. All cells of exterior CMU walls shall be fully grouted and reinforced.

For additional requirements see Section 04200 MASONRY.

4.8 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, 9th Edition. 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.

For additional requirements see Section 01520 STRUCTURAL STEEL.

4.9 METAL DECK

Deck units shall conform to SDI Pub. No.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 inch) 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.

4.10 OPEN WEB STEEL JOIST

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.

4.11 FOUNDATIONS

Foundations shall be in accordance with the Geotechnical requirements of this RFP.

4.12 PRE-ENGINEERED METAL BUILDING SYSTEMS

Metal building systems shall comply with the requirements of the MBMA Low Rise Building Systems Manual-2002.

4.13 WOOD

Structural lumber shall comply with AITC OT-01. Grades and species of framing and board lumber shall comply with WWPA G-5. Wood framing shall be in accordance with AF&PA T10. Members shall be closely fitted, accurately set to required lines and levels, and rigidly secured in place. Floor platform framing lumber shall be treated in accordance with AWWA C2 with waterborne preservatives listed in AWWA P5 to a retention level of 6.4 kg per cubic meter (0.40 pcf). Plywood shall conform to PSI, underlayment grade with exterior glue, or B-C (plugged) exterior grade, 19 mm thick, 1200 mm wide, and be tongued and grooved. Any surface roughness at nail heads or joints shall be lightly sanded to blend with the undisturbed surface. For new floors receiving a vinyl finish flooring, a separate layer of fully-sanded underlayment shall be properly installed before the vinyl flooring is installed. Exterior grade treated plywood conforming to AWWA C9 should be used in exterior locations. Bolts, nuts, and other fasteners shall be appropriately sized and spaced for the job in accordance with referenced publications. Fasteners in contact with preservative treated wood, masonry or concrete shall be zinc-coated.

5. GEOTECHNICAL INVESTIGATION AND REPORT

5.1 General

Site specific geotechnical information necessary to design and construct the foundations, pavements, and other geotechnically related items contained in this project shall be the Contractor's responsibility. The Contractor shall determine all necessary geotechnical conditions by appropriate field and laboratory investigations and supporting calculations.

5.2 Definitions

For purposes of this specification, a major structure is defined as any structure that meets any of the following criteria: a) reinforced concrete framed structures with a building footprint in excess of 1,000 sq. m., b) steel framed structures with a building footprint in excess of 3,000 sq. m., c) a structure that has a height equal to or greater than one and a half stories, d) steel or concrete tanks in excess of 350 cubic meters. A minor structure is any structure that does not meet any of the four major structure criteria above.

5.3 Minimum Requirements

5.3.1 Structures. As a minimum for major structures, the Contractor shall advance three (3) borings within the building footprint of any major structure. For minor structures, depending on the foundation size, the Contractor shall advance one (1) to three (3) test pits within the building footprint, advancing one test pit for every 225 SM within the building footprint. The depths of these explorations shall be sufficient to determine the subsurface conditions within the influence of the structure's foundation system.

5.3.2 Pavements. As a minimum for airfield pavements, the Contractor shall excavate three (3) test pits for pavements less than or equal to 5,000 sq. m. and one (1) test pit for each additional 5,000 sq. m. of pavement or fraction thereof. As a minimum for all other pavements such as hard stands and parking lots, except roads, the Contractor shall excavate three (3) test pits for pavements less than or equal to 7,500 sq. m. and one (1) test pit for each additional 5,000 sq. m. of pavement or fraction thereof. As a minimum for roads, the Contractor shall excavate three (3) test pits for pavements less than or equal to 200 linear meters and one (1) test pit for each additional 200 linear meters or fraction thereof.

5.4 Geotechnical Report

The Contractor shall produce a detailed geotechnical report containing the field exploration and testing results, laboratory testing results, evaluations, recommendations, calculations and descriptive supporting text. Information in the report shall include, but not be limited to: existing geotechnical (e.g., surface and subsurface) conditions,

location of subsurface exploration logs, exploration point, foundations selected, bearing capacity, pavement design criteria (e.g., CBR values, K Values), ground water levels, and construction materials (e.g., concrete cement, asphalt and aggregates). Two copies of the detailed geotechnical report shall be submitted to the Contracting Officer.

5.5 Geotechnical Qualifications

All geotechnical engineering design parameters shall be developed by a geotechnical engineer or geotechnical firm responsible to the Contractor. The geotechnical engineer or geotechnical firm shall be qualified by: education in geotechnical engineering; professional registration; a minimum of ten (10) years of experience in geotechnical engineering design.

5.6 Design Certification

The Contractor shall certify in writing that the design of the project has been developed consistent with the site-specific geotechnical conditions. The certification shall be stamped by the geotechnical engineer or geotechnical firm and shall be submitted with the final design.

6. MECHANICAL

6.1 GENERAL

The work covered by this section consists of design, supply, fabrication and installation of new building ventilation and air-conditioning systems. It also includes the delivery to site, erection, setting to work, adjusting, testing, balancing and handing over in perfect operating and running condition all of the equipment including all necessary associated mechanical works.

6.2 SPECIALIST SUB-CONTRACTORS QUALIFICATIONS

The ventilation, and air-conditioning works shall be executed by an air-conditioning specialist sub-contractor experienced in the design and construction of ventilation and air conditioning equipment to include conventional compression systems, indirect and direct evaporative cooling systems and knowledge in fabricating specialized units consisting of supplemental direct expansion (DX) cooling coils in satisfying the specified indoor design conditions. The HVAC design shall be prepared using recognized HVAC load analysis programs such as Trane "Trace" or Carrier "HAP". The HVAC specialist shall submit the complete HVAC analysis at the 65% design submittal. The HVAC analysis shall clearly state what type of systems are to be used and how the system will satisfy the specified indoor design conditions. Provide related psychrometric charts showing the air wet bulb and dry bulb temperatures at each section of the heat/cool unit.

Provide complete, edited specifications using the UFGS specs for evaporative cooling. The edited specifications shall be submitted along with the 65% design submittal. The specifications shall be coordinated with the manufacturer of the evaporative cool/heat units.

6.3 CODES, STANDARDS AND REGULATIONS

The equipment, materials and works covered under the ventilation and air-conditioning services shall conform to the referenced standards, codes and regulations listed in Paragraph 1.8 except where otherwise mentioned under each particular clause.

6.4 DESIGN CONDITIONS

6.4.1 Outside Design Conditions. (Contractor shall verify the ambient conditions with available and reliable local weather data.)

Latitude – (approx.) 34 deg. North

Longitude – (approx.) 70 deg. East

Elevation – (approx.) 800 M (2620 ft.)

Summer – 40.5 deg C (105 deg F) Dry Bulb (DB) [& 19.4 deg C (67 deg F)] Wet Bulb (WB)]

Winter – (2.2 deg C/36 deg F)
Daily Range – data unknown]

6.4.2 INDOOR DESIGN CONDITION

SUMMER:

Barracks	Cooling maximum 27.8 C (82 F)
Administrative buildings	Cooling 25.6 C (78 F)
DFAC	Cooling 25.6 C (78 F)
Bathroom/Shower/Laundry	Cooling maximum 30 C (85F)
Maintenance facilities	Cooling maximum 30 C (85F)
Warehouses	Cooling maximum 30 C (85F)
Workshops	Cooling maximum 30 C (85F)

WINTER:

NOTE: See Spec 01010 Scope of Work and requirements hereinafter to verify if a facility is to be provided heating in this contract or the HVAC system shall be designed to allow for future addition of heat using diesel heat.

Barracks	20 C (68 F)
Administrative Buildings	20 C (68 F)
DFAC	20 C (68 F)
Toilet/Showers/Laundry	20 C (68 F)
Maintenance Facilities	12.7 C (55 F)
Warehouses	No Heating
Workshops	12.7 C (55 F)

6.4.3 NOISE LEVEL

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

6.4.4 INTERNAL LOADS

- a. Occupancy: Use ASHRAE standards to calculate sensible and latent heat from people
- b. Lighting (Fluor.): 21.5 W/m² (2 W/Ft²) maximum (however lighting levels shall meet minimum requirements)
- c. Outdoor Air: 34 CMH/Person (20 CFM) or “51 CMH/bedroom (30 CFM/bedroom)”; Latrine – 85 CMH/WC or Urinal (50 CFM) exhaust.
- d. Building Pressurization: 1.3 mm W.G. (0.05 in W.G.); Maintain negative pressure in latrine areas

6.4.5 THERMAL PERFORMANCE

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 3.52 (R 20)
ceilings/roof	RSI 5.28 (R 30)
basement wall	
floor (over unheated space)	RSI 5.28 (R 30)
exterior doors	RSI 0.25 (R 1.43)
exterior windows/ (glazing within doors)	RSI 0.308(R 1.75)
Skylights	RSI 0.18 (R 1.02)

6.4.6 SEISMIC REQUIREMENTS

All mechanical and plumbing equipment and piping shall be installed to meet the seismic requirements as defined by the International Building Code and seismic response coefficients as identified in Paragraph 4 Structural.

6.5 NEW AIR CONDITIONING EQUIPMENT

Air Conditioning Equipment:

Environmental control of the facilities shall be achieved by air conditioning equipment as listed below and approved by the U.S. Government. Unless otherwise noted, the Contractor may choose any combination of equipment to achieve the inside design conditions specified for the floor plans. As a general rule, buildings over 250 SM qualifies for evaporative cooling with diesel heat units. Provide space in the unit to retrofit the heating module if required in the future.

Facility Type	Cooling	Heating	Type of HVAC System	Remarks
Barracks	82 F	68 F	Evap Cool w/Diesel Heat	Heat Equip to be added in future
BOQ Type B	78 F	68 F	Evap Cool w/Diesel Heat	Heat Equip to be added in future
Battalion HQs	78 F	68 F	Evap Cool w/Diesel Heat	Heat Equipment to be added later; Command Centers and Commander's office shall be provided with split pack heat pump units
Comm. Facility	78 F	68 F	DX Type Air-conditioning	
Bathroom/Shower		82 F	68 F Evap Cool w/Diesel Heat	Heat Equip to be added later
Storage	85 F	55 F	Ventilation only	No Heating-
All DFAC's	78 F	68 F	Evap Cool w/Diesel Heat	Heat Equip to be added later
ETTC Barracks	78 F	68 F	Evap Cool w/Diesel Heat	Heat Equip to be added later
Interpreter Barracks		78 F	68 F Evap Cool w/Diesel Heat	Heat Equip to be added later
Power Plant				
Admin Area & Control Rm				
	78 F	68 F	Central DX type Unit	Engine Bay to be provided filtered air ventilation only
Guard Tower, Guard House, Reception Fac., BOQ Type A & MWR's	78 F	68 F		Split pack heat pumps

6.6 EVAPORATIVE COOLING/HEATING UNITS

This is a package unit, consisting of modules: indirect evaporative unit, direct evaporative unit, DX cooling coil, (with provision to allow future addition of heater fitted with diesel atomized burner; with a double-wall 500 liter fuel tank mounted underneath), intake hood, blower with dampers & filters, all mounted on a steel chassis. The supplemental DX cooling coil module shall be installed with the direct or indirect evaporative cooling module to maintain spaces requiring 78 F indoor conditions. Evaporative units without the supplemental DX cooling coils qualify for facilities such as bathroom/shower buildings, maintenance facilities and general spaces which do not require the stringent 78 F indoor conditions. The Evap Unit has supply and return insulated air ducts to connect to the building duct system. Evaporative cooling (swamp-cooler) cooling efficiency shall be 82% for direct type and 65% for indirect type and the heating efficiency shall be 80%. The Evap Unit shall be suitable for outdoor mounting on a concrete slab.

The Evap Unit shall be installed exterior to the building, with sheet-metal ducts of calculated size to evenly distribute the cooled air to all conditioned parts of the building. For small rooms, flexible metal branch ducts may be used from the central duct system. Flexible ducts must be limited to 3 meters in length. Exterior ducts shall be insulated; interior ducts generally will not be insulated. Duct air velocity shall be between 3.0 and 6.0 m/s. Minimum galvanized duct sheet-metal thickness shall be 0.85 mm (22g). Duct sheet-metal quality shall be according to SMACNA (Sheet Metal and Air Conditioning Contractors' National Association) manual for air conditions ducts. Supply and return ducts shall be provided for each room and space. If a direct evaporative unit can satisfy the specified indoor conditions, then all the air can be discharged through the building openings.

6.6.1 Submittals

The Contractor shall submit the following for the equipment to be provided under this section of the specification: manufacturer's data including performance characteristics at design conditions; manufacturer's certificate stating

that each unit will perform to the conditions stated, catalog cuts showing dimensions, performance data, electrical requirements, compliance with standards as stated in paragraph CODES, STANDARDS AND REGULATIONS; complete shop drawings indicating location and installation details.

The manufacturer shall also submit a 2 year warranty for each of the units.

Water for the evaporative coolers shall be taken from the nearest water main or building service line. Water supply for the evaporative coolers shall not tie into a small branch line such that it affects the water supply to the fixtures on that line. The Contractor shall field verify the water distribution system for the facility and recommend the most appropriate line to tie into.

6.6.2 Unitary (ductless split) Heat Pump Units

Ductless split units shall be unitary in design and factory manufactured ready for installation. Heat pump units shall provide cooling during summer and heating during winter. Evaporator unit shall consist of a DX evaporator cooling coil, blower, supplemental electric heater elements and washable filter all mounted in a housing finished for exposed installation. Cooling coil condensate piping shall route to and discharge to the sanitary sewer system. The condensing unit will contain compressor, condenser coil, and all internal controls/fittings complete to include a weatherized housing. Outdoor condensing unit shall be mounted on steel supports or on a concrete pad. Copper refrigerant suction and liquid piping shall be sized, insulated and installed in accordance to unit manufacture recommendations. Unit temperature control shall include wall mounted adjustable thermostat, blower on-off-auto switch and heating-cooling change over control.

6.6.3 Temperature control for cooling shall be by turning on/off the evaporative-cooler water-pump and/or starting/stopping the blower. Temperature controls shall be securely mounted to the building surface and protected from any abuse and damage.

6.6.4 Wall Penetrations

Building wall penetrations shall be carefully made so as not to deteriorate the structural integrity of the wall system. The Contractor shall consult with the building manufacturer, if possible, to determine the best way to penetrate the wall. If the building manufacturer is not available, a structural engineer shall be consulted. In either case, the recommendations of the engineer shall be strictly adhered to.

6.6.5 Control Wiring and Protection Devices

Control wiring and protection of the air conditioning units being offered must be the manufacturer's standard, pre-wired, installed in the unit at the factory or as recommended. Thermostats shall be located near the unit return. For units serving more than one area, the thermostat shall be located near the return of the space with the highest heat generation.

6.6.6 Air Filtration

All supply air shall be filtered using manufacturer's standard washable filters mounted inside the unit (for ductless split pack) and 30% ASHRAE efficiency throwaway pleated filters (for central air handling units). In addition, all outdoor air intakes, where required shall be equipped with 50 mm (2 inch) thick washable filters.

6.7 VENTILATION AND EXHAUST SYSTEMS

All fans shall be used for building ventilation and pressurization with capacities to be selected for minimum noise level generated. Unit mounted fans either used for supply or exhaust 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 exhaust fan shall be provided with motorized or gravity dampers which close automatically when the fan is not

running. Also, each fan shall be complete with vibration isolator, external lubricators, and all accessories and sound attenuators as necessary.

Supply intake openings shall be provided with motorized dampers which are interlocked with the exhaust fan. The dampers open or close when the exhaust fan is on or off respectively.

Maintenance shops and similar spaces that use solvents and oils shall be provided with mechanical exhaust air systems. Exhaust fans shall be centrifugal wall mounted type. Intake openings shall be provided with motorized dampers which are interlocked with the exhaust fans. Provide minimum of 16 ACH. The systems shall consist of centrifugal fan, ductwork, exhaust grills, and interlock controls. Comply with Industrial Ventilation UFC 3-410-04N.

Toilet and Wash Area: Minimum exhaust ventilation shall be the larger of 35 m³/h / m² floor or 85 m³/h / toilet (WC). At extreme cold in winter these values can be reduced for short periods to 10 m³/h / m² or 40 m³/h / toilet (WC) to conserve heat.

Kitchen Hood Exhaust and Make-up Air: As required and as per Kitchen design specialist and equipment supplier requirements. Provide minimum of 250 cfm per linear foot of hood length or 75 cfm per square area of hood per International Mechanical Code. The designer shall take special note that multiple large propane stoves will be installed in the kitchen. The steam generated by the local style of cooking with large pots is immense in comparison to western standards, and the additional need for ventilation must be accounted for in the design. Also, the cooks are accustomed to standing on top of the stoves in order to stir the large cauldrons of food. This common cooking practice should be taken into consideration when designing the exhaust hood. The height of the hood above the stovetop should be such that a man of average stature could stand upright without risk of hitting his head on the hood. Design per NFPA 92A, 96, 204, and 211. Make up air intake shall be integral with the hood system or be located as close to the exhaust intake to prevent cold drafts.

To reduce sand and dirt migration, outside air intakes shall be located as high as possible within architectural constraints. The intakes shall be sized so that free air velocities are below 2.5 m/s (500 fpm). For inhabited buildings locate all air intakes at least 1.5 (center-line of intake) meters above the ground. Each air intake shall be provided with a motorized damper which is interlocked with the exhaust fan.

6.7.1 Submittals

The Contractor shall submit the following for the 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 standards as stated in paragraph CODES, STANDARDS AND REGULATIONS; drawings indicating location and installation details.

6.8 TEST ON COMPLETION

6.8.1 After 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. Operational test shall be conducted once during the summer. Coordinate with the Contracting Officer on when the test shall be scheduled. Include tests for all interlocks, safety cutouts and other protective device to ensure correct functioning. All such tests shall be carried out and full records of the values obtained shall be prepared along with the final settings and submitted to the Contracting Officer in writing.

6.8.2 The following tests and readings shall be made by the Contractor in the presence of the Contracting Officer and all results shall be recorded and submitted in a tabulated form.

- a. Ambient DB and WB temperatures
- b. Room Inside Conditions:
 1. Inside room DB & WB temperatures
 2. Air flow supply, return and/or exhaust
 3. Plot all temperatures on psychrometric chart

c. Air Handling Equipment: Air quantities shall be obtained by anemometer readings and all necessary adjustments shall be made to obtain the specified quantities of air indicated at each inlet and outlet. Following readings shall be made:

1. Supply, return and outside air CMH (CFM) supplied by each air conditioning system.
2. Total CMH (CFM) exhausted by each exhaust fan
3. Motor speed, fan speed and input ampere reading for each fan
4. Supply, return and outside air temperature for each air-conditioning system.

d. Electric Motors:

For each motor: (1) Speed in RPM

(2) Amperes for each phase

(3) Power input in KW

6.9 ELECTRICAL REQUIREMENTS FOR HVAC EQUIPMENT

a. Note that electrical requirements for all equipment shall be designed and installed to operate on the secondary power standard required herein. The existing power distribution system may require modifications or upgrades to support the additional power required by the evaporative cooling unit with supplemental DX cooling coil. The Contractor is responsible to field verify all the conditions and provide complete shop drawings showing any incidental power upgrades. All electrical work shall comply with the National Electric Code.

b. All thermostats shall be wall mounted near the return grilles in the room with the highest heat load generation and mounted 1.5 meters (5 feet) above the floor. In lieu of a thermostat, a temperature sensor may be located in the same location or in the return duct and connected to a thermostat located near the unit return. Thermostat shall be mounted 1.5 meters (5 feet) above the finished floor and be easily accessible. Thermostats for the latrine facilities shall be located near the unit return and mounted 1.5 meters (5 feet) above the finished floor. Operation of the control system shall be at the manufacturer's standard voltage for the unit.

c. The following are the minimum requirements for motors regarding enclosure, insulation and protection:

1. Compressor Hermetic: Provide inherent (internal) overload protection.
2. Condenser: Provide internal thermal overload protection.
3. Evaporator (Open Class "A") fan motor type provides internal thermal overload protection.

6.10 CEILING FANS

6.10.1 Ceiling Fan

Provide 1320mm blade ceiling fans at one per 40 square meters of floor space. Fans shall have reversible motors. Center or distribute evenly in 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 approximately 2.44 meters above the finished floor. The fan shall be provided with out light kit. The finish shall be factory painted white. The controls shall be from either a single pole switch or from two 3 way switches to provide on/off operation. The electrical supply shall be 230volts, single phase, and 50 hertz. Install per manufacturers' instructions.

6.10.2 Submittals.

The Contractor shall submit the following for the 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 standards as stated in paragraph CODES, STANDARDS AND REGULATIONS; drawings indicating location and installation details.

6.11 PROPANE COOKING STOVE

Cooking area shall be provided canopy type exhaust only kitchen hoods and associated exhaust fans. These exhaust hoods shall include baffle type aluminum filters to trap grease/oil. The exhaust fan sizing calculations should

recognize the use of propane stoves in the kitchen. Sizing should accommodate all propane burning stoves running simultaneously. Additionally, the placement of the exhaust hood should allow enough clearance for an average sized male to stand on top of the stove platform unobstructed, for standing on the stove is common local cooking practice. The higher than average placement of the hood will require the extension of the lip of the hood out further than normal, in order to catch the majority of the smoke and adequately vent the area. Propane tank shall be located out the DFAC covered in the fenced storage yard

New propane stoves shall be installed with consideration to ease of cooking operation and daily cleanup. The new propane stoves shall be set into a formed concrete opening such that it can easily be removed for replacement, maintenance and cleaning.

Each propane stove shall be provided with three burners. The propane stoves shall be of commercial quality and be capable of producing the highest BTU heat output with all three burners on. The center burner is low heat, center and middle burner is medium heat and all three burners is high heat. A shut off valve for each burner shall be provided at the face of the propane appliance.

Piping from the propane tanks to the respective propane stoves shall be wrought iron, ASTM B36.10M or steel (black or galvanized), ASTM A53. The steel piping shall terminate in front of the propane stoves with a shut off valve and quick disconnect nipple. A stainless steel flexible hose shall connect from the propane stove to the steel piping. Each end of the flexible hose shall be provided with quick disconnect fittings.

The propane piping shall not be embedded in the concrete floor. Installation of the 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.

6.11.1 Propane Fuel Storage/Distribution. Propane Storage and Distribution shall be provided to support operation of the propane stoves for cooking and boiling tea. The bulk storage of fuels shall consist of above-ground horizontal steel tanks sized to store a 30-day supply of fuel. These tanks shall be complete with fill fittings, 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.. Bulk storage capacity shall be based on minimum four-week full load operation of the kitchen. Metal fuel tank saddles should not be placed directly on fuel containment area slabs. They should be elevated on piers to avoid moisture corrosion. Propane storage tanks shall be provided and installed in accordance with NFPA 58. The propane storage tanks shall be installed on a concrete pad, and provided within an enclosure to protect the tanks from the elements. The Contractor shall coordinate with the User and the Contracting officer in determining the capacity of propane fuel required. The propane fuel capacity shall be based on frequency of cooking, consumption of fuel every cooking cycle, frequency and availability of replacement fuel tanks and spare capacity. This project will require that the Contractor provide the agreed to amount of fuel tanks filled with propane fuel at time of completion.

Provide chain link fence and gates around entire propane storage facility. Fence shall match perimeter Force protection fence with lockable gates, and concertina wire etc. Provide fuel filling system for unloading fuel from fuel tanker into individual bulk storage tanks comprising of truck pad(s), duplex fuel transfer pumps, piping manifold and valves as required for a complete system.

6.12 WOOD COOKING STOVE

Provide a separate wood burning cooking stove kitchen annex building within the DFAC yard with commercial grade wood fired cooking stoves. The floor shall be terrazzo floor tiles and ceramic tile wainscots. Provide a trench drain that extends the length of the cooking line-up for cleaning purposes. The cooking stove tops shall be accessible by stairs for walking on top of the stoves and the stove tops wide enough for a person to walk on. The hood height shall not interfere with a person standing on the stove top. The ceiling of the annex shall not be less than 3 meters high to allow smoke and/or heat to be ventilated outside of the building. This can be accomplished with exhaust fans and clerestory window designs.

This annex shall be separated from the main kitchen by a covered walkway.

Provide a covered wood storage area next to the annex which shall be secured and surrounded with fencing as to prevent pilfering. Gates and locks shall be provided as part of the security.

Water service shall be provided for the cooking annex. Water piping shall be insulated to prevent piping from freezing. Freeze proof wall hydrants shall be considered.

Stove shall be constructed out of fire bricks and topped with 5mm thick cast iron countertop. Route the chimney runs inside the building envelope (inside the heated space) so air and flue gases stay at least as warm as the air in the building until they are expelled outside. The minimum flue thickness shall be no less than 1.5mm black steel. The Contractor shall protect chimney by means of metal rails or masonry wall from damage from large pots during cooking. The chimney shall penetrate the highest part of the building envelope so the chimney functions better. The chimney shall rise at least 60 cm (24 inches) above the roof ridge and its top is clear of obstacles to wind flow so it can produce stable draft and it has a chimney (rain) cap because without one, any chimney is vulnerable to adverse wind pressures. The chimney flue shall be insulated and be the correct size for the appliance so flue gases are kept warm and flow quickly through the system. The flue pipe, if used, shall run straight up from the appliance to the chimney and the chimney has no offsets because each change in direction presents resistance to flow. The appliance and venting system shall be reasonably well-sealed to prevent leaks that introduce cool air and make the system more vulnerable to adverse pressures. The system shall be installed in a building that has a balanced ventilation system. There shall be high exhaust fan in the stove exhaust hood. The Wood stove kitchen shall be well vented with louvers located high at walls on the building ends. The wood feeding doors shall be located on the outside of the building. Contractor must submit shop drawings for approval. See wood stove details Appendix A.

7. PLUMBING

7.1 SCOPE OF WORK.

7.1.1 General

The Contractor shall design and build domestic cold and hot water systems, waste, drain and vent systems, waste-oil collection and storage and fuel-oil storage and distribution systems required in the facilities identified in Section 1010 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, setting to work, adjusting, testing and balancing and handing over in full operating condition all of the plumbing equipment and associated plumbing works.

7.1.2 Sub-Contractors Qualifications

The plumbing systems shall be executed by a plumbing specialist sub-contractor experienced in the design and construction of these types of systems.

7.1.3 Standard Products

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.

7.1.4 SEISMIC REQUIREMENTS

All mechanical and plumbing equipment and piping shall be installed to meet the seismic requirements as defined by the International Building Code and seismic response coefficients as identified in Paragraph 4 Structural.

7.2 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 listed in paragraph 1.8 except where otherwise indicated under particular clause(s) and in accordance with design specifications set provided in this package. The publications to be taken into consideration shall be those of the most recent editions. Standards other than those mentioned herein 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.

7.3 PLUMBING SYSTEMS REQUIREMENTS

7.3.1 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. 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. 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.

7.3.2 Piping Materials

Domestic water shall be distributed by means of standard weight (schedule 40) galvanized steel pipe. Waste and vent piping can be made of either galvanized steel pipe (schedule 40), or Polyvinyl Vinyl Chloride (PVC) conforming to ASTM D 2665. Corrosion protection shall be provided if galvanized piping comes in contact with earth or masonry floors, walls or ceilings.

7.3.3 Plumbing Fixtures

The following typical plumbing fixtures shall be provided:

a. Eastern Water Closet with flush tank assembly. . Provide acid resisting fired porcelain enameled cast iron 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. Faucets shall be chrome plated brass single lever mixing type. Provide maintenance access to waste piping and P-traps from under the sink. Lavatories inside the prison cells shall be tamper-proof with integral spout, soap depression, and outlet connection to slip 40mm OD tubing.

Lavatories. Enameled cast iron, wall or counter mounted. Brass fittings provided for water supplies. (To be used in American or Afghan/American mixed facilities only.)

c. Janitor's Sink. 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.

d. Shower. Showerhead and faucet handles shall be copper alloy. Provide for manual mixing with hot and cold water valves. In addition to a shower head, provide each shower stall with a threaded faucet approximately 1.2 m AFF 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.

e. 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).

f. Service Sink . Standard trap type, enameled cast iron. Service sinks provided in maintenance areas shall be metallic, and in battery rooms acid resistant.

g. Kitchen Sink. Single Bowl corrosion resisting formed 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. See building floor plans for size and construction of trench and number of stations. Provide trench drain 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 . 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 21 MPa (3045 psi) minimum compressive strength in 28 days. Kitchen use only.

j. Floor Sink (P-13). Provide floor sink, circular or square, with 300mm overall width or diameter and 250 nominal overall depth. 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. Floor Trench : 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. 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 an 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. Drinking Water Fountain: Non-refrigerated with enamel cast iron or corrosion resistant bowl with brass fittings and faucets.

o. 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.

p. Large Pot sink, provide clean-up spray nozzle with hose assembly.

7.3.4 Hot Water

Hot water shall be provided for the facility to supply 49°C (120°F) hot water to fixtures and outlets requiring hot water. Hot water of a higher temperature shall be provided only where required for special use or process. Hot water piping shall be routed parallel to the building lines and concealed within finished rooms. All hot water piping shall be insulated. A hot water re-circulating pump shall be provided if hot water piping run exceeds 30m.

7.3.5 Hot Water Heaters

The hot water shall be generated by electric water heaters. The unit shall be typically located inside a mechanical room, storage room, toilet/janitor room or similar type space. The unit shall be of the commercially available tank type having low or medium watt density electric heating elements. Gas (natural or liquid propane) powered hot water generators shall be provided to satisfy large hot water requirements when economically justifiable and practical. In cases where the pressure of the water coming into the tank will violate manufacturer recommendations, a pressure reducer shall be installed in the line before the water heater. Also, all water heaters shall be equipped with a blow-off valve that will empty into a nearby floor drain or to the exterior of the building.

7.4 WASTE, DRAIN AND VENT SYSTEM

Floor drains shall be provided in each room that contains a water source. Floor drains shall be provided in the mechanical equipment and toilet rooms as required. Floor drains shall be provided next to the electric water heaters. In mechanical rooms, floor drains shall be provided to avoid running drain piping long distances above or over the floor. A trench drain shall be provided for the DFAC Kitchen. All waste and vent piping shall be provided in accordance with the latest edition of IPC. Drain outlet shall use p-trap system to trap sewer gases. P-trap drain should be a one-piece system without removable parts.

Every trap and trapped fixture shall be vented in accordance with the IPC.

7.5 SPECIAL PLUMBING SYSTEMS. Contractor shall design and construct compressor air storage and distribution, waste-oil collection and storage, fuel-oil storage and distribution other plumbing systems that are required for full performance of equipment and operations and for maintenance in the Power Plant and Vehicle Maintenance facilities. These systems shall be designed and built in accordance with codes and publications referenced herein before and in compliance with equipment manufacturer recommendations.

7.5.1 Compressed Air Systems. Compressed air shall be provided using a packaged air-cooled electric motor driven compressor and ASME rated receiver with air cooler and moisture separator to remove moisture and oil. Compressed air system shall be capable of operation up to 200 psig maximum for 125 psig normal units. High-pressure system (above 200 psig) shall be provided to supply compressed air to equipment where required. Provide an engine driven air compressor where needed for operation during electrical power outages. The air distribution system shall be provided with necessary regulator valves to maintain desired pressure. Where required, line filters, lubricators, and/or hose reels shall be provided. Compressed air piping shall be black steel pipe and painted to match wall color. Noise level of air compressor should not exceed acceptable db limits.

7.5.2 Waste or hazardous drainage from battery repair/charging areas shall be treated prior to entering the base general waste drainage system. Hazardous waste drainage piping shall be acid resistant. Smaller battery rooms shall have waste treatment available using an acid neutralizing tank. Waste oil storage tanks shall be provided for collection of waste oil in the power plant and vehicle maintenance facilities. Waste oil storage tank shall be underground double-wall fiberglass or double-wall steel. Provisions should be made in the design of the underground storage tank that enable manual detection of leaks, prevent overfilling, facilitate liquid level detection, and allow for vapor release.

7.5.3 Drainage from maintenance areas, fueling areas, POL areas, etc., shall be treated prior to entering the base general waste drainage system. Treatment shall consist of sand and oil separators as required by facility function. Buried oil storage tanks shall be provided where required.

7.5.4 Generator Fuel Storage/Distribution. Fuel Oil Storage and Distribution shall be provided to support operation of diesel engine generators at the Power Plant, emergency generators and other locations. The bulk storage of fuels shall consist of above-ground horizontal steel tanks sized to store a 30-day supply of fuel, with containment dikes. These 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. Fuel shall be transferred from the bulk storage tanks by duplex transfer pumps into individual day tanks. Fuel piping shall be fiberglass for underground and steel for piping located above grade. Bulk storage

capacity shall be based on minimum 30-day full load operation of the plant. Metal fuel tank saddles should not be placed directly on fuel containment area slabs. They should be elevated on piers to avoid moisture corrosion. Fuel containment area should have a sump or manually controlled water release valves for water removal.

7.5.4.1 Provide fuel filling system for unloading fuel from fuel tanker into individual bulk storage tanks comprising of truck pad(s), duplex fuel transfer pumps, piping manifold and valves. The system shall provide remote fuel level monitoring panels at the pad(s).

7.5.5 Vehicle Fuel Point

Vehicle Fuel Point (Storage/Dispensing). Fuel storage and distribution shall be provided to support the vehicles. The fuels shall be stored in one or more above-ground horizontal steel tank as per capacity scheduled given below.

40,000 liters of Diesel and 10,000 liters of MOGAS

The Contractor shall install a vehicle re-fueling point, capable of storing 40,000 liters of diesel and 10,000 liters of MOGAS. The fuel point shall consist of one 25,000 liters tank of diesel and another dual compartment 25,000 liters tank, of which, 15,000 liters would be used for diesel and 10,000 liters would be used for MOGAS. The re-fueling point shall include fuel dispensers, and a concrete pad.

The fuel storage tanks shall be pre-engineered and fully assembled code compliant package system. The packaged fuel storage tanks shall be mounted on a concrete pad. Standard tank features shall be dual wall fire rated tanks, internal tank lining, electronic dispensers, submersible pump, low mount fill with containment, mechanical gauge, leak monitor, overfill prevention valve, emergency venting, grounding, fire extinguisher, electrical control system with "E-stop" and Flameshield & Fireguard options.

The dispensing unit shall be dual twin type and provided with a self-contained electric motor and pumping unit located in the storage tank. Provide a meter for each dispenser. Equip fuel dispensers with an in-line filtration system capable of sediment removal to 10 mg/L or less. Dispenser and nozzle shall be securable by means of standard padlock. Card and key lock access is not required. Surround fueling islands with a concrete slab graded at a minimum of 1 percent slope away from island and fuel storage tanks. Provide bollards completely around each fuel dispenser and tanks from damage by vehicles and trucks.

Following the tank tightness test, each storage tank shall be leak tested in accordance with the manufacturer's written test procedure if the manufacturer's test procedure is different from the tightness tests already performed. Each storage tank shall be completely filled with the proper fuel at the time of turnover to the Government.

7.6 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.

8. FIRE PROTECTION

8.1 GENERAL

Facility construction and fire protection systems shall be installed in accordance with the publications listed herein and the publications referenced therein. Where a conflict occurs among various criteria, the more stringent requirement shall take precedence.

8.2 BUILDING CONSTRUCTION

Building construction shall conform to fire resistance requirements, allowable floor area, building height limitations and building separation distance requirements of the building code.

8.3 LIFE SAFETY

Facilities features will be provided in accordance with NFPA 101, among other references, to assure protection of occupants from fire or similar emergencies.

8.4 FIRE PROTECTION EQUIPMENT

All fire protection equipment shall be listed by Underwriters' Laboratories (UL) or approved by Factory Mutual (FM) or equivalent and shall be listed in the current UL Fire Protection Equipment Directory or Factory Mutual Approval Guide or equivalent.

8.5 FIRE ALARM AND DETECTION (NOT USED)

Smoke detection – see electrical section for more fire alarm and detection details. Smoke detectors are required for each building. Smoke detectors shall have back up battery power and be installed according to all applicable fire protection codes. Fire alarm evacuation systems shall be provided as required by NFPA 101 and UFC 3-600-01 and listed herein.

8.6 WATER SUPPLY FOR FIRE PROTECTION

A dedicated fire protection water supply is unavailable. Therefore, alternate methods of design and construction are being instituted.

8.7 PORTABLE FIRE EXTINGUISHERS

Portable fire extinguishers shall be provided inside all facilities and at exterior locations as required in accordance with NFPA 10. 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).

9. ELECTRICAL

9.1 SCOPE OF WORK

9.1.1 General. Design a complete Prime Power Plant and power distribution system for the entire Master Plan. Construct a Prime Power Plant and power distribution system to provide electrical service to all facilities being constructing as part of this contract, future phases and options shown on the installation master plan. Contractor shall design and construct Exterior manhole ductbank Primary and Secondary Power Distribution System, to include pad mounted transformer sub-stations and all building/facility service entrance cables from transformer sub-stations. The Contractor shall design and construct any other required systems described in section 01015 not provided as part of the design drawings and specifications to ensure a complete and usable facilities, to include electrical systems required for scope of work described under the Civil section of 01015. The contractor shall construct in accordance with the contract design drawings, specifications, and section 01015: (a) Interior Secondary Distribution System (b) Lighting and power branch circuitry, (c) Premise telephone and network/data wiring and (d) Interior Fire Detection and Alarm System. The site power distribution system shall be designed for the ultimate demand loads plus 25% spare capacity.

9.1.2 Temporary Electrical Service: Contractor shall be responsible for providing necessary temporary electrical service to all facilities which may be built / occupied prior to the completion of the Power Plant. Temporary service to each facility shall meet all required electrical demands of that facility plus 25% for spare capacity and shall be

operational until such time the Base Power Plant and the exterior power distribution system is in place and becomes operational.

9.1.3 All equipment shall be tested, commissioned, and operational at time of turn-over to the government. Contractor shall provide all necessary operating instructions, commissioning reports, spare parts, and related items at time of turn-over.

9.2 DESIGN AND CONSTRUCTION CRITERIA

9.2.1 Applicable Standards

ANSI/IEEE C57.12.22-1993 (R1998) - American National Standard for Transformers— Pad-Mounted, Compartmental-Type, Self- Cooled Three-Phase Distribution Transformers With High-Voltage Bushings, 2500 kVA and Smaller: High Voltage, 34 500 Grd Y/19 920 Volts and Below; Low Voltage, 480 Volts and Below

ANSI/IEEE Std 81-1983

ANSI/NETA ETT-2000

ANSI/NETA MTS 7.2.2-2001

ANSI/TIA/EIA-568 Commercial Building Telecommunications Cabling Standard

ANSI/TIA/EIA-569 Commercial Building Standard for Telecommunication Pathways and Spaces

ANSI/TIA/EIA-942 Telecommunications Infrastructure Standard for Data Centers

EIA ANSI/TIA/EIA-607: (1994) Commercial Building Grounding/Bonding Requirement Standard.

EIA ANSI/TIA/EIA-607: (1994) Commercial Building Grounding/Bonding Requirement Standard.

EIA ANSI/TIA/EIA-607 Commercial Building Grounding/Bonding Requirement Standard.

ETL 1110-3-412 Transformer Application Guide

ETL 1110-3-502, Telephone and Network Distribution System Design and Implementation Guide.

Factory Mutual (FM) Approval Guide-Fire Protection (2002).

IBC - International Building Code

IMC – International Mechanical Code

IPC – International Plumbing Code

IEEE C2 National Electrical Safety Code (NESC)

IEEE C57.12.28 - IEEE Standard for Pad-Mounted Equipment—Enclosure Integrity

IEEE C57.12.34-2004 - Errata to IEEE Standard Requirements for Pad-Mounted, Compartmental-Type, Self-Cooled, Three-phase Distribution Transformers (2500 kVA and Smaller)- High-Voltage: 34 500 GrdY/19 920 Volts and Below; Low Voltage: 480 Volts and Below

IEEE C57.12.80-2002 - IEEE Standard Terminology for Power and Distribution Transformers

IEEE 48 IEEE Standard Test Procedures and Requirements for Alternating- Current Cable Terminations 2.5 kV Through 765 Kv

IEEE Std 62™-1995 (R2005)

IEEE Std 81-1983

IEEE Std 81.2-1991

IEEE standard 400-1991

IEEE standard 519-1992

IEEE standard 602-1996 , Recommended Practices for Electric Systems in Health Care Facilities

IEEE standard 1100, Powering and Grounding Electronic Equipment (aka Emerald Book)

IESNA Lighting Handbook

International Electrical Testing Association Inc. (NETA) Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems

MIL-HDBK-1003/11 Diesel-Electric Generating Plants

MIL-HDBK-1004/21 Power Distribution Systems

MIL-HDBK-1012/3

NFPA 70, National Electrical Code

NFPA 72, National Fire Alarm Code, 2007 edition

NFPA 99, Health Care Facilities

NFPA 101, Life Safety Code, 2006 edition

NFPA 110, Emergency and Stand-by Power Systems, 2005

NFPA 780, Lightning Protection

TI 800-01 Design Criteria

TM 5-684 Facilities Engineering - Electrical Exterior Facilities

TM 5-688 Foreign Voltages and Frequencies Guide

TM 5-803-14 Site Planning and Design

TM 5-811-1 Design: Electrical Power Supply and Distribution

TM 5-811-3 Electrical Design: Lightning and Static Electricity Protection

UFC 1-200-01, Design: General Building Requirements, 31 July 2002

UFC 1-300-09N, Design Procedures, 25 May 2005

UFC 3-501-03N Electrical Engineering Preliminary Considerations

UFC 3-520-01 Interior Electrical Systems, 10 June 2002

UFC 3-530-01AN Design: Interior and Exterior Lighting and Controls 19 Aug 2005

UFC 3-540-04N Design: Diesel Electric Generating Plants 16 Jan 2004

UFC 3-550-03FA Electrical Power Supply and Distribution

UFC 3-550-03N Power Distribution Systems

UFC 3-560-10N, O&M: Safety of Electrical Transmission and Distribution Systems

UFC 3-600-01: Fire Protection Engineering for Facilities

UFC 4-010-01, Design: Minimum DoD Antiterrorism Standards for Buildings, 8 Oct 2003

UFC 4-010-02, DoD Minimum Antiterrorism Standoff Distances for Buildings, 8 Oct 2003

UFC 4-510-01, Design Medical Military Facilities

Underwriters' Laboratories (UL) Fire Protection Equipment Directory (2002).

USCINCCENT OPORD 97-1

UL 467 Grounding and Bonding Equipment

MIL-HDBK-1004/21 Power Distribution Systems

9.2.2 Design shall be in metric units.

9.3 MATERIAL

9.3.1 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, or DIN listed material, but the contractor must prove equivalence and must provide the government with a full copy of the relevant specification(s). Material and equipment installed under this contract shall be for the appropriate application and installed in accordance with manufacturers recommendations.

Equipment enclosure types shall be in compliance with the National Electrical Manufacturer's Association (NEMA) or the International Electro-Technical Committee (IEC) standards.

Material and equipment installed under this contract shall be for the appropriate application. Materials and equipment shall be installed in accordance with recommendations of the manufacturer. 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.

9.3.2 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.

9.3.3 Design Conditions: All equipment shall be rated and designed for 50 Degree Centigrade and elevation of 565 meter (1853 ft) meters above sea level.

All medium voltage installations shall comply with the requirements of the National Electrical Safety Code (NESC, aka IEEE C2) and the National Electrical Code (NEC, aka NFPA 70), as well as appropriate UFCs and IEEE standards listed above.

9.3.4 Restrictions: Aluminum conductors shall only be used for overhead lines as approved by the Contracting Officers Representative. Aluminum windings shall NOT be used in transformers.

Any references to 120/208/220/277/480 volt, 60Hz systems in any code or standard shall be interpreted as 220/380 volt, 50Hz systems, unless otherwise modified or directed in this RFP. References in the National Electrical Code to 120 or 125 volt receptacles shall be taken to mean 220v receptacles.

9.4 DESIGN REQUIREMENTS

9.4.1 Power Plant

On-site Prime Power Generating Plant shall be house in a power plant building consisting of, as a minimum, a separate generator area, high voltage switchgear room, office area and a storage room. Two empty generator bays, provided with necessary conduit stub-up etc. for future equipment, room for switchgear expansion, and room for two future step-up transformers shall be provided within the building. Electrical equipment shall include, but not be limited to, diesel engine generators, medium voltage switchgear, step-up transformers, compressors, pneumatic tanks, day tanks, relaying equipment and all other auxiliary equipment that is necessary for operating a prime power plant. All equipment items should have brief instructions posted on them in English and Afghan languages. Final generating capacity of the power plant design only shall be for the ultimate site demand load based on the master (site) plan plus 25% spare capacity for any future load growth. Secondary wiring within the building shall be per paragraph 'Secondary Power Distribution System' below. All cabling within the Power Plant associated with Power Generation (Generator to Transformer to Switchgear) shall be installing underground.

9.4.1.1 Generators

Generators shall be skid mounted standard industry size, 1500 RPM, diesel-engine Prime Power rated units. Number of units shall be based on the N+2 principle. Where 'N' would represent number of units required to meet the Base demand load plus 25% spare capacity and '+2' would represent a spare generator available at all times. Contractor shall consider building sq footage of existing and any known future buildings planned for calculating ultimate electrical demand loads for the Base in sizing of the Power Plant / generators. Generating voltage shall be 3 phase, 380 volts, and 50 hertz, stepped up to 15kV, via transformers, for base wide Primary Power Distribution through the generator switchgear described below. Generator starting may be either pneumatic or electric, at the Contractor's option. Each generator shall be provided with a day tank with a minimum fuel capacity of 8 hours operating at 100% generated rated (kW) load. Maximum generator size shall not exceed 1000KW (1250 KVA). Contractor, at his option, may select generators with 15kv generating voltage in lieu of 380v and stepping-up to 15kv via transformers for distribution. The Contractor shall schedule transformer and other long lead-time power submittals in time for approvals, procurement, delivery and installation to establish permanent power as soon as possible.

9.4.1.2 Medium Voltage (15 kV) Switchgear

Dead-front type (i.e. no live parts shall be exposed) switchgear shall consist of a Generator Bus and a Distribution Bus. Both buses shall be connecting via a bus-tie circuit breaker. Distribution Bus shall be provided with a minimum of three (3) 15 kV feeder circuit breakers. Minimum two (2) medium voltage feeders, with load transfer capability, shall service initial Base loads. Three (3) medium voltage feeders shall service ultimate Base loads. Circuit breakers shall be vacuum or SF-6 gas filled type. Each feeder breaker shall be furnished with, but not be limited to, necessary relays, ammeter, voltmeter, current and potential transformers etc. for recording current and voltage readings. Concrete encased high voltage feeder cable duct-bank shall be providing from each breaker cubicles to outside manhole(s). Spare conduit shall be providing in each duct-bank. Conduits shall be PVC, minimum 100 mm (4 inch) in diameter.

9.4.1.3 Generator Synchronizing Equipment

Generator synchronizing/paralleling equipment shall be providing, in order for the generator(s) to synchronize with an operating generator, prior to coming on-line. Minimum of one (1) prime power generator shall be on line at all

times. An Automatic Synchronizing Transfer Switch shall be provided for automatic transfer of power when switching from one generator to another when the electrical demand load is below 90% of a single generator, and shall automatically start and synchronize the second generator when the first is operating above 90% capacity so as to allow both generators to equally share the demand load. When only one generator is required, transfer between generators shall be fully automated with a programmable time clock. The other generator(s) shall run through a complete cool-down cycle and then stop. Similarly, with the decrees in the demand load, the generator(s) shall drop-off line, one at a time, keeping a minimum of one generator operating on-line. All generator(s) shall go through a cool down cycle prior to coming to stop. All relaying shall be automatically reset for automatic restart and stopping of generators, as the load demands increases or decreases. Load sharing by the stand-by generator(s) shall be adjustable between 50% to 90% load on the operating generator(s). Synchronizing/paralleling of generators shall be automatic and manual.

9.4.1.4 Load Bank

Contractor shall provide a factory manufactured, industry standard permanent load bank connected to the medium voltage (15 kV) bus via a transformer to supplement for low demand load on the operating generator(s). Generator shall be fitted with load banks matched the Base demand load. Unit shall be providing with a control panel and necessary circuit protection.

9.4.1.5 Fuel Storage / Distribution System: Refer to mechanical section for generator fuel storage / distribution system requirements.

9.4.1.6 Miscellaneous

Contractor shall be responsible for providing all relaying, metering and power plant grounding equipment necessary for safe and efficient operation of the power plant. Relaying shall include, but not be limited to, differential, locking-out, over current, directional, reverse power,

9.4.1.7 Operating Instructions

Contractor shall provide, mounted in a frame, a complete electrical one-line diagram of the power plant with detail operating instruction. Instruction shall be mounting on a wall inside the switchgear room. Similarly, complete fuel and cooling system schematic diagrams shall also be providing in the switchgear room. Brief operating instructions shall be post on major components in the power plant. These instructions shall be written in English and Afghanistan language.

9.4.2 Site Primary & Secondary Power Distribution System

Primary (15kV 'Delta') and secondary power distribution (380/220V 'Wye') shall be underground. Design and installation of primary and secondary power distribution systems shall be complete and in compliance with the requirements of the National Electrical Safety Code (ANSI/IEEE C2), UFC 3-550-03FA (also called Army TM 5-811-1), National Electrical Code (NFPA 70), and other electrical references listed in this RFP. Site-wide primary power distribution system shall be designed (laid-out) to be serviced by a minimum of three (3) high voltage feeders. All feeders shall be provided with feeder-to-feeder tie capabilities to transfer loads between feeders. Feeder tie points shall be located in the field and away from the Power Plant. Primary power distribution shall be complete, to include but not be limited to, fused cut-outs, arresters, terminals, cable guards, circuit breakers, transformers, and related items. All primary feeder taps shall be protected with fused cutouts. Long feeder runs shall be provided with sectionalizing devices, such as, in-line fuses, sectionalizer or reclouser, as necessary. Minimum of 3 fuses, with appropriate rating, shall be provided as spares at each fused cut-out location.

The Contractor shall complete a power system analysis for the entire site and provide site power load calculation to determine the total site power requirements, and the power production requirement for the power plant. The Contractor shall perform load calculations to determine the number of required transformers to feed all facilities in this project, to include future facilities. All power system analysis and load calculations shall be submitted as part of the 35% Design Analysis, and revised/updated for each design submittal.

Primary Distribution shall be installed in accordance with the NESC, UFC 3-550-03FA, and other applicable standards listed in this RFP.

9.4.3 Raceways

Exterior raceways (conduits) shall be installed at a slope towards a manhole or hand-hole to avoid collection of water in the raceway. Conduit shall be PVC, thin-wall for concrete encasement and hard-wall (Schedule 40) for direct burial. Direct buried conduit shall only be installed for street lighting circuits. Direct buried conduits shall be encased in concrete, when under paved areas or under road crossings. Primary and secondary cables shall be installing in conduit no less than 100mm (4 inch) in diameter. Secondary cable shall be installed in conduit no less than 50mm (2 inch). Direct buried conduit shall be installing 610mm (24 inch) below grade.

All underground conduits shall use long-sweeping elbows. All communications conduits shall use long-sweeping elbows.

9.4.4. Existing Services / Building Loads

Contractor shall connect all existing active electric services to facilities in the Base, to the new power distribution system provided under this contract. Connection of existing services to the new system shall be via appropriately sized pad-mount transformer(s) and coordinated with the Contracting Officer.

9.4.3 Provide telephone lines to the Battalion Headquarters Buildings.

9.4.5 Transformer Substations: Transformer substations shall be strategically located close to the loads. Dedicated transformer substations shall be provided for large loads. Transformers shall be Primary 'Delta' and Secondary 'Wye' connected. Primary side load-break disconnecting means shall be provided with all transformers. All transformers shall be sized for known projected demand loads, plus (+) 25% spare capacity for future growth. Transformer substations shall be dead front, loop-feed, pad-mounted, compartmental, self-cooled type. Transformers shall come complete from manufacturer; use of third-party transformer housings or add-on transformer housings shall not be permitted. Transformers shall have no exposed live components.

Transformer selection, design, and installation shall be governed by NEC, NESC, ETL 1110-3-412, TM 5-684, UFC 4-510-01, UFC 3-550-03FA, UFC 3-550-03N, IEEE C57.12.28, ANSI/IEEE C57.12.22, IEEE C57.12.34, and C57.12.80.

Medical Clinic: Electrical system for future Medical Clinic shall be designed as a double-ended substation, fed from two different feeder circuits, to two different transformers. Installation shall be per UFC 4-510-01 paragraphs 10.2.3 and 10.3 (including 10.3.1 thru 10.3.5) and figure 10-1. Power system for medical clinic shall be a "type 1 EES" as defined in NFPA 99. Size of transformers, generators, and power feeds shall be governed by UFC 4-510-01, NFPA 99, and the NEC. In case of conflict between transformer design criteria between the above named standards, UFC 4-510-01 shall govern; in cases where UFC 4-510-01 can not resolve the conflict, it shall be brought to the attention of the Contracting Officer for resolution.

9.4.6 Underground Conductors: All underground conductors shall meet the requirements of the codes and standards listed in this RFP, including but not limited to: NESC, NEC, UFC 3-550-03FA, and related.

9.4.7 Secondary Power Distribution System

Secondary Power shall be 380/220 volts, 3 Phase, 4 Wires, 50 Hz. Building secondary power distribution system shall include main distribution, lighting and power panels as required. All panel boards shall be circuit breaker 'bolt-on' type panels. In large buildings separate lighting and power panels shall be provided. The minimum size circuit breaker shall be rated at 20 amperes. Circuit breakers shall be connected to bus bar(s) within the panel boards. Daisy chain (breaker-to-breaker) connection(s) shall not be acceptable. Indoor distribution panels and load centers shall be flush mounted in finished 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 bridged to make a 3-pole breaker. All wiring shall be copper, minimum # 12 AWG (4mm sq), recessed in finished areas and surface mounted in metal conduits in unfinished areas. Conductors shall be size in accordance with NFPA 70. The use of 75 or 90 degrees C (minimum) terminal and insulated conductors is required. Use of 75 degree C conductors on circuits with protective device terminals rated for 60 degree C is inappropriate. All panels shall be providing with a minimum of 25% spare capacity for future load growth. Power receptacles (outlets) shall be duplex, 20A/240 volts, 50 HZ, German (DIN) Standard. All splicing and terminations of wires

shall be performed in a 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 the requirements of NFPA 70 (National Electric Code). Main Distribution Panel shall be provided with an ammeter, voltmeter and kilowatt-hour meter. Selector switch shall be provided for reading all 3 phases. All service entrance cables and equipment, such as main distribution panels etc., to the facilities shall be sized for the ultimate facility loads, to include any heating loads (infrared heating), initial and future provided by others.

9.4.8 Receptacles

General purpose receptacles shall be duplex, grounding (earthed) type, "flush" or "semi-flush" wall mounted type, color ivory and installed 450 mm above finished floor (AFF). In office or similar areas receptacles shall be provided at every 3.66 M intervals. In maintenance buildings 3-duplex receptacles shall be provided at each vehicle maintenance bay. In storage buildings, receptacles shall be providing in 10 m intervals. In communications rooms, receptacles shall be provided at 1 m intervals or closer. CEE Type receptacles with plugs 2P+E (240v) or 3P+E (380v) and with appropriate rating, shall be provided for, but not be limited to, washers, dryers, kitchen equipment and any other type of large plug-able equipment. Receptacle shall be complete to include box, cover plate and necessary screws/connectors and of the type most commonly used in Afghanistan. Receptacles near sinks or lavatories shall be switch operated and Ground Fault Circuit Interrupter (GFCI), or Residual Current Disconnect (RCD) type, with the trip setting of 10 milliampere or less.

Sinks will have a receptacle above, with one dual receptacle serving two sinks that are side-by-side. Receptacles in wet/damp areas or within 1 meter (~3 feet) of sinks, lavatories, or wash-down areas shall be ground fault circuit interrupter (GFCI) type or Residual Current Disconnect (RCD) type, with the trip setting of 10 milliampere or less.

Total number of duplex receptacles shall be limited to six (6) per 16- or 20-ampere circuit breaker.

9.4.9 Lighting

Light Fixtures: Lighting fixtures shall be a standard manufacturer's product. Fluorescent light fixtures shall be power factor corrected and equipped with standard electronic ballast(s). All light fixtures shall be capable of receiving standard lamps used locally. Light fixtures shall be mounted at 2.5M (8 ft), minimum, AFF. Fixtures may be pendant or ceiling mounted, depending on the ceiling height. All fixtures shall be fully factory wired. Lighting levels shall be as follows:

General Office Space / Computer Rooms	50 FC (540 Lux)
Conference Rooms	30 FC (320 Lux)
Dinning Rooms	30 FC (320 Lux)
Laundry Rooms	30 FC (320 Lux)
Bed Rooms	30 FC (320 Lux)
Kitchen	70 FC (750 Lux)
Lobbies	15 FC (160 Lux)
Lounges	15 FC (160 Lux)
Mechanical, Electrical Equipment Rooms	15 FC (160 Lux)
Stairways	20 FC (215 Lux)
Toilets	20 FC (215 Lux)
Storage Rooms	15 FC (160 Lux)
Corridors	10 FC (110 Lux)
Parking Lots	0.5 FC (5 Lux)

9.4.6.2.1 High Ceilings

Contractor may provide high bay High Pressure Sodium (HPS) vapor light fixtures in facilities with high ceilings, provided that the replacement lamps for the fixtures are available locally.

Indoor lighting for all areas shall consist of fluorescent surface mounted light fixtures. Exterior lighting will be installing as referenced. Moisture resistant/waterproof fluorescent light fixtures shall be provided in high humidity and wet areas such as latrines and showers. 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 use, except in unfinished mechanical or electrical service rooms.

HID Metal Halide light fixtures may be providing in the generator / high bay area(s). Fluorescent light fixtures shall be providing in the remaining areas. Emergency lighting, emergency egress 'exit' lights and exterior building lighting shall be provide as necessary.

9.4.9.1 Emergency "EXIT" Light Fixtures

Emergency "EXIT" light fixture shall be provided in accordance with NFPA requirements. Fixtures shall be single sided and for wall and/or 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/reset and lamp failure indication buttons. Primary operating voltage shall be appropriate for the available secondary voltage. Lettering "EXIT" shall be color red and not less than 6 inches (150 mm) in height and on matte white background. Illumination shall be via LEDs.

9.4.9.2 Above Mirror Lights

Above mirror lights shall be provided in toilet rooms.

9.4.9.3 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/reset and lamp failure indication buttons. Primary operating voltage shall be 220 volts.

9.4.9.4 Light Switch

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. Lighting contactors may be used to operate lighting in open or large bay areas. Rooms with multiple entrances shall have multi-way switches.

9.5 CONDUCTORS

All cable and wire conductors shall be copper. Conductor jacket or insulation shall be color coded to satisfy local utility requirements. Conductors shall be sized in accordance with this RFP and the listed codes and standards.

For interior wiring, the use of 75 or 90 degree C (minimum) terminals and insulated conductors is required. Use of 75 degree C conductors on circuits with protective device terminals rated for 60 degree C is inappropriate. Wire size shall be a minimum of 4mm² (#12 AWG).

9.6 GROUNDING AND BONDING

In general, grounding and bonding shall comply with the requirements of NFPA 70 and NFPA 780, and UFC 3-550-03FA. Generating equipment shall also comply with the requirements of UFC 3-540-04N. Underground connections shall be exothermal 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 copper-clad steel. Ground resistance

shall not exceed 25 ohms when measured more than 48 hours after rainfall using the fall of potential method outlined in IEEE 81.

Communications Building: Grounding and Bonding shall meet the requirements of ANSI/TIA/EIA-942, IEEE 81.2 and IEEE 1100, as well as the NEC. Ground resistance shall not exceed 5 ohms when measured more than 48 hours after rainfall using the fall of potential method outlined in IEEE 81. A ground ring shall be installed around the communications building.

Power plant: Grounding and Bonding shall meet the requirements of ANSI/TIA/EIA-942, IEEE 81.2 and IEEE 1100, as well as the NEC. Ground resistance shall not exceed 5 ohms when measured more than 48 hours after rainfall using the fall of potential method outlined in IEEE 81. A ground ring shall be installed around the Power Plant.

9.6.1 Lightning Protection

Communications Building, Medical Clinic, Ammo Supply Point, Propane Tanks, Fuel Point and Power Plant including Fuel storage tanks shall have a lightning protection system installed per the NEC and NFPA 780, as well as other applicable standards listed in this document. Medical clinic lightning protection requirements shall also meet the requirements in UFC 4-510-01.

Ammo Supply Point and all fueling areas shall also implement static electricity controls in accordance with standards listed in this document.

9.7 ENCLOSURES

Enclosures for exterior applications shall be NEMA Type 4X (IEC Classification IP56) or better and for dry interior locations NEMA Type 1 (IEC Classification IP10) or better. For wet indoor locations, NEMA type 3S (IEC Classification IP54) or better shall be used.

9.8 FIRE DETECTION & ALARM SYSTEM (NOT USED)

Per directions from the Host Nation, no Fire Detection and Alarm System shall be provided in the facilities to be used by the Host Nation's personnel. However, Fire Alarm System shall be provided, as described below, in the facilities to be used by the U.S. Personnel. In U.S. Barracks Fire Detection and Alarm System shall consist of hard-wired, multi-station smoke detectors, with building wide annunciation. In the U.S. Headquarters Building complete Fire Detection and Alarm System shall be provided, to include, fire alarm control panel, pull (or push button) stations, horns, strobe lights, smoke and/or heat detectors, as required. No Fire Alarm System shall be provided in the Dining/MWR Facility. Fire alarm cable shall be installed in recessed hard wall PVC conduit and plastered over it. In addition to building wide fire alarm annunciation, the system shall also be capable of automatically transmitting the alarm signal via telephone lines to the local Base Fire Department / Fire Station. System design shall be in accordance with the requirements of NFPA 72. Fire alarm system shall be complete and a standard product of one manufacturer. Contractor shall provide hard-wired carbon monoxide (CO2) detectors, with local in-room annunciation, in all rooms where wood burning or oil-fired heaters will be provided.

9.9 TELEPHONE/COMPUTER NETWORK SYSTEM

Each Corps, Brigade, and Battalion HQ building office, room shall have telephone and computer data outlets. Telephone/data System shall include cross-connect boxes, duplex RJ-45 telephone outlets with a minimum of 4 pair Category 5 Enhanced (CAT 5e) cable terminating at each outlet (jack). The Contracting Officer shall determine outlet locations for individual rooms. Telephone wiring shall be recessed in finished areas and surface mounted in metal conduits in unfinished areas. Two 4 inches conduits shall be providing from the cross connect box to the outside communication hand-hole. See paragraphs 10 thru 10.16 below for additional requirements for communications systems.

9.10 TELEVISION SYSTEM

Television System shall consist of television outlets and an empty metal conduit raceway system, to include necessary junction boxes and pull wire. The Contracting Officer shall determine outlet locations. Television monitors, coaxial cable any amplification devices shall be provided by others. One 2 inches conduit shall be providing from the television junction box to the outside communication hand-hole.

9.11 IDENTIFICATION NAMEPLATES

Major items of electrical equipment, such as the transformers, manholes, hand holes, panel boards and load centers, shall be provided with a permanently installed engraved identification nameplate.

9.12 SCHEDULES

All panel boards and load centers shall be provided with a panel schedule. Schedule shall be typed written in English and Afghan languages.

9.13 SINGLE LINE DIAGRAM

Complete single line diagram shall be provided in every transformer distribution panel and in Main Distribution Panel in each building. Single line diagram shall show all panels serviced from the transformer distribution panel and the MDP respectively.

10. COMMUNICATIONS SYSTEM

10.1 General

10.1.1. 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

RUS Bulletin 1753F-201 (1997) Acceptance Test and Measurements
Of Telecommunications Plant

RUS Bulletin 1753F-208 (1993) Specifications for Filled
Telephone Cables with Expanded
Insulation (PE-89)

RUS Bulletin 1753F-401 (1995) Standards for Splicing Copper
And Fiber Optic Cable (PC-2)

RUS Bulletin 1753F-601 (1994) Specifications for Filled
Fiber Optic Cables (PE-90)

RUS Bulletin 1753E-001 (1996) RUS General Specification for Digital, Stored Program Controlled,
Central Office Equipment, RUS Form 522.

RUS Publication IP 344-2 (2006) List of Materials Acceptable

For Use on Telecommunications Systems
of RUS Borrowers.

RUS Bulletin 345-65 (1978) Shield Bonding Connectors (PE-33)

RUS Bulletin 345-83 (1982) REA Specification for Gas Tube
Surge Arrestors (PE-80)

RUS Bulletin 1753E-001 (1996) RUS General Specification for
Digital Stored Program Controlled Central
Office Equipment, (Form 522)

American National Standards Institute/Telecommunications Industry Association/Electronics Industry Association

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

10.1.2 Communication Systems Design

The communications system for Jalalabad is to be designed, supplied and constructed by the Contractor. The design and construction of the systems shall be in accordance with the references and the requirements contained herein. The design and selection of materials and equipment shall be submitted to TAC through the Contracting Officer for approval. The inside plant (building communications cabling) shall use the existing design provided by the Government.

10.2 Exterior Communication Manhole System

The contractor shall install a manhole/handhole and duct system. The manholes and hand-holes shall be constructed in accordance with the contract drawings. The maximum distance between manholes and/or hand-holes shall be 140 m (450 ft). The ducts shall be direct buried with a minimum of 1000 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 handhole. In this case, four (two with innerducts) conduits can be installed in the walls.

10.3 Exterior Conduit

The underground conduit for the manhole and duct system shall be direct buried (1 meter below surface), 100 mm DB type PVC or schedule 40, PVC. Innerducts shall be four (4) 25mm PVC or PE innerducts 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 will be reinforced concrete encased where a road or taxi way is crossed. The ducts (inner and outer) shall be listed on the RUS list of materials acceptable for use on RUS projects. Cable racking diagrams (manhole/hand-hole butterflies) shall be provided for the manholes and hand-holes. The minimum duct configuration in the main duct system shall be a six way duct, being three conduits wide by two conduits deep (3 X 2) with two of the conduits having inner-ducts installed. Laterals off of the main duct system manhole to manhole shall be a minimum of a 4 way (2x2) with one duct having innerducts. The duct system from the manhole/handhole to a building with cable installed shall be a 1x 2, 100 mm PVC duct bank with one duct having innerducts. The duct system from a manhole/handhole to a building with allocations only shall be two (2), four inch (100mm) DB type PVC conduits stubbed out 3 meters from the manhole/handhole. 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.

10.4 Exterior Telephone Cable

The Contractor shall install copper and fiber optic cable in accordance with the references and the cable requirements listed below. The copper cable shall be 24 AWG, RUS PE89 type, foam skin polyolefin, with an outer layer of solid colored polyolefin and a copolymer coated 8 mil aluminum tape shield. The fiber optic cable shall be a single mode, RUS PE90 type, with a 6 mil, copolymer coated steel shield. The fiber shall not have any internal splices and have a maximum loss of .4dB/Km at 1310nm and .3dB/Km at 1550nm. The copper and fiber optic cable shall be installed, grounded/bonded, spliced and tested in accordance with RUS standards.

10.5 Splices

10.5.1 Copper Splices

25 pair modules shall be used on copper splices 25 pairs or greater and discrete connectors shall be used on lesser count cable splices. The copper splice closures shall be flash tested with nitrogen in accordance with the manufacturer's recommendations before encapsulation. The encapsulant shall fill all of the splice interstices. The copper splicing connectors, bonding hardware, splice closures and encapsulant shall be on the RUS list of material acceptable for use on RUS projects, IP 344-2. Bonding and grounding shall be in accordance with the RUS standards. The copper splice closure shall be installed by the copper splicer only. The copper cable splicer (s) shall have 7 years documented unsupervised experience in the installation of the splice closure being used and 7 years experience splicing RUS type cable.

10.5.2 Fiber Optic Splices

The fiber optic splice closure shall be equipped with splice trays that properly hold the fusion splice protectors (stainless steel rod with heat shrink tube). The splice loss shall be .02dB or less as measured by the fusion splicing machine and .2dB as measured by an OTDR. The fiber optic splice closure shall be flash tested with nitrogen in accordance with the manufacturer's recommendations and also be listed in RUS IP 344-2. All bonding hardware shall also be listed in RUS IP 344-2. Bonding and grounding shall be in accordance with the RUS standards. The fiber optic splice closure shall be installed by the fiber optic splicer only. The fiber optic cable splicer (s) shall have 7 years documented unsupervised experience in the installation of the splice closure being used and with RUS cable. The fiber optic splice shall also have a minimum of 7 years documented unsupervised experience with fusion splicing machines and a minimum of three years with the particular make and model of the machine that will be used.

10.6 Main Distribution Frame

The contractor shall install a painted steel main distribution frame (MDF) in the communications building. The MDF shall be double sided, 10 vertical, with guard rails adjustable from 775mm to 927mm. The MDF shall have 10 horizontal shelves 531mm long, on 203 inch centers. There shall be a minimum of 1 meter clearance from the walls on all sides. The vertical shall support a minimum of seven (7) 100 pair protector blocks. The frame shall be equipped with a ground bar connected to ground in accordance with the referenced standards. The MDF shall comply with RUS Bulletin 1753E-001. The frame shall be mounted above an underground cable vault 4.6 meter long, 3.66 wide, and 2.74m high. Cable ladder, 457mm wide, by 38mm deep with solid 9.5 mm side bars will be installed around the perimeter of the communications equipment room. The ladder rack will have 152mm high cable retaining posts mounted on both sides of the rails at 150mm intervals.

10.6.1 Protector Blocks on the Main Distribution Frame (MDF)

The contractor shall install a minimum of twelve (12) 100 pair copper protector units with cable stubs on the MDF. The protectors shall be equipped with heavy duty three element gas tube protector units and both the connectors and gas tubes shall be on the RUS list IP 344-2. The Switch side of the protector units shall be equipped for wire wrap terminations. The protector stubs (TIP Cables) shall be spliced to the incoming outside plant cables. The tip cable splice closures shall be mounted on formed metal channel (Kindorf, Unistrut, BeeLine etc.) frame work in the cable vault on galvanized cable racks (the same as installed in the manholes and hand-holes) and cable rack hooks. The distance between the cable racks shall be no more than 30 inches, meaning that the vertical members on the formed metal channel structure will be no more than 30 inches apart. Rust Resistant hardware (galvanized) shall be used on

the formed metal channel framework. The copper splice closures shall be flame retardant and listed on RUS Bulletin 344-2. Bonding and grounding of the MDF and the cable vault shall be in accordance with the referenced RUS standards. Each incoming cable pair will be protected on the MDF. A minimum of two (2) six hundred pair cables will be installed under this contract to provide the initial distribution cable infrastructure. If more copper cable pairs are needed to provide the required cable pairs on the initial contracted buildings and all future buildings on the site plan, then the Contractor shall provide the required cable. The distribution of cable pairs shall be in accordance with paragraphs 10.8 and 10.8.1 of this document. A 100 pair MDF protector unit shall be installed exclusively for guard tower/guard house/guard gate use. A 25 pair cable, 24 AWG cable, shall be installed in a ring configuration around the base from the communications building to the perimeter guard structures (towers, guard houses etc.) The 25 pair shall be installed in the inner duct system. A 100 pair MDF protector shall be installed exclusively for the two command centers, 50 pair per command center.

10.6.2 Protected Entrance Terminals

Building Protected Entrance Terminal, 25, 50 or 100 Pair

The PETs shall consist of an input splice chamber with punch down blocks for the copper cable pairs, a protector field for 5 pin connectors and a factory installed output punch down block terminal for each outside plant cable pair. The PET shall be listed in RUS 344-2. The station cables shall be terminated on a field installed category 5e, 110 type punch down block and jumpers shall be installed between the PET block and the field installed block to connect dial tone to the outlet.

10.6.2 Protected Entrance terminal, 6 or 12 pair. The PETS shall consist of blocks with two well type heavy duty gas tube protector units. The six pair shall consist of three units where as the 12 pair will consist of 6 units. Every building with terminated cable shall be equipped with gas tube protectors. The station cables will be terminated on a category 5e 110 "station" block and jumpers shall be installed between the PET and the "station" block to connect dial tone to the outlet.

10.7 Patch Panels

10.7.1 Fiber Optic MDF, Communications Building

The fiber optic patch panels used for the Fiber MDF shall be relay rack mounted combination units that provide for patching and splicing. The combination unit shall have fusion splice trays and be equipped to use pre-connectorized panels. Each panel shall be equipped with six duplex SC connectors with zirconia ceramic sleeves per panel. The combination unit enclosure shall be able to properly store one meter of de-sheathed fiber optic cable. The combination units shall be mounted on the relay racks at the end of the copper main distribution frame. The fiber optic terminations shall consist of the outside plant cable being fusion spliced to single mode pigtails with factory installed SC connectors. The fusion splice shall have a splice loss of .02dB or better as measured by the splicing machine and .2dB as measured by an OTDR. The pigtails shall have a single mode insertion loss of less than .35dB with the typical being 15dB and a single mode return loss of better than -55dB. The fusion splices shall be protected by a stainless steel rod and heat shrink tube and placed in a splice tray. The combination unit enclosure shall be capable of mounting 15 panels. Blank adapter plates shall be used fill up all unused spaces on the combination unit. One duplex, single mode patch cord SC-SC shall be provided for each patch panel port. The fiber patch cords shall have a mated pair insertion loss of less than .35dB with a typical loss of .15dB and a typical mated return loss of less than -55dB. The relay rack shall be double sided, painted steel, 483mm wide relay racks. A minimum of two (2) 96 strand fiber optic cables shall be installed under this contract to provide the initial fiber optic distribution cable infrastructure. If more fiber optic cable strands are needed to provide the required fiber optic service, for the initial contracted buildings and all future buildings on the site plan, then the Contractor shall provide the required fiber optic cable strands. The distribution of fiber strands shall be in accordance with paragraphs 10.8 and 10.8.1 of this document. A 24 strand, PE 90, single mode, fiber optic cable dedicated for the "command centers" shall be installed on the fiber optic MDF to the command center buildings via the manhole and duct system.

10.7.2 Fiber Optic Patch panels, all buildings with data outlets.

The fiber optic terminations shall consist of the outside plant cable being fusion spliced to single mode pigtailed with factory installed SC connectors. The fusion splice shall have a splice loss of .02 dB or better as measured by the splicing machine and .2dB as measured by an OTDR. The pigtailed shall have a singlemode insertion loss of less than .35dB with the typical being 15 dB and a singlemode return loss better than -55dB. The fusion splices shall be protected by a stainless steel sleeve and heat shrink tube and placed in a splice tray. The terminations shall be contained in a wall mounted hinged door enclosure. The enclosure shall be equipped with hardware to properly store 1 meter of fiber slack. The enclosure shall be designed to handle adapter panels with three duplex SC connectors per adapter panel. The SC connectors shall have zirconia ceramic sleeves. The enclosure shall be capable of mounting four (4) adapter panels. Blank adapter plates shall be used wherever there are no fiber optic adapter panels. One duplex single mode fiber optic patch cord shall be provided for each duplex fiber optic port. The fiber patch cords shall have a mated pair insertion loss of less than .35dB with a typical loss of .15dB and a typical mated return loss of less than -55dB.

10.7.3 Copper Patch Panels, Category 5e - All Buildings with Data Outlets

Provide one patch panel port per data outlet plus 20% spare. The largest patch panel allowed shall be 48 port and the smallest 12 port. Where the 12 port is used, it shall be a category 5e, 12 port patch panel mounted on an 89 type block frame for the station cables. The 24 or 48 port patch panel shall be mounted on a swing down bracket mounted on the backboard. Cable guides and wire management bars shall be provided. Provide one category 5e patch cord, (RJ45-RJ45) per patch panel port. The Patch cords shall meet the minimum performance requirements specified in EIA/TIA-568B.1, EIA/TIA-568B.2 and EIA/TIA-568B.3.

10.8 Outside Plant Cable

The outside plant cable (cable size and cable counts) shall be engineered and installed in accordance with the referenced standards. The OSP cable engineering shall be approved at TAC before any cable is ordered. Under no circumstances will home runs from each building to the communications building be allowed; normal telephone cable distribution engineering standards will be used, meaning that large cables will be installed from the vault splices and the cables will get smaller as the buildings are provided service.

10.8.1 Spare Cable Pairs and Fiber Optic Strands

There shall be spare cable pairs and fiber strands in the manholes/hand holes as required ensuring that standard sized cables are used. Dead Cable pairs shall be spliced through and cleared and capped in proper connectors. The 25 pair binder grouping of the cable shall be maintained. When the smaller (6 pair or 12 pair) counts are used, the first 6 pair count or first two 6 pair counts are used, the 13th pair of the count is cleared and capped, and then the second pair counts 14th through 25 pair count will be used. Under no circumstances will a split binder count be used. The 6 strand grouping of the fiber optic cable plant shall also be maintained.

10.9 The Contractor shall provide cable (copper and fiber optic cable) count provisions, either installed in the building or allocated in cable stubs in manholes/handholes for all buildings on the Government provided site plan, (contracted buildings and future). Conduit stub outs in manholes/handholes shall be provided for all buildings on the Government provided site plan. The following buildings will either have the cables installed and terminated in the building OR have the cables allocated in the cable counts and left in the manhole/handhole cable stub out closures.

10.9.1 Battalion /Company HQ building. 50 pairs copper, 12 strands single mode fiber optic cable. Copper and fiber shall be installed in the building, terminated and tested. All outlets except wall outlets in the building shall be dual RJ 45, category 5e, one white labeled voice and one blue labeled data. An additional 50 pair copper and 12 strand fiber optic cable shall be installed in the command center constructed on the buildings. The cables shall be part of the consolidated 100 pair copper, 24 strand fiber optic "Command Center" cables installed from the respective MDFs to the command centers in the buildings. The command centers shall have dual category 5e, RJ 45 outlets installed on the walls at 1.5 meter intervals.

10.9.2 BOQ Facility, 12 pairs copper and 6 strands fiber optic cable, installed, terminated and tested in the building. All outlets except wall outlets in the building shall be dual RJ 45, category 5e, one white labeled voice and one blue labeled data.

10.9.3 Barracks Type A, 12 pairs copper and 6 strands fiber optic cable installed, terminated and tested in the building. All outlets except wall outlets in the building shall be dual RJ 45, category 5e, one white labeled voice and one blue labeled data.

10.9.4 Barracks Type B, 12 pairs copper and 6 strands fiber optic cable installed, terminated and tested in the building. All outlets except wall outlets in the building shall be dual RJ 45, category 5e, one white labeled voice and one blue labeled data.

10.9.5 Shower, 6 pairs copper, installed, terminated and fully tested in the building. No fiber.

10.9.6 DFAC, 12 pairs copper and 6 strands fiber optic cable installed, terminated and tested in the building. All outlets except wall outlets in the building shall be dual RJ 45, category 5e, one white labeled voice and one blue labeled data.

10.9.7 Battalion Storage, 12 pairs copper and 6 strands fiber optic cable allocated in the cable plant and accessible in the closest manhole/handhole to the building.

10.9.8 Motor Pool, 6 pairs copper, installed, terminated and fully tested in the building. No fiber.

10.9.9 Communications Building. All cables originate from this building.

10.9.10 Fuel Point, 12 pairs copper and 6 strands fiber optic cable allocated in the cable plant and accessible in the closest manhole/handhole to the building.

10.9.11 Bunkers 12 pairs copper and 6 strands fiber optic cable allocated in the cable plant and accessible in the closest manhole/handhole to the building.

10.10 Interpreter Facilities

10.10.1 Interpreter Barracks, 12 pairs copper and 6 strands fiber optic cable installed, terminated and tested in the building. All outlets except wall outlets in the building shall be dual RJ 45, category 5e, one white labeled voice and one blue labeled data.

10.10.2 Interpreter MWR building, 25 pairs copper, 12 strands single mode fiber optic cable. Copper and fiber shall be installed in the building, terminated and tested. All outlets except wall outlets in the building shall be dual RJ 45, category 5e, one white labeled voice and one blue labeled data.

10.10.3 Interpreter DFAC building, 12 pairs copper and 6 strands fiber optic cable installed, terminated and tested in the building. All outlets except wall outlets in the building shall be dual RJ 45, category 5e, one white labeled voice and one blue labeled data.

10.11 Embedded Training Team Compound (ETTC)

10.11.1 Embedded Training Team Barracks, 12 pairs copper and 6 strands fiber optic cable installed, terminated and tested in the building. All outlets except wall outlets in the building shall be dual RJ 45, category 5e, one white labeled voice and one blue labeled data.

10.11.2 Embedded Training Team MWR building, 25 pairs copper, 12 strands single mode fiber optic cable. Copper and fiber shall be installed in the building, terminated and tested. All outlets except wall outlets in the building shall be dual RJ 45, category 5e, one white labeled voice and one blue labeled data.

10.11.3 Embedded Training Team laundry. 12 pairs copper installed and terminated in the building. 6 strands fiber optic cable allocated in the cable plant and accessible in the closest manhole/handhole to the building. Copper to be fully tested. Fiber to be tested to ensure no fractures occurred during installation.

10.11.4 Embedded Training Team DFAC building 12 pairs copper and 6 strands fiber optic cable installed, terminated and tested in the building. All outlets except wall outlets in the building shall be dual RJ 45, category 5e, one white labeled voice and one blue labeled data.

10.12 Guard House. 25 pairs copper installed and terminated in the building. 12 strands fiber optic cable allocated in the cable plant and accessible in the closest manhole/handhole to the building. Copper to be fully tested and fiber to be tested to ensure no fractures occurred during installation. The 25 pair cable “perimeter cable” from the MDF shall be connected from each guard house, tower and gate house and back to the MDF.

10.13 Guard Tower, 25 pairs copper installed and terminated in the building. 6 strands fiber optic cable allocated in the cable plant and accessible in the closest manhole/handhole to the building. Copper to be fully tested and fiber to be tested to ensure no fractures occurred during installation. The 25 pair cable “perimeter cable” from the MDF shall be connected from each guard house, tower and gate house and back to the MDF.

10.14 Gate House, 25 pairs copper and 6 strands fiber, installed, terminated and tested. The 25 pair cable “perimeter cable” from the MDF shall be connected from each guard house, tower and gate house and back to the MDF.

10.15 Reception building. 6 pairs copper installed and terminated in the building. 6 strands fiber optic cable allocated in the cable plant and accessible in the closest manhole/handhole to the building. Copper to be fully tested. Fiber to be tested to ensure no fractures occurred during installation.

10.16 All buildings not included above but included in the master plan (future) except the fire station, the medical clinic, the training building, Brigade Headquarters and Garrison Headquarters, shall be considered to have requirements of 12 copper cable pairs and 6 fiber strands for planning purposes. The fire station and medical clinic should have plans for 50 copper pairs, and 12 fiber strands each, the training building should be planned for 25 copper cable pairs and 12 fiber strands, the Brigade Headquarters should have 150 pairs copper, 12 strands fiber and the Garrison Headquarters should have 300 pairs copper and 12 strands fiber.

11. ATTACHMENTS

The following attachments form an integral part of the technical requirements:

- C-1 Proposed Site Plan
- C-2 Jalalabad Drawings
- C-3 USACE Facilities
- C-4 Chain Link Fence Details
- C-5 Chain Link Fence Details
- C-6 Bunker Details

Appendix B – Jalalabad Specifications

END OF SECTION