

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION 00010 - SOLICITATION CONTRACT FORM

The following have been modified:
PROPOSAL SCHEDULE

SECTION 00010
 PROPOSAL SCHEDULE

The Contractor shall provide a price for all items, including those labeled, "Optional Items".

CLIN	DESCRIPTION	QTY	UNIT	AMOUNT
BASE ITEMS				
0001	Mobilization and Demobilization in accordance with solicitation documents.	1	LS	\$
0002	Design and Construct Apron (Helicopter Class II Pavement section), Taxiway (Medium Load Pavement section), Asphalt Shoulders, and associated site improvement in accordance with solicitation documents.	1	LS	\$
0003	Design & Construct Two Aircraft Parking Shelters in accordance with contract documents.	1	LS	\$
0004	DBA Insurance for Base Items	1	LS	\$
<p>The amount listed by the offeror on this CLIN is the estimated DBA insurance premium (estimated payroll of the offeror and its subcontractors, multiplied by the applicable rate(s)). The actual amount paid by the Government under this CLIN will be based on the amount of the Rutherford invoice submitted by the offeror after contract award. In the event of recalculation of the premium by CNA based on actual payroll amounts, the Contracting Office will adjust this CLIN by contract modification to reflect actual premium amounts paid.</p>				
TOTAL BASE BID ITEMS				
			LS	\$

CLIN	DESCRIPTION	QTY	UNIT	AMOUNT
OPTIONAL ITEM #1				
0005AA	Design and Construct additional 6,065 SM of Concrete Pavement for Apron (Helicopter Class II Pavement section) and additional 540 SM Asphalt Shoulder in accordance with solicitation documents.	1	LS	\$
0005AB	DBA Insurance for Optional Item #1	1	LS	\$
<p>The amount listed by the offeror on this CLIN is the estimated DBA insurance premium (estimated payroll of the offeror and its subcontractors, multiplied by the applicable rate(s)). The actual amount paid by the Government under this CLIN will be based on the amount of the Rutherford invoice submitted by</p>				

the offeror after contract award. In the event of recalculation of the premium by CNA based on actual payroll amounts, the Contracting Office will adjust this CLIN by contract modification to reflect actual premium amounts paid.				
TOTAL OPTIONAL ITEM #1			LS	\$

CLIN	DESCRIPTION	QTY	UNIT	AMOUNT
0006	OPTIONAL ITEM #2			
0006AA	Design and Construct Revetments in accordance with solicitation documents	1	LS	\$
0006AB	DBA Insurance for Optional Item #2	1	LS	\$
The amount listed by the offeror on this CLIN is the estimated DBA insurance premium (estimated payroll of the offeror and its subcontractors, multiplied by the applicable rate(s)). The actual amount paid by the Government under this CLIN will be based on the amount of the Rutherford invoice submitted by the offeror after contract award. In the event of recalculation of the premium by CNA based on actual payroll amounts, the Contracting Office will adjust this CLIN by contract modification to reflect actual premium amounts paid.				
TOTAL OPTIONAL ITEM #2			LS	\$

TOTALS		
TOTAL BASE BID ITEMS CLINS 0001 – 0004	LS	\$
TOTAL OPTIONAL ITEMS CLINS 0005 – 0006	LS	\$
TOTAL BASE BID ITEMS AND OPTIONAL ITEMS CLINS 0001 - 0006	LS	\$

SCHEDULE NOTES:

1. Offeror shall submit prices on all items. Scope of work on each item is described in Section 01010. The quantities shown in the bid schedule shall take precedence and be used for developing the proposal.
2. The entire schedule work contained in this solicitation will be awarded as one contract (Design and Construction of the Special Operations Forces Helicopter Apron, Herat Province, Afghanistan. This Proposal Schedule is an accounting tool for allocating funds to applicable budget. All applicable specification from the original contract shall fully apply to this solicitation.
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 design analysis, drawings, and specifications for all facilities.
5. EVALUATION OF OPTIONS: The award will be made to the lowest, responsive and responsible bidder. For pricing purposes the Government will evaluate both the Base Proposals and Option Proposals. The Government is not obligated to exercise the options.
6. EXERCISE OF OPTIONAL BID ITEMS: Optional bid items (if any) may, at the option of the Government, be exercised at any time within 60 calendar days after receipt of the Notice to Proceed.
7. Abbreviations:
 - LS = Lump Sum
 - SM = Square meters
 - EA = Each

-END OF SECTION-

SECTION 00100 - BIDDING SCHEDULE/INSTRUCTIONS TO BIDDERS

The following have been added by full text:

PICTURES OF PROJECT SITE







RESPONSES TO BIDDER INQUIRIESQuestions/Inquiries and Responses to Bidder Inquiries

W5J9LE-12-R-0019

SOF Helicopter Apron Project, Herat

Q1. In Section 00113 Para 2, it is mentioned that the contractor will design and build 45,000 SM paved apron for rotary-wing and fixed wing aircraft. But it is indicated that the total pavement area is 41,470 SM in Drawing C-111 Site Plan. Could you please clarify this contradiction?

A1. Contractor pricing and technical proposals should be based on dimensions shown in the drawings already provided in the RFP. This amendment revises Section 0013 Para 2 to read “contractor will design and build a paved apron not to exceed 45,000 SM.”

Q2- According to RFP documents, it is clearly understood that two (2) soft-side aircraft shelters are included in this project. However we could not find the relevant item for the aircraft shelters in Proposal Schedule. We assumed that these shelters are included in Base Item CLIN 0002. Please confirm this assumption

A2. This amendment adds a separate “CLIN” for the two (2) soft sided aircraft shelters.

Q3- In section 01 80 00.12 Para 2.14, it is mentioned that the airfield revetments shall be provided by others. Therefore, we understand that the contractor responsibilities for Option Item # 2 are only to ensure appropriate spaces in helicopter apron for revetments and provide concrete foundation where revetments are located on asphalt pavement. Please confirm this assumption.

A3. This amendment removes the statement “revetments shall be provided by others”. Bid Option #2 should be priced as stated in the proposal schedule (“Design and Construct”). The contractor’s responsibility includes the cost of the revetments themselves. They will NOT be provided by others.

Q4- Request you to provide us the below at the earliest

- a- UFC 3-535-02
- b- Design Fixed Wing aircraft type
- c- AGL specifications
- d- Any general advice on layouts, markings

A4. It is the contractor’s responsibility to obtain their own copies of design manuals and specs. The government will not be providing the items requested. Contractor pricing and technical proposals should be based on only the technical requirements and drawings already provided in the RFP.

Q5. Could you please clarify need (or no need) for Sureties related to this tender? The first page of the solicitation (12 a) states that neither payment nor performance bonds are required; the solicitation does not mention Bid Bonds. Yet, under Submittal Descriptions (please see below) there is a reference to sureties.

A5. This amendment removes surety bonds from the submittal requirements. Delete “Surety bonds” from 1.1.2 Submittal Descriptions (SD)

Q6- As per our understanding, Nominal height of revetments is 5 meters but Chinook aft rotor is 5.7 meters. Is 5 meters OK? Please confirm

A6- Contractor proposals should price the cost of the revetments as described in the RFP.

Q7- Turning nodes from parking bays to taxi lanes appear to be approx. 5 meter radius. We assume aircraft will be under tow out of parking bays. If so where are engine start/shutdown locations for day and night?

A7- There is no "engine start/shutdown locations" identified in this RFP. Contractor proposals should only address what is described in the technical requirements and drawings in the RFP.

Q8- Can Apron and associated taxi lanes be illuminated by apron floodlighting or do taxi lanes require centerline and /or edge lights?

A8- Contractor proposals should price only the lighting options described in the RFP.

Q9- Is there any requirement for Passenger handling facilities and access roads?

A9- The current solicitation does not describe any requirement for "Passenger Handling Facilities or any associated access road".

Q10- The hatched demolition areas are shown on the Drawings C-101 & C-102 . In these drawings, it is indicated that 'Existing facilities within demolition area are considered temporary structures requiring removal or demolition by the contractor'. In order to give accurate proposal for demolition works, we will need more information about the details of existing facilities. We had planned to determine the details of existing facilities in the site visit but as you know the site visit is cancelled in accordance with the Amendment 0002. Could you please clarify the details (structure types, quantities; numbers, dimensions, etc.) of existing facilities.

A10- There is no existing facility or existing pavement to be demolished at the site. The crossed hatch area that is shown on the site plan is the future planned taxiway. It has not yet been built. In short, no facility to be demolished at the project site. The new revised plan shows the project ties into the existing AC Apron with the construction note # at the edge of the pavement where it is tied between new and existing. See revised drawings as a part of this amendment.

Q11- In Section 00010 Proposal Schedule, it is mentioned that the additional 6,065 SM paved apron are constructed for Optional Item #1 by the contractor. But it is indicated that the apron area (SOF Helicopter Option #1) is 6,605 SM in Drawing C-111 Site Plan. Could you please clarify this contradiction.

A11- Both revised bid schedules and drawings indicate this work is under Option 1, Contractor to provide cost as indicated in the proposal schedule.

The following have been modified:

SECTION 00113

**BASIC PROPOSAL SUBMISSION REQUIREMENTS
(SECTION 00113)**

1. General

a. Basic and Intent: This project is being procured as a full and open competition with offerors submitting competitive proposals using FAR part 15 procedures.

2. Basic Proposal Submission Requirements

a. The intent of the Request for Proposal is to select one (1) Contractor will design and build a paved apron not to exceed 45,000SM for rotary-wing and fixed wing aircraft, with connecting taxiway, concrete maintenance pad, shoulders and pavement markings to suit the various mission requirements at Herat Air Base in Afghanistan. Work will include two soft-side aircraft shelters, airfield edge lighting grounding points and ties down, utilities and other necessary site improvements including but not limited to clearing, grading, and necessary storm drainage measures such as culverts, rip-rap, etc. The facility shall include structures as shown on the drawings, specifications, and contain all necessary utilities for operations as such. These facilities shall be designed and constructed in accordance with current building codes, Unified Facilities Criteria (UFC), safety, and DOD antiterrorism/force protection requirements per UFC and security standards applicable to local standards

The basis of award is Lowest Price Technically Acceptable (LPTA). This award will be made on the basis of the lowest evaluated price of proposals meeting or exceeding the acceptability standards for non-cost factors. The Contracting Officer will award a firm fixed price contract to the responsible offerors whom the SSA determines conforms to the LPTA requirements.

Electronic (softcopy) proposals (submitted as attachments to emails) shall be submitted to the following email address: LTC Derek Draper at Derek.J.Draper2@usace.army.mil with a courtesy copy to tas.contracting@usace.army.mil

All offers must be received by the closing date and time identified in Block #13 of the SF1442 (unless amended) in order to be considered for award.

Hand-carried offers will not be accepted.

3. The Government will not make assumptions concerning an Offeror's intent, capabilities, or experiences. Clear identification of proposal details shall be the Offeror's sole responsibility. The Government may reject incomplete proposals after initial evaluation without further consideration. Therefore, the proposal must meet the following basic requirements at the time of submission:

a. The Proposal shall be typed, submitted in English, and easy to read.

b. Proposal shall be organized, concise, and submitted in the volumes and in the order indicated below. Volumes shall be clearly identified and tabbed. Each factor and sub-factor shall be described in a separate tabbed section.

c. Proposals must be sent in two (2) separate volumes. Each volume shall be contained within a separate PDF file. Each volume shall be identified by the solicitation number, volume number, and name, address, and telephone number of the prime Offeror on the cover. Each volume shall contain a Table of Contents and include at the bottom left side of each page the volume and page number.

d. Offerors shall verify that the information for all forms submitted are current, correct and complete including names of the points of contact, email address, fax number, and telephone number.

- e. Proposal Schedule, Volume I, Technical Proposal, shall be completed in full and shall consist of Factor 1, Experience, Factor 2, Personnel, Factor 3, Past Performance and Tab A Joint Venture agreement, if applicable.
- f. Proposal Schedule, Volume II, Price Proposal, shall be completed in full.
- g. Offerors shall submit a signed Offer Standard Form 1442 in Volume II for this solicitation, including verification of all amendments received.
- h. Offerors will be discouraged from submitting elaborate corporate marketing information, formatting, and special reproduction techniques.
- i. If additional information is provided, it shall be with regard to the solicitation requirements only.
- j. Failing to submit attachments may result in rejection of the offer without further evaluation. Therefore, Offerors are urged to follow instructions and contact the Contracting Officer via email with questions regarding the instructions.
- k. Contractors are cautioned against submitting conditional proposals, or submitting proposals that contain reservations. The Offeror should instead direct all questions and/or concerns to the Contracting Officer, in writing. Questions and/or comments received by the Contract Specialist later than five (5) calendar days prior to the proposal due date shall not be entertained.
- l. Proposal Expenses and Pre-Contract Costs: The solicitation does not commit the Government to pay any costs incurred in the preparation and submission of a proposal or for any other costs incurred by any firm submitting a proposal in response to these solicitations.
- m. Volume I shall be limited to no more than fifty (50) pages in length. Each page of Volume I shall be numbered sequentially. Use only 8 ½ by 11 inch paper or A4 paper submissions, unless another paper size is specifically authorized elsewhere in this section for a particular submission. Do not use fold-outs (e.g., 11" x 14" or 11" x 17" sheets) unless specifically authorized in this section for a particular submission. A standard, 11-point minimum font size applies. Arial or Times New Roman fonts are required. Tables and illustrations may use a reduced font size of not less than 8-point and may be landscape-oriented. The use of hyperlinks to electronic materials in the proposal is prohibited.
- n. Necessary charts and graphics may be larger than 8.5" x 11", but no larger than 11" x 17", and will count as one page. Charts and graphics should only contain the minimal text required to interpret the graphic (such as a concise caption or a map legend). Inclusion of excessive text on a graphic in an attempt to circumvent the page limitation will cause the graphic to be counted as more than one page.
- o. All page margins must be at least 1-inch wide, but may include headers and footers. All pages shall be numbered and correlate to proposal index. For submissions with page limitations, the pages will be counted as follows: One side of the paper is one page; information on both the back and front of one sheet of paper will be counted as two pages. Where authorized, fold-out pages (11" x 14" or 11" x 17") will count as one page. Pages furnished for organizational purposes only, such as a "Table of Contents" or divider tabs, are not included in the page limitation.
- p. The submission shall be clearly indexed and logically assembled. Each volume shall be clearly identified and shall begin at the top of a page. All pages of each volume shall be appropriately numbered and identified by the complete company name, date and solicitation number in the header and/or footer. A Table of Contents should be created.
- q. All information shall be confined to the appropriate file. The offeror shall confine submissions to essential matters, sufficient to define the proposal and provide adequate basis for evaluation. Offerors are responsible for including sufficient details, in a concise manner, to permit a complete and accurate evaluation of each proposal. Proprietary information shall be clearly marked as such.

4. Joint Ventures

a. When proposing as a joint venture, all members of the joint venture shall sign the SF 1442 and the financial surety instrument unless a written agreement by the joint venture is furnished with the proposal designating one firm with the authority to bind the other member(s) of the joint venture. In addition, a copy of the joint venture agreement shall be submitted with the proposal. Failure to comply with the foregoing requirements may eliminate the proposal from further consideration. The JV agreement will not count towards the 50 page limit.

b. If submitting a proposal as a Joint Venture, the experience, past performance, and management approach 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. Joint ventures shall submit the following additional documentation regarding their business entities:

1) A copy of their Joint Venture agreement in English.

2) A detailed statement outlining the following in terms of percentages, where appropriate.

i) The relationship of the joint venture parties in terms of business ownership, capital contribution, and profit distribution or loss sharing.

ii) The management approach of the joint venture in terms of who will conduct, direct, supervise and control the project and have custody and control of the assets of the joint venture and perform the duties necessary to complete the work.

iii) The structure of the joint venture and decision-making responsibilities of the joint venture parties in terms of who will control the manner and method of performance of the work.

iv) The bonding responsibilities of the joint venture parties.

v) Identification of the key personnel having authority to legally bind the joint venture to subcontracts and state who will provide or contract for the labor and materials for the joint venture.

vi) Identification of the key personnel having authority to legally bind the joint venture to subcontracts and state who will provide or contract for the labor and materials for the joint venture.

vii) Identification of party maintaining the joint venture bank accounts for the payment of all expenses and the deposits of all receipts, keep the books and records, and pay applicable taxes for the joint venture.

viii) Identification of party furnishing the facilities, such as office supplies and telephone service.

ix) Identification of party having overall control of the joint venture.

c. Other sections of the proposal shall identify, where appropriate, whether key personnel are employees of the individual joint venture entities and identify the entity, or hired as employees of the joint venture.

d. If one of the joint venture parties possesses relevant experience and/or past performance, the experience and/or past performance of that firm will be considered as the experience and/or past performance of the joint venture.

e. If the Joint Venture is not organized according to U.S. Law, the Government reserves the right to review the actual Joint Venture agreement to determine its basis.

f. A complete and legally binding document with all the information required under this section titled "Joint Ventures" shall be included.

JV Agreements shall clearly indicate the percentages of the JV participants, in particular the percent of the controlling party, a clear delineation of responsibilities and authorities between the JV parties, and provide that each party is jointly and severally liable for the performance of all contract requirements.

5. Certifications and Representations: Each offeror shall complete (including signatures) the solicitation sections indicated below using the file (without modification to the file) provided with the solicitation. An authorized official of the firm shall sign the SF 1442 and all certifications requiring original signature. An Acrobat PDF file shall be created to capture the signatures for submission.

- " Standard Form 1442 (SF 1442), Solicitation, Offer and Award
- " Contract Administration Data
- " Representations, Certifications and Other Statements of Offerors

6. Price Evaluation

The SSEB can evaluate price proposals independent of the technical/quality evaluation. The SSEB will not have access to price information until completion of the technical/quality evaluation.

The SSEB will evaluate and rate those proposals passing the first review, above. Proposals will be evaluated against the solicitation requirements. Factors will be rated either 'Acceptable' or 'Unacceptable'.

The resulting report shall document the findings in detail for each factor, and explain the rationale for elimination from further competition / evaluation. The SSEB Chair will prepare the written report, if a board is convened, or it will be prepared by the individual reviewer. The report will convey the evaluation findings to the SSA. The report must substantiate in language understandable to non-technical personnel that the evaluation has been conducted fairly and in accordance with the evaluation method and criteria specified in the solicitation. Supporting documentation must include individual evaluation worksheets and the consensus evaluation worksheets (if necessary) for each proposal. This documentation will be included in the contract file.

7. Discussions

Although not anticipated, in accordance with FAR 15.306(d), discussions with each offeror may be held. After completion of discussions with each offeror in the competitive range and in accordance with FAR 15.307(b), all offerors in the competitive range will be allowed a minimum of 3 calendar days to submit Final Proposal Revisions.

8. Site Visit

There will be no site visit for this project.

9. Bidder Inquiries/Questions

All questions and inquiries shall be submitted by email to: Derek.J.Draper2@usace.army.mil with a courtesy copy to tas.contracting@usace.army.mil.

Electronic (as email) inquiries to this solicitation must be received by this office not later than five (5) calendar days prior to the due date of proposals. Questions received less than five days prior to the due date of proposals will not be entertained.

Faxed Proposals, Modifications Thereto, Or Cancellations Will Not Be Accepted. However, offers may be withdrawn in writing by letter or e-mail. Any written notice to withdraw an offer sent to this office must be received in the office designated for receipt of offers not later than the exact date and time set for receipt of proposals.

Telephone Inquiries Will Not Be Accepted. Oral explanations or instruction are not binding. Any information given to an Offeror which impacts the solicitation and/or offer will be given in the form of a written amendment to the solicitation.

SECTION IV: EVALUATION FACTORS FOR AWARD

Proposals will be evaluated (in English) in accordance with the evaluation factors. The Government intends to evaluate and award this contract without discussions with offerors (except clarifications as described in FAR 15.306(a)). Therefore, Offerors are reminded to include their best technical and price terms in their initial offer and not to automatically assume that they will have an opportunity to participate in discussions or be asked to submit a revised offer. The Government reserves the right to conduct discussions, if the Contracting Officer later determines them to be necessary.

Volume I - Technical and Performance Capability:

Factor 1	Experience;
Factor 2	Personnel;
Factor 3	Past Performance;
Tab A	Joint Venture Agreement (if applicable)

Volume II - Price:

Tab A	Standard Form 1442;
Tab B	Section 00010, Proposal Bid Schedule;
Tab C	Representations and Certifications.

1. Volume I - Technical and Past Performance Capability
 - a. Factor 1 - Experience: Submission Requirements

The offeror shall submit a minimum of three (3) but no more than five (5) "Prime Contractor Experience" forms (Appendices Form A-1) attached to the end of this section. The forms shall be used to provide descriptions of projects which show PRIME CONTRACTOR experience with the features/activities delineated in below.

In order to receive an "ACCEPTABLE" rating for this evaluation factor, the projects submitted must satisfy ALL of the following requirements:

- 1) The Offeror must have been the Prime Contractor on all projects submitted. To meet Prime Contractor Experience, a Prime Contractor must have self performed, on site at least 25% of the direct contract labor, exclusive of other general condition or field overhead personnel, material, equipment, design or subcontractors.
- 2) AT LEAST ONE (1) project shall demonstrate experience building airfield facilities including aircraft aprons, runways, taxiways or similar large paved concrete facilities in excess of \$5,000,000.
- 3) AT LEAST ONE (1) of the projects used to demonstrate design/build of aircraft aprons, runways, taxiways or similar large paved concrete facility.
- 4) AT LEAST ONE (1) project must demonstrate successful experience building on a controlled access site and experience with flight line access restrictions and requirements.
- 5) AT LEAST ONE (1) project used to demonstrate experience must have been completed within the last 3 years from the date of this solicitation.

One project can be used to satisfy multiple features or activities. Each offeror is required to submit at least three (3) but not more than five (5) 'Prime Contractor Experience' forms. Regardless of the number of forms submitted (not to exceed 4), the offeror must demonstrate all of the above features/activities (items 1 through 5).

An IDIQ contract may be submitted only if a single task order could be considered similar to this project. Task orders may not be combined in order to satisfy the features/activities delineated in above.

NOTE: The Prime Contractor is defined as the contractor identified in Block 14 of the Standard Form 1442. If more than one contractor is listed in Block 14, then a signed joint venture must be submitted with the proposal.

Factor 1 - Experience: Evaluation Criteria

"ACCEPTABLE" Rating:

The SSEB will evaluate experience submitted per Section 1.a. The proposal must clearly meet all of the minimum experience requirements identified in Section 1.a to receive an 'Acceptable' rating.

"UNACCEPTABLE" Rating:

Proposals that do not include substantial evidence that the offeror has experience to successfully construct the proposed project will be considered to not meet the minimum requirements of the solicitation and will be rated an 'Unacceptable'. Substantial evidence is defined as written documentation demonstrating the experience required in Section 1.a.

All blocks of the 'Prime Contractor Experience' form (Appendices: Form A1) must be completed, and all data must be accurate, current, and verifiable. Failure to provide a current and accurate point of contact on the 'Prime Contractor Experience' form may render the form and the project as unacceptable.

The Government reserves the right to contact the references listed on the submitted forms in order to verify the information submitted.

b. Factor 2 – Personnel: Submission Requirements

The offeror shall provide resumes for the following key personnel (note, key personnel resumes shall not exceed two pages per key personnel):

- 1) Overall Project Manager;
- 2) Construction Superintendent;
- 3) Quality Control Manager;
- 4) Senior Electrical Engineer, and;
- 5) Senior Civil Engineer

Overall Project Manager, Construction Superintendent and Quality Control Manager shall have:

- a. The key personnel resume shall demonstrate a minimum of 5 years of relevant experience in their assigned job position on this project as it relates to Design/Build and/or Site Adapt construction projects;
- b. Provide documentation identifying each person as a current full-time employee of the Prime Contractor or a letter of intent signifying their employment for this project; and
- c. FOR OVERALL PROJECT MANAGER ONLY: In addition to Section IV 1 b, also provide documentation by transcript or otherwise evidencing a 4-year college degree from an accredited university.

The key personnel resume for Senior Electrical and Senior Civil Engineer shall:

- a. Demonstrate that the Senior Electrical and Senior Civil Engineers have a minimum 10 years of relevant experience in their assigned job position on this project as it relates to Design/Build and/or Site Adapt construction projects AND must be a professional engineer with an active professional registration in their home of record (HOR). Provide documentation in the form of a certificate or otherwise evidencing a professional license number or registration. If the HOR country does not possess a professional registration practice, the key personnel resume must demonstrate a minimum of 15 years of relevant experience in their assigned job position on this project as it relates to Design/Build and/or Site Adapt construction projects;
- b. Provide documentation identifying each person as a current full-time employee of either the Prime Contractor or sub-contractor or a letter of intent signifying their employment for this project; and,
- c. Provide documentation by transcript or otherwise evidencing a 4-year college Bachelor of Science or Engineering degree from an accredited university in the respective field of study and assigned job position.

Resumes must include the information on 'Personnel Resume/Experience' form attached at the end of this section. All information must be filled in and all data should be accurate, current, and complete.

NOTE: Identified personnel must be used on the project. Any substitution of identified persons will not be permitted without prior approval of the Contracting Officer. Identification of two individuals proposed for a single position will result in the evaluation of only the least qualified person. A single individual cannot be identified as 'key personnel' for more than one 'key personnel' position.

a. Factor 2 – Personnel: Evaluation Criteria

“ACCEPTABLE” Rating:

The SSEB will evaluate the resumes of the Key Personnel submitted per Section IV 1.b. The proposal must clearly meet all of the minimum experience requirements identified in Section IV 1.b to receive an 'Acceptable' rating.

“UNACCEPTABLE” Rating:

Proposals that fail to include substantial evidence that the offeror can provide key personnel with the qualifications and relevant experience will be considered to not meet the minimum requirements of the solicitation and will be rated an 'Unacceptable'. Substantial evidence is defined as written documentation demonstrating the qualification required in Section IV 1.b.

d. Factor 3 - Past Performance: Submission Requirements

The offeror shall provide past performance information in one of two formats for each project provided under Factor 1 - Experience.

(1) Copies of Contractor Performance Assessment Reports (CPARs - also commonly referred to as CCASS reports) for projects performed for the U.S. Government. If the project provided has a CPAR, it must be used by the offeror to demonstrate past performance. If CPAR submission is used to validate past performance, it will be the

most recent evaluation in the system (i.e. for projects submitted as completed, the final 100% completed CPAR will be provided). If the offeror submits a CPAR, they are not required to submit a separate Past Performance Questionnaire for the specific project.

(2) If CPAR information is not available for a project provided for experience, a completed Past Performance Questionnaire (PPQ), attached at the end of this section (Form PPQ-0) must be provided per the following guidance:

- a. The Past Performance Questionnaire included in the solicitation is provided for the offeror to submit to the client for each project the offeror includes in its proposal for Factor 1 (Experience). Ensure correct phone numbers and email addresses are provided for the client point of contact.
- b. Completed Past Performance Questionnaires should be submitted with your proposal. If the offeror is unable to obtain a completed PPQ from a client for a project(s) before proposal closing date, the offeror should still submit Form PPQ-0 with their proposal, only with blocks 1-6 filled out, which will provide contract and client information for the respective project(s).
- c. Offerors should follow-up with clients/references to ensure timely submittal of questionnaires. If the client requests, questionnaires may be submitted directly to the Government's point of contact, LTC Derek Draper at Derek.J.Draper2@usace.army.mil, prior to the proposal closing date. Offerors shall not incorporate by reference into their proposal PPQs previously submitted for other RFPs. However, this does not preclude the Government from utilizing previously submitted PPQ information in the past performance evaluation.

It is the offeror's responsibility to ensure the Government will be able to contact the POCs using the contact information provided. Offerors are encouraged to send their request to the POC as soon as possible once a project is identified for experience under Factor 1.

The offeror may also include performance recognition documents received within the last 3 years such as awards, award fee determinations, customer letters of commendation, and any other forms of performance recognition.

In addition to the above, the Government may review any other sources of information for evaluating past performance. Other sources may include, but are not limited to, past performance information retrieved through the Past Performance Information Retrieval System (PPIRS), including Contractor Performance Assessment Reporting System (CPARS), using all CAGE/DUNS numbers of team members (partnership, joint venture, teaming arrangement, or parent company/subsidiary/affiliate) identified in the offeror's proposal, inquiries of owner representative(s), Federal Awardee Performance and Integrity Information System (FAPIS), and any other known sources not provided by the offeror.

While the Government may elect to consider data from other sources, the burden of providing detailed, current, accurate and complete past performance information rests with the Offeror.

e. Factor 3 - Past Performance: Evaluation Criteria

The Source Selection Evaluation Board (SSEB) will evaluate past performance information received as follows:

"ACCEPTABLE" Rating

Based on the offeror's performance record, the Government has a reasonable expectation that the offeror will successfully perform the required effort, or the offeror's performance record is unknown.

"UNACCEPTABLE" Rating

Based on the offeror's performance record, the Government has no reasonable expectation that the offeror will be able to successfully perform the required effort.

Note: In the case of an offeror without a record of relevant past performance or for whom information on past performance is not available or so sparse that no meaningful past performance rating can be reasonably assigned, the offeror may not be evaluated favorably or unfavorably on past performance (see FAR 15.305 (a)(2)(iv)). Therefore, the offeror shall be determined to have unknown past performance. In the context of acceptability/unacceptability, "unknown" shall be considered "acceptable" or an "ACCEPTABLE".

Tab A, Joint Venture Agreement (if applicable), Submission Requirements

If the Offeror is a Joint Venture (JV), include a copy of the JV Agreement. If a JV Agreement has not yet been finalized / approved, indicate its status.

The JV Agreement will not count towards the 50-page limit.

OVERALL TECHNICAL ACCEPTABILITY

If a proposal is found to be technically unacceptable in any one of the three evaluated areas (experience, personnel or past performance), this will render the proposal as technically unacceptable overall, and the offer will be removed from further consideration for award

2. Volume II - Price

a. Tab A, Standard Form 1442: Submission Requirements

The offeror shall submit Standard Form 1442. This form is included in Section 00010 of this SOLICITATION. This submittal must be in a separate electronic file or a separate sealed envelope (if submitting hardcopy proposals).

b. Tab A, Standard Form 1442: Evaluation Criteria

Standard form 1442 is to be completed, to include Block #19 Acknowledgement of Amendments (if applicable), and duly executed with an original signature by an official authorized to bind the company in accordance with FAR 4.102.

c. Tab B, section 00010, Proposal Bid Schedule: Submission Requirements

The Offeror shall complete and submit in its entirety Section 00010, Proposal Bid Schedule. This form is included in Section 00010 of the SOLICITATION.

d. Tab B, section 00010, Proposal Bid Schedule: Evaluation Criteria

The total price (Proposal Bid Schedule) will be evaluated by the SSEB for reasonableness, completeness and unbalanced pricing through the use of cost and or price analysis.

e. Tab C, Representations and Certifications: Submission Requirements

Each offeror shall complete all representations and certifications in Section 00600.

3. Source Selection Decision

The Source Selection Authority (SSA) will make an independent source selection decision using the findings presented by the SSEB. The SSA is not necessarily bound by the evaluation findings of the SSEB and reserves the right to review all available resources such as the Past Performance Information Management System (PPIMS), Past Performance Information Retrieval System (PPIRS), Federal Awardee Performance Information & Integrity System (FAPIS), or any other databases or sources available to establish the overall acceptability of an offer using price and non-price factors prior to making award.

4. Responsibility Determination

Prior to actual award of the Contract, the Government will conduct an independent responsibility review of the apparent successful offer in accordance with the provision of FAR Subpart 9.1

Enclosures:

1. Prime Contractor Experience Form A-1
2. Personnel Resume/Experience Form A-2
3. Past Performance Questionnaire (PPQ-0)

ATTACHMENT 1, Form A1, CONTRACTOR EXPERIENCE FORM

Your firm's name

Project name and project location (city, state, country)

Project owner's name (government agency, commercial firm, or other organization)

Project owner's complete address

Your company's role (prime contractor, joint venture, subcontractor) _____

Percentage of work your company performed: _____%

Contract number for this project: _____

Contract value, at time of award \$ _____

Final invoiced amount (or amount invoiced to date): \$ _____

Relevant dates

Date of contract: _____

Date work began: _____

Completion date, initial: _____

Completion date, actual: _____

Points of contact

English-speaking technical point of contact for the project owner

Name and title _____

Email address _____

Phone number _____

English-speaking technical point of contact for the project owner

Name and title _____

Email address _____

Phone number _____

Description of construction contract work

- Describe detailed nature and scope of work.
- Detail how the project demonstrates experience requirements in Section 00113, Section IV, Paragraph 1. a.
- Also include an explanation of any performance problems or other conflicts with the customer. (Offerors will be evaluated for the ability to provide timely, complete work; be certain to explain any differences between the initial and actual completion dates above.)
- Use continuation sheet for additional information, if necessary.

Current status of the project (check one)

- Work continuing, on schedule
- Work continuing, behind schedule
- Work completed, no further action pending
- Work completed, routine administrative action pending
- Work completed, claims negotiation pending/underway
- Work completed, litigation pending/underway
- Terminated for convenience
- Terminated for default
- Other (Explain, use additional sheets as necessary)

- End of Contractor Experience Form -

ATTACHMENT 2

PERSONNEL RESUME/EXPERIENCE

Name and Title _____

Name of your firm _____

No. of years: Presently with this firm _____ With other firms _____

No. of years in field of work: _____

Education (School/Degree(s)/Year/Specialization):

Registration/Accreditation: _____ YES _____ NO*

License No. _____ Country/State _____ Year _____

***Note: If the HOR country does not possess a professional registration practice, the key personnel resume must demonstrate a minimum of 15 years of relevant experience in their assigned job position.**

Your Assignment on this project

Your specific experience and qualifications relevant to this project. Include a POC with phone number for the two most recent projects described:

Project Name and Location: _____

General Scope of Project:

Your Role in the Project and a Description of the Duties You Performed:

ATTACHMENT 3

NAVFAC/USACE PAST PERFORMANCE QUESTIONNAIRE (Form PPQ-0)	
CONTRACT INFORMATION (Contractor to complete Blocks 1-4)	
1. Contractor Information	
Firm Name:	CAGE Code:
Address:	DUNs Number:
Phone Number:	
Email Address:	
Point of Contact:	Contact Phone Number:
2. Work Performed as: <input type="checkbox"/> Prime Contractor <input type="checkbox"/> Sub Contractor <input type="checkbox"/> Joint Venture <input type="checkbox"/> Other (Explain)	
Percent of project work performed:	
If subcontractor, who was the prime (Name/Phone #):	
3. Contract Information	
Contract Number:	
Delivery/Task Order Number (if applicable):	
Contract Type: <input type="checkbox"/> Firm Fixed Price <input type="checkbox"/> Cost Reimbursement <input type="checkbox"/> Other (Please specify):	
Contract Title:	
Contract Location:	
Award Date (mm/dd/yy):	
Contract Completion Date (mm/dd/yy):	
Actual Completion Date (mm/dd/yy):	
Explain Differences:	
Original Contract Price (Award Amount):	
Final Contract Price (<i>to include all modifications, if applicable</i>):	
Explain Differences:	
4. Project Description:	
Complexity of Work <input type="checkbox"/> High <input type="checkbox"/> Med <input type="checkbox"/> Routine	
How is this project relevant to project of submission? (<i>Please provide details such as similar equipment, requirements, conditions, etc.</i>)	
CLIENT INFORMATION (Client to complete Blocks 5-8)	
5. Client Information	
Name:	
Title:	
Phone Number:	
Email Address:	
6. Describe the client's role in the project:	
7. Date Questionnaire was completed (mm/dd/yy):	
8. Client's Signature:	

NOTE: NAVFAC/USACE REQUESTS THAT THE CLIENT COMPLETES THIS QUESTIONNAIRE AND SUBMITS DIRECTLY BACK TO THE OFFEROR. THE OFFEROR WILL SUBMIT THE COMPLETED QUESTIONNAIRE TO USACE WITH THEIR PROPOSAL, AND MAY DUPLICATE THIS QUESTIONNAIRE FOR FUTURE SUBMISSION ON USACE SOLICITATIONS. CLIENTS ARE HIGHLY ENCOURAGED TO SUBMIT QUESTIONNAIRES DIRECTLY TO THE OFFEROR. HOWEVER, QUESTIONNAIRES MAY BE SUBMITTED DIRECTLY TO USACE. PLEASE CONTACT THE OFFEROR FOR USACE POC INFORMATION. THE GOVERNMENT RESERVES THE RIGHT TO VERIFY ANY AND ALL INFORMATION ON THIS FORM.

**ADJECTIVE RATINGS AND DEFINITIONS TO BE USED TO BEST REFLECT
YOUR EVALUATION OF THE CONTRACTOR'S PERFORMANCE**

RATING	DEFINITION	NOTE
(E) Exceptional	Performance meets contractual requirements and exceeds many to the Government/Owner's benefit. The contractual performance of the element or sub-element being assessed was accomplished with few minor problems for which corrective actions taken by the contractor was highly effective.	An Exceptional rating is appropriate when the Contractor successfully performed multiple significant events that were of benefit to the Government/Owner. A singular benefit, however, could be of such magnitude that it alone constitutes an Exceptional rating. Also, there should have been NO significant weaknesses identified.
(VG) Very Good	Performance meets contractual requirements and exceeds some to the Government's/Owner's benefit. The contractual performance of the element or sub-element being assessed was accomplished with some minor problems for which corrective actions taken by the contractor were effective.	A Very Good rating is appropriate when the Contractor successfully performed a significant event that was a benefit to the Government/Owner. There should have been no significant weaknesses identified.
(S) Satisfactory	Performance meets minimum contractual requirements. The contractual performance of the element or sub-element contains some minor problems for which corrective actions taken by the contractor appear or were satisfactory.	A Satisfactory rating is appropriate when there were only minor problems, or major problems that the contractor recovered from without impact to the contract. There should have been NO significant weaknesses identified. Per DOD policy, a fundamental principle of assigning ratings is that contractors will not be assessed a rating lower than Satisfactory solely for not performing beyond the requirements of the contract.
(M) Marginal	Performance does not meet some contractual requirements. The contractual performance of the element or sub-element being assessed reflects a serious problem for which the contractor has not yet identified corrective actions. The contractor's proposed actions appear only marginally effective or were not fully implemented.	A Marginal is appropriate when a significant event occurred that the contractor had trouble overcoming which impacted the Government/Owner.
(U) Unsatisfactory	Performance does not meet most contractual requirements and recovery is not likely in a timely manner. The contractual performance of the element or sub-element contains serious problem(s) for which the contractor's corrective actions appear or were ineffective.	An Unsatisfactory rating is appropriate when multiple significant events occurred that the contractor had trouble overcoming and which impacted the Government/Owner. A singular problem, however, could be of such serious magnitude that it alone constitutes an unsatisfactory rating.
(N) Not Applicable	No information or did not apply to your contract	Rating will be neither positive nor negative.

**PERFORMANCE EVALUATION
TO BE COMPLETED BY CLIENT**

PLEASE CIRCLE THE ADJECTIVE RATING WHICH BEST REFLECTS YOUR EVALUATION OF THE CONTRACTOR'S PERFORMANCE.						
1. QUALITY:						
a) Quality of technical data/report preparation efforts	E	VG	S	M	U	N
b) Ability to meet quality standards specified for technical performance	E	VG	S	M	U	N
c) Timeliness/effectiveness of contract problem resolution without extensive customer guidance	E	VG	S	M	U	N
d) Adequacy/effectiveness of quality control program and adherence to contract quality assurance requirements (without adverse effect on performance)	E	VG	S	M	U	N
2. SCHEDULE/TIMELINESS OF PERFORMANCE:						
a) Compliance with contract delivery/completion schedules including any significant intermediate milestones. <i>(If liquidated damages were assessed or the schedule was not met, please address below)</i>	E	VG	S	M	U	N
b) Rate the contractor's use of available resources to accomplish tasks identified in the contract	E	VG	S	M	U	N
3. CUSTOMER SATISFACTION:						
a) To what extent were the end users satisfied with the project?	E	VG	S	M	U	N
b) Contractor was reasonable and cooperative in dealing with your staff (including the ability to successfully resolve disagreements/disputes; responsiveness to administrative reports, businesslike and communication)	E	VG	S	M	U	N
c) To what extent was the contractor cooperative, businesslike, and concerned with the interests of the customer?	E	VG	S	M	U	N
d) Overall customer satisfaction	E	VG	S	M	U	N
4. MANAGEMENT/ PERSONNEL/LABOR						
a) Effectiveness of on-site management, including management of subcontractors, suppliers, materials, and/or labor force?	E	VG	S	M	U	N
b) Ability to hire, apply, and retain a qualified workforce to this effort	E	VG	S	M	U	N
c) Government Property Control	E	VG	S	M	U	N
d) Knowledge/expertise demonstrated by contractor personnel	E	VG	S	M	U	N
e) Utilization of Small Business concerns	E	VG	S	M	U	N
f) Ability to simultaneously manage multiple projects with multiple disciplines	E	VG	S	M	U	N
g) Ability to assimilate and incorporate changes in requirements and/or priority, including planning, execution and response to Government changes	E	VG	S	M	U	N
h) Effectiveness of overall management (including ability to effectively lead, manage and control the program)	E	VG	S	M	U	N

5. COST/FINANCIAL MANAGEMENT	
a) Ability to meet the terms and conditions within the contractually agreed price(s)?	E VG S M U N
b) Contractor proposed innovative alternative methods/processes that reduced cost, improved maintainability or other factors that benefited the client	E VG S M U N
c) If this is/was a Government cost type contract, please rate the Contractor's timeliness and accuracy in submitting monthly invoices with appropriate back-up documentation, monthly status reports/budget variance reports, compliance with established budgets and avoidance of significant and/or unexplained variances (under runs or overruns)	E VG S M U N
d) Is the Contractor's accounting system adequate for management and tracking of costs? <i>If no, please explain in Remarks section.</i>	Yes No
e) If this is/was a Government contract, has/was this contract been partially or completely terminated for default or convenience or are there any pending terminations? <i>Indicate if show cause or cure notices were issued, or any default action in comment section below.</i>	Yes No
f) Have there been any indications that the contractor has had any financial problems? <i>If yes, please explain below.</i>	Yes No
6. SAFETY/SECURITY	
a) To what extent was the contractor able to maintain an environment of safety, adhere to its approved safety plan, and respond to safety issues? (Includes: following the users rules, regulations, and requirements regarding housekeeping, safety, correction of noted deficiencies, etc.)	E VG S M U N
b) Contractor complied with all security requirements for the project and personnel security requirements.	E VG S M U N
7. GENERAL	
a) Ability to successfully respond to emergency and/or surge situations (including notifying COR, PM or Contracting Officer in a timely manner regarding urgent contractual issues).	E VG S M U N
b) Compliance with contractual terms/provisions (<i>explain if specific issues</i>)	E VG S M U N
c) Would you hire or work with this firm again? (<i>If no, please explain below</i>)	Yes No
d) In summary, provide an overall rating for the work performed by this contractor.	E VG S M U N

-- END OF PAST PERFORMANCE QUESTIONNAIRE --

(End of Summary of Changes)



**US Army Corps
of Engineers**
Middle East District



TETRA TECH

SOF HELICOPTER APRON HERAT, AFGHANISTAN

W519LE-12-R-0007

Technical Specifications

Submitted to:

USACE Middle East District
201 Prince Frederick Drive
Winchester, VA 22602

Prepared by:

Tetra Tech
One Grant Street
Framingham, MA 01701

Amendment #1
December 7, 2011

AMENDMENT #1
TECHNICAL SPECIFICATIONS
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SECTION 01 80 00.12 10

TECHNICAL REQUIREMENTS

PART 1 GENERAL

1.1 Contractor's Design and Construction

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.

1.1.1 Design and Product Requirements

These design and product requirements are minimum requisites. Variations shall be submitted in accordance with Section 01 33 00.12 10 entitled SUBMITTAL PROCEDURES FOR DESIGN-BUILD PROJECT. All variations must be approved by the Contracting Officer. Unless otherwise specified, all of the materials and equipment to be installed in this project shall comply with a recognized standard for the intended use. The Unified Master Reference List for ASTM, ASME, etc., located at www.ccb.org/docs/ufgshome/ufgstoc.htm identifies the titles and approval dates.

1.1.2 Asbestos Containing Materials

Asbestos containing material (ACM) will 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.

1.1.3 Limitation of Working Space

The Contractor shall, except where required for service connections or other special reasons 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.

1.1.4 Subcontractors

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

1.1.5 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. All utilities required to support temporary structures during the contract period of performance shall be provided by the Contractor.

1.2 Specifications

All specifications except for those included in this RFP shall be developed by the Contractor in accordance with this section and Section 01 33 00.12 10. The specifications included in this RFP shall be used verbatim and not edited by the Design-Build Contractor.

1.3 Site Conditions

- (a) Site Location: Herat Airfield, Herat, Afghanistan.
- (b) Site Elevation: 984 Meters, Above Sea Level.
- (c) Ambient Temperatures: Summer 39 degree C; winter -2.0 degree C.
- (d) Maximum 39 degrees C dry bulb, 23.9 degrees C wet bulb.
- (e) Atmospheric Conditions: Dry and Dust-laden.

2. CIVIL AND SITE DEVELOPMENT

2.1 General.

The contractor shall perform design and construction services as required to provide a complete and usable site at the location shown on the drawings. The site requires some demolition, access roads, connection of utilities, and a fire suppression system with water capacities as indicated in the following sections.

The civil site development includes the following items of work:

- a. Topographic Survey
- b. Environmental Protection
- c. Demolition
- d. Utility Infrastructure - Design & Construct
- e. Grading and Drainage - Design & Construct
- f. Pavements and Siting - Design & Construct

2.2 Drawings.

The civil designs shall be based on Unified Facilities Criteria/United States Air Force/Army Technical Manuals, the references listed below, or other approved standards. All required documents, including drawings, specifications, and design analysis, shall be prepared in accordance with Section 03 33 00.12 10 SUBMITTAL PROCEDURES FOR DESIGN-BUILD PROJECT. The design analysis shall include detailed calculations, additional information required to clearly define the project, and the information listed below, when applicable. The Contractor shall review the details provided and make adjustments, if necessary, before applying them to the project.

The RFP drawings include a general site location plan, demolition, site plan, pavement marking, pavement section and pavement details. The site plan provided in the RFP indicates approximate existing conditions and shall be verified by the contractor with a complete topographic survey of the site prior to starting design.

Existing and proposed utility locations are subject to verification by the Contractor and approval of the Contracting Officer. In addition to all other required Civil plans and details the D-B contractor shall provide plans and details for Aircraft Mooring and Grounding Points.

2.3 Design Criteria.

USACE Middle East District Design Instructions Manual,

Pavement-Transportation Computer Assisted Structural
Engineering (PCASE) Program, v2.08. <http://www.pcase.com>

UNIFIED FACILITIES CRITERIA (UFC)

Uniform Facility Criteria (UFC) documents are available on the Internet at
<http://www.hnd.usace.army.mil/techinfo/engpubs.htm>

UFC 3-210-01A (2004) Area Planning, Site Planning, and Design

UFC 3-210-06A (2004) Site Planning and Design

UFC 3-230-01 (2006) Surface Drainage Design (FAA AC150/5320-5C)

UFC 3-230-06A (2004) Subsurface Drainage Design

UFC 3-210-02 (2004) POV Site Circulation and Parking

UFC 3-240-04A (2004) Water Supply: Water Distribution

UFC 3-250-01FA (2004) Pavement Design for Roads, Streets, Walks and Open
Storage Areas

UFC 3-250-3 (2001) Standard Practice Manual for Flexible Pavements

UFC 3-250-04FA (2004) Standard Practice Manual for Concrete Pavements

UFC 3-250-07 (2004) Standard Practice for Pavement Recycling

UFC 3-250-08FA (2004) Standard Practice for Sealing Joints and Cracks in
Rigid and Flexible Pavements

UFC 3-250-11 (2004) Soil Stabilization for Pavements

UFC 3-250-18FA General Provisions and Geometric Design for Roads, Streets.
(2004) Walks, and Open Storage Areas

UFC 3-260-01 (2008) Airfield and Heliport Planning and Design

UFC 3-260-02 (2001) Pavement Design for Airfields

UFC 3-535-01 (2005) Visual Air Navigation Facilities

UFC 3-535-02 (2002) Design Drawings for Visual Air Navigation Facilities

UFC 3-600-01 (2006) Fire Protection Engineering for Facilities

AIR FORCE ENGINEERING TECHNICAL LETTER (ETL)

ETL 01-20 (2001) Guidelines for Airfield Frangibility Zones

ETL 02-15 (2002) Fire Protection Engineering Criteria Letter
New Aircraft Facilities

ETL 04-02 (2004) Standard Airfield Pavement Marking Schemes

AIR FORCE TECHNICAL LETTER (TL)

TL 04-4-1 (2004) Trenchless Technology (TT) for Crossing Air Force

Pavements

AIR FORCE TECHNICAL INSTRUCTION (AFI)

AFI 32-1042 (2005) Standards for Marking Airfield

ARMY TECHNICAL INSTRUCTION (TI)

TI 8-222-08 (1999) Standard Practice Manual for Flexible Pavements

ARMY FIELD MANUAL (FM)

FM 5-430-00-2 (2006) Planning and Design of roads, airfields and
Heliports in the Theater of Operations - Airfield and Heliport
Design

ARMY ENGINEERING TECHNICAL LETTER (ETL)

ETL 1110-3-394 (1991) Aircraft Characteristics for Airfield-Heliport Design
and Evaluation

AMERICAN CONCRETE INSTITUTE (ACI)

ACI 318 (2008) Building Code Requirements for Structural Concrete

ACI 305R (1999) Hot Weather Concrete

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7 (2005) Minimum Design Loads for Buildings and Other Structures

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 615 (2007) Deformed and Plain Billet-Steel Bars for Concrete
Reinforcement

ASTM A 185 (2007) Steel Welded Wire Fabric, Plain for
Concrete Reinforcement,

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 325 Steel Construction Manual, 13th Edition

INTERNATIONAL CODE COUNCIL INCORPORATED

IBC (2009) International Building Code

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 415 (2008) Standard on Airport Terminal Buildings, Fueling Apron
Drainage, and Loading Walkways

USCENTCOM FORCE PROTECTION STANDARDS

OPORD 05-0 Force Protection Construction Standards (Appendix V)

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

LRFD Bridge Design Specifications, 5th Edition with 2010 Interim Revision

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO)

ICAO Annex 14, Aerodromes, Volume 1 Aerodrome Design and Operations.

2.4 Studies Supporting the Final Design

To accomplish the work contained in this RFP, the contractor is required to publish design studies to document the existing site conditions before proceeding with the design and construction of the facilities and pavements. Included in this work are a topographic survey, a geotechnical survey and a hydrologic study. Report formats are listed in Section 01 33 00.12 10 SUBMITTAL PROCEDURES FOR DESIGN-BUILD PROJECT.

2.4.1 Site Survey.

Following the criteria in Appendix "A" of this section and submitted in accordance with Section 01 33 00.12 10 SUBMITTAL PROCEDURES FOR DESIGN-BUILD and attachments to Appendix "A" of this section, a survey shall be produced of the project site.

Upon completion of the construction, the original survey shall be updated with an as-built survey of the site as constructed. The as-built survey shall be submitted to the COR for approval.

The original and as-built survey shall include location and elevation of all relevant existing site features within the project limits. This includes the elevation and location of buildings (new and existing), roadways, pads, other structures, drainage systems, and utilities (subsurface and overhead) within 5 meters of the project sites.

2.4.2 Hydrologic Study

The Contractor shall investigate and assess the adequacy of the existing drainage systems to handle the runoff from the drainage areas that surround the project sites.

The Contractor shall analyze the 10-year and 100-year storm event and determine the ponding volumes, areas and elevations. The Contractor shall calculate in tabular form the hydraulic grade line (HGL) as described in UFC 3-230-01 section 6-4. If the 100-year storm event results in ponding in excess of criteria, storm water detention shall be provided as necessary to meet pending criteria. Detention shall be located away from the airfield to the extent possible.

2.4.3 Geotechnical Study

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. Additional requirements are contained in paragraph 5.0 below.

2.5 Environmental Protection

2.5.1 Applicable Regulations

The Contractor shall comply with all laws, rules, regulations or standards concerning environmental pollution control and abatement at Herat Airfield.

2.5.2 Notification

The Contracting Officer will notify the Contractor in writing of any observed non-compliance with the paragraph entitled ENVIRONMENTAL PROTECTION. 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.

2.5.3 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.

Any spill that threatens or enters the sewer system should be reported immediately to the Fire Department. These spills can be categorized in two (2) groups: hazardous chemicals and other materials (e.g., paint, tar). The other materials, as well as the hazardous materials, may have potential negative impact to the environment, as well, specifically to the storm water system. Any type of spill shall be reported to the Fire Department.

2.5.4 Disposal

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

2.6 Hazardous Materials and Contamination

The Government does not anticipate that the Contractor will be required to remove or dispose of any hazardous materials or waste during the site preparation phase of this project.

2.7 Topographic Survey

2.7.1 Topographic Survey

The Contractor shall perform a topographic survey and establish all necessary permanent bench marks for vertical and horizontal controls. The Contractor shall perform all necessary topographic surveying/mapping as required for the design of the site, grading, utilities, roads, etc. The topographic survey shall be performed in accordance with Appendix "A" and associated attachments. The topographic survey shall be submitted in accordance with Section 01 33 00.12 10 SUBMITTAL PROCEDURES FOR DESIGN-BUILD PROJECT. Contractor shall establish permanent bench marks.

Upon completion of the construction, the original survey shall be updated

with an as-built survey of the site as constructed. The as-built survey shall be submitted to the COR for approval.

The original and as-built survey shall include location and elevation of all relevant existing site features within the project limits. This includes the elevation and location of buildings (new and existing), roadways, and pads, other structures, drainage systems, and utilities (subsurface and overhead) within 5 meters of the project sites.

2.8 Demolition and Removal.

If demolition is required, the contractor shall submit a demolition plan including a schedule, haul routes, and storage areas. The demolition plan shall be submitted 30 days prior to commencement of work. The work includes demolition and removal of resulting rubbish and debris. Rubbish and debris shall be removed daily, unless otherwise directed, to avoid accumulation at the demolition site, do not allow accumulations inside or outside the buildings.

The Contractor shall stake-out the project boundaries before starting work. Existing utilities that interfere with this project will be relocated. At all times during demolition the integrity of the flight line perimeter shall be maintained through the use of suitable temporary protective measures in any areas where existing fence has been removed and new fence is not complete. Rubbish and debris shall be removed daily, unless otherwise directed, to avoid accumulation at the demolition site, do not allow accumulations inside or outside the buildings.

Any demolition debris shall be removed from the site. The COR will designate a site off base. Debris shall be removed and transported in a manner that prevents spillage on streets or adjacent areas.

In the interest of occupational safety and health, the work shall be performed in accordance with EM 385-1-1, Section 23, Demolition and other applicable Sections. In the interest of conservation, salvage shall be pursued to the maximum extent possible. Use of explosives will not be permitted. Existing structures shall be removed to include the foundations. The resulting excavation will be brought back to natural grade with fill material.

Double saw cut and remove concrete and asphaltic concrete paving and slabs including aggregate base as necessary. Provide neat saw cuts at limits of pavement removal as necessary. Pavements shall be removed in a manner such to ensure no damage to adjacent existing pavements that will remain in place. Adjoining airfield pavements shall be cut to full depth for the entire length of contact with the proposed pavements and jointed as needed.

2.9 Excavation

Any hand digging, driving of pickets or excavation of any kind requires a Dig Permit. If work requires digging, the Contractor must obtain a digging permit from the Contracting Officer.

When digging must be done, backfill the resulting hole/trench with clean fill or material as described in the Government provided specification or Contractor provided specification as applicable, at the earliest opportunity. If digging is to be done manually, then the Contractor must submit Site Specific Safety and Health Plan (SSHP) which meets EM 385-1-1, Section 28.

2.10 New Site Design and Construction.

The concept site plan drawings present a suggested geometric layout for the site work. The Contractor shall design the site features shown on the Site Plan and otherwise specified in the RFP. This site plan includes the approximate location of the apron utility area which includes fire pump house, generators, fuel tank and shelters. This schematic design must be verified by the contractor. The final site is to supply parking for six (6) CH-47 helicopters, plus two (2) C-12 aircraft.

The Contractor shall ensure the facilities are sited in compliance with the attached drawings and additional requirements stated herein.

Airfield pavement geometrics shall be in accordance with UFC 3-260-01, FM 5-430-00-2 and ETL 1110-3-394 and other manufacturer's manuals. Vehicle pavement geometrics shall be in accordance with UFC 3-210-02. Templates showing the turning movements for design aircraft that are published in the ETL-1110-3-394 Aircraft Turning Diagrams shall be included in design submittals. Design site entrances, exits, service drives, and special circulation areas to accommodate the turning radius of the controlling aircraft. Provide the aircraft clearances that are required in the UFC 3-260-01 Airfield and Heliport Planning and Design manual. The design aircraft for this site's geometric properties shall be the CH-47 for the rotary wing and C-12 for the fixed wing aircraft.

The site plan prepared by the Contractor shall show geometric design of the site, including applicable dimensions of facilities, taxiways, aprons, pavements, equipment shelters, buildings, utilities, set back lines, fences, etc.

At all times during construction the integrity of the flightline perimeter shall be maintained through the use of suitable temporary protective measures in any areas where existing fence has been removed and new fence is not complete.

2.11 Airfield Pavement Design

The Base Bid shall consist of Air Force Medium load Portland Cement Concrete pavement for the connecting taxiway, Army Class II (IFR) Heliport load Portland Cement Concrete pavement for the parking apron and Asphaltic pavement shoulders. The apron shall consist of same direction taxi in and taxi out parking for six (6) CH-47 helicopters, plus two (2) C-12 aircraft. The connecting taxiway shall extend from the parking apron to the existing runway.

Bid Option 1 shall consist of an expansion of the apron using the Army Class II (IFR) Heliport load Portland Cement Concrete pavement for the parking apron and Asphaltic pavement shoulders. The apron shall consist of taxi through parking for six (6) CH-47 helicopters, plus two (2) C-12 aircraft.

The airfield pavements for the SOF Helicopter Apron shall be designed in accordance with the technical requirements described herein and in accordance with UFC 3-250-18FA, UFC 3-250-09FA, UFC 3-250-01FA, and UFC 3-260-02. The technical requirements described herein shall govern. The pavement designs shall be conducted with the Pavement-Transportation Computer Assisted Structural Engineering (PCASE) program. The pavement designs shall utilize the aircraft and ground vehicle types, weights, and traffic passes specified below. The designs shall be submitted for review to the Contracting Officer prior to any construction.

All Rigid Pavement shall be designed as rigid pavement with a minimum of 150 mm of Graded Crushed Aggregate Base Course. Rigid pavements shall be jointed plain concrete pavement with compression joint seals in accordance with Specification 32 13 73 COMPRESSION JOINT SEALS FOR CONCRETE PAVEMENTS. The material used for constructing the airfield pavements shall be in accordance with the specifications of this contract and shall consider locally available cement, sand, aggregates, weather conditions and the results of the geotechnical investigation. These specifications shall be used verbatim and not edited by the Design-Build Contractor.

All compaction requirements shall be based on ASTM D1557, Method C.

All airfield pavements shall be designed for a 20-year life-span and shall be based on site-specific geotechnical information.

The pavement design for the SOF Helicopter Apron was designed based on traffic pattern per UFC 03-260-02. The pavement for the Apron Entrance Taxiway was designed based on Air Force medium traffic pattern per UFC 03-260-02.

The minimum pavement sections shall be as shown on the drawings below.

The minimum Army Class II (IFR) Heliport airfield pavement section shall be:

Apron

210 mm of Portland Cement Concrete, JPCP
150 mm Graded Crushed Aggregate Base compacted to 100%
150 mm Natural Subgrade compacted to 95%

The Contractor has the option of using Asphalt or Portland Cement Concrete for the airfield shoulders.

The minimum Asphalt airfield shoulder pavement section shall be:

50 mm Asphalt Surface Course
210 mm Graded Crushed Aggregate Base Course compacted to 100%
150 mm Natural Subgrade compacted to 100%

The minimum airfield shoulder section shall be:

175 mm Portland and Cement Concrete Surface Course
150 mm Graded Crushed Aggregate Base Course
150 mm Natural Subgrade compacted to 95%

2.12 Pavement Marking, Markers and Signage

2.12.1 Airfield Pavement Marking

Pavement marking is required on all airfield pavements in conformance with the ETL 04-02 and AFI 32-1042 and as shown on the drawings. Stop blocks shall be painted at fixed wing aircraft parking positions to indicate the intended location for the aircraft nose wheel when parked. Static ground points shall be marked per the drawings. All markings on concrete shall be outlined with black paint, which shall extend at least 150 mm beyond the outside edge of the markings.

2.13 Instrument Holding Position.

Runways served by precision instrument navigation aids may require an instrument holding position be marked in addition to the VFR holding position. Where practicable, collocate these markings and mark only the VFR holding position. If required, locate the instrument holding position further

from the active runway to prevent taxiing or holding aircraft from interfering with signals transmitted to inbound aircraft during Instrument Meteorological Conditions (IMC). This hold position is configured differently from a VFR hold position and is augmented with the letters "INST" on the runway side of the line. The letters are to be read when facing the runway. They are marked in block letters 1829 millimeters (6 feet) high by 610 millimeters (2 feet) wide, spaced 305 millimeters (1 foot) apart. The letters are formed with a 152-millimeter (6-inch) stroke. The "INST" designator must be placed symmetrically between the taxiway centerline and the taxiway edge or edge marking on the left side of the centerline. For hold lines over 61 meters (200 feet) long, mark the "INST" designator at intervals not exceeding 45.7 meters (150 feet). Locations for the instrument hold line vary, depending on the type and capability of the landing aid; locate them in accordance with the following paragraphs.

2.14 Revetment (Bid Option 2)

~~The airfield revetments shall be provided by others.~~ The Contractor shall coordinate with the Contracting Officer to ensure that the helicopter parking spaces are located to accommodate the size and type of revetment to be provided. The Contractor shall submit a layout plan with appropriate dimension for approval prior to construction. The revetment shall be a minimum of 2.5m wide, 5m high with a concrete cap and shall be filled with soil.

2.15 Tiedown & Grounding Points

2.15.1 Tiedown Points

Air Force aircraft tiedown points shall be constructed in accordance with UFC 3-260-01 B11 and Specification 34 73 13 AIR FORCE TIEDOWN, ARMY MOORING AND GROUNDING POINTS FOR AIRCRAFT.

For maximum flexibility, they may be placed in 4.6-meter (15-foot), 6.1-meter (20-foot), or a 9.1-meter (30-foot) grids, or offset grids. At minimum, place tiedowns as indicated in aircraft Technical Orders. Mooring points shall be at the locations shown and in accordance with UFC 3-260-01.

2.15.2 Static Grounding and Tiedown Points

Static grounding and tiedown points shall be constructed in accordance with the drawings, UFC 3-260-01 Section 11 - Figures B11-14 and B11-15, and Specification 34 73 13 AIR FORCE TIEDOWN, ARMY MOORING AND GROUNDING POINTS FOR AIRCRAFT. Every static grounding point shall be interconnected to other static grounding points and other grounding systems, in addition to complying with the static grounding requirement. If tiedowns are intended to also be used as static grounds, it is required that a ground rod be installed and rebar size increased as shown on Sheet C-504. When a ground rod is included, bond it to the tiedown bar.

2.16 Earthwork, Site Grading and Off-site Drainage

2.16.1 Earthwork

Perform all earthwork necessary to provide apron pads and taxiways that meets UFC requirements for taxiway aprons and provides access from the surrounding airfield by design vehicles.

2.16.2 Site Grading.

The topographic survey shall be used in designing the grading and drainage of the site. The Contractor will provide all necessary site grading to insure adequate drainage so that no utilities or manholes, facilities or pavements will be flooded due to a 10-year design rainfall. Drainage of the area should be compatible with the existing terrain.

Finished grade shall slope away from the project sites and provide positive drainage. Swales and cross-culverts shall be provided as required and have a minimum longitudinal gradient of 0.5%. Side slopes of swales within the infield shall follow UFC 3-260-01 criteria.

Provide a positive crown or sheet drainage to all aircraft areas. Overland flow shall be used to the maximum extent possible. The grading and drainage plans shall be in accordance with UFC 3-230-17FA and UFC 3-250-18FA and shall be prepared in 0.25m contours.

The finished grade adjacent to future facilities and fabric shelters shall be designed to slope away from the facility at a minimum rate of 2%.

The taxiways shall be designed to match the elevation of the adjoining runways at all connection points.

Plans shall show existing contours (0.25 m) and new contours (0.25m) and spot grades to indicate new grading, finished floor and pavement elevations, drainage swales, etc.

2.16.3 Storm Drainage

2.16.3.1 Storm Drainage.

The Contractor will provide necessary site grading and provide drainage structures to ensure adequate drainage, so that no water shall pond within 23 meter of any paved area or building resulting from a 10-year recurrence storm and no water shall pond within 8 meters of the runway resulting from a 100-year recurrence storm.

All storm drainage system designs shall be in accordance with references contained herein. Storm drainage system design shall consist of swales, side slopes, and culvert piping where necessary to provide adequate drainage for the project sites. All storm drainage piping located in traffic areas shall be rated to withstand wheel loading from the design vehicle.

Detention basins, if needed shall have side slopes not steeper than 4:1 (horizontal: vertical). Erosion control measures using rock, geotextiles, or other materials shall be included as required to stabilize erodible soil conditions. Provide aggregate blanket at the base and side slopes of detention ponds. The aggregate shall be crushed stone, 35 mm to 50 mm across, applied 50 mm deep. Detention sites located near subsurface utilities shall ensure they are protected from infiltration inflows with devices such as manhole seals and/or pond liners.

Design flows for storm sewers shall produce velocities suitable to flush collected dust and debris accumulation during storm events. Minimum gravity storm sewer requirements are to be in compliance with UFC 3-230-06A. Unless otherwise directed by the CO, the contractor shall use reinforced concrete pipe exclusively.

Contractor shall coordinate hydrologic study and storm water management

design of the project with the Contracting Officer, the adjacent future and current construction projects and the existing runway storm water system. The contractor is also responsible for obtaining all local permits associated with the storm water design, including but not limited to the discharge of storm water to tributaries outside the limits of the base.

2.16.3.2 Airfield Drainage

Aircraft parking apron shall have an interior system of inlets and storm water drains. The apron cross-section shall be designed such to minimize the amount of storm water draining through aircraft parking locations.

a) The storm water facilities for an apron that will experience fueling operations shall be designed and constructed in conformance with NFPA Standard 415. Storm sewers shall not have bituminous coatings and sewer joints shall be sealed with fuel resistant, water-tight neoprene or rubber sealants. The storm drain for a fueling apron shall be separate from airfield drainage and convey the flow through a fuel spill containment facility.

b) Aprons shall have a system of interior inlets. Provide trench drains and holding tank with float valve to capture 15 minute runoff from the Design Storm.

c) Aprons shall be sloped such that the maximum depth of ponding at an inlet shall be 225 mm before sheet flow of storm water off the apron occurs. Side slopes of swales within the infield shall follow UFC 3-260-01 criteria.

2.16.3.3 Non-Airfield Drainage

The topographic survey shall be used in designing the grading and drainage. The Contractor will provide all necessary site grading to ensure adequate drainage so that no utilities or manholes, facilities or pavements will be flooded due to a design rainfall. Drainage of the area should be compatible with the existing terrain.

2.17 Utilities.

There may be existing electric, communications and other utility lines on, around and under the project sites. It is the Contractor's responsibility to confirm the specific locations of the existing utilities and to design adjust or protect utility services in the project sites. Coordination of all site work on the project, including utility work, is the responsibility of the Contractor. Follow requirements of part 2.7 "Demolition and Removal", this section when adjusting utilities.

2.17.1 Water Distribution

Fire water distribution and fire hydrants in the project site shall be in compliance with UFC 3-230-10A Water Supply: Water Distribution. Fire hydrant placement and number shall be in compliance with ETL 02 15 and UFC 3 600 01. See paragraph 8.0 below for further specification of fire protection components.

2.17.2 Sanitary Sewer Collection - Not Applicable

2.17.3 Electrical Distribution

The Contractor shall provide prime power diesel generators and electrical distribution to service the facilities placed within this project. See

paragraph 9 below and associated drawings for more details. Proposed above ground utility structures shall conform to airfield wing tip and imaginary surface clearance requirements of UFC 3-260-01.

2.18 Utility Trenches & Conduits.

Electric and communications line depth, bedding, and cover shall be designed as required by the UFC design criteria for line size, material, and vehicular loading. Utilities placed in traffic areas shall be designed for the greater of an AASHTO H20 vehicle loading or the wheel loading imposed by the design aircraft. Locater's tape shall be placed above the utility and 300mm below finished grade. Trench backfill shall be compacted to at least 95% maximum density.

Any adjustment to communication utilities shall be replaced with a minimum of four (4) concrete encased 110mm PVC. The conduits shall be in a 2x2 configuration with 52mm of space between the conduits and 100 mm concrete around the duct bank. The conduits shall be DB 60, DB 120 or Schedule 40. The minimum cover over the top of the concrete shall be 762mm. Cap empty conduit. Place conduit at other proposed pavement intersections on this site to provide crossing points for future communications wiring at the site. Extend conduit 1 meter beyond compacted subgrade toe on either side of road crossings.

All utility borings under existing airfield pavements shall be accomplished by dry boring, auguring or jacking following Contractor's submitted specifications, and under guidance from Air Force Technical Letter (TL) 04-4-1. All other excavations shall be accomplished by methods approved by the Contracting Officer.

3. ARCHITECTURAL

3.1 General Architectural Design Requirements

This package includes the design and construction of two (2) new Aircraft Parking Shelters, A Fire Protection Equipment Building (including a Fire Pump Room, Fire Pump Control Room, Foam Equipment Room, Electrical Equipment Room, and Communications Equipment Room), an Airfield Lighting Enclosure (ALE), and a Generator Sunshade. The Fire Protection Equipment building shall be a single structure serving both Aircraft Parking Shelters. These facilities shall be constructed as part of the SOF Helicopter Apron in Herat, Afghanistan.

3.1.1 Design Objectives and Considerations

Design and construction shall comply with the requirements contained herein. The Aircraft Parking Shelters and associated structures shall be designed for a life expectancy of not less than 20 years. This document establishes minimum standards for design and construction quality. A concept floor plan, sections and elevations of the Aircraft Parking Shelter present a suggested layout. The Contractor shall design the shelter, Fire Protection Equipment Building and sunshade as specified in the RFP. The size of the shelter is approximated, appropriate final sizes and relationships shall be determined by the Contractor based on functional requirements. The size and layout of the Fire Protection Equipment Building shall be determined by the contractor based on equipment types and functional requirements. The size of the Generator Sunshade shall be determined by the contractor based on the size and layout of the equipment being covered with a minimum 1 meter overhang beyond furthest piece of equipment on all sides and minimum overhead

clearance as needed to properly access and maintain the equipment.

3.1.1.1 Orientation

Orientation of the buildings shall be coordinated with the civil engineer to ensure that placement of building features such as primary entrances and service entrances are logically considered with respect to adjacent site characteristics such as pedestrian circulation routes, roads, parking areas and other buildings. Future expansion shall be taken into consideration when designing the facility and siting it. Primary building entrances shall be architecturally defined and clearly discernable and shall be oriented in such a way as to ensure that they do not face installation perimeters or other uncontrolled vantage points with direct lines of sight to the entrance. If this cannot be done, other means shall be provided to block the lines of site.

3.1.1.2 Exterior Appearance

The buildings shall be designed to provide structures appropriate to the prescribed purpose of the installation. Buildings shall be designed to enhance or compliment the visual environment of the installation. Exterior finishes and colors shall be compatible with those of existing adjacent buildings of similar construction. Chillers and other mechanical or electrical equipment located outside of the building shall be shielded from view.

3.1.1.3 Corrosion

Exposed metals must be carefully selected and appropriately protected against corrosion. The project site may have corrosive soils, constant winds and limited rainfall resulting in windblown chloride containing dust which can lodge in joints, welds and result in condensation on metal surfaces.

3.1.1.4 Life Safety and Force Protection

The designer shall perform a life safety analysis including a narrative supporting a floor plan addressing building occupancy classification, construction type, egress capacity and travel distance, allowable area and fire suppression. Classification and Occupancy shall be as defined in the International Building Code (2009) and comply with the requirements of UFC 4-010-01, DOD Minimum Antiterrorism Standards.

3.1.1.5 Anti-Terrorism and Force Protection

Force Protection and Anti-Terrorism measures are included in this project.

3.2 Applicable Publications

- Corps of Engineers Technical Instructions, TI 800-01
- International Building Code (IBC) 2009
- National Fire Protection Association, NFPA 101 Life Safety Code, 2009
- Mid East District (MED) Design Instructions Manual
- UFC 1-200-01 General Building Requirements (2010)
- UFC 3-190-06 Protective Coatings and Paints (2004)
- UFC 3-260-01 Airfield and Heliport Planning and Design
- UFC 3-600-01 Fire Protection Engineering for Facilities, 2009
- UFC 4-010-01 DOD Minimum Antiterrorism Standards for Buildings, 2002
- UFC 4-191-10N Design: Aviation Operations and Support Facilities (2004)
- UFC 4-211-01N Aircraft Maintenance Hangars: Type I, Type II and Type II with Change 3

3.3 Buildings

Building construction systems shall be based on conventional building construction methods that can be erected on site within a limited period of time such as pre-engineered building systems.

3.3.1 Aircraft Parking Shelters

Each Aircraft Parking Shelter is approximately 1,100 SM and shall be a single story pre-engineered fabric structure with an appropriately sized aircraft access door at one end and personnel access doors distributed as required with a minimum of 1 door placed at each corner of the building. The height, width and depth of the shelter shall be designed to house a single CH-47 Chinook helicopter with appropriate surrounding space to allow for field maintenance. Note the shelters will also be used to house and maintain C-12 fixed wing aircraft.

The structure supplier shall be a reputable manufacture with a minimum of ten years direct experience in the design, manufacture and installation of structures of the type specified herein and shall operate according to a comprehensive quality system and shall provide documentary evidence as follows: 1. Provide three references with structures in use for at least five years which exceed 30.48 m (100 ft.) clear span and which enclose in excess of 929 square meters (10,000 square feet). 2. Provide information of company experience, engineering and installation which meet the above indicated experience requirements.

The structure and cladding membrane fabric shall be designed to provide a minimum 20 year operational use period. All main components of the structure shall be galvanized to ASTM G-90 or equal. Welded steel work shall be hot dip galvanized to ASTE A123 after manufacture to provide corrosion protection. Painting of steel components shall only be utilized if necessary for field repairs and shall not be employed as a factory finish. If field repairs are necessary a zinc rich field coat shall be used. The structure shall be clad with PVC coated polyester fabric manufactured by an approved and reputable supplier with demonstrated long term performance. Laminated materials are not acceptable for use on outer weather membrane. The PVC coated membrane fabric shall be waterproof and free from defects. All roofs end walls and connecting sections shall be weather tight. The color of the material shall be selected from the manufacturer's standard color chart. The material must be UV stabilized and flame retardant must carry a minimum five year manufacturer's warranty and have a life expectancy of 20 years. The structure shall accept penetrations through the membrane for access doors and mechanical services with minimal modification. The structural membrane shall not be designed to function as a structural member such that, should any damage to or penetrations of the membrane occur, the integrity of the structural framework would be affected.

Dimensions of the largest helicopter CH-47

Clear length (outside edge of rotor): 30.1 meters
Clear width (outside of rotor): 18.3 meters
Clear height: 5.791 meters

The Fire Protection Equipment Building is a single story structure sized and of appropriate construction for the site equipment housed and consisting of the following: a Fire Pump Room housing the fire pumps and related equipment for both shelters, a Fire Pump Control Room accessed directly from the Fire

Pump Room, a Foam Equipment Room housing the foam fire suppression equipment for both shelters, an Electric Equipment Room housing the electrical panels and equipment for both shelters, and a Communications Equipment Room housing the communications equipment for both shelters.

The Generator Sunshade shall be a structure, open on all sides with a pitched roof of construction and size as determined by the contractor to be appropriate to the site and the equipment being covered. The sunshade shall extend a minimum 1 meter beyond the furthest piece of equipment on all sites.

3.3.2 Building Construction Requirements

The following requirements establish the design parameters for the facilities. There shall be no deviations from these requirements without the prior approval of the Contracting Officer. Any items or methods required but not specifically mentioned herein shall be subject to approval by the Contracting Officer.

3.3.2.1 Exterior Walls

On Aircraft Parking Shelters provide the manufacturer's standard polyethylene or vinyl cover fabric stretched over structure meeting the following minimum standards:

Weight	407 g/sm	
Grab Strength	Warp - 1600 N	Weft - 1500 N
Tensile Strength (N/5cm)	Warp - 2300	Weft - 2100 N
Low Temperature Bend	-40 deg. C	
Fire Performance	ASTM E-84 (class 1) and NFPA 701	

The walls of the Fire Protection Equipment Enclosure and electrical panel room shall be insulated (minimum R-10) and of appropriate materials and construction as determined by the contractor to be appropriate for the site and equipment housed. Metal panel walls shall be factory formed and finished.

The Generator Sunshade shall have no walls. It shall have supporting structure and bracing coordinated with the covered equipment to allow easy access for maintenance and repair.

3.3.2.2 Floor Systems

Floors shall be sealed cast-in place concrete slabs on grade. The concrete slab in the Aircraft Parking Shelter shall be sloped to contain spills.

3.3.2.3 Ceiling Systems

All areas shall have exposed structure and/or insulation backing. All untreated exposed ferrous metal surfaces shall be painted.

3.3.2.4 Roof Systems

The roof for the Aircraft Parking Shelter shall consist of the manufacturer's standard polyethylene or vinyl cover fabric stretched over the structure and held down at regular intervals as required to resist wind and precipitation with flashing as required to ensure that water is drained away from footings and slabs.

The Fire Protection Equipment Building roof shall be roll formed factory

finished metal panels having a minimum slope of 1:10 and insulated to a minimum R-value of 10 and shall have gutters, downspouts and splash blocks located and designed to direct water away from footings and floor slabs.

The roof for the Generator Sunshade shall be roll formed factory finished metal panels having minimum slope of 1:10 and shall have gutters, downspouts and splash blocks located and designed to direct water away from footings and floor slabs.

The roof for the Airfield Lighting Shelter shall be roll formed factory finished metal panels having minimum slope of 1:10 and shall have gutters, downspouts and splash blocks located and designed to direct water away from footings and floor slabs.

The roof for the Generator Sunshade shall be roll formed, factory finished metal panels having a minimum slope of 1:10. Factory finish on panels shall consist of a minimum 1 mil thick baked-on fluoropolymer enamel top coat of a color selected from the manufacturer's standard product line. Roof to have gutters, downspouts and splash blocks located and designed to direct water away from footings and floor slabs.

3.3.2.5 Windows

No windows are required for this project.

3.3.2.6 Exterior Doors

Exterior doors shall be 16 gauge steel with hollow metal core. Exterior door frames shall be 16 gauge hollow core metal. Standard single doors shall be 900mm x 2050mm. Doors and frames shall be primed and painted as approved by the Contracting Officer. Exterior doors shall swing outwards. Doors servicing the Fire Protection Equipment Building shall be large enough to allow the installation and removal of complete components without the need for dismantling. Frame anchors shall be no more than 50mm apart and no more than 75mm from corners. Doors servicing conditioned spaces shall have insulated cores.

3.3.2.7 Interior Doors

There are no interior doors required for this project.

3.3.2.8 Aircraft Doors

Aircraft Parking Shelter door work shall include the design, fabrication and installation of a complete usable door which is air and water tight when closed. Aircraft doors shall be overhead collapsing or sliding fabric construction sized to accommodate the largest aircraft identified in this report. Doors shall not require a ground track.

3.3.2.9 Door Hardware

Each personnel door must have the following commercial quality hardware as a minimum. One and a half pairs of metal butt hinges, one heavy duty door closer, weather stripping, a bored or mortise lockset, a six pin cylinder. All locksets shall be keyed to one master key system. All hardware shall be heavy duty and installed per the manufacturer's recommendations. Provide all hardware to meet the requirements of NFPA 80 for fire doors and NFPA 101 for exit doors.

Aircraft Door shall be motorized with a manual override system. Aircraft door hardware shall include: heavy duty zinc coated steel guides, door conduits, electric winch, manual winch backup with brake, pulleys with sealed bearings, cables, weather seals and interior locking mechanism. All hardware shall be made of corrosion resistant materials or specifically coated to resist corrosion. All hardware shall be specifically designed for this application.

3.3.2.10 Finishes

All painted surfaces to receive washable semi-gloss paint. Paints shall not contain over 0.06 percent of lead content by weight of nonvolatile content nor shall they contain any other hazardous material, or asbestos.

3.3.2.11 Joint Sealants

Joint sealants shall be complete systems to include sealant, bond breakers, backstops and primers as necessary. Single component sealants are preferred.

3.3.2.12 Signage

This project includes no signage.

3.3.2.13 Static Grounding

Static ground points shall be provided in accordance with UFC 3-260-01.

3.4 Airfield Lighting Enclosure (ALE)

The Contractor shall design and construct the following facility as described in this document.

3.4.1 Airfield Lighting Enclosure

Design and construct a pre-engineered metal building sized to accommodate the strategic and helicopter apron and taxiway lighting equipment. This building shall have one (1) exterior door for access to the space at one end of the enclosure. The following functions/activities shall be provided within the facility; electrical equipment enclosure. Exterior of the building shall be factory finished metal panels. The roof shall be factory finished metal panels with 1 in 10 slope. Interior floor finishes shall be exposed concrete floors. All color selections shall be submitted to the Contracting Officer for review. The Contractor shall have the option to pre-fabricate the building off-site and deliver to the site.

3.4.2 Lifesafety/ Fire Protection/ Handicapped Accessibility

All facilities shall be designed in accordance with recognized industry standards for lifesafety and building egress. In keeping with the intended function of these facilities, handicapped accessibility requirements will not be incorporated into individual building design. It is assumed that the facilities in the Base Operations Complex will be used by able-bodied personnel.

3.4.3 APPLICABLE PUBLICATIONS

Mil Handbook 1008-C: Fire Protection

Corps of Engineers Technical Instructions

3.5 INTERIOR DESIGN

Colors shall be selected from the standard colors of the major manufacturer's of the product. Colors shall be appropriate for minimizing maintenance and resisting wear and damage.

4. STRUCTURAL

4.1 Design

Design shall be performed and signed by a structural engineer with a minimum of seven-years experience performing structural design. The publications listed below form a part of this specification to the extent referenced. Other international standards that comply with these standards may be used upon approval by the Contracting Officer. The publications are referred to within the text by the basic designation only.

All required documents, including drawings, specifications, and design analysis, shall be prepared in accordance with Section 01 33 00.12 10 Submittal Procedures for Design Build Projects. Specific submittal requirements in these sections supplement the requirements of Section 01 33 00.12 10.

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.

4.2 References

American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures, ASCE 7-2005

American Concrete Institute, Building Code Requirements for Structural Concrete, ACI-318-2008

International Building Code, IBC-2009

Unified Facilities Criteria, UFC 3-301-01 - Structural Engineering, 27 January 2010.

American Society for Testing and Materials (ASTM) Publication, Deformed and Plain Billet-Steel Bars for Concrete Reinforcement, ASTM A 615-2007

ASTM Publication, Steel Welded Wire Fabric, Plain for Concrete Reinforcement ASTM A 185-2007

ASTM Publication, Potential Alkali Reactivity of Aggregates (Mortar-Bar Method), ASTM C 1260-2007.

American Institute of Steel Construction, Steel Construction Manual, AISC - 13th Edition; AISC 325-05

Steel Joist Institute (SJI), Standard Specifications and Load Tables for Steel Joists and Joist Girders, 42nd Edition Catalog

Steel Deck Institute (SDI), Design Manual for Composite Decks, Form Decks and Roof Decks-N0. 31, November 2007

American Iron and Steel Institute, Specifications for Design of Cold-Formed Steel Structural Members AISI - 2001 with latest supplements.

Structural Welding Code-Steel by the American Welding Society, AWS D1.1-04 and D1.4

Building Code requirements for Masonry Structures, ACI 530 2008/ASCE 5 2008/TMS 402 2008.

Metal Building Manufacturers Association. MBMA Metal Building System Manual -

2006

Unified Facilities Criteria (UFC) 3-260-02 Pavement Design for Airfields, 30 June 2001.

4.3 Dead and Live Loads

Dead and Live loads used for design shall be in accordance with the International Building Code IBC-2009. Structural elements of reinforced concrete shall be designed for all the applicable design loads using the load combinations as defined by the ACI-318-2008; and structural elements of other materials shall be designed for all the applicable design loads using the load combinations as defined by the IBC-2009. Shelter floor slabs subjected to aircraft traffic shall be designed as airfield pavement in accordance with UFC 3-260-02.

4.4 Snow Loads

Roof snow load: 98 kg/m² (20 psf) with Occupancy Category II and shall be designed in accordance with IBC.

4.5 Wind Loads

Wind loads shall be calculated in accordance with IBC-2009 design standards using a "3-second gust" wind speed of 145 km/hr (90 mph).

4.6 Seismic

The structure and all parts thereof shall be designed for the seismic requirements as defined by the International Building Code, IBC 2009. For Herat, Afghanistan use Spectral Response $S_s=0.62g$ and $S_1=0.24g$ in accordance with UFC 3-301-01, with occupancy category II, and Importance Factor= 1.00. Site soil classification will be determined by Geotechnical investigations at site.

4.7 Concrete (not including pavement concrete)

Concrete shall be composed of cementations material, water, fine and coarse aggregates, and admixtures and shall be in accordance with the provisions of the ACI 318. Concrete shall have cylinder compressive strength of 28 MPa (4,000psi) flexural strength of 4.1 MPa (60psi) minimum at 28 days shall be used for design and construction of all structural concrete. Concrete shall be comprised of ASTM C 150, Type I or Type V cement. Admixtures shall consist of air entraining admixture and shall contain a high-range of water-reducer, HRWRA, in accordance with ASTM C-494, Type "F" or Type "G". The dosage of the HRWRA shall be determined during mixture proportioning study. The cementitious material shall consist of Portland cement with a 7.0 to 9.0 percent by mass replacement of cement by silica fume. Silica fume shall comply with the requirements of ASTM C1240. The cementitious material content shall not be less than 390 kg/cubic meter. The mixture shall also have a maximum water-cementitious material ratio of 0.45. Concrete shall have a maximum water-soluble chloride ion content for corrosion protection of 0.15 percent by mass of the portland cement. Hot weather requirements shall comply with the recommendations of ACI 305R-1999. Concrete shall not be placed in cold weather when ambient temperature is less than 5 degrees C or when concrete temperature is less than 10 degrees C. Heating of the mixing water or the aggregates will be required to regulate the concrete placing temperature in cold weather.

Protective measures shall be taken if freezing temperatures are anticipated

before the expiration of the specified curing period. All concrete shall be cured for a minimum of 7 days. For aggregates alkali-silica reactivity requirement, see Section 32 13 11 Part 2.2.1.2, Alkali-Silica Reactivity. Concrete members at or below grade shall have a minimum concrete cover over reinforcement of 75 millimeters. Reinforcing steel shall be deformed bars conforming to ASTM A 615/615M, grade 60, and welded wire fabric shall conform to ASTM A 185.

See Part 2 Civil and Site Development and Section 32 13 11 for requirement on pavement concrete. Aircraft shelter floor slab shall conform to Section 32 13 11.

4.8 Structural Steel

Structural steel shall be designed and constructed in accordance with the provisions of AISC 13h Edition and design of cold-formed steel structural members shall be in accordance with the provisions of American Iron and Steel Institute, Specifications for Design of Cold-Formed Steel Structural Members-2001 with latest supplements. Structural Steel for fabric shelters shall be galvanized.

4.9 Masonry

Masonry shall be designed and constructed in accordance with the provisions of ACI 530 2008/ASCE 5 2008/TMS 402 2008. Concrete masonry units shall conform to ASTM C90, Type I (Normal weight, moisture controlled). Mortar shall be Type S and conform to ASTM C 270. Grout shall conform to ASTM C476. Joint reinforcement shall be ladder type. Masonry shall not be used below grade.

4.10 Pre-Engineered Metal Building System.

Metal building systems shall comply with the requirements of the MBMA Metal Building Systems Manual-2006.

4.11 Frame Supported Fabric Shelters

The frame supported fabric shelters shall be fabricated by a manufacturer experienced in the design and fabrication of these types of structures with similar or larger dimensions. See Architectural section for requirements on fabric and fire performance.

4.12 Metal Deck

Deck units shall conform to SDI Pub. No. 31. Panels of maximum possible lengths shall be used to minimize end laps. Deck units shall be fabricated in lengths to span 3 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.

4.13 Open Web Steel Joist

Open web steel joists shall conform to SJI Specifications, 42nd Edition Catalog and Tables, for K- Series. Joists shall be designed to support the loads given in the standard load tables of SJI Specifications and Tables.

4.14 Steel Truss

Roof trusses shall be designed using structural shapes which conform to AISC Specifications. Trusses shall be designed to support all the applicable loads; including but not limited to dead, live, wind uplift, collateral and crane loadings.

4.15 Force Protection.

Force protection shall comply with the requirements of CENTCOM AT/FP and DoD Minimum Antiterrorism Standards for Buildings; and UFC 4-010-01.

4.16 Foundations

Foundations shall be designed in accordance with the Geotechnical requirements of the site and manufacturer's recommendations.

5. GEOTECHNICAL INVESTIGATION AND REPORT

5.1 Site Specific Information

Site specific geotechnical information necessary to design and construct the foundations, pavements and other geotechnical 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. However, as a minimum for structures, the contractor shall advance three (3) borings within the building footprint of any major structure and three (3) test pits within the building footprint of any minor structure. The depths of these explorations shall be sufficient to determine the subsurface conditions within the influence of the structures foundation system. For purposes of this paragraph, a major structure is any structure that meets any of the following criterion: 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 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. If rock is encountered in a structure boring, core a minimum of three (3) meters and then terminate. All explorations shall be backfilled with soil/rock cuttings to grade upon completion of field work.

As a minimum for the roadways, the contractor shall excavate two (2) test pits for every 100 linear meters of pavement having a minimum depth of three (3) meters below finished grade. For the airfield pavements, the recommended maximum spacing of borings shall meet the following requirements:

-Runway and taxiways < 61 meters (200 ft) wide, one boring every 61 to 152 meters (200 to 500 feet) longitudinally on alternating side of pavement centerline and having a minimum depth of three (3) meters below finished graded in cut sections, three (3) meters into natural subgrade for fill sections, or to rock, whichever is shallower.

-Runways > 61 meters (200 feet) wide, two borings every 61 to 152 meters (200 to 500 feet) longitudinally on alternating sides of pavement centerline and having a minimum depth of three (3) meters below finished graded in cut sections, three (3) meters into natural subgrade for fill sections, or to rock, whichever is shallower.

-Parking aprons and pads, one boring per 2,325-square-meter (25,000-square-foot) area having a minimum depth of three (3) meters below finished graded in cut sections, three (3) meters into natural subgrade for

fill sections, or to rock, whichever is shallower.

Standard Penetration Tests (SPT) shall be performed in general accordance with ASTM D 1586, with the maximum sampling interval of one (1) meter to the bottom of the hole. All soil materials shall be field logged by geotechnical engineer or engineering geologist in accordance with ASTM D 2488 and final construction-document logs shall be prepared with applicable soil laboratory testing results in accordance with ASTM D 2487. The exploration and laboratory testing plan shall be approved by the Contracting Officer, prior to performance of field work., with a minimum of xx borings in the apron and 6 in the taxiways.

5.2 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). Five (5) hard copies and two (2) soft copies (PDF Format) copies of the detailed geotechnical report shall be submitted to the Contracting Officer.

5.3 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.

5.4 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 Contractor shall design, supply, fabricate and install new heating, ventilation and air conditioning (HVAC) systems and special mechanical systems in the facilities identified in the scope of work. The contractor shall be responsible for the complete design and construction of all HVAC and special mechanical systems required in the Strategic Airlift Apron & Helicopter Apron complex as part of this contract. The work also includes the delivery to site, erection, setting to work, adjusting, testing and balancing, and handing over in full operating conditions all of the HVAC equipment and associated mechanical works.

6.1.1 Sub-Contractors Qualifications

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

6.1.2 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.

6.1.3 Local Standards

Where conflicts arise between these criteria and local standards the more stringent shall apply. In such instances, the Contractor shall furnish all available information with justification at the Contracting Officer's request.

6.2 CODES, STANDARDS AND REGULATIONS

The design and installation of equipment, materials and works covered under the mechanical heating, ventilation and air-conditioning services shall conform to the following standards, codes and regulations as applicable except where otherwise indicated under particular clause. The publications to be taken into consideration shall be those of the most recent editions. Standards other than those mentioned above 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 to the Contracting Officer for approval.

A & E SERVICES MANUAL

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

ACGIH - American Conference of Governmental Industrial Hygienists

ARI - Air Conditioning and Refrigeration Institute

ASHRAE - American Society of Heating, Ventilation and Air Conditioning Engineers

ASME - American Society of Mechanical Engineers

ASTM - American Society for Testing and Materials

AWS - American Welding Society

International Building Code (IBC), 2006 Edition

International Mechanical Code (IMC), 2006 Edition

NFPA - National Fire Protection Association

SMACNA - Sheet Metal and Air Conditioning Contractors' National Association

UNIFIED FACILITIES CRITERIA (UFC)

- UFC 1-200-01 Design: General Building Requirements
- UFC 3-260-01 Design: Airfield and Heliport Planning
- UFC 3-400-02 Design: Engineering Weather Data
- UFC 3-410-01FA Heating, Ventilating, and Air Cond.
- UFC 3-600-01 Design: Fire Protection Engineering for Facilities
- USAF Commanders' Guide to Facility Excellence

6.2.1 Outside Design Conditions:

Summer: 39°C (102°F) db/22°C (72°F) wb

Winter: -9°C (16°F)

Longitude: 62.23E

Latitude: 34.21N

Elevation: 964m (3164 feet)

6.2.2 Inside Design Conditions:

Interior Environmental Design Conditions: (Shelters/fire pump house)
Summer: temperatures not to exceed ambient condition (ventilated)
Winter: 10.0°C (50.0°F) - (Fire protection equipment building)
20.0°C (68.0°F) - (Aircraft shelters)

Interior Environmental Design Conditions:
(Fire pump control room/foam equipment room)
Summer: 27°C (80°F) db, 50% RH Maximum
Winter: 20°C (68°F) db

Interior Environmental Design Conditions:
(Electrical equipment room)
Summer: 50°C (122°F) db
Winter: not applicable

Interior Environmental Design Conditions:
(Communications equipment room)
Summer: 24°C (75°F) db, 50% RH Maximum
Winter: 20°C (68°F) db

6.2.3 Ventilation (and air-conditioning) systems shall be designed to minimize sand and dirt infiltration into interior spaces. Outside air requirements shall be as defined in ASHRAE 62.1-2004 as a minimum and as indicated below. The outdoor air intake shall be located away from fumes including vehicle exhaust, generator exhaust, toilet exhaust, etc.

Shelters:	1.5 cfm/sq. ft.
Fire equipment area:	1.5 cfm/sq. ft.
Fire Control Pump Room and Foam room:	1.0 cfm/sq. ft.

6.2.4 Noise Levels

The sound levels for various applications for both centrifugal and propeller type fans shall be as set forth in the ASHRAE Handbooks. Noise levels generated by HVAC systems shall not exceed NC 35.

6.2.5 Smoke Detection.

Smoke detection and emergency automatic controls shall be in accordance with NFPA 90A and NFPA 72.

6.2.6 Testing and Commissioning

The contract shall include specifications and requirements for testing and commissioning of all HVAC systems and equipment including air balancing, pressure testing and temperature controls. Complete testing shall be required of all systems. Government shall witness all testing, balancing and commissioning. The Contractor shall provide reports of all tests and commissioning results.

6.3 Equipment

6.3.1 Filtration

a. 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 2.54MPS (500 FPM).

b. All outside air wall intakes shall be through weatherproof louvers with a

bird screen. To reduce sand and dirt migration, outside air intakes shall be located as high as possible within the architectural constraints (minimum of 1.5 meters above grade). Wall intakes and roof hoods shall have 50mm thick washable metal mesh type panel filters for filtration of dust.

c. Makeup air units shall have medium efficiency (30 percent, as defined by ASHRAE 52 Dust Spot Efficiency Criteria) filters, the 50 mm (2 -inch) thick disposable panel type filters.

6.3.2 Air Conditioning

6.3.2.1 Air conditioning and heating for fire pump control rooms, foam equipment room and communication rooms shall be accomplished with split-system direct expansion heat pump type refrigeration equipment. Provide multiple split-systems as required by the HVAC load. For the communication rooms provide one additional split-system for backup.

6.3.2.2 Makeup Air units: Factory fabricated makeup air units shall be of the low or medium pressure class and shall be typically the single-zone draw through or blow through type. Units include fans, heating coils, air tight insulated casings, filters, v-belt motor drives, and all appurtenances required for the specified operations. The air handling units shall be typically located adjacent to the shelters atop steel support platforms. Make-up or outdoor air shall be filtered, conditioned and supplied to the building spaces as needed to accomplish ventilation requirements.

6.3.2.3 Outdoor Equipment:
Equipment located outside will receive all necessary weather protection.

6.3.2.4 Split system heat pump air conditioners shall consist of complete packaged units consisting of a remote air cooled condensing unit and matched evaporator blower unit.

6.3.3 Refrigeration System

6.3.3.1 Direct Expansion (DX) air cooled condensing unit shall be located outdoors and mounted on a stand or slab on grade. Slab on grade equipment shall be protected from wind blown sand by 4 foot (1.2 meter) high enclosure walls. Enclosure shall provide access for equipment removal and minimum clearances as required by the manufacturer's written instructions. Each unit shall consist of weatherproof casing, compressor(s), condenser coil, condenser fans, motor, and appurtenances. Compressor shall be of the hermetic or semi-hermetic reciprocating type. Refrigeration circuit shall be connected to the refrigeration circuit of the split system air conditioning unit.

6.3.3.2 Refrigerant: All refrigerants used shall conform to the "Montreal Protocol on Substances That Delete the Ozone Layer" September 1987, sponsored by the United Nations Environmental Program and shall have Ozone Depletion Allowance (ODA) if 0.05 or less.

6.3.4 Heating

Heating for the shelters shall be provided through electric resistance coils located either within the makeup air unit or in the duct just down stream of the makeup air unit. Heat shall be provided to maintain indoor design condition. Heating units shall be located so as not to interfere with maintenance operations. All other areas shall be provided heating through the use of electric unit heaters located within the heated space.

6.3.5 Ventilation and Exhaust Systems

All fans shall be used for building ventilation and pressurization with capacities to be selected for minimum noise level generation. Unit mounted fans either used for supply or exhaust shall be centrifugal forward curved, backward inclined, or airfoil fans with no 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 shut-off dampers which close automatically when the fan is not running. Also, each fan shall be complete with vibration isolator, internal lubricators, and all accessories and sound attenuators as necessary.

6.3.6 Ductwork.

Air shall be distributed from central makeup air units as necessary to achieve proper airflow throughout the facility by means of air distribution ductwork. Air distribution system shall be comprised of ductwork, fittings, grilles, registers, and/or diffusers. Ductwork shall be constructed of galvanized steel or aluminum sheets and installed as per SMACNA "HVAC Duct Construction Standards (Metal and Flexible)." Duct insulation shall be provided for all supply ductwork and for return ductwork not located within a conditioned area. All metals which are exposed to the air stream within the duct shall be of non-sparking types.

6.3.7 Duct Insulation.

Ducts exposed to weather shall be insulated with a minimum of 100mm insulation. The outside of the insulation shall be covered with a vapor barrier and then covered with an aluminum protective jacket. There shall be no breaks in vapor barrier.

6.3.8 Diffusers, registers and grilles shall be factory fabricated of steel or aluminum and distribute the specified air quantity evenly over the space intended. The devices shall be round, half round, square, rectangular, linear, or with perforated face as determined by the design. Units will be mounted in ceilings, high sidewalls, or directly to ductwork and shall be sized for the airflow to be delivered with a maximum NC rating of 35. Pressure loss through the diffuser shall be considered in sizing the duct system and the system static pressure calculations.

6.3.9 Wall Penetrations

Building wall and roof penetrations, along with fabric shelter penetrations shall be carefully made so as not to deteriorate the structural integrity of the wall system. The contractor shall consult with a structural engineer or manufacturer representative. The recommendations of the engineer/manufacturer shall be strictly adhered to. Wall and roof penetrations shall be weather tight.

6.3.10 Control Wiring and Protection Devices

Control wiring and protection devices shall be the manufacturer's standard, pre-wired, and installed at the factory. Operation of the control system shall be manufacturer's standard configured for 24V operation.

6.3.11 Thermostats

All thermostats shall be located near the return grills and mounted 1.5 meters above the floor and shall be easily accessible. In lieu of a

thermostat, a temperature sensor may be located in the room location and connected to the control thermostat near the unit. Thermostats located inside occupied areas shall be provided with lockable covers.

6.3.12 Electric Requirements for HVAC Equipment

a. Note that all electrical requirements for all HVAC systems shall be designed and installed to operate on 400/230 volt, 3-phase, 50-cycle power. Verify electrical requirements with Contracting Officer.

b. Electric Motors: All HVAC motors shall be Totally Enclosed Fan Cooled (TEFC) type and rated for minimum 45 C ambient.

c. All thermostats shall be wall mounted. Thermostat shall be mounted 1.5 meters above the finished floor and be easily accessible. Operation of the control system shall be the manufacturer's standard voltage for the unit.

d. 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 providing internal thermal overload protection.

6.3.13 Electric Motors

a. Motors shall be of sufficient size without operating in the service factor for the duty to be performed and will not exceed their full rated load when the driven equipment is operating at specified capacity under the most severe conditions likely to be encountered.

b. All motors exposed to 40.5 ° C temperature or greater shall be of the totally enclosed fan cooled (TEFC) type continuous duty classifications based upon 50 ° C ambient temperature of reference.

6.3.14 High Ambient Rating

All HVAC equipment located outdoors shall be selected to provide required capacity and for operation in an ambient temperature of 46.1° C (115° F); the equipment safety trip shall allow equipment to operate at higher ambient though at reduced capacity.

6.4 TESTING AND COMMISSIONING

6.4.1 General.

The Contractor shall demonstrate that the installed systems are adjusted and operate correctly 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 design conditions are met. All testing, adjusting, balancing and commissioning shall be performed by an independent subcontractor certified by NEBB, AABC or SMACNA. 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 or its representative and full written records of the test data and final settings shall be submitted to the Contracting Officer.

6.4.2 The following tests data shall be submitted in a tabulated form:

- a. Date and time of the test.
- b. Outdoor DB and WB temperature.
- c. Indoor Room Conditions: DB and WB temperatures and supply return and exhaust airflow.
- d. Makeup Air Units: Air quantities shall be measured by anemometer. Following readings shall be recorded:
 - (1) Supply air CMH (CFM) supplied by each system.
 - (2) Total CMH (CFM) exhausted by each fan.
 - (3) Motor speed, fan speed.
 - (4) Input amperes and power input (KW) for each fan.
- e. Ventilation and exhaust 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) Outside air CMH (CFM) supplied by ventilation system
 - (2) Total CMH (CFM) exhausted by each exhaust fan
 - (3) Motor speed, fan speed and input ampere reading for each fan
- f. Electric Motors: For each motor:
 - (1) Speed in RPM
- g. A continuity tester shall be used to demonstrate that the end bands of the inlet and outlet ducts when setup are satisfactorily grounded to the frame of the blower.
- h. Ductless Split Unit Air Conditioners:
 - (1) Amperes for each phase
 - (2) Power input in KW

6.5 Operation and Maintenance Manuals

O & M Manual shall be submitted and shall include the following:

- a. Manufacturer's technical catalogues, dimensional drawings and wiring diagrams for each and every type of equipment installed.
- b. Operating instructions for various equipment and systems included in the installation work.
- c. Maintenance manuals for all equipment and systems included in the installation work which need regular and specialized periodic maintenance.

6.6 Airfield Lighting Enclosure (ALE)

6.6.1 UNIFIED FACILITIES CRITERIA

UFC-3-260-01 Airfield and Heliport Planning and Design

UFC-3-410-01 Heating ventilating and Air Conditioning

The HVAC sub-contractor shall be responsible for furnishing DX split-system type AC equipment for maintaining the necessary interior temperature and

humidity control for an electrical aboveground enclosure which houses approximately eight constant current regulators/transformers furnished by the electrical sub-contractor.

The AC equipment installed shall maintain the required enclosure's temperature and humidity to ensure the electrical equipment furnished is maintained within the temperature and humidity limits of the equipment manufacturer's recommendations.

7. PLUMBING

7.1 General

The Contractor shall design and build fuel storage and distribution systems required in the facilities identified in Section 01 10 00.12 10 Scope of Work and as described herein. The contractor shall also be responsible for complete design and construction of all special plumbing systems required for full and safe operations in all facilities under 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. Sub-Contractors Qualifications: The plumbing systems shall be executed by a plumbing specialist subcontractor experienced in the design and construction of these types of systems. 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. Local Standards: Conflicts between criteria and local standards 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. Seismic Requirements: All plumbing equipment and piping shall be installed to meet the seismic requirements as defined by the International Building Code, IBC 2000 and seismic response coefficients in Paragraph 4 "Structural"

7.2 Codes, Standards and Regulations

Fuel storage and distribution systems shall be manufactured and installed in accordance with the publications listed below and the publications referenced therein. Where a conflict occurs among the various criteria, the more stringent requirement shall take precedence.

American national Standards Institute:

- ANSI/IEEE 142-91

American Petroleum Institute:

- API RP 540 Electrical Installations in Petroleum Processing Plants
- API 650 Welded Steel Tanks for Oil Storage

International Building Code (IBC), 2006 Edition

International Mechanical Code (IMC), 2006 Edition

International Plumbing Code (IPC), 2006 Edition

National Fire Protection Association:

- NFPA 30 Flammable and Combustible Liquid Code
- NFPA 30A Code for Motor Fuel Dispensing Facilities and Repair Garages
- NFPA 70 National Electric Code

Underwriters Laboratory, Inc.:

- UL 142 Standard for Steel Aboveground Tanks for Flammable and Combustible Liquids

Unified Facilities Criteria:

- (UFC) 3-460-01, Petroleum Fuel Facilities. 16 January 2004

7.3 Power Plant Fuel Storage/Distribution

Fuel Storage and Distribution for fuel shall be provided to support operation of the diesel engine generators. The fuel storage shall consist of aboveground horizontal steel tanks with containment dikes. These tanks shall be complete with fill tube and cap, suction tube, tank gage, vent, and other fittings and appurtenances required for full and safe operation. Refer to UL-142 for further requirements. Tanks shall be provided with support saddles, platform/stair and concrete pad. Fuel shall be transferred from the fuel storage tanks by duplex transfer pumps into individual day tanks integral with the generator unit. Fuel piping shall be painted black steel aboveground and supplied and installed in conformance with NFPA 30 Flammable and Combustible Liquid Code. Fuel storage capacity shall be based on minimum seven days with generators operating at normal capacity of the plant and two days at 100% of the generator full load rating. The fuel storage system shall be expandable to allow for increases in generator capacity. Metal fuel tank saddles should not be placed directly on fuel containment area slabs. They should be elevated on concrete piers to avoid moisture corrosion. Fuel containment area shall be sized for 110% of storage capacity and shall include a sump with a manual ball valve to allow for water removal. Provide fuel filling system for unloading fuel from fuel tanker into storage tanks comprised 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).

Provide lockable plug valve (in supply) and other accessories in fuel piping as required by the engine manufacturer.

7.4 Corrosion

Pipe subject to corrosion passing through or under corrosive fill such as cinders, concrete, or other corrosive material, shall be protected against external corrosion by protective coating, wrapping, or other means which will resist such corrosion. Piping made of inherently non-corrosive material will be used to the greatest extent possible. Dielectric unions shall be used where dissimilar metals are used in the same piping system.

7.5 Testing and Inspection

The Contractor shall test all piping systems in accordance with International Building Code. The contractor's designer shall specify that all plumbing systems shall be left uncovered and unconcealed until it has been tested and approved. The installation contractor shall furnish all equipment, materials, and labor required for testing a plumbing system. All such tests shall be carried out in the presence of the Contracting Officer. 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 design 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.

8. FIRE PROTECTION

8.1 Fire Protection, SOF Helicoptert Apron, Herat, Afghanistan

8.1.1 General

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

Unified Facilities Criteria (UFC) 3-600-01, Fire Protection Engineering for Facilities. 14 July 2009

Engineering Technical Letters (ETL) ETL 02-15 Fire Protection Engineering Criteria - New Aircraft Facilities.

Codes and Standards of the National Fire Protection Association (NFPA) 2010 edition (Individual standards may carry earlier edition dates.).

These include, but are not limited to:

NFPA 10, Portable Fire Extinguishers, 2010 edition

NFPA 11, Standard for Low-, Medium, and High-Expansion Foam, 2010 Edition

NFPA 13, Standard for Installation of Sprinkler Systems, 2010 Edition

NFPA 20, Installation of Stationary Pumps, 2010 edition

NFPA 22, Water Tanks for Private Fire Protection, 2008 edition

NFPA 24 Private Fire Service Mains and Their Appurtenances, 2010 edition

NFPA 70, National Electrical Code, 2008 edition

NFPA 72, National Fire Alarm and Signaling Code, 2010 Edition

NFPA 101, Life Safety Code, 2009 edition

FM Global (FMG) Approval Guide, Fire Protection, 2010 edition with updates

Underwriters Laboratories (UL) Fire Protection Equipment Directory, current edition

International building Code (IBC), 2009 Edition

8.1.2 Life Safety

Facilities features shall be provided in accordance with NFPA 101 to assure protection of occupants from fire or similar emergencies.

8.1.3 Fire Protection Equipment

All fire protection equipment shall be currently listed by Underwriters Laboratories (UL) or approved by FM Global (FMG); or equivalent subject to the approval of the Contract Officer.

8.1.4 Building Construction

Building construction shall conform to the fire resistance requirements, allowable floor area, building height limitations and building separation requirements of the International Building Code (IBC), UFC-3-600-01, and ETL 02-15.

8.1.5 Building Separation

A minimum separation between tension fabric structures will be 15 meters (49.2 feet) with a clear zone between shelters. The minimum separation between tension fabric structures and other structures will be 30 meters (100 feet). The clear zone cannot be used for storage and must be clear of vegetation (maintained lawn is permitted). The clear zone may be used as a street or driveway, but not for vehicle parking.

8.1.6 Internal Fire-Rated Separation

Non-Required

8.1.7 The water distribution system shall include ductile iron underground distribution piping, sectional control valves, underground fire service piping to fire suppression and standpipe system. Installation shall comply with NFPA 24, Private Fire Service Mains.

8.1.8 Automatic fire sprinkler system is required in the helicopter shelter due to its size, construction type, and occupancy. Automatic sprinkler protection is to be provided based on the system requirements specified in ETL 02-15, for -fueled- aircraft. Additionally, automatic sprinkler protection is to be provided in the pump and foam shelter(s).

8.1.9 Low Level High Expansion Foam Sprinkler Systems

8.1.9.1 Except as modified herein, the low level high expansion foam sprinkler systems shall comply with applicable provisions of UFC 3-600-01, ETL-02-15, and NFPA 11. The HEF system will draw off inside air and be hydraulically operated. The HEF system will operate on wet pipe sprinkler system activation for the same shelter, or by manual foam release.

8.1.9.2 Sprinklers shall be quick response upright spray type with a temperature rating of 79 C (175 F). In areas where extremely high temperatures normally occur at the roof sprinklers may have a temperature rating of 93.3 C (200 F).

8.1.9.3 The fire area is limited to one (1) shelter. Each shelter will be protected by a dedicated wet-pipe sprinkler riser.

8.1.9.4 Each shelter shall have a dedicated HEF riser assembly to operate on water flow in the same shelter, or a manual release from the shelter.

8.1.9.5 One foam shelter containing the valves, foam tank, and related equipment shall serve all of the aircraft shelters.

8.1.10 Water Supply for Fire Protection

A system of water storage and distribution shall be provided to meet the maximum calculated fire demand for the duration required. The water system shall comply with UFC 3-600-01, ETL 02-15, and applicable NFPA standards. A Fire Flow of 1893 liters per minute (lpm) (500 gallons per minute (gpm)) with a minimum 1.4 bar (20 psi) residual pressure shall be provided.

8.1.10.1 Water Supply for Fire Protection

A system of water storage and distribution shall be provided to meet the maximum calculated fire demand for the duration required by the standard for the required sprinkler/suppression system. The water system shall comply with UFC 3-600-01, ETL 02-15, and applicable NFPA standards. A hose allowance of 1893 lpm (500 gpm) for Exterior Hose Demand (hydrants) shall be included in the sprinkler system hydraulic calculations. Provide jockey pump and controller. Provide both a flow meter system and a test header for the fire pumps. Flow meter discharge shall be piped back to water storage tanks. Provide surge tank and calculations for surge tank capacity. Tanks are to be monitored for low level and low temperature. Surge tanks are provided on each riser and for each pump setup with pressure gauge. Isolation valves for surge tanks are to be electronically monitored.

The water supply is dedicated to fire protection and not to be used as a potable water supply, so no backflow prevention is required. Additionally,

tank is required to be filled manually via water tankers, or other means as determined suitable by the contractor and approved by the local authorities. Site utilities are limited.

The quantity of water storage is based upon the assumption that there will be only one fire at a time and only one (1) structure involved. Size water storage tanks to provide 30 minutes of flow duration as required for the sprinkler and high expansion foam systems, and 60 minutes for the exterior hose demand (hydrants). Water storage tank, shall serve the new apron hydrants. Provide 10% ullage. Tank capacity shall be the greater of 193,500 liters (51,120 gallons) each, or as required by 120% of the hydraulic calculations plus appropriate ullage.

8.1.10.2 Storage tanks in total shall contain 120% of the maximum required water demand with water distributed as equally as is practical between two fire water storage tanks. Per ETL 02-15, Section A1.4.2.3, Provide storage capacity equal to 120 percent of the maximum demand for 30 minutes. Divide the required storage capacity between two equal-sized water tanks, each storing one-half of the required volume. The piping configuration must allow water to be supplied by both reservoirs, and either of the reservoirs if the other is out of service.

8.1.10.3 The water distribution system shall be protected from frost.

8.1.10.4 The water distribution system shall include ductile iron underground distribution piping, sectional control valves, and underground fire service piping to sprinkler systems. Installation shall comply with NFPA 24, Private Fire Service Mains. Underground water distribution system supplying the wet pipe sprinkler piping is to enter the shelter per ETL 02-15, Section A1.3.1.6.4. Foam solution piping to the helicopter shelters is required to be below ground in covered tanks to allow vehicle traffic between the shelters. Covered trenches shall have solid covers and shall be designed to withstand vehicle loading equipment to MRAP or equal distributed per AASHTO HS-20 loading distribution. Trenches shall be provided with drainage sump every 3 m and shall pitch to ensure that there is no standing water in the trench at any time.

8.1.11 Fire Pumps. Fire pumps shall be horizontal split case type, installed in accordance with NFPA 20, Standard for the Installation of Centrifugal Fire Pumps. Fire pumps shall be housed in a pump house.

8.1.11.1 Fire pump drivers shall be soft start electric motor primary and secondary supplied by the generator provided as part of this project under separate section.

8.1.11.2 A minimum of two fire water pumps shall be provided.

8.1.11.3 The maximum nominal fire pump capacity rating shall be 7571 lpm (2,000 gpm). Pump nominal pressure ratings shall not exceed 8.6 bar (125 psi).

8.1.11.4 A pressure maintenance or jockey pump shall be provided to maintain pressure in the fire protection piping system as specified in NFPA 20.

8.1.11.5 Fire pumps shall be arranged for automatic starting upon pressure drop within the fire protection piping system and also start upon the manual activation of the high expansion foam system. If there is an existing base fire alarm system that allows for additional control points, one fire pump shall also start upon a manual start signal from the base fire dispatch

center.

8.1.11.6 Exhaust, cooling, ventilation, and air intake configuration shall be as determined by the fire pump and fire pump driver supplier. The Foam Structure and the fire pump structure shall be sized to accommodate all of the fire protection equipment and systems whether located in a combined structure, or separate structures, but must meet the hydraulic and foam distribution time requirements for the most remote helicopter shelter. All valves, waterflow switches, monitoring devices, and controls are to be monitored by the fire alarm panel.

8.1.12 Wet-pipe automatic sprinkler system shall be provided in the fire pump and foam/fire equipment structures.

8.1.12.1 Provide wet sprinkler risers with vane type water flow switches per ETL 02-15.

8.1.13 Smoke Detection

Smoke detection shall be provided only in accordance with UFC 3-600-01, NFPA 72-National Fire Alarm Code, and ETL 02-15. Provide smoke detection in near fire alarm releasing panel, and other fire alarm control panels.

8.1.14 Local Fire Alarm System

A fire alarm evacuation system shall be provided as required by UFC 3-600-01, NFPA 101-Life Safety Code, and ETL 02-15 and shall be UL listed for releasing service. System shall be arranged to operate audible and visual alarm signals throughout the facility upon activation of a manual fire alarm pull station, area smoke detection where required, or suppression system. Fire alarm system shall monitor all points including (but not limited to) in the fire pump shelter and foam shelter, including all valves, flow switches, low pressure, pump monitoring, and low temperature. Manual alarm pull stations shall be located at all exit and entrance doors and as otherwise required by NFPA 72. Refer to Electrical Specification Section 9 for additional fire detection and alarm requirements.

8.1.15 Fire Alarm Reporting System.

The fire alarm system shall be a local fire alarm system and not monitored off site.

8.1.16 Fire Hydrants shall be placed at a maximum of 91 meter (300 foot) intervals around the accessible side(s) of the apron. Further, a hydrant shall be a maximum of 30 meters (100 feet) from each corner of the building.

8.1.17 Portable Fire Extinguishers

Portable fire extinguishers shall be provided inside all facilities as required in accordance with NFPA 10.

Extinguishers shall be of the multi-purpose dry chemical type except for occupancies requiring a special type of extinguisher (such as Carbon Dioxide extinguishers for electrical equipment rooms). Wheeled extinguishers employing potassium bicarbonate dry chemical are generally recommended for helicopter shelters because they provide the maximum extinguishing capability for Classes B and C type fires.

Wheeled extinguishers employing a minimum 45 kg (100 lbs) of potassium bicarbonate dry chemical shall be supplied for aprons for the maximum extinguishing capability of Classes B and C type fires.

9. ELECTRICAL

9.1 SCOPE OF WORK

The Contractor shall design, supply all electrical materials, and construct the electrical systems necessary to support the SOF, Helicopter Apron, aircraft shelters, Airfield Lighting Enclosure and Fire Protection Equipment Enclosure at the Herat Airfield in Afghanistan. This includes but is not limited to, all consumables, trade tools, construction equipment and test equipment needed to result in a fully functional electrical system required for reliable operation of this project.

The systems shall be designed and constructed by the Contractor in accordance with the applicable codes and standards listed herein and the standards referenced in the listed specifications. The Contractor shall design, construct and procure all electrical facilities.

In the bid documents, as described and/or listed in this Contract and, good engineering practices, to deliver fully functional electrical systems required for reliable operation of this project.

In accordance with the applicable codes, standards and publications listed herein and the standards referenced in those listed documents. Refer to the Civil Site Plans for the proposed layout and details for this site. The Contractor shall provide complete electrical design services including, but not limited to:

- calculations and design analysis
- schematics and one lines
- construction drawings
- specifications for the electrical systems

The Contractor is responsible:

-for identifying and providing the electrical systems needed for a complete and operational facility to adequately support the Contract requirements,

-for providing facilities to support the expected electrical loads and functions of this project.

-for obtaining all construction permits from local and national agencies, needed to proceed with construction in a timely manner

-for the design and selection of all materials and equipment being submitted to the Contracting Officer for prior approval before any work commences.

9.1.1 Scope Items Summary

The Contractor shall design, procure and install all items as follows but not limited to:

-Demo of any existing airfield lighting and NAVAID system facilities required

for new construction. -Apron and taxiway edge lighting for the SOF and Helicopter Aprons

- Grounding system including static grounding points/ aircraft and helicopter tie-downs
- Secondary power distribution to support facilities -Obstruction lighting (if required)
- Prime power generator(s) and paralleling switchgear with sunshade
- Mechanical equipment power support
- Testing and commissioning
- Onsite training
- Airfield Lighting Enclosure (ALE)

9.2 GENERAL REQUIREMENTS

9.2.1 Applicable Standards and/or Codes

The standards and/or codes listed below form a part of this Contract to the extent referenced or applicable. The Contractor shall be bound by the latest issued code or standard in effect at the time this Contract is issued for Construction. All are referred to by basic designation only. The Contractor shall confirm and verify the standards and/or codes used, to include but not limited to:

- BS 7671 (2008) Requirements for Electrical Installations, IEE Wiring Regulations, Seventeenth Edition
- IEC 60364 (2005-11) Low-voltage electrical installations
- BS 1363-2 (Jan 1995, Amd 1) 13 A Plugs, socket-outlets & adapters
- Specifications for 13 A switched and unswitched socket-outlets
- Institute Of Electrical And Electronics Engineers (IEEE) IEEE C2 (National Electrical Safety Code (NESC), 2008
- Illuminating Engineering Society of North America (IESNA)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

- National Fire Protection Association, NFPA 70 (National Electric Code (NEC), 2011 Edition (can use in lieu of BS 7671 if necessary)
- NFPA 70E Standard for Electrical Safety in the Workplace, 2009 Edition NFPA 72 National Fire Alarm and Signaling Code, 2010 Edition
- NFPA 77 (2000) Recommended Practice on Static Electricity
- National Fire Protection Association Life Safety Code, NFPA 101, 2009 Edition.
- National Fire Protection Association Standard for Installation of Lightning Protection systems, NFPA 780, 2011 Edition.
- FAA Section AC 150/5345-43 Obstruction Lighting Equipment

9.2.1.1 References in the specification to U.S. (American) standards (e.g. ASTM, ASME, Factory Mutual (F.M.), National Electrical Manufacturer's Association (NEMA), ANSI, IEEE, Underwriter's Laboratories (UL), etc.) for construction materials and equipment, is made to establish a level of electrical quality and standardization for this project. Material conforming to other internationally recognized standards such as British Standards (BS), and International Electrotechnical Commission (IEC) may be acceptable in lieu

of compliance with U.S. material standards depending on the application, and if approved by the Contracting Officer.

9.2.2 Unified Facilities Criteria and Design Guides

Complete design of the airfield lighting system shall be in accordance with the most recent requirements of the United Facilities Criteria located here http://www.wbdg.org/ccb/browse_cat.php-o=29&c=4 and other design guides as listed below (Contractor to use the latest published version available at the time of Contract award.) In every instance where the criteria is applicable, it shall become part of this Contract document. The following guides to be used include but are not limited to:

(NOTE: Some of the following apply only if the Option is exercised)

UFC 3-260-01 Airfield and Heliport Planning and Design

UFC 3-460-01 Design Petroleum Fuel Facilities

UFC 3-520-01 Design: Interior Electrical Systems

UFC 3-530-01 Design: Interior and Exterior Lighting and Controls

UFC 3-535-01, Visual Air Navigation Facilities, 17 Nov 05

UFC 3-535-02, Design Drawings For Visual Air Navigation Facilities
available upon request.

UFC 3-540-04N Diesel Electric Generating Plants

UFC 3-550-0 Exterior Electrical Power Distribution

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

UFC 3-560-01 Electrical Safety, O&M

UFC 3-600-01 Design: Fire Protection Engineering for Facilities, Change 1, 14 July 2009

UFC 3-570-02N Electrical Engineering Cathodic Protection

UFC 3-570-02A Cathodic Protection

-U.S. Army Corps of Engineers, Transatlantic Programs Center, Design
Instructions Manual

-ANSI/ASHRAE/IESNA Standard 90.1-2007 (Lighting)

-ARMY TM 5-811-3 (AIR FORCE FM 88-9 CHAP. 3)

Electrical Design Lightning and Static Electricity Protection

-Air Force Engineering Technical Letter ETL 02-15 Fire Protection Criteria

-Fire Protection Engineering Criteria-New Aircraft Facilities

-ICAO (International Civil Aviation Organization) Annex 14 -STANAG 3316 (NATO
Standardization Agency)

Airfield Lighting Design measurements shall be shown in metric units.

9.2.3 Guide Specifications

The Contractor shall utilize the Division 26-Electrical and 33-Utilities
guide specifications and others, found on this website:

http://www.wbdg.org/ccb/browse_org.php-o=70, in preparing their technical
specifications.

(Note do not use -Preparing Activity: NASA- spec versions)

Guide specifications may be found on the internet at Construction Criteria
Base (CCB), available to the public at the following url: www.ccb.org. The
Contractor shall edit applicable guide specifications and submit a completed
version showing changes and or additions, for approval as part of the
submittal requirements of this Contract including but not limited to:

UFGS 34 73 13 Mooring and Grounding Points for Aircraft (included in this

Contract)

UFGS 26 56 20.00 10 Airfield and Heliport Lighting and Visual Navigation Aids.

UFGS 33 70 02.00 10 Electrical Distribution System Underground

UFGS 26 32 15.00 10 Diesel-Generator Set Stationary 100-2500 KW, with
Auxiliaries

UFGS 26 23 00 Switchboards and Switchgear

UFGS 26 24 16.00 40 Panelboards

If a needed specification is not available on this site the Contractor can submit a proposed spec required in order to result in a complete set of specifications for this work.

9.2.4 NOT USED

9.2.5 Electrical Site Survey

The contractor shall perform a site survey prior to design start and is responsible for obtaining all necessary information and performing all calculations, measurements, and any other data pertinent to design and construction of this project.

The Contractor shall note all existing utilities, structures and enclosures that could possibly impact the electrical design and power supply for this project and provide a report to the Contracting officer. The report shall include findings and recommendations in how to utilize electrical facilities if possible, or to integrate into the final design.

The Contractor shall coordinate design and construction under this project with any design/build contractor implementing the adjacent taxiway projects that is preceding or being built within the same time frame as this work. Review all available design drawings for the existing and new airfield lighting systems to determine where there are potential interferences and conflicts between the new construction and existing construction and utilities.

The Contractor shall perform a complete field survey to gather information for his design, and field verify any potential problems, and report and make recommendations to the Contracting Officer for proposed resolution.

Existing communications or electrical power lines, can be left in place if they are buried deep enough and do not interfere with the new construction. These cables at a minimum shall have a protective sleeve placed around them to facilitate their replacement if necessary and to provide physical protection. The requirements of UFC 3-535-01 shall be followed. If this is not possible the cables should be re-routed. Any re-routing necessary shall be reported to the Contracting Officer.

The Contractor shall review the existing airfield lighting systems. The Contractor shall field verify the existing systems that might affect the new installation, and provide a report to the Contracting Officer. The Contractor shall evaluate all existing equipment and cables to accommodate the additional systems being installed as part of this Contract. New cables and equipment will be needed for the new apron.

9.2.6 Demolition of Existing Airfield Lighting

Contractor shall demolish all existing lighting systems as required to connect the proposed aprons into existing systems in accordance with Chapter 19 of the Design Instruction Manual that require removal to accommodate the new installation. All fixtures, material and equipment removed as a result of demolition are considered Government property and shall be properly stored at a location approved by the contracting officer. No demolition shall take place prior to obtaining authorization from the Contracting Officer.

9.2.7 Site power

Depending on the recommendations of the Electrical Site Survey, the site power shall be supplied from new prime power diesel generators, having the necessary capacity to carry all the electrical load required for this project including lighting, aircraft shelter power, fire protection equipment enclosure, electric fire pump(s) and the ALE loads if that Option is exercised.

The Contractor shall design and construct electrical systems for this project utilizing 3phase 380/220 volt 50HZ or as directed by the Contracting Officer.

Single phase shall be 220V, with a neutral and ground, 50HZ. Service and distribution shall generally be 3-phase, 4-wire 380/220V utilization power for convenience receptacles and small power loads.

9.2.8 Environmental Conditions

The design and selection of materials for exterior work shall be appropriate for the site environmental conditions as described in the Contract. The Contractor shall clearly indicate any de-rating factors applied to equipment or cabling.

Required design capacities including adequate spare capacity must be met after applying applicable de-rating factors to equipment and cabling. Where multiple feeder cables are run within close proximity, apply de-rating factors according to manufacturer's guidance or other applicable published guidance when manufacturer's guidance does not fit installation condition.

9.2.9 Material

US criteria require the use of Underwriter's Laboratories (U.L.), Factory Mutual (F.M.), National Electrical Manufacturer's Association (NEMA) or other standards for electrical construction materials and equipment. Comparable internationally recognized standards such as British Standards (BS), International Electrotechnical Commission (IEC) standards, or Deutsches Institut fur Normung (DIN) standards, for example, may be acceptable in lieu of compliance with U.S. standards depending on the application and if approved by the Contracting Officer. There is no exception for Airfield lighting material except as noted herein.

-Material and equipment installed under this contract shall be for the appropriate application.

-All airfield lighting system equipment shall be certified by the ICAO (International Civil Aviation Organization) Annex 14, STANAG 3316 (NATO Standardization Agency) or Airfield Lighting Federal Aviation Administration (FAA). All airfield lighting materials and equipment shall be manufactured to one of those standards. The Contractor shall provide proof to the Contracting

officer in the form of internationally recognized certificates, verifying that the suppliers of the airfield lighting equipment and materials are certified prior to any equipment installation. Material installed without this certification will be in violation of the Contract requirements and subject to penalties or withholding of payment for services until the problem is resolved to the Contracting officers satisfaction.

-Material and equipment shall be a standard product of an established manufacturer regularly engaged in the manufacturing business for at least 5 years and the product by that manufacturer shall essentially duplicate items that have been successfully utilized by industry and businesses for at least 2 years prior to bid opening.

-Equipment installed shall be capable of being serviced by an organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site if practical and feasible.

-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.

-Equipment and materials shall be new unless indicated or specified otherwise.

-Enclosures for exterior and interior applications shall be NEMA Type 4 (IEC Classification IP54) and NEMA Type 1 (IEC Classification IP10), respectively unless noted otherwise.

9.2.10 Manholes/Handholes/Pullboxes

Contractor shall be responsible for providing handholes, manholes and/or pull boxes as required by the applicable referenced codes and publications.

All covers for all manholes/pullboxes and handholes shall be constructed:

-to meet ASTM (American Society for Testing and Materials) Specification A 48, Class 20. (9,090kg vertical load) and loading as per Section 2 -Utilities Trenches and Conduits

-in locations subject to aircraft traffic, to support not less than 34,000kg (75,000 lbs) single wheel load. The top surface of foundation should be 1 inch above grade per UFC 3-260-01 for runways (paragraph 3.9). See Air Force ETL 02- for heavy aircraft loading to determine the lateral loads on handholes/manholes. Structural calculations must be submitted for government approval prior to construction.

9.2.11 Grounding System

The Contractor shall design, construct and supply all necessary labor, equipment, and material to result in a fully functional electrical grounding system for this project. This grounding system shall comply with the requirements of BS 7671 (also reference UFC 3-535-01 and NFPA 70, National Electrical Code (NEC), Article 250).

Some but not necessarily all, grounding design criteria are as follows:

-All exposed non-current carrying metallic parts of electrical equipment in the electrical system shall be grounded/bonded.

-Insulated grounding conductor (separate from the electrical system neutral conductor) shall be installed in all feeder and branch circuit raceways per BS7671.

-Equipment grounding bars shall be provided in panelboards.

-The equipment grounding conductors shall be carried back to the service entrance grounding connection or separately derived grounding connection.

-Equipment safety grounding/bonding conductor shall be insulated green-colored per BS7671 or the NEC.

-Ground rods shall be copper-clad steel, 20mm (0.75 inch) round and 3 meter (10 feet) long, minimum.

-Bare copper grounding electrode conductors shall be installed 450-600 mm below final grade shall be no less than 70 mm² (2/0 cu) stranded

-Ground resistance at any grounding point shall not exceed 25 ohms when measured more than 48 hours after rainfall. Additional ground rods will be installed as needed to ensure this value is not exceeded. Test results shall be submitted to the Contracting Officer by the Contractor documenting these results for all locations.

-Static grounding systems will be in accordance with UFC 3-520-01, UFC 3-535-01, NFPA 77 and MIL-HDBK-419A.

-Underground connections shall be exothermal welded utilizing molds and materials designed for that purpose by reputable established manufacturers.

-All above grade ground connections will use brass or stainless steel connectors designed specifically for grounding use and to minimize dissimilar metal corrosion issues.

Grounding shall be provided at each generator system, and shall be a permanently installed below grade counterpoise bonded by not less than four ground rods and with one rod located in a ground test well to provide accessibility for grounding system maintenance and testing.

9.2.11.1 Lightning Protection

Lightning protection design shall follow NFPA 780. Assume the same Isokeraunic levels as a medium level of activity in the USA if none is available for MES.

One TVSS (Transient Voltage Surge Suppressor) unit shall be provided at all service entrances, installed per the manufacturer's recommendations. These TVSS units will meet or exceed the latest UL 1449 standard. As a minimum, metal oxide varistors (MOV) technology shall be used. A service entrance shall include all first power or lighting panels downstream from a generator or transformer. The main distribution panel next to a generator or transformer would be considered a service entrance.

9.2.11.2 Static Grounding Points/ Aircraft Tie-downs

See Paragraph 2 for requirements.

9.2.11.3 Counterpoise Lightning Protection System

Provide a continuous counterpoise of number 25 sq mm minimum (#4 AWG) bare, stranded copper wire over the entire length of all primary circuits supplying airfield lighting per UFC 3-535-01.

9.2.12 T ransformers

9.2.12.2. Not used

9.2.13 Identification Nameplates

Major items of electrical equipment, such as the transformers, manholes (MH), pullboxes, hand holes, panel boards, street light poles, and load centers, etc, shall be provided with permanently installed engraved outdoor rated identification nameplates as per the specifications. These nameplates shall identify the equipment by type or function, ratings, configuration and specific unit number and be capable of resisting sunlight for 25 years if outdoors.

Contractor shall submit a schedule of name plates for all electrical equipment for approval of the Contracting Officer prior to ordering.

9.2.14 Warning Signs

In addition to standard warning signs required by the specifications, The Contractor shall perform an Arc Flash Hazard Analysis Study per the requirements of NFPA 70E or include existing published information for typical equipment similar to that to be used on this project, to determine Flash Hazard Boundaries and the Personal Protective Equipment (PPE) level needed. Specific arc flash hazard sign requirements will be made based on the arc flash analysis of electrical equipment to be submitted by the Contractor.

See Section 01 33 00.12 10 for more Electrical submittal requirements. Provide durable permanent indoor or outdoor warning signs on switchboards, panelboards, industrial control panels or other energized electrical equipment as required per BS 7671 or the NEC Article 110.16. The warning signs shall include the Flash Hazard Boundary and the Personal Protective Equipment (PPE) required for working on equipment hot. (Reference NFPA 70 Article 110-16; NFPA 70E Article 130.3; and UFC 3-560-01 Electrical Safety, O & M) .

9.2.15 Mechanical Equipment

Contractor shall design, provide and install circuits for all mechanical equipment that require power and make the final connections.

9.2.16 Seismic Requirements

All electrical equipment shall be installed to meet the seismic requirements as defined by the International Building Code, IBC 2003 and seismic response coefficients as identified in -the Structural section.

9.2.17 Testing and Commissioning

In addition to requirements in other sections of this Contract the Contractor shall adhere to the following as a minimum:

The Contractor shall provide all necessary temporary power and equipment to operate the systems for testing and shall provide all test equipment. All test equipment performing any type of measurements or documenting field test values must have a recent valid certificate of calibration acceptable to the Contracting Officer.

After installation of all equipment, Contractor shall adjust that equipment as necessary and conduct checkout tests in accordance with the procedures contained in the equipment manufacturer's instruction books or as per NETA (National Electrical Testing Association) whichever is more stringent.

All systems shall be functionally checked and tested in the presence of the Contracting Officer for satisfactory operation prior to the commissioning the overall installed system.

After functionally checking individual systems or equipment the Contractor shall demonstrate, by operational tests, which the entire system will operate satisfactorily on remote and local control under all foreseeable operational scenarios. These scenarios will be determined by the Contractor and submitted to the Contracting Officer for approval and modification, if needed, prior to any system testing.

All tests will be thoroughly documented and witnessed by the Contracting officer or his designees. Contractor shall cooperate with, assist and train the appropriate Air Base personnel during the shakedown testing to exercise, test and evaluate the system in an operational environment to verify the system is ready for full operation.

Only after all testing and commissioning is completed will the Contracting officer will acknowledge substantial completion and acceptance of the Contract.

9.2.18 Onsite Training

The Contractor shall include all costs associated with providing a qualified manufacturers field representative to train base personnel in the operation of the newly installed electrical systems. Training shall be provided for all major electrical equipment, (i.e. generators, switchgear, lighting systems). The costs for handouts, pamphlets, course material, annuals, etc. shall be included in the training by the Contractor. The training period shall consist of a minimum total of 8 hours for upto 8 designated base personnel per element.

The Contractor shall provide an hourly rate in the case the Contracting Officer wants to provide additional training for the operational staff. The course instructions shall cover operation and maintenance of all aspects of the equipment.

The Contractor shall submit information describing training to be provided, training aids to be used, duration, and schedules for Contracting Officer approval.

9.2.19 Warranty and Recommended Spare Parts

Contractor shall supply the equipment manufacturers' recommended testing equipment and tools, and the manufacturer's standard package of spare parts

and spare circuit boards. The test equipment and spare parts shall be located as directed by the Contacting Officer and shall be sufficient for at least two years of normal operation. The systems equipment and operation shall be warranted against manufacturer and installation defects after acceptance of the systems in accordance with other requirements of this Contract.

9.3 ELECTRICAL SYSTEMS

9.3.1 Generators

Contractor shall supply a comprehensive generator package from one vendor consisting of two 380/220V, 50HZ, 3 phase generators with paralleling switchgear integral with the generator control panel. The generators shall be prime power rated and sized to provide full load output for whichever design condition becomes the determining factor. Exact location of the generator sets shall be approved by the Contracting Officer.

Generator set unit shall be designed to meet all specified requirements, such as total power output after application of all de-rating factors for the elevation, ambient temperature and humidity of the project location and fuel type.

Generators shall operate in 'Stand Alone' or 'Island Mode' (no external power is available).

Design shall generally follow UFC 3-540-04N Diesel Electric Generating Plants guidelines where applicable. The Contractor shall perform and document calculations to determine the size of generator(s) required for successful operation of this project. As a minimum the output power shall be as specified for the maximum diversified demand load plus 25% spare capacity, running at 1500 rpm at an intake air temperature of 50 degrees C at 0.8 power factor. In addition the generators, when sized for two operating in parallel, shall not be sized smaller than:

- the prime rating required to serve the normal facility diversified peak demand with one generator running

- the prime rating required to serve the normal facility diversified peak demand, the fire pump and associated emergency facilities with two running.

The generators shall have automatic synchronizing equipment for parallel operation.

Generator:

- shall be capable of operation on JP8 (jet petroleum) and shall be capable of producing 110 percent rated output for a minimum of 3 hrs.

- fuel systems shall meet NFPA 30 and NFPA 37 or equivalent. Fuel storage and delivery system shall be grounded in accordance with UFC 3-460-01. Refer to paragraph 7 for additional fuel system requirements.

- shall have an integral manufacturers standard size day tank sized for approximately 6-8 hours of operation at 100 percent load.

- shall be electric start type.

- shall be provided with exhaust mufflers with sound attenuation, rated for residential areas.

-shall be skid mounted standard industry size, and provided in the manufacturer's standard weatherproof/sound attenuation enclosure.

-unit shall be installed on a concrete pad. Pads shall protrude 150mm (6 inches) above grade.

-shall be provided with automatic alternating and paralleling controls for both generators.

-shall be grounded per the requirements of BS 7671 and NEC Article 250.

9.3.2 Generator Sunshade

The generator shall be installed under a sunshade. A minimum of one (1) meter clear space shall be maintained above all equipment under the sunshade(s). Weatherproof exterior lighting shall be provided for the sunshade. Minimum illumination level, utilizing a white color light, under the sunshade shall be 215 Lux (20 foot-candle).

The sunshade shall be provided with a minimum of two duplex weatherproof electrical outlets on both ends, to allow connection of power tools or portable lighting. Exact location of the sunshade(s) shall be coordinated with the Contracting Officer.

9.3.3 Secondary Power Distribution System

Contractor shall design, provide all material and install a complete electrical low voltage distribution system to provide low voltage power to all components of the airfield lighting system, fire protection equipment building and the aircraft shelters.

-All electrical installation shall be in accordance with the applicable requirements of NFPA 70 (National Electric Code, 2011 Edition).

-The Contractor will procure, design and install all wiring and equipment to the terminals of the distribution panel(s).

-All low voltage circuits shall be designed and installed to ensure the worst case voltage drop on any circuit is less than 5% maximum from the generator.

-Breaker sizing shall be coordinated to ensure downstream breakers are not any bigger than the next upstream breaker.

9.3.3.1 Electrical Service Entrance

An electrical service entrance per BS7671 shall be provided at the generator location into the main distribution panel.

-Service entrances shall be from underground if more than 2m from the secondary source and consist of multi-conductor copper insulated armored cable or individual conductors in conduit.

-The service capacity shall be based on a demand load that includes all known loads that are part of the present Contract and consider 25% estimated growth for any future phases.

-The service cable shall be sized at a minimum of 125% of the main distribution switchboard demand load or the main circuit breaker ampere

rating whichever is larger.

-The sizing shall account for a 45 degree C ambient temperature.

9.3.3.2 Switchboards and Panelboards

The Contractor shall design, install and provide material for all lighting fixtures, cabling and equipment for the secondary distribution system to include but not necessarily limited to the following requirements:

-The contractor shall design and supply one 380V low voltage outdoor switchboard next to the generator location(s) mounted on a concrete pad under a sunshade. This switchboard will be served from the generator(s) via the automatic transfer switch or synchronizing gear. This switchboard shall have an adequate number of circuit breakers to serve the required secondary services with not less than two spare spaces for future secondary service loads and one spare sized to match the largest branch breaker used.

-Three phase service entrance panelboards rated 200A or greater than shall be provided with an ammeter-selector switch, voltmeter-selector switch and kilowatt hour meter. Selector switch shall be provided for reading individual phases.

-Main switchboards shall be UL listed for Service Entrance.

-All distribution shall be from circuit breaker switchboards or panelboards.

All panels shall:

-be provided with a minimum of 25% spare breakers installed for each size/type used and all spare space shall be equipped and ready for future breaker installations.

-have a minimum of 25% spare KVA capacity for future load growth.

-be circuit breaker type

-be provided with a typed directory, in English and Pashtun or predominant local dialect, that clearly lists each specific load for each circuit. The directory shall be placed within a durable heavy duty clear holder on the inside of each power panel door readable without removing from the holder. It should be suitable for making changes by field personnel over time.

-have a complete single line diagram provided on the inside of the panel door along with the directory, showing all panels serviced from the panel power source.

-lighting and appliance branch

-circuit panelboards shall be of the circuit breaker type conforming to NEMA PB 1 and UL 489 and shall be located on an end wall in each shelter. Miniature circuit breakers shall not be allowed.

-panelboard busses shall be tin-plated copper only. Aluminum busses are not acceptable.

The phase loading on panelboards shall be balanced as much as practical by the type of loads on the panel. This includes equally disbursing the spares between the phases. Panelboards shall have hinged covers door-in-door

construction with a master keyed flush tumbler latches.

All circuit breakers shall be:

-labeled with an identification number corresponding to the panel schedule and drawings.

-rated at 20 amperes minimum for minimum branch circuit size.

-bolt-on- type and connected to all copper phase and neutral bus bar(s) within the panel boards.

-Daisy chain (breaker-to-breaker) connection(s) shall not be acceptable. Stab-in breakers shall not be allowed.

3-pole circuit breaker shall be a single unit and not made up of 3 single pole circuit breakers.

9.3.3.3 Receptacles

-The final circuit breaker serving receptacle circuits shall be rated 20 ampere.

-All outdoor receptacles will be ground fault interrupter (GFCI) type.

9.3.3.4 Cables and Wires

-Conductors shall be sized based upon BS 7671.

-All exterior secondary AC voltage cables shall be rated for underground duct installation and shall be rated for either 600V for secondary voltages above 300V and 300V for AC voltages less than 300V.

-All conductors shall be copper.

-Underground installation can be direct buried armored cable for 4 conductor 3phase circuits or individual cable in conduit. Power and lighting conductors shall be 600 volt, Type THHN (in dry locations), and THWN-2 or XHHW (in wet locations).

-All wiring shall be copper, minimum 4 mm sq (# 12 AWG).

-Proper wire nuts/connectors shall be used for splicing wire. No twist-wire connections with electrical tape wrapped around it shall be acceptable.

-No secondary power cable splices are allowed except for interior above grade lighting and receptacle circuits.

-All conductors shall be installed in a minimum size of 21mm (3/4-inch) conduit.

-Cabling systems such as mineral-insulated cables, metallic armored cables and nonmetallic-sheathed cables shall not be allowed.

-Conduit size shall be based on use of single conductor cable with THW or RHW insulation for sizes #1 AWG and smaller.

-Flexible metal conduit (FMC) is permitted only where equipment vibration is a consideration.

9.3.3.5 Secondary Raceways

This requirement shall include installation of secondary power distribution system (service entrances) in an underground cable system from the generator control panel(s) and secondary distribution centers, to the respective distribution panels.

-Exterior raceways (ductbanks, conduits) shall be installed at a slope towards a pullbox or hand-hole to avoid collection of water in the raceway.

-Maximum conduit fill will be calculated per BS 7671 but no more than 40%.

-All conduit stub outs below grade will be installed with a metal detectable marker at the stub out point and an above grade durable marker.

-For all conduit and ductbank, cable warning tape with magnetic strips suitable for detection by equipment designed for that purpose shall be provided 450mm below final grade (18inches) directly above all underground cables and conduits. For cable raceway more than 30cm wide, more than one warning tape shall be required.

-Ductbanks designed for secondary voltage feeders shall consist of PVC Schedule 40 conduits, 53mm (2 inch) minimum internal diameter.

-Conduit shall be concrete encased PVC schedule 40 under roads or paved areas. Cables crossing roads within concrete encased pipe sleeves is also acceptable.

-All runway cable crossings shall be in concrete encased ductbanks.

-Each encased ductbank shall be provided with a minimum of one (1) spare conduit of same size for future use. If different size conduits are used in one ductbank run then each size will have at least one spare.

-Direct buried conduits may be used for apron / taxiway edge lighting system and shall not be less than 53mm (2 inches) internal diameter.

-All outdoor below grade cables or conduits shall be installed per code requirements but no less than 600mm below final grade.

-All conduits shall be cleaned with a wire mandrel prior to the installation of cables.

-Spare conduits shall be capped at both ends with a pull string in place.

-Only RGS (Rigid Galvanized Steel meeting ASTM (American Society for Testing and Materials) standards) will be used above grade to enclose all wiring per BS 7671. They shall be surface mounted in unfinished areas. Conduit that is exposed along walls in areas that are subject to damage shall be RGS.

-Secondary duct-bank system shall include pullboxes/hand-holes for secondary power as required. -Conduits shall be securely and rigidly fastened in place as required by the BS 7671. No hardware, panels, boxes or other electrical equipment will be supported by conduit.

-All non-metallic conduits shall be no smaller than 21mm internal diameter (3/4 inches).

-Conduit size shall be based on use of single conductor cable with THW or RHW insulation for sizes #1 AWG and smaller.

-Flexible metal conduit (FMC) is permitted only where equipment vibration is a consideration.

-Plastic conduit is allowed only underground or under the floor slab.

Electrical duct depth, bedding, and cover shall be designed as required by the UFC design criteria for line size, material and vehicular loading. Utilities placed in traffic areas shall be designed for the greater of an AASHTO H20 vehicle loading or the wheel loading imposed by the design aircraft. Trench backfill shall be compacted to at least 95% maximum density. All reasonable measures shall be taken to ensure that no manholes shall be located inside the airfield. Where manholes/handholes fall within the airfield, the equipment shall be rated per UFC 3-260-01 and Air Force ETL 02-1.

Trenching will not be permitted to cross existing airfield pavements. All utility borings under existing airfield pavements shall be accomplished by dry boring, auguring or jacking following Contractor's submitted specifications, and under guidance from Air Force Technical Letter (TL) 04-4-1. All other excavations shall be accomplished by methods approved by the Contracting Officer.

9.4 NAVAIDS AND AIRFIELD LIGHTING SYSTEMS

9.4.1 Engineer and Installer Qualifications

The design of the airfield lighting systems shall be completed by qualified engineer(s) with a minimum of 5 years experience in designing airfield lighting systems. The Contractor shall provide a detailed resume and documented evidence of past performance for the engineer(s) designing these systems to the Contracting Officer for approval. The engineer(s) information shall indicate a thorough knowledge and experience with ICAO, FAA, military and other appropriate standards.

The engineer(s) shall work closely with the airfield lighting equipment manufacturer engineers to ensure that the systems are properly coordinated. The Contractor shall employ qualified installers thoroughly familiar with airfield lighting equipment and systems installation. The Contractor shall submit written verification that the installers are experienced with the installation, testing, and maintenance of these systems.

Information for these individuals demonstrating their qualifications and experience shall be submitted to the Contracting Officer (CO) for approval. If it is found the installers are not qualified at any time during the installation process, the Contracting Officer shall have the authority to reject the credentials of those personnel who will have to be replaced by personnel acceptable to the Contracting officer at the Contractors full expense and associated cost to the project, as a result of this replacement.

9.4.2 Airfield Lighting Systems Manufacturer Certification

All manufacturers of aviation and airfield lighting materials and equipment for this Contract shall be third party tested and listed in the FAA Advisory Circular (AC) 150/5345-53C, Airport Lighting Equipment Certification Program, ICAO (International Civil Aviation Organization) Annex 14 approved or STANAG 3316 (NATO Standardization Agency) -Airfield Lighting approved. Manufacturers

shall be listed specifically for the material or equipment they are supplying. Manufacturers not listed as certified will not be acceptable. Airfield Lighting System equipment (fixtures etc.) shall be sole source procured equipment to match existing installed equipment if practical and feasible while meeting the required standards of this scope.

9.4.3 Air Navigation Lighting

Contractor shall design, provide and construct a complete and functional air navigation lighting system for the project pavements interconnecting ducts, manholes, hand-holes, conduit, wiring, grounding counterpoise, and lighting fixtures. Those pavements include but are not necessarily limited to taxiways and parking aprons.

The design of the airfield lighting system shall be in accordance with the details in United Facilities Criteria (UFC) 3-535-01, Visual Air Navigation Facilities. All visual NAVAID lights shall be in conformance with UFC 3-535-02. Plastic light can bases and plastic bolts are not permitted. The D-B contractor shall submit preliminary plans for visual NAVAIDS with the first design submitted showing location, type, lens color, height and details. The D-B Contractor shall evaluate the existing visual NAVAIDS at the project airfield. The condition of existing NAVAIDS, conformance with current criteria, and need for any waivers of requirements shall be included in the Contractor-furnished Design Analysis. The Contracting Officer shall determine the disposition of deficiencies. The D-B Contractor is not responsible for correcting existing deficiencies unless directed to in these specifications.

The visual air navigation system shall include but not limited to Instrument Meteorological Conditions (IMC) for Precision Instrument Category I per Table 2-1A for the Strategic Airlift Apron and Table 2-2 for the Helicopter Apron (Air Force) in UFC 3-535-01 as noted below only:

1. Taxiway/Apron edge lights

2. Mandatory Guidance signs

3. Obstruction lighting (if justified). Obstruction lights shall not be Light Emitting Diodes (LED) based obstruction lights per AFSC.

4. The existing mimic panel, human machine interface (HMI) display or PC based display in the ATCT and existing ALE as part of the main runway lighting system, shall be modified / reprogrammed by the Contractor to the satisfaction of the Contracting Officer, as part of this contract with consideration for expansion of other airfield lighting.

Apron edge lighting shall follow the same guidelines as that specified in the UFC for taxiway edge lighting.

For airfield lighting:

-Runway edge lighting shall be modified for new taxiway construction.

-Elevated taxiway edge lighting (non-interleaved) shall be provided for all new taxiways and aprons.

-Apron Edge lights shall not be required behind aircraft shelters and other areas inaccessible to airworthy vehicles.

-Edge light fixtures and equipment shall be as specified herein but shall be

of the same type, kind and by the same manufacturer as those of other new or proposed site facilities or as designated by the Contracting officer.

-All necessary 'mandatory instructions' and 'information' signs, with fixed message, shall be provided for the new taxiway(s) and apron and shall be internally illuminated.

-Plastic cans and bolts shall not be used.

-All light fixtures recessed and elevated shall be height adjustable to allow for additional pavement or grading in the future.

9.4.3.1. Airfield Lighting Enclosure (ALE)

The Contractor shall supply all electrical equipment needed for a complete and working airfield lighting control system for the Apron including all new power/control supply equipment needed for a complete CCR installation. The ALE loads will be added to the load calculation for the two generators called for in the Contract.

Install a new ALE in accordance with paragraph 9.6. The Contractor shall submit for Government approval, load calculations for the constant current regulators in accordance with UFC 3-535-01 Table 15-4, AGL Series Circuit Load Calculation Data Sheet.

The Contractor shall work with the Contracting Officer/Airfield Operations to minimize any operational lapses required for the upgrade work including providing all labor and temporary controls, to make the switchover during any time of the day, as designated by the Contracting Officer.

9.4.3.2. Constant Current Regulator (CCR)

All taxiway and apron edge lighting shall be connected to constant current regulator(s) (CCRs) installed in the new ALE. Contractor shall provide properly sized CCR(s) for the proposed taxiway and apron edge lighting system expansion if existing apron and taxiway edge lighting equipment, cabling and infrastructure cannot carry the new load within their design ratings and limits. One spare CCR shall be provided as part of the contract if the Contractor uses an existing spare. Provide CCR load calculations in the Design Analysis. Calculations shall be shown in the form of UFC 3-535-01, Table 15-4. Load calculations for existing regulators shall include data for new and existing loads.

Reference Chapter 15 in UFC 3-535-01 for CCR design criteria.

CCR(s) shall as a minimum:

-be provided as required, in the main ALE. Taxiways and aprons will have independent CCR circuits as required by the relevant UFC guides.

-be dry type, ferro-resonant, for taxiways and aprons with the number of brightness steps to match existing taxiway regulators or for mission requirements.

-be sized for the apron lighting, the taxiway lighting as shown on the layout drawings and maintain a minimum of 20% spare capacity based on the Contractor's maximum design loads and CCR ratings.

-have a minimum rating of not less than 10KW each

- be FAA type L-829, Class 1, Style 2 with monitoring.
- be solid state type and be microprocessor assisted and have an output transformer for automatic current regulation under varying load and input variations.
- be capable of operating all functions locally.
- have true RMS output current digital ammeter.
- be capable of compensating for an input voltage variation of plus or minus 15%.
- be sized to have a minimum of 20% spare capacity based on the Contractor calculated design loads.
- be programmable with complete monitoring of regulator functions.
- have a 48V DC control voltage for local control of the lights
- have proper working and maintenance space provided around the CCR.
- each CCR shall be provided with an S-1 plug cutout in a NEMA 1 enclosure with door and handle for the output side of the regulator.

All airfield light fixtures shall be installed on appropriate FAA type (aircraft loading or non-aircraft loading) light bases.

All airfield lighting circuits shall be provided with identification tags in each light base, hand-hole or manhole, showing CCR#, circuit# and ampacity rating for the respective circuit.

9.4.4 Obstruction Lights

Obstruction lights shall be in accordance with UFC 3-535-01 Chapter 6, Standards For Obstruction Lighting. In addition to the obstruction lighting specifically required in this RFP, provide obstruction lights on all structures that penetrate the imaginary surfaces identified in UFC 3-260-01 Airfield and Heliport Planning and Design. Lights shall be dual, minimum 100 watt lamp each; steady continuous burning, color red and FAA approved per AC 150/5345-43. Provide the power source, panels and facilities to deliver a complete and working system.

The design submittals must show in the design analysis clearly if obstruction lighting is or is not required based on the Contract installed facility elevations and locations from affected runways and other landing or takeoff zones

9.4.5 Raceway and Cables

Airfield 5000V lighting cable shall be 16 sq. mm (6 AWG) minimum and meet UFC requirements. All airfield lighting circuits shall be provided with identification tags in each light base and hand-hole, showing CCR#, circuit# and ampacity rating for the respective circuit. Contractor shall be responsible for providing hand-holes and/or pull boxes, as required by the applicable referenced codes and publications.

For airfield lighting circuits, all new underground duct shall be concrete-encased PVC electrical duct in conformance with Table 12.1 in UFC

3-535-01. Power and control circuits shall be in separate duct.

Handholes, or light bases shall be at a maximum spacing of 400 feet.

System duct shall not be less than 50mm (2 inches) in diameter or bigger as dictated by the UFC requirements.

9.4.6 Signs and Markers

All necessary 'mandatory instructions' and 'information' signs, with fixed message, shall be provided for the new taxiway. Signs shall be internally illuminated.

All mandatory signs and markers will be included for airfield pavements included in the project. Signs and markers consist of:

Guidance Signs - Informative

Guidance Signs - Mandatory

New signage must be consistent with an Air Base signage master plan. If a master plan does not exist, the D-B Contractor shall prepare a signage layout in conformance with Section 9.5 of UFC 3-535-01, or STANAG 3316 or ICAO as has been determined, and submit the layout with the first design submittal. All signage and markers shall be illuminated. Lighted signage and markers may be connected to the appropriate edge light series circuit for both power and control.

9.4.7 Grounding and Bonding

Provide an equipment grounding system for airfield lighting circuits in accordance with UFC 3-535-01, Paragraph 12-5. Provide a counterpoise lighting protection system for airfield lighting circuits in accordance with UFC 3-535-01, Paragraph 12-6.

9.4.8 Manholes and Handholes

The design of new manholes and handholes shall be based on the following criteria: Manholes and handholes shall not be located in pavement subject to normal aircraft operation (i.e. runways, taxiways and aprons). When located in paved shoulders or aprons they shall have a structural capacity for a 75,000# single wheel load. When located in unpaved shoulders they shall have a structural capacity for a 50,000# single wheel load. When located outside of unpaved shoulders they shall have an AASHTO H-20 rating. Wheel load ratings are at 250 psi tire pressure.

9.4.9 Inspection and Testing

9.4.9.1 Checklists and Manuals

At the completion of visual NAVAID installation, the Contractor's Designer of Record (DOR) or Quality Control Representative (QCR) shall submit the completed applicable checklists included in UFC 3-535-01, Chapter 14. The DOR and QCR shall certify that the checklists were completed during an on-site inspection and are correct. The Contractor shall also submit six (6) copies of operation and Maintenance (O&M) manuals furnished by the equipment manufacturers for all visual NAVAIDS.

9.4.9.2 Operational Testing

Upon submission of the checklists and O&M manuals, the Contractor shall aim and adjust the equipment as necessary and conduct checkout tests in accordance with the procedures contained in the O&M manuals. The Contractor shall demonstrate, by operational test, that the entire system will operate satisfactorily on remote and local control. The Contractor shall include Air Base personnel during the shakedown testing to exercise and test the system in an operational environment to determine if the system is ready for full operation.

9.5 AIRCRAFT SHELTER ELECTRICAL REQUIREMENTS

9.5.1 Lighting and Controls

Interior lighting for the aircraft shelters shall be high intensity discharge (HID) white light type light fixtures suspended from the shelter's framing. Follow UFC 3-530-01 Design: Interior and Exterior Lighting and Controls for lighting level criteria.

Emergency egress lighting will be accommodated by using local battery backed wall packs meeting requirements of NFPA 101. Illuminated -EXIT- signs will employ red LED lamps on a polished aluminum field with local battery backed power supplies.

Exterior building lighting fixtures shall be wall pack type fixtures with emergency ballasts per ASHRAE 90.1 2007, installed over doors. Lamps shall be metal halide. Fixtures shall be mounted near each entrance for the building.

Exterior building lighting control shall be with photocell but can be turned off with an inside switch.

Fixtures shall be wired from within the building and shall conform to the interior wiring standards described in this section.

9.5.2 Receptacles (or Sockets)

13 ampere, 250 volt, British style switched duplex receptacles shall be provided in all indoor or outdoor spaces of the facility rated accordingly except as noted below.

A maximum of 10 receptacles shall be allowed on one 20A breaker where loads are not predetermined. If loads are known, adjust receptacle quantity down to match breaker sizes as necessary for a given circuit.

All receptacle circuits for general purpose use outdoors, near sinks, in designated kitchen areas and in bathrooms will be protected by a British Standard ground fault interrupter breaker type like the residual current device (RCD) rated for 16A, 10mA trip.

9.5.3 Architectural/Mechanical Connections

Provide branch circuits, disconnect switches, magnetic starters, and other related electrical equipment and material for architectural, mechanical equipment and environmental equipment to be installed in the shelters This shall include HVAC units, unit heaters, exhaust fans and other mechanical equipment in the shelter.

9.5.4 Equipment Sizing Requirements and Ratings

Except as specifically noted otherwise, minimum required capacity of the

equipment bus shall be computed from the estimated maximum demand (EMD) for the panelboard and be specified as having the next larger manufactured standard bus or main lug size. Overcurrent protection for panelboards with heavy motor loads, sizing must also consider starting current of the largest motor or motors in addition to the continuous demand amperes.

9.5.5 Feeders and Branch Circuits

Branch circuit sizes shall be based on the load supplied, EMD and voltage drop requirements.

Feeders to distribution equipment such as panelboards shall be sized to allow the full capacity of the panelboards bus bar amperage rating to be used.

Voltage drop shall be taken into account when sizing branch circuits.

9.5.6 Fire Alarm System

Complete Fire Detection and Alarm System shall be provided in each shelter. System shall include fire alarm control panel, pull stations, horns, strobe lights, and smoke and heat detectors, as required. Fire alarm cable shall be installed in metal conduit system.

The system shall be capable of automatically transmitting the alarm signal to the local Fire Department / Fire Station. Signal transmission shall be by means of a system compatible with the existing base system. System shall be arranged to operate audible and visual alarm signals throughout the shelter upon activation of a manual fire alarm pull station, area smoke detection (where required), or suppression system. Manual alarm pull stations will be located at all exit doors and as otherwise required by NFPA 72.

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. Exterior (site) cable installation and connection shall be provided.

9.5.7 Lightning Protection

Provide a lightning protection system in accordance with UL 96A, ETL 90-6 and NFPA 780. Lightning protection system provided shall include (but not be limited to): -air terminals -main conductors down conductors -bonding conductors, and -ground rods (interconnected by a perimeter ground ring if necessary)

9.5.8 Static Grounding

See requirements in paragraph 2.

9.5.9 Installation

The Contractor shall install system components, panelboards, lighting, equipment connections, etc., including Government furnished equipment and appurtenances in accordance with the manufacturer's instructions and shall furnish necessary connectors, terminators, interconnections, services, and adjustments required for a complete and operable system. Flexible cords or cord connections shall not be used to supply power to any components, except where specifically allowed in writing by the Contracting Officer.

Grounding shall be installed as necessary to preclude ground loops, noise, and surges from adversely affecting system operation.

9.5.10 Hazardous Locations

Aircraft shelters shall have a hazardous rating Class 1, Div. 1, Group D, from floor level and below per NEC Article 513. Aircraft shelters from 18 inches away from the walls and up to the shelters door level and shall have a Class 1, Div. 2, Group D per NEC Articles 513 and 513.3(B)

9.6 AIRFIELD LIGHTING ENCLOSURE (ALE) (BID OPTION)

9.6.1 General Description

9.6.2 GENERAL REQUIREMENTS (ALE)

9.6.2.1 Power

Power will be provided to the ALE from the generators described in Paragraph 9.3.1 Generators.

9.6.2.2 Airfield Lighting Enclosure (ALE)

The Contractor shall design and construct a new airfield lighting enclosure (ALE) as described in the Architectural section but no less than 2.4M wide by 3.65m in length by 2.4m in height internally. Site orientation of the enclosure shall be coordinated with the Contracting Officer. Location will be adjacent to the eastern helicopter shelter and in compliance with UFC requirements.

The electrical equipment room will house all apron and taxiway electrical equipment including but not limited to power panels, constant current regulators and control equipment. The Contractor will increase the room size as needed to accommodate all electrical equipment needed for a complete and working airfield lighting control system.

The ALE shall:

- a. utilize a Programmable Logic Controller (PLC) for the airfield lighting system controls.
- b. have room for the control equipment described in Paragraph 9.4 NAVAIDS AND AIRFIELD LIGHTING SYSTEMS.
- c. be controlled locally from the ALE. The local control in the new ALE shall have provisions for connecting to the existing main ATCT via radio control to allow full control of all systems in the new ALE from the existing ATCT.
- d. include a 114 mm schedule 40 PVC conduit from one wall through the slab to three (3) meters outside the ALE.
- e. include a 114 mm schedule 40 PVC conduit from one wall through the slab to within 10 m of the existing runway. The conduit shall be direct buried a minimum of 1 meter under the ground and capped with a solvent welded cap with a marker identifying the conduit location. Inside the ALE, the conduit shall extend 1 meter above the slab and be capped with a solvent welded cap. The conduit and fittings shall be listed in RUS IP 344-2.
- f. be airconditioned as needed to control the internal ambient temperature and humidity to stay within equipment operating ranges based on a 45deg C maximum outdoor ambient temperature.

The existing mimic panel, HMI display or CPU based display in the ATCT shall be modified as part of this contract to reflect the connecting taxiway with consideration for expansion of other airfield lighting that might be served from the new ALE.

9.6.2.2.2 Constant Current Regulator (CCR) Circuits

Constant Current Regulator (CCR) circuits shall be designed to accommodate the strategic and helicopter apron and taxiway lighting.

9.6.3 ELECTRICAL SYSTEM SCOPE DETAILS (ALE)

9.6.3.1. Generator, Automatic Transfer Switch and Secondary Power Distribution System

The generators, automatic transfer switches and secondary power distribution shall be as required and in accordance with Paragraph 9.3 ELECTRICAL SYSTEMS.

9.6.3.2 Interior electrical systems

The Contractor shall design, procure and construct an interior electrical system for the ALE as needed to accommodate the helicopter apron and taxiway lighting.

9.7 Apron Flood Lighting

9.7.1 References

UFC 3-535-01, Design Standards for Visual Air Navigation Facilities

Army TM 5-811-5, Army Aviation Lighting

IES IES-RP-14-1987, IES Recommended Practice for Airport Service Area Lighting

9.7.2 General

The Contractor shall provide a lighting system to floodlight the Helicopter Parking Apron, including design and all fixtures, hardware, poles, power supply, controls, and appurtenances needed to provide a fully functional lighting system.

9.7.3 Illumination

Upon completion, the Contractor shall test the lighting system which shall meet or exceed the following criteria: All areas designated loading zones shall be illuminated to a minimum of 21.52 lux (2 foot-candle) in the horizontal plane, and all aircraft parking areas shall be illuminated to a minimum of 5.3 lux (0.5 foot-candle) in the horizontal plane. The horizontal plane shall be at the pavement surface. The ratio of maximum to minimum illumination should not exceed 4 in any 20-meter wide strip on the apron, parallel to the apron edge where the lights are located. The Contractor shall provide a point-to-point lighting plan showing that the design meets the minimum illumination requirement in the horizontal plane throughout the apron area to be illuminated.

9.7.4 Poles

The Contractor-furnished drawings shall show:

- a. Pole locations with dimensions between poles and the distance from the apron pavement edge.
- b. The clearance line required to provide the minimum required required wing tip clearance for the critical aircraft taxiing along the near edge of the apron.
- c. The elevation of the top of pole and the elevation of the obstruction imaginary surface at the pole location.
- d. Design for local wind load requirements. Provide design calculations for review in the first design submittal.

9.7.5 Floodlights

The Contractor shall provide the following:

- a. An aiming table with horizontal and vertical aiming angles for each light fixture.
- b. A floodlight fixture detail showing horizontal and vertical aiming angles relating to the aiming table.
- c. Glare louvers on all lighting fixtures. Submit a ray diagram analysis to assure no glare (direct sight of the fixture lamp) to the Air Traffic Control Tower and to the pilots on approach. The floodlights may require custom louvers to meet this criteria.

9.7.6 Foundations, Poles, and Supports

Floodlight poles, foundations and luminaires supports shall be designed using dead load, ice load and wind loading. The loads and design shall meet the requirements of AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, latest edition. Wind loading shall be the Annual Extreme-Mile 30 Feet Above Ground, 50-Year Mean Recurrence Interval determined for the project location. Foundations shall be reinforced concrete. AASHTO publications can be obtained at: AASHTO-American Society of State Highway and Transportation Officials, 444 North Capitol Street, N.W., Suite 249, Washington, DC 20001.

9.7.7 Floodlight Controls

Floodlight circuiting shall include manual on-off controls at the apron lighting location with remote controls in the Air Traffic Control Tower and at the point of floodlight electric service connection.

9.8 Aviation Lighting, Mooring and Grounding Drawings

The D-B Contractor shall provide drawings in the first submittal as follows:

9.8.1 Visual NAVAIDS

- a. Plans
- b. Schedules
- c. Details

9.8.2 Airfield Lighting Enclosure

- a. Plan showing locations of constant current regulators, airfield lighting, control systems, diesel-engine generator set
- b. Elevations showing regulators, generator set, switch gear panels and wireways
- c. Details and wiring diagrams

9.8.3 Apron Flood Lights

- a. Location plan of lights with aiming data
- b. Plan with point-by-point light intensities showing compliances with minimum light intensity requirements.

10. AIRCRAFT SHELTER COMMUNICATIONS REQUIREMENTS

10.1 General

10.1.1. Applicable Specifications

The Publications listed below form a part of this specification.

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 Publication IP 344-2 (2009) List of Materials Acceptable For Use on Telecommunications Systems Of RUS Borrowers.

RUS Bulletin 1753F-201 (1997) RUS Standard for Acceptance Testing and Measurements of Telecommunications Plant, (PC-4).

RUS Bulletin 1753F-401 (1995) RUS Standard for Splicing Copper and Fiber Optic cables, (PC-2).

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

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

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

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

Telecommunications Industry Association (TIA)

ANSI TIA 568-C.1C (2009) Commercial Building & Annexes Telecommunications Cabling Standard.

ANSI TIA 568-C.1.1 A1 (2009) Commercial Building Telecommunications Cabling

SOF Helicopter Apron
Herat, Afghanistan

Tetra Tech, Inc.

Standard, Part 1, General Requirements. Addendum 1-Minimum 4 Pair UTP and 4 pair Sctp patch Cable Bend Radius. Addendum 1.

ANSI TIA 568-C.1.2 A2 (2009) Commercial Building Telecommunications Cabling Standard, Part 1, Addendum 2 Grounding and Bonding Specifications for Screened Balanced Twisted Pair Horizontal Cabling.

ANSI TIA 568-C.1.4 A4 (2009) Commercial Building Telecommunications Cabling Standard, Part 1, Addendum 4, Recognition of Category 6 and 850nm Laser-optimized 50/125 um Multimode Optical Fiber cabling.

ANSI TIA 568-C.2 (2009) Commercial Building Telecommunications Cabling Standard, Part 2, Balanced Twisted-Pair Cabling Components, Annex K, 100 ohm Screened twisted pair cable.

ANSI TIA 568-C.2-2, A2 (2009) Commercial Building Telecommunications Cabling Standard, Part 2, Balanced Twisted-Pair Cabling Components, Addendum 2.

ANSI TIA 568-C.2-1,A1 (2009) Commercial Building Telecommunications Cabling Standard, Part 2, Balanced Twisted-Pair Cabling Components, Addendum 1-Transmission Performance Specifications for 4-pair 100 ohm Category 6 cabling.

ANSI TIA 568-C.2-5, A5 (2009) Commercial Building Telecommunications Cabling Standard, Part 2, Balanced Twisted-Pair Cabling Components, Addendum 5. Corrections to TIA/EIA-568-B.2.

ANSI TIA 568-C.3 (2008) Optical Fiber Cabling Components Standard.

ANSI TIA 568-C.3-1 (2008) Optical Fiber Cabling Components Standard. Addendum 1-Additional Transmission Performance Specifications for 50/125 um Optical Fiber Cable.

ANSI TIA 569-B (2009) Commercial Building Standard for Telecommunications Pathways and Spaces.

ANSI TIA 606-A (2008) Administrative Standard for the Telecommunications Infrastructure.

ANSI TIA J-STD-607-A (2009) Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications.

United Facilities Criteria (UFC)

UFC-3-580-01 (2007) Telecommunications Building Cabling Systems Planning and Design.

Department of the Army

AR 380-5 (2000) Department of the Army Information Security Program National

SIPR Net Technical Guide (2008) Technical Guide for the Integration of Secret Internet Protocol Router network (SIPRNET)

(2010) Technical Guide for Installation Information Infrastructure Architecture (I3A)

(2008) Worldwide Outside Plant Design and Performance Requirements TR No. AMSEL-IE-TI-06001-7.

Security Telecommunications and Information Systems Security (NSTISSI)

NSTISSI No. 7003 (1996) Protective Distribution Systems (PDS)

NSTISSAM TEMPEST /2/95 (1995) RED/BLACK Installation Guidance United Facilities Criteria (UFC) UFC-3-580-01 (2007), Telecommunications Building Cabling Systems Planning and Design

Department of the Air Force

United States Air Force 2002) Engineering Technical Letter (ETL) 02-12, Communications Information Criteria for Air Force Facilities.

10.1.2 The Communications System Design

The communications design and construction of the systems shall be in accordance with the references and the requirements contained herein unless otherwise noted. The design and selection of materials and equipment and all other communication system related submittals shall be sent to the ISEC Communications Engineer at MED through the COR for review in lieu of the site office. The use of RUS listed materials for the Outside plant (OSP) and ANSI/TIA and UL listed material for the inside plant (premise wiring) shall be a requirement and not an option.

10.2 Communication Outside Plant Pathways and Spaces

10.2.1 Communications Manholes

The Contractor shall install one (1) manhole outside the telecommunications room with four (4) inch, (114 mm) schedule 40 PVC conduit stub outs on three sides future ties into existing infrastructure by others. The manhole shall be constructed in accordance with the references and the drawings.

10.2.2 Communications Exterior Conduit

The underground conduit from the manhole to the Telecommunications Room and helicopter shelters shall be direct buried (minimum of 1 meter below the finished grade), four (4) inch, (114 mm) schedule 40 PVC. There shall be two (2) conduits installed to each shelter building and two (2) conduits installed from manhole to Telecommunications Room. They shall be schedule 40, nominal 4 inch PVC conduits, one with inner duct. The inner duct can be either four (4) 1 inch field installed PE or PVC innerducts, four (4) factory installed 1.19 or 1.25 inch (manufacturer dependent) PE or PVC inner ducts or two (2) three cell fabric inner ducts. All ducts will be sealed with expandable duct plugs and provided with synthetic pull tape. The conduit shall be UL listed and listed on the RUS list of materials acceptable for use on RUS projects, RUS publication IP344-2. The conduit, the conduit fittings (elbows, connectors, couplings etc.) and solvent cement shall be the same brand. ABS plastic duct terminators (not required to be the same brand as conduit) shall be cast into the manhole walls for use in terminating the conduit. The conduit shall be solvent welded to the terminators. Cable racks with cable hooks, bonding ribbon and braid and all other necessary manhole hardware shall be installed in accordance with the referenced standards and drawings. Each vacant duct shall be provided with a synthetic pull tape of at least 1200 lbs. tensile strength. The pull tape shall be terminated on an eye bolt integral to the duct plug.

One conduit shall be stubbed up inside the aircraft shelter at minimum of

100mm aff. Provide a 19mm fireproof/ fire rated plywood backboard mounted on unistrut, kindorff, etc. above the conduit stub ups for installation of fiber optic combination units and other communication system hardware. The second conduit will be routed 1220 mm above finished grade to a 305 mm square junction box on the outside of the shelter wall.

10.3 Exterior Cables

10.3.1. Copper cable

The contractor shall install one 25 pair copper cable into each helicopter shelter from the communications room, to the exterior PET. The copper cable shall be listed in RUS Bulletin IP 344-2. 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 Contractor shall install a larger cable that will contain all required cable pairs for the shelters and wrap it around the manhole two times and clear and cap the cable pairs in discrete clear and cap connectors in a splice closure. Out of that closure, the Contractor shall install the 25 pair cables to each shelter. The one spare pair shall remain cleared and capped as spare in the closure. The splice closures shall be RUS listed and flash tested, (with the results being approved by the MED/ISEC Engineer before the system is turned over), in accordance with the manufacturers requirements except nitrogen shall be used in lieu of compressed air. The Contractor shall provide the quantity of encapsulant required for the site personnel to properly encapsulate the fiber optic closures after connection to the base system.

10.3.2. Fiber optic cable.

The contractor shall install fiber optic cables from the manhole between the helicopter shelters to the communications cabinet mounted on the backboard. The fiber optic cables shall be listed in RUS IP 344-2. The fiber optic cables shall be a dual window, single mode, RUS PE90 type, with a 6 mil, copolymer coated steel shield. The single mode fiber shall not have any internal splices and have a maximum loss of .4dB/Km at 1310nm and .3dB/Km at 1550nm. The fiber optic cables shall be installed, grounded/bonded, spliced and tested in accordance with RUS standards. The fiber splice closures shall be flash tested in accordance with the manufacturer's recommendations except that nitrogen will be used in lieu of compressed air, with the results being approved by the MED/ISEC Engineer before the system is turned over. The Contractor shall provide the quantity of encapsulant required for the site personnel to properly encapsulate the fiber optic closures after connection to the base system. The fiber optic splice closures shall be equipped with splice trays that properly hold the fusion splice protectors (stainless steel rod with heat shrink tube). The contractor shall provide two (2) 12 strand fiber optic cables (NIPR net) to each shelter.

10.4 Exterior Cable Termination

10.4.1 Copper cable

The Contractor shall install a 25 pair protected entrance terminals (PETs) on the exterior wall of the shelter next to the junction box for each 25 pair copper cable. The PETs shall be equipped with three element heavy duty gas tube protectors with sneak current protection and be the type where no continuity between input and output can be achieved unless the protector unit is installed. The PETs shall be listed on the RUS list of material, (Publication IP 344-2). The PETs shall be equipped with factory installed punch down blocks in a splicing chamber to terminate the incoming cable and

the output from the protector fields connected to factory installed punch down blocks which are part of the PET. The Contractor shall mount a category 6, 110 block inside the shelter room the PET output block and cross connect all outside plant cables to that "subscriber PET block". Each outside plant cable pair will be allocated four pairs on the output cross connect block. The Contractor shall provide one jumper per voice outlet.

10.4.2 Fiber Optic Cable, Combination Units

The fiber optic cable shall be terminated in combination units that will allow splicing and patching within the same enclosure. The enclosures shall be sized to contain a minimum of 48 fibers. The NIPR shall be terminated in a wall mounted rack on the backboard. The single mode outside plant fiber cables shall be fusion spliced to single mode fiber pigtailed equipped with a factory terminated SC connector. Each fiber cable (NIPR net, SIPR net) shall have its own fiber optic combination unit. The fusion splices shall be protected by a steel rod and heat shrink tube. The single mode pigtailed shall have an insertion loss of <.35dB and a return loss of better than -55dB. The maximum allowable fusion splice loss as measured by the splicing machine will be .02dB as measured by the fusion splicing machine and .2dB as measured by an OTDR. The fiber optic connectors shall be SC type and be mounted on a connector plate that fits in the combination unit. The connector plate shall contain six single mode duplex SC connectors. One factory manufactured single mode fiber optic patch cord, SC-SC, shall be provided per single mode patch panel port. The single patch cord shall have a mated pair insertion loss of <.35dB and a mated pair return loss of <-55dB.

10.5 Inside Plant Cable

10.5.1 Copper, Horizontal Cable (Station Cable)

The contractor shall install the inside plant (premise) horizontal cable and outlets. The subscriber cable and unsecure data cable will be a minimum 24 AWG; Category 6 shielded twisted pair (STP), for non secure data. All station cable to be plenum rated.

10.6 Station Outlets

10.6.1 Voice/Data Outlets

The voice/data outlets will be RJ 45, T568A configuration, Category 6 STP keystone module type, that snaps into the wall plate. The standard outlet configuration will be a six plex plate with two (2) 4 pair, Category 6 STP modules, one gray voice with gray cable, one green data with green cable and four blank filler plate modules. The Contractor shall install one standard outlet configuration on each outside wall and an additional two more at a location provided by the COR.

10.7 Outlet Boxes

All non-secure telecom outlets shall be mounted in a surface mounted 119mm square, steel box, 54mm deep.

10.8 Patch Panels

10.8.1 Voice/Data Patch Panels, Non-secure

The contractor will terminate voice/data cables (from the voice/data outlets) floor relay rack mounted, Category 6, ANSI TIA/EIA T568A configuration STP patch panels. The largest size patch panel shall be 48 ports and the smallest

shall be 24 ports. One factory manufactured Category 6 rated green STP patch cord (RJ45-RJ45) shall be provided per patch port.

10.9 Backboards

The communication system backboard shall be used to mount the fiber optic combination units and all other outside plant material required to bring communications into the fabric shelter.

10.10 Data cabinets

10.10.1 Non secure cabinets

The non secure cabinet shall be steel, NEMA 12, three sections, (swing out) large enough to house the PET, the cross connect block, the fiber optic combination unit and the patch panels. The cabinet shall be UL listed and equipped with one dedicated 13 ampere, 230vax receptacle.

10.11 Bonding/Grounding and Labeling

Bonding, grounding and labeling shall be done in accordance with the U.S Army I3A requirements, ANSI TIA/EIA 607-A, ANSI TIA/EIA 606-A and the Outside plant references.

10.12 Testing

The Contractor shall perform Category 6 link tests in accordance with ANSI/TIA 568-C.1 and ANSI/TIA 568-C.2. Test shall include wire map, length, insertion loss, NESXT, PSNEXT, ELFEXT, PSELFEXT, return loss, propagation delay, and delay skew.

10.12.1 Outside Plant and Inside Riser Copper Cable

The outside plant copper cable (telephone) cable shall be tested for grounds, shorts and crosses.

10.12.2 Fiber Optic Cable

The Contractor shall perform optical fiber tests in accordance with RUS Bulletin 1753F-201. The hard copy printout shall be provided to the COR.

10.12.3 Test notification

The Contractor shall notify MED a minimum of 6 weeks before testing begins to allow MED time to send an Engineer to observe Testing.

11. ATTACHMENTS

The following attachments form an integral part of this specification:

Cover Sheet
Index of Drawings
C-001 Locus Plan
C-101 Demolition Plan - Base Bid
C-102 Demolition Plan - Option 1
C-110 Site Plan - Base Bid
C-111 Site Plan - Option 1
C-115 Pavement Marking Plan - Base Bid
C-116 Pavement Marking Plan - Option 2

SOF Helicopter Apron
Herat, Afghanistan

Tetra Tech, Inc.

C-501 Typical Apron Pavement Section
C-502 Concrete Joint Details
C-503 Pavement Marking Details
C-504 Tie Down Details
XT-501 Communication Details Sheet 1 of 4
XT-502 Communication Details Sheet 2 of 4
XT-503 Communication Details Sheet 3 of 4
XT-504 Communication Details Sheet 4 of 4
A-101 Floor Plan
A-201 Building Elevations
A-301 Building Section

Appendix A - Topographic Survey Scope of Work

-- End of Section --

POSTED 12/07/11

SOF Helicopter Apron

Herat, Afghanistan
December 7, 2011



US Army Corps of Engineers
Middle East District



TETRA TECH

Solicitation
W519LE-12-R-0007
Amendment #1

INDEX OF DRAWINGS

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G-001	AF1139-GI001GN	△		INDEX OF DRAWINGS					
SITE DESIGN									
SITE CIVIL									
C-001	AF1139--CS001GN	△		LOCUS PLAN					
C-101	AF1139--CD101PN	3		DEMOLITION PLAN BASE BID					
C-102	AF1139--CD102PN	3		DEMOLITION PLAN OPTION 1					
C-110	AF1139--CS110PN	△		SITE PLAN BASE BID					
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A-201	AF1139A-AE201EL	3		BUILDING ELEVATIONS					
A-301	AF1139A-AE301SE	3		BUILDING SECTION					

AMENDMENT NUMBER 1

AMENDMENT #1	DATE	BY
3	12/07/11	GCH
2	11/16/11	GCH
1	11/10/11	GCH
0	10/31/11	GCH
0	10/06/11	GCH

DESIGNED BY: SFD DATE: 12-07-2011
 DRAWN BY: SCJ SUBMITTED BY: TETRA TECH
 CHECKED BY: GCH FILE NO.: AF1139-GI001GN01

TETRA TECH
 US Army Corps of Engineers
 Middle East District

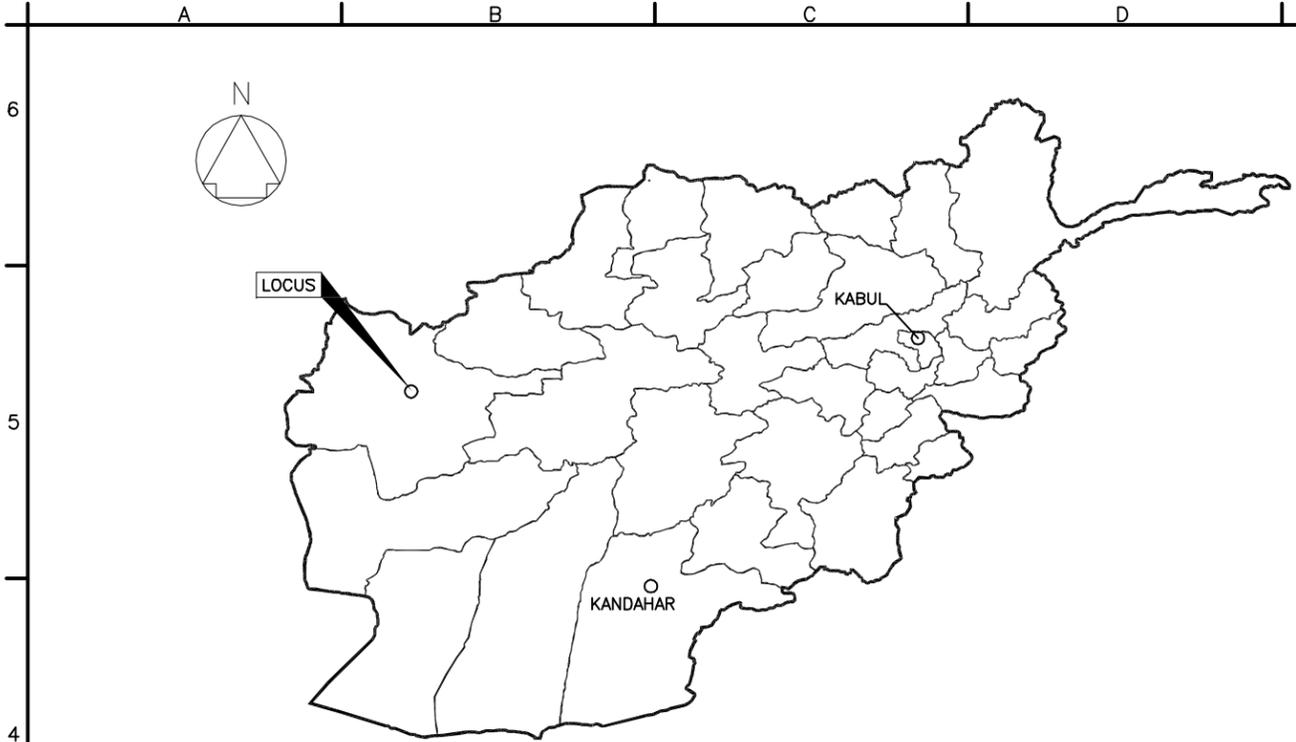
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 FOB HERAT
 HERAT PROVINCE, AFGHANISTAN
 INDEX OF DRAWINGS

SHEET REFERENCE NUMBER:
G-001

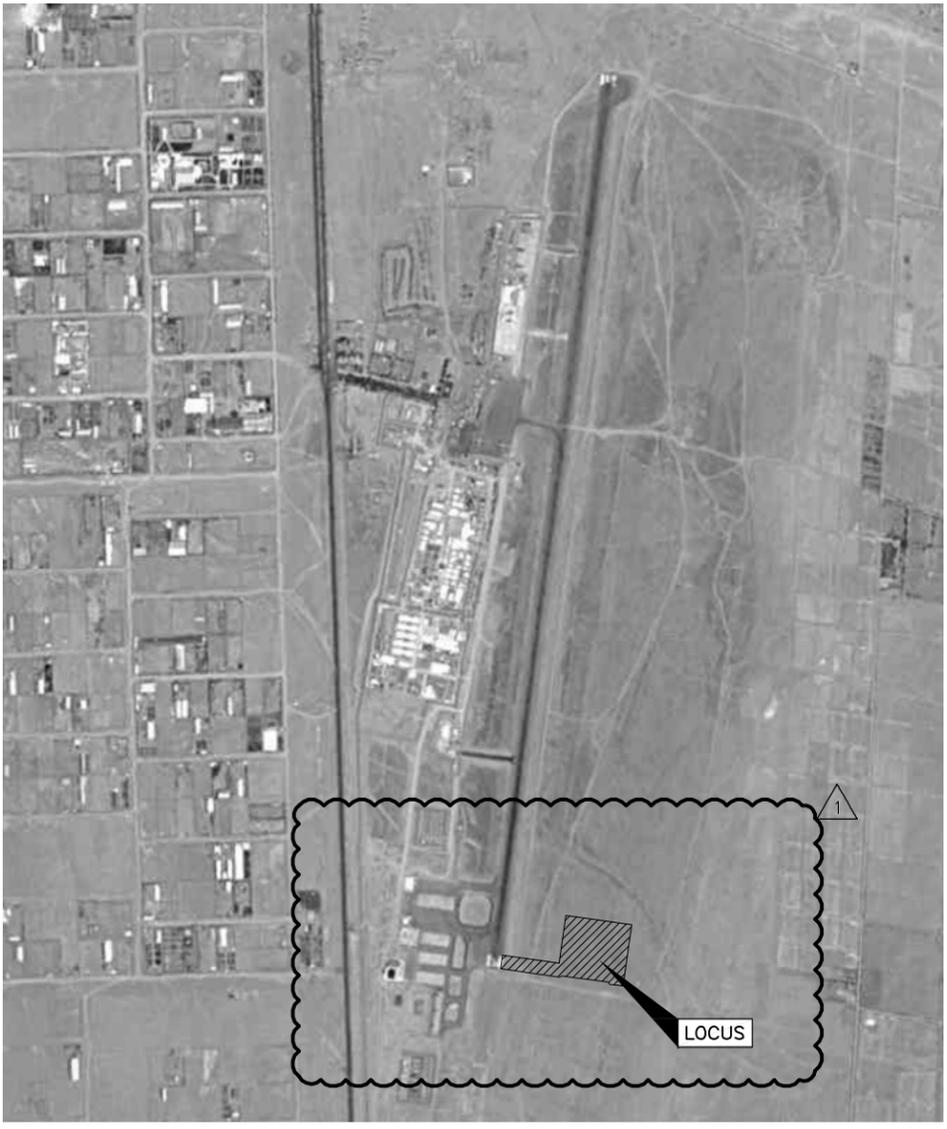
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REGIONAL LOCUS PLAN
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ENLARGED LOCUS PLAN
NTS

AMENDMENT NUMBER 1

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1	FINAL CORRECTED DESIGN SUBMITTAL	10/31/11	GCH
0	FINAL CORRECTED DESIGN SUBMITTAL	10/06/11	GCH
2	FINAL CORRECTED DESIGN UPDATE 2	11/10/11	GCH
3	FINAL CORRECTED DESIGN UPDATE 3	11/16/11	GCH
4	REVISED LOCUS AREA	12/07/11	GCH

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DRAWN BY: SCJ	SUBMITTED BY: TETRA TECH
CHECKED BY: GCH	FILE NO.: AF-1139--CS001GN01

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US Army Corps of Engineers
Middle East District

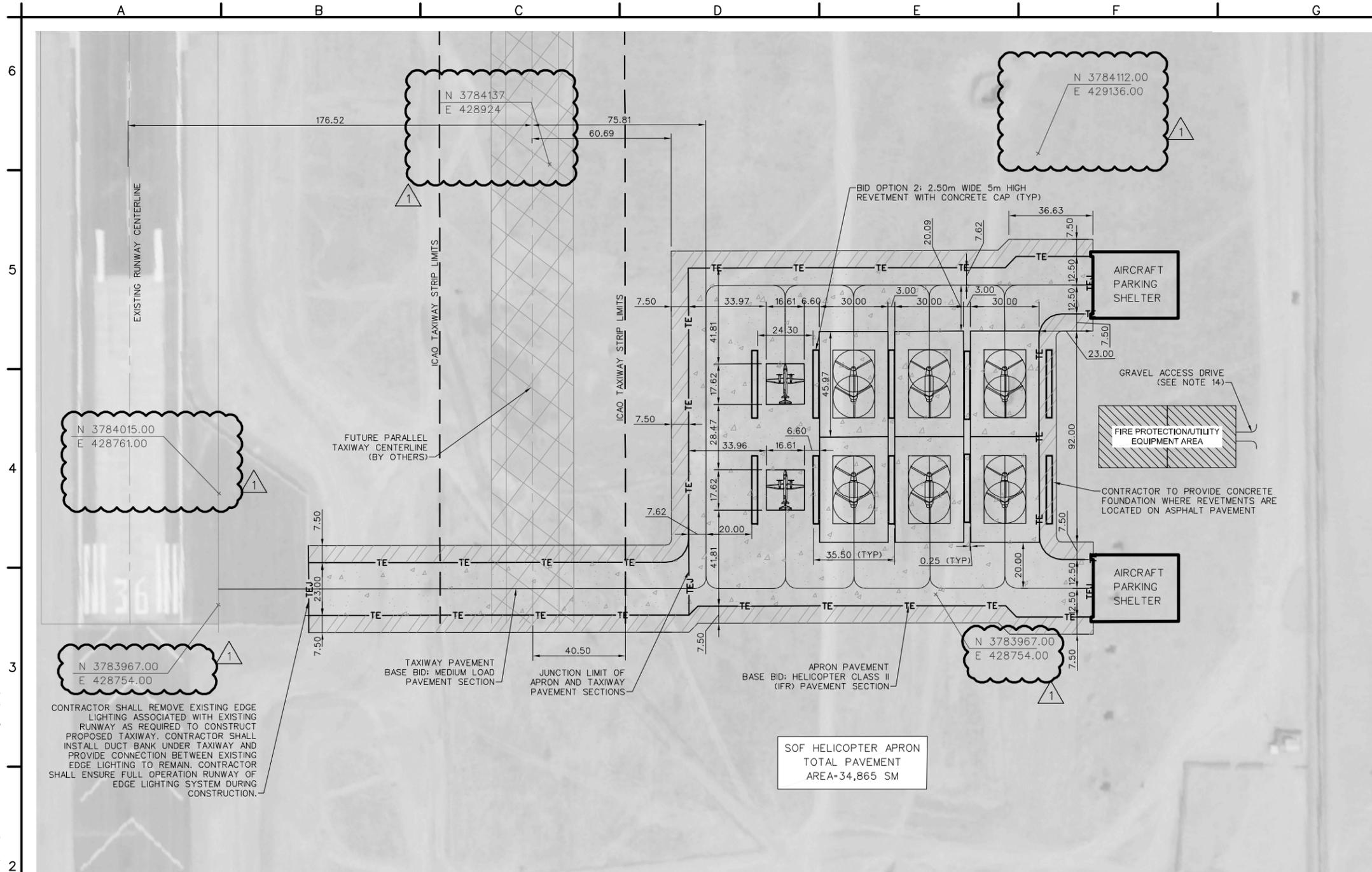
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FOB HERAT
HERAT PROVINCE, AFGHANISTAN
SITE DESIGN
LOCUS PLAN

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SOF HELICOPTER APRON
TOTAL PAVEMENT
AREA=34,865 SM

AMENDMENT
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2	11/16/11	GCH
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0	10/06/11	GCH
0	10/06/11	GCH

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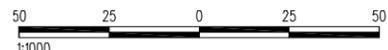
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- DOWELS SHALL BE USED AT ALL CONSTRUCTION JOINT LOCATIONS.
- ALL ODD SHAPED SLABS ARE TO BE REINFORCED PER UFC 3-260-02.
- A THICKENED EDGE EXPANSION JOINT SHALL BE PROVIDED AT ALL LOCATIONS WHERE CONCRETE PAVEMENT IS ADJACENT TO EXISTING CONCRETE PAVEMENT AND AT THE THRESHOLD OF ALL SHELTERS. A THICKENED EDGE JOINT SHALL BE PROVIDED AT ALL LOCATIONS WHERE CONCRETE PAVEMENT IS ADJACENT TO ASPHALT PAVEMENT, AN UNPAVED SURFACE AND AT CONNECTION OF APRONS AND TAXIWAYS. SEE DETAIL ON SHEET C-502.
- MOORING POINTS AND STATIC GROUND POINTS ARE REQUIRED AT EACH AIRCRAFT PARKING POSITION. SEE SECTION 01 80 00.12 10 FOR REQUIREMENTS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGNING AND PROVIDING ALL SITE GRADING AND CLEARING REQUIRED TO CONSTRUCT THIS FACILITY.
- CONTRACTOR SHALL REMOVE ALL TREES AND OBSTACLES WITHIN THE APRON FIXED AND MOVEABLE OBJECTS CLEARANCE LIMITS. SEE UFC 3-260-01, AIRFIELD AND HELIPORT PLANNING AND DESIGN, FOR REQUIREMENTS.
- LOCATION OF PARALLEL TAXIWAY CENTERLINE IN RELATION TO RUNWAY CENTERLINE IS IN ACCORDANCE WITH THE INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) AERODROME DESIGN MANUAL
- LOCATION OF PARKING APRON IN RELATION TO ORGANIZATION (ICAO) AERODROME DESIGN MANUAL AND WITH UFC 3-260-01 WHICHEVER IS MORE RESTRICTIVE.
- CONTRACTOR SHALL INSTALL REINFORCED CONCRETE PIPE CULVERT UNDER PROPOSED TAXIWAY AS REQUIRED TO PROVIDE DRAINAGE PER SPECIFICATION 018000.12.10
- ALE-AIRFIELD LIGHTING ENCLOSURE SHALL BE LOCATED WITHIN THE "FIRE PROTECTION/UTILITY EQUIPMENT AREA" IN ACCORDANCE WITH SECTION 01 80 00.12 10, 9.6.2.2
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- AIRCRAFT PARKING SHELTER CONCRETE SLAB SECTION SHALL BE EQUAL TO THE APRON PAVEMENT SECTION
- MINIMUM SECTION FOR GRAVEL ACCESS DRIVE SHALL BE 100 AGGREGATE SURFACE COURSE PER SPECIFICATION 32 15 00, 150mm GRADED/CRUSHED AGGREGATE BASE COURSE PER SPECIFICATION 32 11 23, AND SUB-GRADE SHALL BE UNDISTURBED NATIVE MATERIAL OR MINIMUM 150mm OF COMPACTED (95%) SUBGRADE CONSISTING OF SUITABLE SATISFACTORY ONSITE MATERIAL WHERE FILL IS REQUIRED PER SPECIFICATION 31 00 00.

DESIGNED BY: DATE: 12-07-2011
 SUBMITTED BY: TETRA TECH
 DRAWN BY: SCJ
 CHECKED BY: GCH
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TETRA TECH
 US Army Corps of Engineers
 Middle East District

SOF HELICOPTER APRON
 FOB HERAT
 HERAT PROVINCE, AFGHANISTAN
 SITE DESIGN
 SITE PLAN
 BASE BID

SHEET
REFERENCE
NUMBER:
C-110



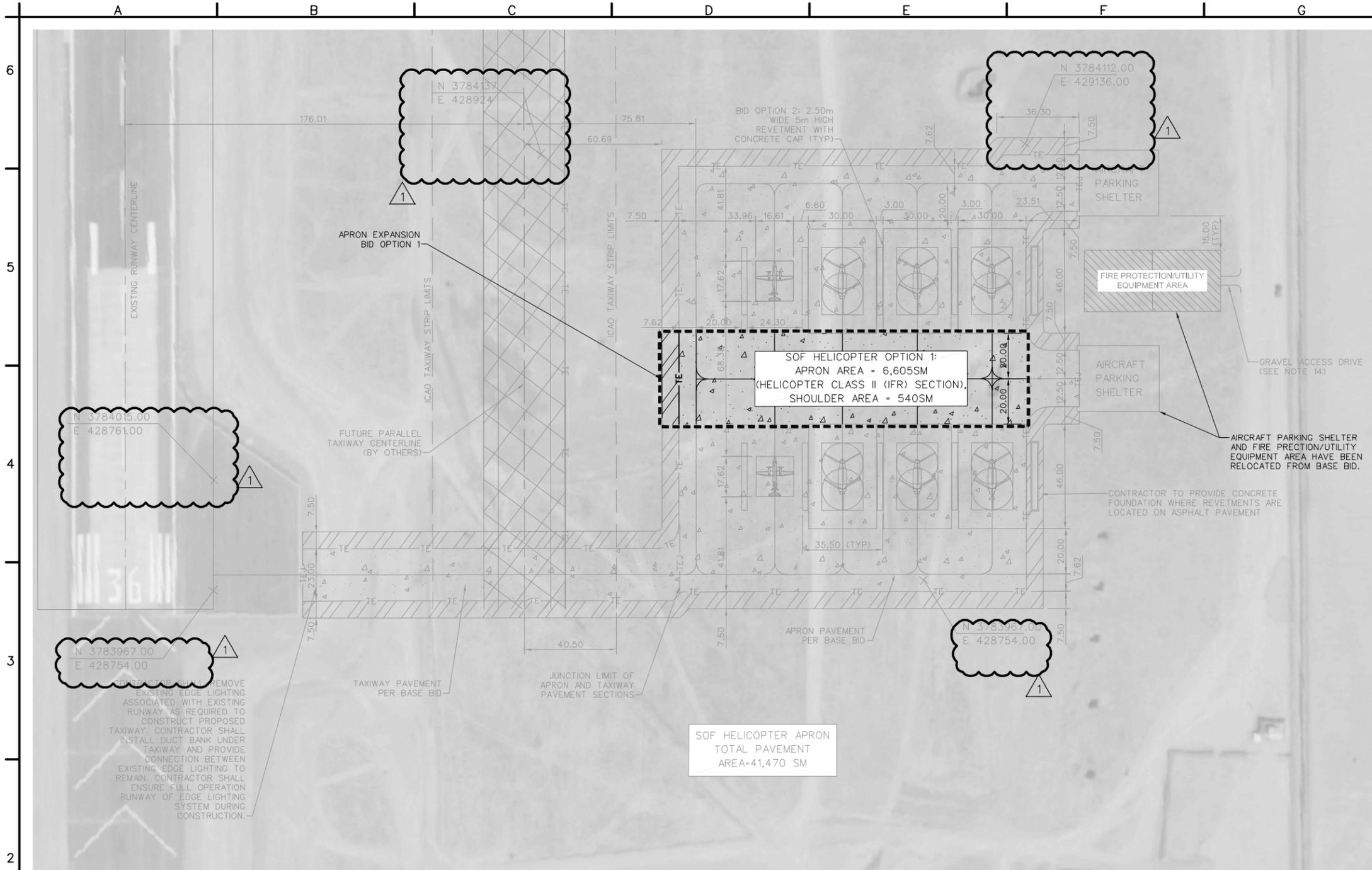
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LEGEND

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- [Symbol] ASPHALT PAVEMENT (SEE DETAIL ON C-501)
- [Symbol] CONCRETE PAVEMENT (SEE DETAIL ON C-501)
- TEJ— THICKENED EDGE EXPANSION JOINT (SEE DETAIL ON C-502)
- TE— THICKENED EDGE JOINT (SEE DETAIL ON C-502)

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LEGEND

-  LIMITS OF FUTURE PROJECT BY OTHERS
-  ASPHALT PAVEMENT (SEE DETAIL ON C-501)
-  CONCRETE PAVEMENT (SEE DETAIL ON C-501)
-  TEJ THICKENED EDGE EXPANSION JOINT (SEE DETAIL ON C-502)
-  TE THICKENED EDGE JOINT (SEE DETAIL ON C-502)
-  LIMITS OF BID OPTION 1 APRON EXPANSION

NOTES:

1. PLAN IS CONCEPTUAL AND THE FINAL DESIGN IS TO BE PERFORMED BY THE DESIGN/BUILD CONTRACTOR TO COMPLY WITH THE RFP, SPECIFICATION 01 80 00.12 10 AND ALL APPLICABLE CODES.
2. DOWELS SHALL BE USED AT ALL CONSTRUCTION JOINT LOCATIONS.
3. ALL ODD SHAPED SLABS ARE TO BE REINFORCED PER UFC 3-260-02.
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3	FINAL CORRECTED DESIGN UPDATE 3	11/10/11	GCH
1	FINAL CORRECTED DESIGN UPDATE 1	10/31/11	GCH

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TETRA TECH

US Army Corps of Engineers
 Middle East District

SOF HELICOPTER APRON
 FOB HERAT
 HERAT PROVINCE, AFGHANISTAN
 SITE DESIGN
 SITE PLAN
 OPTION 1

SHEET REFERENCE NUMBER:
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