

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT		1. CONTRACT ID CODE	PAGE 1 OF 2 PAGES
2. AMENDMENT/MODIFICATION NO. 0004	3. EFFECTIVE DATE 8/6/03	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)
6. ISSUED BY U.S. Army Corps of Engineers Honolulu Engineer District Construction/A-E Contract Branch Building 200 Fort Shafter, Hawaii 96858-5440	CODE	7. ADMINISTERED BY (If other than Item 6) U.S. Army Corps of Engineers Honolulu Engineer District Schofield Resident Office Building 230 Fort Shafter, Hawaii 96858-5440	CODE
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)		(<input checked="" type="checkbox"/>) 9A. AMENDMENT OF SOLICITATION NO. DACA83-03-R-0013	(<input type="checkbox"/>) 9B. DATED (SEE ITEM 11) 7/13/03
CODE		10A. MODIFICATION OF CONTRACTS/ORDER NO.	
FACILITY CODE		10B. DATED (SEE ITEM 13)	

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers is extended, is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (if required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

<input checked="" type="checkbox"/>	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
<input type="checkbox"/>	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
<input type="checkbox"/>	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
<input type="checkbox"/>	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor is not, is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
FY03 MCA/BUP PN 52068/69, Whole Barracks Renewal Brigade Complex, Phase 3A, Quad C, Schofield Barracks, Oahu, Hawaii

(See pages 2 of 2 pages)

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
_____ (Signature of person authorized to sign)		BY _____ (Signature of Contracting Officer)	

AM-0004
No. DACA83-9
Item 14 (Continued)

Standard Form 30
Page 2 of 2 Pages

1. CHANGES TO SPECIFICATIONS. Attached hereto are new and revised pages and sections to the specifications. The revision mark "(AM-0004)" is shown on each page.

- A. REVISED PARAGRAPHS. The following are revised paragraphs to the specifications. Changes are indicated in bold. The following are new, revised, and deleted paragraphs to the specification.

Section 00120 Evaluation Factors for Award

2.5.1

2.5.2.1.1

2.5.2.2.1

Section 00900 Responses to Contractor Questions (Questions 38 thru 62)

Statement of Work

Chapter 8 paragraphs: 8-1.1, 8-1.2, 8-3.1, 8-4.1, 8-4.2, 8-4.3, 8-4.4, 8-5.8

Chapter 10 paragraphs: 10-1.1, 10-3.1, 10-3.1.1, 10-3.1.2, 10-6.12

Chapter 12 paragraphs: 12-1.1, 12-1.2, 12-8.3, 12-10.7, 12-10.10, 12-11.4,

- B. NEW PAGES. The following information is added to the specification:

ATTACHMENT 6

- C. DELETED PAGES. The following information is deleted from the specifications:

ATTACHMENT 6

2. The proposal due date of August 11, 2003, is hereby extended to August 18, 2003, 2:00 p.m. Hawaiian Standard Time (HST).

SECTION 00120

PROPOSAL SUBMISSION REQUIREMENTS AND EVALUATION FACTORS

1.0 GENERAL

1.1. Cost of Preparing Proposals

The Government will not reimburse any Offeror any costs incurred in responding to this Request for Proposal.

1.2. Inquiries

Address all inquiries regarding this Request for Proposals to:

U.S. Army Engineer District, Honolulu
Attn: Ms. Renee Hicks (CEPOH-CT-C)
Building S-200
Fort Shafter, Hawaii 96858-5440
Phone No. (808) 438-8564
Fax No. (808) 438-8588
E-Mail: renee.hicks@usace.army.mil

1.3 Submittal of Proposals

Submit proposal packages to the US Army Corps of Engineers ("the Government") as shown in Block 8 of Standard Form 1442.

Proposals received by the Government after the date and time set for receipt of proposals will be handled in accordance with the requirements of Provision "52.215-1, Instructions to Offerors—Competitive Acquisition (May 2001)," subparagraph (c), found in Section 00100.

1.4 Proposal Evaluation

The Government intends to award without discussions to the Offeror with the Lowest Priced, Technically Acceptable (LPTA) proposal, in accordance with the provisions of this solicitation and applicable acquisition regulations. The Government will evaluate offers in accordance with the NON-PRICE EVALUATION FACTORS described in paragraph 2.5 of this section and the Offeror's proposed total price.

Factors/subfactors will be evaluated against the standards described in this section. Each factor/subfactor will receive one of the following ratings:

Acceptable. The proposal demonstrates an acceptable understanding of the requirements. The Offeror's proposed capability is of an acceptable level of quality and justified or substantiated by meeting the requirements of the factor or subfactor.

Unacceptable. The proposal fails to demonstrate an acceptable understanding of the requirements. The Offeror's proposal does not meet the requirements to receive an acceptable rating for the factor or subfactor.

Neutral. Offerors will not be rated favorably or unfavorably if contracts were not issued a final performance evaluation.

1.5 Contract Award

Offerors are advised that the Government intends to award without discussions. However during the evaluation of the proposals, clarifications may be requested. Those proposals that receive an unacceptable rating on any of the non-price factors or subfactors may be determined unacceptable and may not receive further consideration for award.

Upon completing the evaluation of all proposals, as long as there is at least one acceptable proposal, the Contracting Officer may, in accordance with the provisions of this solicitation and applicable acquisition regulations, evaluate price for those proposals determined to be technically acceptable. However, if all proposals are determined unacceptable, then the Contracting Officer may conduct discussions with all Offerors. Upon conclusion of discussions, the Contracting Officer may request final proposal revisions from all Offerors and may, upon receipt of final proposal revisions, proceed to award a contract without further discussions or notice.

In the event that award cannot be made to the lowest-priced, acceptable Offeror, the Contracting Officer may conduct discussions only with Offerors that submitted an acceptable proposal. Upon conclusion of discussions, the Contracting Officer may request final price proposal revisions from the Offerors that submitted an acceptable proposal and may, upon receipt of final proposal revisions, proceed to award a contract without further discussions or notice.

2.0 PROPOSAL FORMAT

2.1 General

Submit proposals three (3) separate envelopes. All proposal revisions shall be submitted as page replacements with revised text readily identifiable, e.g. bold face print or underlining. Proposal replacement pages shall be clearly marked "REVISED", shall show the date of revision, and shall be submitted in the appropriate number of copies (e.g., if four copies of the original page was required, then four copies of the revised page will also be required).

2.1.1 Volume I, Non-Price Proposal

One envelope shall be clearly marked, "VOLUME I, NON-PRICE PROPOSAL, RFP NO. DACA83-03-R-0013." It shall contain an original and six (6) copies of the items provided in response to the Non-Price Factors described in paragraph 2.5.

2.1.2 Volume II, Price Proposal

The second envelope shall be clearly marked, "VOLUME II, PRICE PROPOSAL, RFP NO. DACA83-03-R-0013." It shall contain one original and two copies of the Offeror's completed Standard Form (SF) 1442, using a printed copy of the SF 1442 included in this solicitation.

Volume II shall also include the following:

- One original and two copies of Section 00010, Price Proposal Schedule. Indicate whether or not Facilities Capital Cost of Money is included in the Offeror's costs of performing the work. Proposals that state that Facilities Capital Cost of Money is not included, or proposal that do not address Facilities Capital Cost of Money, will be deemed to have waived Facilities Capital Cost of Money.

- If the Offeror is a joint venture (JV), two copies (certified as a true copy) of the Offeror's executed joint venture agreement and identify the size status for each member of the JV).
- Two copies of the Offeror's completed Section 00600, Representations and Certifications, using a printed copy of Section 00600 included in this solicitation.
- Two copies of the Offeror's completed, if applicable, SF LLL, Disclosure of Lobbying Activities, using a printed copy of the SF LLL included as Appendix A in Section 00600.

2.1.3 Volume III, Subcontracting Plan (only required from Large Business Concerns)

If the Offeror is a large business concern, the Offeror shall submit a subcontracting plan in accordance with FAR 52.219-9 (See Section 00100, Appendix A for a sample).

The third envelope shall be clearly marked, "VOLUME III, SUBCONTRACTING PLAN, RFP NO. DACA83-03-R-0013". Volume III will not be evaluated or rated. Only the selected Offeror's plan will be reviewed and must be approved prior to award of the contract.

2.1.4 Table of Contents

Proposal volumes shall be tabbed. Each of the proposal volumes shall include a Table of Contents that includes the title of the subject matter discussed therein and the page number where the information can be found. The volumes shall be organized in the same order listed in paragraph 2.4 of this Section. Each evaluation factor and subfactor shall be separately tabbed. Proposals that are not correctly tabbed may be considered unacceptable.

2.2. Proposal Presentation

Prepare proposals in the English language.

Proposals shall completely address the requirements of the RFP. Elaborate format, binders, special reproduction techniques, and the like are not necessary. However, the proposal shall be neatly organized and bound. All pages, except divider tabs, shall be numbered. Except for divider tabs and revisions sheets, as noted above, plain white 8-1/2" x 11" bond shall be used. However, if drawings or other graphics are included, Offerors may reduce them only to the extent that legibility is not lost.

There is no limit to the number of pages in the non-price proposal. Pages shall be single-sided, numbered, and shall be typed. Type pitch shall be 10 pitch or larger.

Information presented should be organized so as to pertain to only the evaluation factor or subfactor in the section that the information is presented. Information pertaining to more than one evaluation factor or subfactor should be repeated in the tab for each factor or subfactor.

2.3 Proposal Content

Proposals shall be in a narrative format, organized and titled so that each section of the proposal follows the order and format of the factors and subfactors set forth below in paragraph 2.5, "VOLUME I, NON-PRICE PROPOSAL".

Any information, presented in a proposal that the Offeror wants safeguarded from disclosure to other parties must be identified and labeled in accordance with the requirements of Provision "52.215-1, Instructions to Offerors—Competitive Acquisition (May 2001)," subparagraph (e), which is found in Section 00100 of this solicitation. The Government will endeavor to honor the restrictions against release requested by Offerors, to the extent permitted under United States law and regulations.

The proposal must set forth full, accurate, and complete information as required by this solicitation. The Government will rely on such information in the award of a contract. By submission of an offer, the Offeror agrees that all items in its proposal (key managerial and technical home office and on-site personnel, subcontractors, material and equipment manufacturers, targets for utilization of eligible SDB concerns, etc.) will be used throughout the duration of the contract and any substitutions of any item will require prior approval of the Contracting Officer.

2.4 Evaluation Factors

All proposals will be evaluated on non-price and price factors. Offerors are required to provide data addressing all stated factors in a clear and understandable format. If an Offeror does not have data relating to a specific factor, it shall be clearly stated in the proposal. Proposals that do not clearly address all factors may be considered unacceptable and may not receive further consideration.

All factors and subfactors within a factor have equal importance.

NON-PRICE FACTORS (Volume I):

Factor I, Experience

Subfactor A - Construction Experience

Subfactor B - Design-Build Experience

Factor II, Past Performance

Subfactor A - Construction

Subfactor B - Design-Build

Subfactor C - Customer Satisfaction

~~Factor III, Project Management (Deleted)~~

Factor IV, Small Business Program, Past performance in complying with Small Business Subcontracting Plan.

PRICE (Volume II)

2.5 Volume I, Non-Price Proposal

Data provided in response to the non-price factors described below shall be included in Volume I, "Non-Price Proposal". All references to Offeror shall include any proposed members of the Construction team meeting the criteria stated in paragraph 2.5.2 below.

2.5.1 Relevant Contracts

For a contract **or task order under an IDIQ type contract** to be considered relevant, the contract **or task order** must have been awarded to the Offeror after 1 July 1993 and has been declared substantially complete between 1 July 1997 and 1 July 2003, and each contract must have involved at least four (4) of the characteristics listed below for either a Construction contract or a Design-Build contract, as applicable. **Evidence of substantial completion from the contracting agency must be included in the proposal in order for a contract to be considered relevant. If a contract has not been**

declared substantially complete, the offeror must submit a narrative discussing why a particular contract should be considered relevant.

Individual task order(s) under an IDIQ-type contract shall be considered relevant if it meets a minimum of four (4) of the characteristics for either a construction or a design-build contract, as applicable. Task orders may not be combined in order to meet the first characteristic. Task orders may not be combined in order for the contract to meet the criteria for relevancy. The individual task order must meet the award date and substantial completion criteria stated above. The characteristics of a task order may be applied towards meeting the required characteristics for either a Construction contract or a Design-Build contract, as applicable.

Characteristic	Construction Contracts	Design-Build Contracts
1	Contract amount at time of award was equal to or greater than \$15,000,000	Contract amount at time of award was equal to or greater than \$10,000,000
2	Contract involved 100,000 square feet or more of Renovation Work	Contract involved 100,000 square feet or more of Renovation Work
3	Work involved the integration of various building systems, including mechanical, electrical, fire alarm and fire protection	Work involved design and integration of various building systems, including mechanical, electrical, fire alarm and fire protection
4	Construction involved work on multiple structures, multiple floor levels, with multiple uses	Design involved multiple structures, multiple floor levels, with multiple uses
5	Work involved management and supervision of many different trades, including at least those involved in site work, interior and exterior electrical, HVAC, plumbing, masonry, and concrete work	Work involved management and supervision of many different trades, including at least those involved in site work, interior and exterior electrical, HVAC, plumbing, masonry, and concrete work
6	Work involved hazardous material identification, abatement, and removal, including both lead-based paint and asbestos	Design addressed hazardous material identification, abatement, and removal, including both lead-based paint and asbestos
7	Work involved removal of and cleanup of petroleum-contaminated soils	Design involved removal and cleanup of petroleum-contaminated soils
8	Work was managed through the use of a Network Analysis System (NAS) and involved multiple construction phases	Design and construction submittals were managed through the use of a Network Analysis System (NAS)
9	Contract involved construction on a U.S. Government Military Base	Contract involved construction on a U.S. Government Military Base

2.5.2 Factor I, Experience

Data provided in support of this factor shall clearly demonstrate the Offeror's ability to meet the requirements of the contract based on its experience on relevant contracts as defined in paragraph 2.5.1. Only experience considered relevant to this project will be considered.

Complete a Contract Data Sheet for each contract provided in support of this factor. This sheet is included as Attachment 1 to this specification section. All requested information must be provided. Failure to provide any of the requested data may be cause to eliminate a contract from consideration in the evaluation. Only the form provided as Attachment 1 will be accepted. Data submitted in any other format will be eliminated from consideration.

The Offeror shall provide a narrative description of each relevant contract included in its proposal in addition to the Contract Data Sheet. The narrative shall clearly explain how the contract fulfills the experience characteristics for which it is being submitted. No more than five (5) pages shall be submitted for each contract, including the Contract Data Sheet and any continuation pages. Pages exceeding this 5-page limit will not be considered.

If the Offeror intends to rely on its joint venture partner's experience, the Offeror shall submit a Contract Data Sheet (Attachment 1) and narrative description for the joint venture partner's relevant experience. In order to demonstrate the depth of its experience, Offerors may submit data for themselves and their joint

venture partner for the same contract. However, the submission of data for multiple team members on the same contract will only be counted as a single contract.

2.5.2.1 Subfactor A, Construction Experience

Offerors shall identify relevant contracts, as defined in paragraph 2.5.1, in which they were the prime contractor.

2.5.2.1.1 Evaluation Standards

Acceptable	The Offeror has submitted one or more relevant contracts (para 2.5.1). These contracts demonstrate that the Offeror has had experience in all of the nine (9) listed Construction Contracts characteristics. Evidence of substantial completion is provided for all relevant contracts or an acceptable narrative is submitted discussing why a particular contract should be considered relevant.
Unacceptable	Based on the submitted relevant contracts, the Offeror has not demonstrated experience on at least one of the Construction Contract characteristics, or evidence of substantial completion is not provided for all relevant contracts or an acceptable narrative discussing why a particular contract should be considered relevant was not submitted.

2.5.2.2 Subfactor B, Design-Build Experience

Offerors shall identify relevant contracts, as defined in paragraph 2.5.1, in which they were the prime contractor.

2.5.2.2.1 Evaluation Standards

Acceptable	The Offeror has submitted one or more relevant contracts (para 2.5.1). These contracts demonstrate that the Offeror has had experience in all of the nine (9) listed Design-Build Contracts characteristics. Evidence of substantial completion is provided for all relevant contracts or an acceptable narrative is submitted discussing why a particular contract should be considered relevant.
Unacceptable	Based on the submitted relevant contracts, the Offeror has not demonstrated experience on at least one of the Design-Build Contract characteristics, evidence of substantial completion is not provided for all relevant contracts or an acceptable narrative discussing why a particular contract should be considered relevant was not submitted.

2.5.3 Factor II, Past Performance

Data provided in support of this factor shall clearly demonstrate the Offeror's ability to meet the requirements of the contract based on his documented past performance history on relevant contracts. Only past performance on relevant contracts will be considered (see paragraph 2.5.1 above).

Provide a copy of the final overall performance evaluation for each of the relevant contracts identified in Factor I, Subfactors A and B, that were completed between 1 July 1997 and 1 July 2003. Only performance evaluations for the Offeror will be considered. Provide complete and accurate documentation for each evaluation. Undocumented performance evaluations may not be considered. The Government may use data provided by the Offeror and data obtained from other sources. While the Government may elect to consider data obtained from other sources, the burden of providing thorough and complete past performance information rests with the Offeror.

2.5.3.1 Subfactor A, Construction

Documentation shall be provided for each of the final overall performance evaluations received for the relevant contracts submitted in Subfactor IA, or if one was not received, a statement attesting to the situation shall be provided.

2.5.3.1.1 Evaluation Standards

Acceptable	The Offeror has received no less than satisfactory on all final performance ratings on the submitted relevant contracts; and the Offeror must not have received an Unsatisfactory performance evaluation on any Federal Government contract after 1997.
Unacceptable	The Offeror has received less than a satisfactory performance rating on at least one of the submitted relevant contracts; or the Offeror has received an Unsatisfactory performance evaluation on at least one Federal Government contract after 1997.
Neutral	Offerors will not be rated favorably or unfavorably if all contracts were not issued a final performance evaluation.

2.5.3.2 Subfactor B, Design-Build

Documentation shall be provided for each of the final overall performance evaluations received for the relevant contracts submitted in Subfactor IB, or if one was not received, a statement attesting to the situation shall be provided.

2.5.3.2.1 Evaluation Standards

Acceptable	The Offeror has received no less than satisfactory on all final performance ratings on the submitted relevant contracts; and the Offeror must not have received an Unsatisfactory performance evaluation on any Federal Government contract after 1997.
Unacceptable	The Offeror has received less than a satisfactory performance rating on at least one of the submitted relevant contracts; or the Offeror has received an Unsatisfactory performance evaluation on at least one Federal Government contract after 1997.
Neutral	Offerors will not be rated favorably or unfavorably if all contracts were not issued a final performance evaluation.

2.5.3.3 Subfactor C, Customer Satisfaction

A customer satisfaction questionnaire is provided at the end of this section as Attachment 2. For each of the relevant contracts identified in Factor I, Subfactors A and B, Offerors shall complete Part A. Offerors shall send the partially completed forms to the Contracting Officer for the identified contract (respondent) for completion of Part B. Only one questionnaire for each relevant contract will be accepted. The respondent shall return completed questionnaires directly to the following address:

US Army Engineer District, Honolulu
CEPOH-CT-C
Attn: DACA83-03-R-0013, Customer Satisfaction Questionnaire
Bldg. 230
Fort Shafter, HI 96858-5440

Fax: 808-438-8588

Respondents should be requested to return questionnaires no later than the closing date of the solicitation. The Government advises Offerors that they are responsible for ensuring timely receipt of completed questionnaires. Questionnaires that are not received may impact an Offeror's rating for this subfactor. Questionnaires received directly from offerors will not be considered in the evaluation. Questionnaires that are missing the Contracting Officer's receipt acknowledgement signature may not be considered. Only questionnaires submitted on the provided form (Attachment 2) will be considered.

A copy of page 1 of all partially completed questionnaire sheets sent shall be included in this tab. Ensure that the reference number is completed on each questionnaire sheet to correctly match questionnaires to the contracts listed in Factor I.

2.5.3.3.1 Evaluation Standards

Acceptable	At least 50% of the completed questionnaires are received for the relevant contracts submitted in Factor I, Subfactors A and B; and on the questionnaires received for the relevant contracts submitted in Factor I, Subfactors A and B, all of the ratings for questions 2 through 9 were no less than satisfactory.
Unacceptable	Less than 50% of the completed questionnaires are received for the relevant contracts submitted in Factor I, Subfactors A and B, or on the surveys received for the relevant contracts submitted in Factor I, Subfactors A and B, one or more of the ratings for questions 2 through 9 were less than satisfactory.

~~2.5.4 Factor III, Project Management (DELETED)~~

~~Provide a diagram depicting the proposed management organization. The chart shall clearly identify lines of authority and areas of responsibility. Include a narrative description of how the management team will operate, and the specific duties and responsibilities of the key personnel. It is not necessary to identify individuals by name for any position.~~

~~Incorporate into the description, an organizational chart depicting the on-site managerial and technical staff. At a minimum, the Offeror must include the following key positions: Project Manager, Project Superintendent, Contractor Quality Control System Manager, Design Quality Control Manager, Safety Officer. In addition to these positions, the Offeror should identify any other managerial and/or technical positions that will be used on this contract to demonstrate the Offeror's ability to provide quality work in both the design and construction aspects of the contract within the contract completion period.~~

~~The narrative shall describe the Offeror's proposed on-site organization and structure, and shall describe how the Offeror intends to monitor and control timeliness, quality, and safety of the work at the job site, including the work of any subcontractors on all phases of the contract.~~

~~2.5.4.1 Evaluation Standards~~

~~The Government will review and evaluate the organization chart and other pertinent information provided as either acceptable or unacceptable. The Offeror's proposal submission for this factor must demonstrate the offeror's ability to complete the project successfully through the use of an efficient organizational structure that allows for streamlined reporting processes, proper subcontractor management, ability to manage resources, and a technically knowledgeable and capable on-site staff.~~

Acceptable	The proposal includes all requested information for the factor. The diagram is complete and easy to understand. Lines of authority and areas of responsibility are well defined and are appropriate for the scope of work. The narrative complements the diagram and is in sufficient detail to demonstrate the Offeror's understanding of the effort needed to successfully manage the contract.
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Unacceptable	The diagram is incomplete, key positions are not included; or the diagram is unclear, lines of authority or areas of responsibility are not readily discernible; or the narrative does not match the diagram; or the proposed organization is inappropriate to the effort needed to successfully manage the contract.
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2.5.5 Factor IV, Small Business Program, Past performance in complying with Small Business Subcontracting Plan.

Offerors shall submit data that demonstrate its use of Small Business Concerns. Small Business Concerns include small disadvantaged businesses (SDB), women-owned small businesses, HUBZone small businesses, veteran-owned small businesses and service disabled veteran-owned small businesses.

Provide SF 294' s, "Subcontracting Report for Individual Contracts" for projects of similar scope and magnitude. Provide reasonable justifications if goals were not met.

2.5.5.1 Evaluation Standards

Acceptable	Offeror's Small Business Subcontracting Plan goals were met or reasonable justifications for not achieving these goals provided. Offers from Small Business concerns shall receive an acceptable rating..
Unacceptable	Offeror's Small Business Subcontracting Plan goals were not met and no justification for not achieving these goals is provided.

CONTRACT DATA SHEET

RFP No. DACA83-03-R-0013

The data provided on this sheet will provide supporting information for the Offeror's Experience and Past Performance (Factors I & II). Use this form to document relevant contracts that were awarded after 1 July 1993 and substantially completed between 1 July 1997 and 1 July 2003. Properly referenced continuation sheets may be used if needed. Submit no more than 5 pages per contract -- data sheet plus continuation sheets.

Offeror's Name:

Phone Number:

Fax Number:

Point of Contact:

E-Mail Address:

Contract No:

Reference #: Vol I, Tab _____, Contract # ____

Applicable characteristics (paragraph 2.5.1, 1 - 9):

(List characteristics by number here, describe on continuation sheets)

Contract Title:

Location:

Type of Contract (i.e. firm-fixed, price, cost reimbursable, IDIQ, etc.):

Contract Description:

Award Date:

Original Completion Date:

Actual Completion Date:

Award Amount:

Final Contract Price:

Was Offeror the PRIME or a SUB?

Percentage of Contract Performed by Offeror:

Type/scope of work performed by the Offeror:

Overall Final Contract Performance Rating:

Date of Evaluation:

Quality Awards, Letters of Appreciation/Commendation, Written Overall Performance Evaluations Received. List documents here, include document(s) in Volume I, Factor III, Experience and Past Performance tab.

Type and Extent of Subcontracting. List names of major subcontractors used.

Describe any other factors relevant to experience or past performance that demonstrate the Offeror's capabilities and qualifications in relation to the proposed contract.

End user (i.e. DPW, BCE, etc.)

Point of Contact (Name & Title):

Phone Number:

Fax Number:

E-mail Address:

CUSTOMER SATISFACTION QUESTIONNAIRE

PART A (to be completed by Offeror)

Reference #: Vol I, Tab _____, Contract # _____

Name of Offeror: _____

Contract Number/Contract Title /Location _____

Contract Description: _____

Award Date: _____

Original Completion Date: _____

Actual Completion Date: _____

Award Amount: _____

Final Contract Price: _____

% of work and type of work performed by the Offeror: _____

=====

PART B (to be completed by Respondent)

Received: _____
(signature of Contracting Officer)

Organization Name: _____

Your Name: _____

Your Title: _____ Phone Number: _____

Your role on this contract: _____

Name and phone number of any additional person(s) who may or may not have a different opinion on this contractor's job performance.

1. Describe any special conditions affecting the work.

Circle the appropriate rating and provide supporting narrative below for questions 2 - 8

2. How would you rate the quality of construction in terms of compliance with the contract plans and specifications?

Unsatisfactory Marginal Satisfactory Very Good Outstanding

3. How would you rate the timeliness of performance, taking into account all excusable delays?

Unsatisfactory Marginal Satisfactory Very Good Outstanding

4. How would you rate the cost of the contract, in terms of initial price reasonableness and control of changes and claims?

Unsatisfactory Marginal Satisfactory Very Good Outstanding

5. How would you rate the offeror's ability and cooperativeness in complying with other contract terms and conditions?

Unsatisfactory Marginal Satisfactory Very Good Outstanding

6. How effective was the Offeror's management of the administrative aspects of performance, such as communicating and performing routine coordination?

Unsatisfactory Marginal Satisfactory Very Good Outstanding

7. How would you rate the Offeror's willingness to cooperate with, and assist the customer in routine matters? Non-routine matters?

Unsatisfactory Marginal Satisfactory Very Good Outstanding

8. What is your assessment of the Offeror's business integrity?

Unsatisfactory Marginal Satisfactory Very Good Outstanding

9. How would you rate the overall performance of the Offeror? (Please provide comments, especially if Outstanding or Unsatisfactory)

Unsatisfactory Marginal Satisfactory Very Good Outstanding

10. Would you recommend using this firm for any future similar types of work for your organization, and why or why not?

Thank you very much for responding to this questionnaire. Please mail or fax your completed questionnaire to the following address:

DACA83-03-R-0013

00120-19

AM-0002

Part B - Attachment 2

Page 3 of 3

US Army Engineer District, Honolulu, CEPOH-CT-C
Attn: DACA83-03-R-0013, Customer Survey
Bldg. 230
Fort Shafter, HI 96858-5440

Phone: 808-438-8564 (Ms. Renee Hicks) fax 808-438-8588

RESPONSES TO CONTRACTOR QUESTIONS

Nan, Inc., Walter Yuen/Patrick Shin

1. Per Paragraph 2.3.1, Relevant Contracts, page 00120-4, for a contract to be considered relevant, one of the criteria is that the contract needs to be “declared substantially complete.” This is an unreasonable requirement as a project can be declared “substantially complete”, yet the Government does not issue the final performance evaluation (PE) until after all contractual obligations (i.e. punchlist, modifications) are met. It has been in our experience that this process can take from 6 months to 1 year after the project is “substantially complete” to receive a final PE. Therefore, we ask that the Government also consider interim PE’s as well.

In addition, please define what is considered “substantially complete” for a single construction or design-build contract. For example, if a project is completed in that personnel are allowed to occupy the facility, yet the Contractor is currently completing punchlist items or Government approval of modifications are pending; would such a project be considered “substantially complete”? Or how about in the case of a phased-project involving multiple buildings, of which buildings are turned over after each is completed; would this project be “substantially complete” if majority of the buildings are completed (i.e. 3 out of 5 buildings)?

Response - The intent of identifying relevant contracts as being those that have been declared substantially complete is to allow offerors to highlight experience on completed contracts even though the offeror may not have received a final performance evaluation for that contract. In that case, the offeror must provide, with their offer, documentation from the contracting activity, or the contracting officer, stating that the contract has been declared substantially complete, as defined by that contracting activity. Contracts identified by an offeror that have a final performance evaluation will be evaluated for both experience and past performance. However, contracts identified by an offeror as being only substantially complete (no final performance evaluation) will be evaluated only for experience and will receive a Neutral rating for past performance. Interim performance evaluations will not be considered as evidence of contract substantial completion. Similarly, if a contract contains multiple projects, offeror must provide documentation of contract substantial completion not documentation that some of the projects have been declared substantially complete.

2. In relation to the above questions, in regards to an IDIQ-type contract, would the contract be considered “substantially complete” for either of these two scenarios: (a) the final option year of the contract has ended, yet task orders within the contract are on-going, and dependent upon the definition of “substantially complete:”, are not of one of the submitted task orders or (b)

majority of the contract is completed (i.e. for a base and four (4) option year contract, base year and two option years are completed)? Please define what is considered “substantially complete” for an IDIQ-type contract.

Response - For an IDIQ contract to be considered substantially complete, as stated in the RFP, both the submitted task order and the contract must meet the criteria for substantially completion.

3. In relations to Questions 1 and 2, we particularly feel that a contract 50% complete can be evaluated just as fair as a contract that is “substantially complete”, as majority of the problems on a project occur during the set-up and initial phases of the project. In addition, would it not be more advantageous in the Government’s evaluation of this RFP to award to an Offeror that is currently managing a sizeable staff and an extensive workload, rather than a company who performed at the same capacity, but five years ago? We feel this would be since projects that are most current would reflect an Offeror’s current management style/program, which carries through to the end of the project. Additionally, the Government will be able to better understand the Offeror on on-going projects in comparison to an Offeror that completed a project awhile ago, and may have experienced a downturn in projects in the time since. With the current requirements, the Government is eliminating current projects, and therefore, will not be getting the “best-value” out of their evaluation. Therefore, we feel that current projects should carry the same weight as past projects, in regards to relevant experience and past performance, and that the Government should include on-going projects in their evaluation of this RFP.

Response - The concerns surfaced by the offeror were considered during the establishment of the solicitations evaluation criteria. The Government believes that the evaluation factors and criteria meets the needs of the Government.

4. Regarding the request for a Small Business Subcontracting Plan from Large Business Concerns, as this is a design-build contract, it is very difficult for an Offeror to list definite subcontractors for this project at the time of bid submittal. If an Offeror is required to list subcontractors to be used on this project, this will limit the competition to only large businesses, as most small businesses do not have the capacity to estimate a project of this size. Therefore we ask that the Government hold the Offeror liable to the small business percentage goals presented in its plan, and not necessarily the goals for a specific trade.

For example, if an Offeror proposes to use a women-owned small business painting subcontractor for an X% of the total planned subcontracting dollars. However, after award of the project the Offeror finds that that particular subcontractor is unable to perform on this project. In that case, an Offeror should not be held liable to replace the trade of the subcontract, but rather the

percentage proposed for that small business subcontracting concern (i.e. replace with a WOSB plumbing contractor for X%).

Response - The offeror should include the names of those contractors with whom the offeror has a working relationship. Past experience may be a good indicator. As far as compliance with the **subcontracting plan**, DFARS 219.704(a)(4) states:

"In those subcontracting plans which specifically identify small, small disadvantaged, and women-owned small businesses, prime contractors shall notify the administrative contracting officer of any substitutions of firms that are not small, small disadvantaged, or women-owned small businesses for the firms listed in the subcontracting plan. Notifications shall be in writing and shall occur within a reasonable period of time after award of the subcontract. Contractor-specified formats shall be acceptable."

I interpret this to mean that the contracting officer **does not** need to be notified if the prime contractor substitutes a SDB with another SDB, the subcontractor's trade does not enter into the picture. The objective is to ensure that you provide a good faith effort to ensure that the SDB goal is met or exceeded. (For example, if you do not use an SDB plumber, you should award more to SDB carpenters or electricians.)

5. Paragraph 2 under Paragraph 2.5.1, Relevant contracts, page 00120-5, states, "IDIQ- type contracts may be submitted only if a single task order on that contract involves at least four (4) of the characteristics for either a Construction contract or a Design-Build contract, as applicable." Therefore, we interpret this sentence to mean that if an Offeror submits an IDIQ-type contract, with a contract value over \$25 million and has more than one task order that meets at least four (4) of the specified characteristics for either a Construction contract or a Design-Build contract, this IDIQ-type contract, as a whole, will qualify in demonstrating experience in meeting Characteristic #1. Do you concur?

Response - No, a task order type contract can be counted only once

6. Suppose that an Offeror submits an IDIQ-type contract with various task orders (Task Orders A, B, and C) that involve at least four (4) of the characteristics for either a Construction contract or a Design-Build contract, which are as follows:

- Task Order A meets Characteristics #2,3,4,5
- Task Order B meets Characteristics #4,5,6,7
- Task Order C meets Characteristics #6,7,8,9

In evaluating the contract, will the Offeror be evaluated as meeting Characteristics #2 through #9?

Response - The situation presented by the offeror will not occur. Offerors are reminded that only one task order (and its relevant characteristics) will be considered for an IDIQ contract. In the offeror's example, the evaluation will only consider the first TO (in this case TO A) and any other TO will be discarded - therefore if the following is submitted,

Task Order A meets Characteristics #2, 3, 4, 5 (will be counted)
Task Order B meets Characteristics #4, 5, 6, 7 (will NOT be counted)
Task Order C meets Characteristics #6, 7, 8, 9 (will NOT be counted)

The Offeror will be evaluated as meeting only Characteristics #2 through #5.

7. We are currently working on a project at Quad F, Schofield Barracks (Contract No. DACA83-02-C-0001) with elements of work similar to that of this Quad C project. However, our contract did not involve ACM removal, as it was performed by another contractor, R&D Technologies, on a separate contract, prior to our mobilization on the project. Therefore, as our contract price did not involve asbestos removal, would it be possible for the Government to disclose the contract amount for the work performed on R&D's contract?

Response - The Government will not be disclosing the requested information. As is standard industry practice, the Offeror is responsible for obtaining his own pricing information necessary to prepare an offer.

8. In relation to the above-mentioned question and project, our proposal also did not include consideration of AT/FP requirements. Would the government disclose the Government's estimated amount, as well as the Offeror's option amount?

Response - It is not standard practice for the Government to release its estimates, unless revealed in a public bid opening forum.

9. The RFP documents include Attachment 15, Proposal Data Sheet. This form indicates that it is to be provided at the beginning of the Offeror's proposal. However, it is not referenced anywhere else in the RFP documents. Is this Attachment required for proposal submission?

Response - Attachment 15, Proposal Data Sheet, will be deleted by an amendment.

10. In the Statement of Work, Chapter 6, Structural Design, within para. 6-5.5 on page SOW 6-4 of the RFP, referencing AT/FP, one paragraph mentions “The requirement to design and retrofit existing floor slabs (with FRP or similar top slab reinforcing) to withstand upward blast loads as given by paragraph B-2.1.3 of UFC 4-101-01 shall be treated as a bid option to this project...”. However, Section 00010, Proposal Schedule does not reflect this option. Please review and clarify.

Response - Bid Option will be added by an amendment.

Dick Pacific Construction Co., Inc., Kelvin Osborne/Edward Requilman

11. Where reference is made to Quad F are the documents going to be furnished, i.e. Gear wash, Design? Quad “F” Gymnasium design solution 15-11?

Response - Gear Wash information is provided in Attachment 25. No information will be provided for the Gymnasium.

12. Will the original drawings and photos for Quad C be provided to the Contractor.

Response - Existing architectural floor plans were issued by an amendment. After the contract is awarded the contractor may obtain original drawings and photographs of Quad C, as available, from the Directorate of Public Works and the Schofield Barracks Museum, respectively.

13. Similar but As-built drawings

Response - Existing architectural floor plans were issued by an amendment. After the contract is awarded the contractor may obtain as-built drawings, as available, from the Directorate of Public Works.

14. Do I need to conform to life safety code (NFPA 101) when existing floor transition is greater than 1”? Do we need to fill adjacent floor to meet the requirement?

Response - Yes, NFPA 101 must be complied with.

15. Can small business plan be submitted 10:00 am following day of bid?

Response - No, the plan shall be turned in with proposal on due date

16. Can you provide us the following to be used in preparing for our bid proposal?

I. RFP CAD design drawings.

2. Plans of existing condition of the buildings to be renovated.
3. Selective demolition plans of the renovated buildings.

Response - 1) CAD drawings will not be provided prior to contract award.

2) See responses to Questions 12 & 13.

3) Demolition plans will not be provided.

17. Can we replace the specified material to a renewable material, (i.e. VCT vs. linoleum)?

Response - Linoleum may be used in lieu of vinyl composition tile. Other material substitutions will need the Contacting Officer's approval.

18. Can you provide a RFP facility SPiRiT rating sheet?

Response - A SPiRiT rating analysis will be provided by an amendment.

19. Can you postpone and move the date for the submission of the bid proposal?

Response - Revised proposal closing date will be issued by an amendment.

Cedric D.O. Chong and Associates, Inc., Avin Oshiro

20. RFP mandates "low ozone depleting" refrigerants for chillers. Will this allow us to use R-22, R134a or R-123?

Response - Refrigerants shall comply with SOW Ch 10 which states that the design shall comply with UFGS 15620A.

21. No mention of freezers (not compressors) or chill boxes in the kitchen. Do we replace, reuse or refurbish? Do we improve design? Are the conditions the same?

Response - See SOW Ch 5, PARA.5-1.2.4, requiring demolition of all existing interior partitions. Regarding mechanical items specified in SOW Ch 8 (Plumbing), Ch 10 (Heating, Ventilating, and Air Conditioning), Ch 11 (Energy Conservation) and Ch 12 (Fire Protection) or shown on M-, P-, and FP- sheets shall be new unless otherwise indicated. All existing items shall be removed unless otherwise indicated.

22. Sanitary piping on plan shows 2 lines. Why can't we connect all the risers into one larger main?

Response - The 2 lines shown on the sanitary piping plan sheet P-3 and 1/Detailed Plumbing Floor Plan on Sheet P-4 may be combined as long as the following minimum design criteria are met:

a. The minimum distance required by IPC is provided (i.e. for connections to offsets and bases of stacks, see IPC Chapter 7, paragraph 704.3).

b. No floor cleanouts are located in billeting modules.

23. Do we process the paperwork to obtain HECO rebate?

Response - If necessary, an amendment will be issued to add this requirement to the RFP.

24. DDC controls states "BACNET" compatible. Are other systems allowed? Is compatibility of the new DDC system with an existing system required or necessary?

Response - See SOW Ch 10, para. 10-9, building controllers shall be fully BACNET compatible.

25. There are no specifications on control points. Does this mean we can provide only a minimum system?

Response - Minimum requirements on control points are stated in SOW Chapter 10 paragraph 10-9.

26. Are there minimum efficiencies for the equipment?

Response - As noted in Chapter 10 paragraph 10-1.2, minimum efficiencies shall be in accordance with UFGS.

27. Do we follow mechanical RFP or directive from energy efficiency section?

Response - The design shall comply with Ch 10 and Ch 11. Items provided shall be in accordance with both chapters. If there are specific conflicting items, it shall be brought to the attention of the Contracting Officer.

Hawaiian Dredging Construction Co., Bruce Patterson

28. SOW 5-1, Int. Furn (5-1.1.2); Sow 14-1, Int. Furn (14.1.2.I); SOW-2: Who installs?

Response - SOW Ch 5, PARA. 5-1.1.2, and SOW Ch 2, para. 2-1.7, indicate which items are Government or Contractor installed.

29. When can we expect the funds for this project to be appropriated?

Response - Funds for the project were appropriated and RFP will be revised by an amendment to correct this information.

30. Will this contract bid date be extended, if so when will it be announced?

Response - See response to Question 19.

31. T-3 Dept of Army Facility Stdization Pgm; Std CO Oper Facility Feb 1994: How can we see a copy of this?

Response - Copies of the Standard Company Operations Facility are available for review at the U.S. Army Engineer District, Honolulu, Contracting Office.

32. If “as builts” are not available, what can we expect to verify some of the structural elements more clearly?

Response - There are no structural as-built drawings for Quad C. Ch 6, Structural Design, of the Scope of Work will be revised by an amendment to provide more information on the existing structure.

33. 5-1.2.4 “Roof structure and roofing will have to be removed ... “ need more detail.

Response - The RFP will be amended to provide more information on the roof structure.

34. What surrounding areas will be allowed for contractor equipment?

Response - Information on the Contractor’s Operation and Storage Area will be provided by an amendment.

35. Will there be additional opportunities to walk thru the project site?

Response - The date and time for an additional site visit will be issued by an amendment.

RESPONSES TO CONTRACTOR QUESTIONS

Architectural Window Systems., Mark Braunschweig

36. In the Statement of Work for this project the RFP is clear that the AT/FP requirements are to meet the July 31, 2002 DOD standards, specifically UFC 4-010-01. The windows and entrance doors are shown and called out to be wood, which will not meet these blast requirements (even with the laminated glass). Is there something in the specifications that we are perhaps overlooking that alleviates these requirements as they pertain to the windows?

Response- See RFP Specification paragraph 5-7.1.8 for exterior window and door requirements. See RFP Concept Design Drawings, sheet A-4.1, for NOTE, which indicates type of material.

Dick Pacific Construction, Edward Requilman

37. It appears that the exterior concrete walls are covered in plaster on both the interior face and exterior face. Is it the intent of the seismic / AT/FP strengthening provided in the RFP to have the shotcrete applied directly over the plaster, or does the plaster need to be removed prior to applying the shotcrete?

Response- Concrete surfaces on which shotcrete is to be installed shall have all debris, chemicals, contaminants including plaster removed in accordance with ACI 506R-90.

Kiewit Pacific Co, Robert Iwasaki

38. Chapter 9, SOW9-7 paragraph 9-1.27 Personnel Alerting System (PAS) states the system shall be compatible with the existing base master equipment. What type of system is the existing?

Response- The existing base receiving/transmitting equipment is a wireless system made by MadahCom, Inc.

39. The window details show concrete sills under the windows. The majority of the bump outs do not have these sills. Will these concrete sills be required to be installed if they don't already exist?

Response- Windows require reinforced concrete sills as indicated for each building on the exterior elevation of the RFP Concept Design drawings. Further information provided for windows. Regarding Building Notes in RFP Concept Design Drawings for each building - Original Historic Window

Note reads: “ the original historic windows were previously removed and the opening was blocked with concrete. Contractor shall remove the existing windows and the concrete patch to the original opening size and install new windows as scheduled.” The following is offered for clarification: rough open size of existing windows have been reduced; the contractor is required to restore the window rough openings to original historic size and coordinate that the opening will accommodate the new window scheduled.

40. The structural concept design assumed specific strengths of materials and assumed structural details from other buildings due to a lack of complete structural documentation. Can the offerors make these same assumptions in their bids? Is a testing program (destructive or otherwise) to be performed per FEMA 310, Section 2.2 for final design and construction?

Response- Yes, structural concept design assumptions shall be used. Assume that the structure is adequate for the existing loads and strengthen for increased loads accordingly. Bids shall be based on concept design, however, all structural work not shown on the concept structural design but required for final structural design shall be provided by D-B contractor. D-B contractor may perform testing for the final design after award and NTP of the D-B contract.

41. Are enclosed stairwell doors exposed at the lanai to be heritage style doors or HM?

Response- The enclosed stairwell doors shall be hollow metal.

42. According to the plans : Buildings 355,357 electrical & telecom doors are to be HM. Buildings 356, 358 electrical & telecom doors to be wood. Are both correct?

Response- Provide Historic Doors as indicated on the RFP concept design drawings, see RFP specifications SOW Ch. 5, para., 5-4.9.1. Provide hollow metal doors for Utility spaces (i.e. Electrical, Mechanical, and Telecommunication Rooms).

43. Identify “Sisal fabric wallcovering” identified in SOW 2-4.1.1.3. Is this a vinyl type 3 wallcovering with “sisal like” pattern? Or is it “real” sisal fabric which is commonly used on floors. Please specify product name and manufacturer.

Response- ‘Sisal’ wall covering is real 100% natural fiber. Various companies manufacture and provide ‘Sisal’ wall covering material.

44. Will CID packages be returned from the COE to the design team after 50% and 90% submittals so the CID packages can be altered and resubmitted?

Response- the CID submittals will be returned for your use.

45. Are six 100% Design Submittals Color Boards as noted on 4.1 of section 01012 part of the three 100% CID packages? (Example : 3 separate color boards + 3 CID color boards = a total of 6 color boards). OR are they in addition to the three 100% CID packages (example 6 separate color boards + 3 CID color boards = a total of 9 color boards) Please clarify.

Response- RFP specification SOW Ch. 14 indicates the requirements of a CID package. RFP specification section 1012, para., 4.1 indicates the quantity of CID packages required (6 total) under the column heading 'color board', which will be distributed to various addresses. The color board is one component of the total CID Package.

Nan, Inc.

46. On Sheet T-2 (Ring 2), note # 7, it is specified that "North of the line is to be for use of the Building 355 and 358 occupants." However, in Spec Section 01900, par. 1.13.2 Phasing, it states in part that Buildings 356, 357, and 358 will be turned over in February 1, 2004, and Building 355 will be turned over to the contractor in February 1, 2005. Please clarify that the Spec is correct and that the note on sheet T-2 should apply to Building 355 only.

Response- RFP Concept Design Drawings, Sheet T-2, Note 7, applies to Building 355 only.

Dick Pacific

47. PARAGRAPH 17.3.4

Foote Avenue Corridor (Glennan Ave. to Meigs Ave.)

Please verify that planting and walkway improvements are project requirements.

Response- Planting requirements for the Foote Ave Corridor are stated in 17.4.2 and 17.4.6.

48. Is there a Master Plan document illustrating the proposed treatment?

Response- No

49. Will planting improvements require automated irrigation system?

Response- Yes

50. Will topographic survey documentation be provided?

Response- Topographic survey is provided in Amendment No. 1..

51. PARAGRAPH 17.4.1.1

Topographic Survey

The SOW states additional existing tree inventory information/ topographic survey will be provided during the advertising period. We request a copy of this document.

Response- There is no additional tree inventory information.

52. PARAGRAPH 17.4.2

New Tree Plantings for Restoration

The SOW requires new Silk Oak tree plantings along three parking areas. Is there a concept drawing illustrating the proposed treatment?

Response- No. The silk oak plantings should replace the silk oak plantings but not at a one-for-one basis. Space new plantings approximately 35 feet apart.

53. Will new tree plantings require automated irrigation?

Response- Yes

54. Paragraph 17.4.6

Foote Avenue Corridor Streetscape

The SOW requires a minimum of 8 new Royal Palms planted “on the south side of the parking lot west of building 356”. Are these the same palms illustrated in the RFP Landscape Plan (sht. L-1) located along building 357?

Response- No, the palms indicated along building 357 in L-1 are additional plantings. Para 17.4.6 in the SOW requires planting of royal palms along the Foote Ave edge of the parking lot located west of bldg 356. Drawing L-1 does not show this parking lot area.

55. 17.4.13

Imported Screened Soil

Please verify SOW topsoil requirement for front and side courtyards of buildings “650, 651 and 652”.

Response- Typo error. It should read 356, 357, and 358.

56. 17.4.22.1

The SOW requires irrigating “street lawn areas of the Quad C parking lot along Foote, Meigs and Waianae Avenues”. Please clarify extent of the street lawn area for the Waianae Avenue portion.

Response- Provide irrigation for the entire green space north of the parking lot.

57. RFP REFERENCE DRAWING C-3

Reference Drawing C-3 (SITE PLAN) indicates “ install curbed landscape planter (controlled access)” in both parking lots. The RFP Landscape Plan (sht. L-1) does not reflect these new planters. Are there planting and irrigation requirements for these planters?

Response- Yes, provide plants with irrigation.

58. The RFP indicates a requirement for a temporary air cooled chiller of 150 tons capacity and associated chilled water pump to service Building 355. Are there desirable locations and/or undesirable locations for the temporary air cooled chiller yard?

Response- The location of the temporary air cooled chiller yard is to be determined during design after award and should be located in the construction limits.

Dick Pacific Construction, Edward Requilman

59. The RFP documents note that contractor is responsible for calculating, sizing, and selecting the equipment to be provided for the project. The chilled water and domestic hot water system capacities noted in the RFP documents appears to be low compared to preliminary design figures.

For example, the RFP documents indicates a hot water storage tank capacity of 16,000 liters. It appears that the 16,000 liters will be dedicated to the two BEQ Buildings in order to comply with ETL 1110-3-489. Hot water storage capacity for the remaining buildings which include the kitchen facilities does not appear to be included. Also, the RFP documents indicates a total cooling load of 400 Tons. Our preliminary estimate for the four buildings is a total of 600 Tons.

If the RFP construction cost was based on the capacities noted in the RFP documents, will there be an adjustment made to the successful bidder to increase the construction cost should the design capacities be greater than the RFP?

Response- The contractor is responsible for calculating, sizing, and selecting the equipment to be provided for the project. The RFP construction cost shall be based on the capacities determined by the contractor. There will be no adjustment to the successful bidder to increase the construction cost should the design capacities be greater than the RFP since it is the contractor's responsibility to determine the equipment capacities.

60. Section 5-7.2.3 (Ceiling) on page SOW 5-13 indicates that the ceiling of the Arms Vault shall be 8" thick cast-in-place concrete reinforced with #5 bars at 6" on center, each way, each face. Since no retrofit of the existing structure is indicated on the RFP drawings, are we to assume that the existing ceiling meets this requirement? If it does not, is it the intent of the RFP to retrofit the existing concrete ceiling with one of the methods specified in AR 190-11 such as expanded metal or steel plates?

RESPONSE- The Arms Vault ceiling shall comply with AR 190-11. Expanded metal or steel plates will not be permitted.

61. Section 5-5.2.4 (page SOW 5-8) of Amendment No. 1 indicates “Interior seismic walls: these walls will be made of concrete.” Please verify that interior CMU walls are not allowed for seismic resistance.

RESPONSE- Concrete masonry walls will be permitted if they meet design criteria and seismic requirements.

62. Section 5-5.2.2 (page SOW 5-8) of Amendment No. 1 indicates “Heavy storage areas for the Company Operation Facilities (COF) shall have full height masonry or concrete walls.” It appears that there is a conflict and some of these walls (in particular the walls separating the Unit St. and the Equip. Main.) are shown as drywall partitions on the RFP drawings. Please verify which walls are required to be CMU or concrete.

RESPONSE- Architectural drawings for the First Floor of Building 355 was issued by amendment to clarify the use of concrete masonry unit in lieu of drywall partitions for COF Heavy Equipment Storage Areas.

CHAPTER 8

PLUMBING

8-1 GENERAL REQUIREMENTS

8-1.1 **Plumbing scope.** The plumbing requirements for the project, as indicated in this Chapter, are generally contained within this chapter unless otherwise noted. Other plumbing scope indicated by other Chapters and the Attached Concept Design Documents (Drawings, Plumbing Calculations), which are to be used for the design of this project, are subject to requirements in this section. **The attached concept design documents are provided for information only unless otherwise indicated.** All requirements within this Chapter shall take precedence over any conflicting requirement in other Chapters, Attachment Concept Design Documents or any other criteria and shall be brought to the attention of the Contracting Officer for resolution in writing. All definitions and acronyms used in this section are intended to be used for this section only unless otherwise noted. Catalog cuts in the attachments are not intended to be exact equipment provided. Equipment shall be similar to catalog cuts and based on design developed after award.

8-1.2 **Design Standards and Codes.** Plumbing system shall be designed and installed in accordance with the latest edition of the International Plumbing Code (IPC) and the references listed below. Inspection and testing of the plumbing system shall be performed as prescribed in the IPC. Specified materials and equipment shall be standard products of a manufacturer regularly engaged in the manufacturer of such products. Specified equipment shall essentially duplicate equipment that has performed satisfactorily **at least two** years prior to bid opening. System design and installation must conform to the following mandatory energy and water conservation criteria.

Code of Federal Regulations Government Printing Office Washington, DC 20402	10 CFR 434 Energy Conservation Program for Consumer Products
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NON-GOVERNMENT PUBLICATIONS

Air Conditioning and Refrigeration Institute (ARI)	ARI 1010 (1994) Self-Contained, Mechanically Refrigerated Drinking-Water Coolers
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American Society of Mechanical Engineers International Three Park Place New York, NY 10016-5990	ASME A112.19.1 (1994; R1999) Enameled Cast Iron Plumbing Fixtures ASME A112.19.2 (1998) Vitreous China Plumbing Fixtures ASME A112.19.3 (1987; R 1996) Stainless Steel Plumbing fixtures (Designed for Residential Use) ASME A112.19.4 (1994; Errata Nov 1996) Porcelain Enameled Formed Steel Plumbing Fixtures ASME B16.22 (1995; B16.22a 1998) Wrought Copper and Copper Alloy Solder Joint Pressure Fittings ASME B16.18 (1984; R 1994) Cast Copper Alloy Solder Joint Pressure Fittings
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American Society of Heating, Refrigerating and Air Conditioning Engineers

1791 Tully Circle. NE
Atlanta, GA 30329-2305

ASHRAE 90.1 (1989; 90.1b; 90.1c; 90.1d; 90.1e; 90.1g; 90.1i 90.11-1995; 90.1m-1995; 90.1n-1997)

Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings

ASHRAE Hdbk-IP (1999)
Handbook, Application I-P Edition

Cast Iron Soil Pipe Institute

CISPI 301 (1997) Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications

CISPI 310 (1997) Coupling for Use in Connection With Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping

CISPI HSN-85 (1985) Neoprene Rubber Gaskets for Hub and Spigot Cast Iron Soil Pipe and Fittings.

Department of the Army
U.S. Army Corps of Engineers
Washington, DC 20314-1000

ETL 1110-3-489, Engineering and Design, Domestic Water Heaters for Barracks, 3 April 1998.

International Association of Plumbing and Mechanical Officials

20001 Walnut Drive South
Walnut, CA 91789-2825

IAPMO Z124.1 (1995) Plastic Bathtub Units

IAPMO Z124.3 (1995) Plastic Lavatories

IAPMO Z124.5 (1997) Plastic Toilet (Water Closets) Seats

IAPMO Z124.9 (1994) Plastic Urinal Fixtures

International Code Council, Inc.

5203 Leesburg Pike, Suite 708
Falls Church, VA 22041-3401

International Plumbing Code (2000)

Unified Facilities Guide Specification (UFGS)

Section 02556, Gas Distribution System, December 2002

Section 13080, Seismic Protection for Miscellaneous Equipment, April 1999

Section 15070A, Seismic Protection for Mechanical Equipment, January 2002

Section 15080A, Thermal Insulation for Mechanical Systems, July 2002

Section 15190A, Gas Piping Systems, March 2003

Section 15400A, Plumbing, General Purpose, May 2003

8-2 APPENDIX AND RECOMMENDATIONS. Plumbing design criteria in general that are stated in any reference, which are either in the appendix, stated as a recommendation or addressed with a "should" shall be considered to be mandatory requirements and will be incorporated into the design.

8-3 DESIGN CALCULATIONS

8-3.1 Hot water heater calculations. Design shall be based on the methods described in **ASHRAE 1999 Applications Handbook**.

Hot water shall be stored at 60 deg. C (140 deg. F) and tempered to provide hot water to the hand sinks and lavatories in the employee toilets at 43 deg. C (110 deg. F). 60 deg. C (140 deg. F) hot water shall be supplied to food preparation sinks, vegetable preparation sink and the pot and pan sink. 82.2 deg (180 deg. F) hot water will be provided to the dishwashers, pot and pan rinse sink and hose bibb at the field feeding equipment room. An electric water heater shall be provided at each location to boost the temperature from 60 deg. C (140 deg. F) to 82.2 deg. C (180 deg. F). Provide a hot water recirculation pump if hot water piping extends further than 15.2 meters (50 feet). Hot water heater and storage systems for the barracks occupancies shall be sized in accordance with ETL 1110-3-489. The hot water and storage systems for the barracks occupancies shall be added to the other hot water demands, including, but not limited to, clothes washers and kitchen areas, to obtain the total hot water demand and storage required.

8-3.2 Piping. Design shall be based on the IPC for domestic water, sanitary waste and vent piping. All water piping shall be sized in accordance with methods outlined in the IPC, to limit water velocity to 2440 mm/sec (8 ft/sec) unless a lower velocity is recommended by the plumbing fixture manufacturer(s).

8-4 EQUIPMENT

8-4.1 Water Heater. Water heater types shall be as indicated in the Attached Concept Design Documents (Drawings, Plumbing Calculations) and shall conform to the requirements in UFGS. Water heaters shall be sized in accordance with paragraph 8.3.1 for a 32 deg. C (90 deg. F) rise. Water heater energy factors shall meet or exceed the minimum requirements of 10 CFR Part 434 and shall be Energy Star or with efficiencies in the upper 25% of what is available.

8-4.2 Storage Tanks. Hot water storage tanks shall be of type as indicated in the Attached Concept Design Documents (Drawings, Plumbing Calculations) and shall conform to the requirements in UFGS. Storage tanks shall be the construction of one manufacturer, AMSE stamped for the working pressure, and shall have the National Board (ASME) registration. The tank shall be cement-lined or glass-lined steel type in accordance with AWWA D100. Tanks shall be equipped with a pressure gauge and thermometer, 155 mm (6 inch) minimum diameter face.

8-4.3 Circulation Pumps. Hot water circulation pumps shall be of type as indicated in the Attached Concept Design Documents (Drawings, Plumbing Calculations) and shall conform to the requirements in UFGS. Pump motors shall be non-overloading at any point on the pump curve. Pump and motor shall be standard mechanically coupled. C-face motors shall not be allowed. Pumps shall be mounted concrete housekeeping pads. Pumps shall be equipped with a pressure gauge 155 mm (6 inch) minimum diameter face on the inlet and discharge of each pump. Pumps shall be provided whenever hot water piping extends further than 50 feet from a tank.

8-4.4 Booster Pumps. Variable speed pumping system shall provide a minimum of 413.7 kPa (60 psi) **at the most remote fixture** by varying speed and number of operating pumps. The factory prepiped and prewired assembly shall be mounted on a steel skid frame complete with pumps, variable speed drives, motors, and controls. The variable speed drives shall be the oil-filled type capable of power transmission

throughout their complete speed range without vibration, noise or shock loading. Each variable speed drive shall be run-tested by the manufacturer for rated performance, and the manufacturer shall furnish written performance certification. System shall have suppressors to prevent noise transmission over electric feed lines. Required electrical control circuitry and system function sensors shall be supplied by the variable speed drive manufacturer. The primary power controls and magnetic motor controllers shall be installed in the controls supplied by the drive manufacturer. The sensors shall be located in the system to control drive speed as a function of constant pump discharge pressure. Connection between the sensors and the variable speed drive controls shall be accomplished with copper wiring. Controls shall be in NEMA 250, Type 1 enclosures.

8-4.5 **Factory authorized supplier.** The equipment shall be furnished by a factory authorized supplier within a distance of 500 miles of the installation site.

8-5 **FIXTURES.** The following fixtures will be acceptable for the facilities on this project except where noted otherwise for specific buildings. Where indicated, fixtures shall be handicap accessible type in accordance by ADAAG. Fixtures shall be water conservation type, in accordance with the IPC. Fixtures shall be provided complete with fittings and chromium- or nickel-plated brass (polished bright or satin surface) trim. All fixtures, fittings and trim in the project shall have the same finish.

8-5.1 **Requirements.** Vitreous china plumbing fixtures shall conform to ASME A112.19.2, Vitreous China Plumbing Fixtures. Stainless steel fixtures shall be in accordance with ASME A112.19.3, Stainless Steel Plumbing fixtures (residential design). Plastic fixtures shall conform to IAPMO Z124. Enameled cast iron plumbing fixtures shall comply with ASME A112.19.1, and enameled steel fixtures shall comply with AMSE A112.19.4.

8-5.2 **Traps.** Exposed traps shall be chromium-plated, adjustable-bent tube, 20-gauge brass. Concealed traps may be plastic (ABS).

8-5.3 **Faucets.** Faucets, other than faucets provided for the dining facility, shall be single-control type, with seals and seats combined in one replaceable cartridge designed to be interchangeable among lavatories and kitchen sinks, or having replaceable seals and seats removable either as a seat insert or as part of a replaceable valve unit. Water flow shall be no more than 0.158 L/s (2.5 GPM) from any faucet.

8-5.4 **Showers.** Showers shall be equipped with a combination valve and flow control device to limit the flow to 0.158 L/s (2.5 GPM) at pressures between 137.9 to 413.7 kPa (20 and 60 psi).

8-5.5 **Water closets.** Water closets shall have elongated bowl with flush tank, floor outlet with wax gasket and open-front seat. An adequate quantity of water shall be provided to flush and clean the fixture served. The water supply to flush tanks equipped for manual flushing shall be controlled by a float valve or other automatic device designed to refill the tank after each discharge, and to completely shut off the water flow to the tank when the tank is filled to operational capacity. Water closets having their flush valve seat located below the flood level rim of the closet bowl shall have a ballcock installed within a sheath or in a separate and isolated compartment of the tank, both to have visible discharge onto the floor in case of failure. Provision shall be made to automatically supply water to the fixture so as to refill the trap seal after each flushing.

8-5.6 **Urinals.** Urinals shall be flush valve, wall mounted type and shall meet the requirements of the code.

8-5.7 **Lavatories.** Lavatories shall be rectangular type, minimum 508 by 457 mm (20 by 18 inches). Lavatories shall be vitreous china or cast iron, self-rimming or wall hung type. Lavatories shall be furnished with hot and cold water and have pop-up drains. Lavatories shall meet the requirements of the code.

8-5.8 **Shower Enclosures.** Shower stalls shall be of ceramic tile, floor to ceiling, over membrane **waterproofing on a cementitious substrate;** . **Shower** receptors shall be slip resistant cast stone. Shower stall wainscots shall be ceramic tile.

8-5.9 **Kitchen sinks.** Kitchen sinks, other than sinks provided for the dining facility, shall be Type 302 stainless steel, 20-gauge minimum, seamless drawn and sound deadened. Sinks shall be single or multiple bowl with self-rimming, complete with cup strainer and plug. Kitchen sinks shall meet the requirements of the code. Kitchen sinks shall be provided with a garbage disposer. Garbage disposer shall have a minimum capacity of 0.75 kW (1 HP), 1.48 L (50 oz.) grind chamber, stainless steel grind chamber and grind elements, corrosion protection shield and two-way grinding action.

8-5.10 **Service sinks.** Service sinks shall meet the requirements of the code.

8-5.11 **Electric water coolers.** Units shall be electric refrigerated type and shall conform to the requirements of ARI 1010 and the Lead Contamination Control Act of 1988.

8-5.12 **Handwash sink.** For the handwash area, provide 2 each, 4 station wall mounted wash sink of stainless steel construction, cold water only.

8-6 PIPING SYSTEMS. Piping shall be concealed. Individual shutoff or stop valves shall be provided on water supply lines to each plumbing fixture, piece of equipment except showers and on takeoffs from risers to each floor. Shutoff valves shall be provided for each bathroom group. Pipe and fittings shall be as follows:

8-6.1 **Water piping.** System design, component selection and system installation, including pressure containing parts and material, shall be based upon a minimum service pressure of 862 kPa at 66 degrees C (125 psi at 150 degrees F); minimum ANSI Class 125.

8-6.1.1 Cold water aboveground. Water piping above grade shall be hard-drawn copper tubing, Type K or Type L.

8-6.1.2 Hot water aboveground. Water piping above grade shall be hard-drawn copper tubing, Type K or Type L.

8-6.1.3 Cold water below ground. Water piping below ground shall be in accordance with Chapter 4 Site Engineering.

8-6.1.4 Hot water below ground. Provide prefabricated insulated pipe and fittings. Foam insulation for prefabricated insulated pipe and fittings shall be polyurethane foam meeting the requirements of ASTM C 591 having a density of not less than 32 kg per cubic meter (2 pcf). Carrier pipe shall be in accordance with Chapter 4 Site Engineering.

8-6.1.5 Fittings for soft copper tubing shall conform to ASME B16.18 and for hard-drawn to ASME B16.22.

8-6.2 **DWV piping.** Soil, waste, vent and drain piping shall be service weight cast iron pipe except for piping serving beverage areas in the dining facility. Provide high silicon content cast iron pipe and fittings, for beverage areas.

8-6.2.1 Underground piping and fittings shall be hub pipe, ASTM A 74.

8-6.2.2 Aboveground piping and fittings shall be no-hub, CISPI 301 and ASTM A 888, or hub pipe, ASTM A 74.

8-6.2.3 Provide high silicon content cast iron pipe and fittings, ASTM A518A and ASTM A518M, on branch lines from beverage areas and other areas handling carbonic acid to the building sewer drain line. Provide sufficient high silicon content cast iron pipe so that carbonic acid waste can be diluted by the other building waste as to prevent corrosion of the piping.

8-6.2.4 A waiver from TI 800-01, Appendix C, paragraph 19b to allow sanitary sewer lines above the dining facility in Quad C has been granted by HQ USACE as long as the following requirements are met:

1. All openings through floors over the dining facility shall be provided with sleeves securely bonded to the floor construction and projecting not less than 3/4 inch above the top of the finished floor with space between sleeve and pipe or duct sealed.
2. Floor and shower drains installed over the dining facility shall be equipped with integral seepage pans.
3. Floor and shower drains installed above the dining facility shall be of the wall mounted type except bathtubs. Tubs shall have waste and overflow connections made above the floor piped to the trap below the floor. Connections through floors and traps shall conform with the International Plumbing Code. No floor openings, other than sleeve for waste pipe, will be permitted for tubs.
4. All other soil or drain pipes shall be as indicated in this statement of work. Cleanouts shall be extended through the floor construction above.
5. Soil and drain pipes located above the dining facility shall be subjected to a standing water test of not less than 25 feet.
6. Piping subject to operation at temperatures that will form condensation on the exterior of the pipe shall be thermally insulated.
7. Where pipes are installed in ceilings above the dining facility, the ceiling shall be of the removable type, or shall be provided with access panels in order to form a ready access for inspection of piping.

8-6.3 **Gas piping.**

8-6.3.1 Underground gas piping shall be polyethylene pipe, ASTM D 3350 and ASTM D 2513, or fiberglass pipe, ASTM D 2517, and be installed in accordance with UFGS.

8-6.3.2 Aboveground gas piping shall be seamless galvanized steel pipe, ASTM A53, Type S, Grade B, and be installed in accordance with UFGS.

8-7 **MISCELLANEOUS ITEMS**

8-7.1 **Cleanouts.** Cleanouts shall be provided at each change in direction of sanitary sewer lines, at the intervals specified in the NSPC and at the building service entrance. All cleanouts shall be permanently accessible. Cleanouts-to-grade shall be installed in a 305 by 305 mm (12 by 12 inch) concrete pad, flush with grade. Wall and floor types shall be provided as required by the code. Access panels or cover plates shall be provided in exposed areas.

8-7.2 **Hose bibbs.** Hose bibbs shall be provided at each exterior face of the building and shall be no more than 30 meters (100 feet) apart. Hose bibbs shall be supplied with an integral vacuum breaker.

8-7.3 **Backflow preventers.** Backflow preventers shall be provided as required by the code.

8-7.4 **Grease Traps.** Grease interceptor shall be pre-cast concrete, HS20 vehicular traffic rated, complete with cast iron manhole frames and airtight covers. Grease interceptor shall meet or exceed ASTM C 1227-02b. Manholes shall be a minimum of 609 mm (24 inches) in diameter. All waste from the first floor of Building 357, except from toilet areas, shall be piped to grease traps.

8-8 PIPE INSULATION. Minimum insulation thicknesses and performance shall be in accordance with UFGS.

8-8.1 **Domestic service hot water piping.** Aboveground domestic service hot water pipe mains and laterals shall be insulated with rigid fiberglass type insulation in accordance with UFGS. Below grade domestic service hot water pipe mains and laterals which are not prefabricated, insulated pipe, shall be insulated with cellular glass type insulation in accordance with UFGS. Hot water drops to fixtures located in walls are not required to be insulated.

8-8.2 **Equipment.**

8-8.2.1 Hot water storage tanks. Hot water storage tanks shall be insulated with cellular glass type insulation in accordance with UFGS.

8-8.2.2 Hot water circulation pumps. Hot water circulation pumps shall be insulated with cellular glass type insulation in accordance with UFGS.

CHAPTER 10

HEATING, VENTILATING, AND AIR CONDITIONING

10-1 GENERAL REQUIREMENTS

10-1.1 **Heating, Ventilating and Air Conditioning (HVAC) scope.** The HVAC requirements for the project, as indicated in this Chapter, are generally contained within this chapter unless otherwise noted. Other HVAC scope indicated by other Chapters and the Attached Concept Design Documents (Drawings, HVAC Calculations), which are to be used for the design of this project, are subject to requirements in this section. **The attached concept design documents are provided for information only unless otherwise indicated.** All requirements within this Chapter shall take precedence over any conflicting requirement in other Chapters, Attachment Concept Design Documents or any other criteria and shall be brought to the attention of the Contracting Officer for resolution in writing. All definitions and acronyms used in this section are intended to be used for this section only unless otherwise noted. Catalog cuts in the attachments are not intended to be exact equipment provided. Equipment shall be similar to catalog cuts and based on design developed after award.

10-1.2 **Design Standards and Codes.** HVAC systems shall be designed and installed in accordance with Title 10 CFR Part 434, current versions of the International Mechanical Code and the references listed below.

NON-GOVERNMENT PUBLICATIONS:

Air Movement and Control Association
30 W. University Drive
Arlington Heights, IL 60004-1893

AMCA 210 (1985)
Laboratory Methods of Testing Fans for Rating

Air Conditioning and Refrigeration Institute
4301 North Fairfax Drive
Arlington, VA 22203

ARI 880 (1998)
Air Terminals

American Bearing Manufacturers Association
1200 19th Street, NW
Washington, DC 20036-4303

AFBMA Std 9 (1990)
Load Ratings and Fatigue Life for Ball Bearings
AFBMA Std 11 (1990)
Load Ratings and Fatigue Life for Roller Bearings

American Society for Testing and Materials
100 Bar Harbor Drive
West Conshohocken, PA 19428-2959

ASTM B 88 (1999) Seamless Copper Water Tube
ASTM B 117 (1997) Operating Salt Spray (Fog) Apparatus
ASTM B 280 (1998) Seamless Copper Tube for Air
Conditioning and Refrigeration Field Service
ASTM C 534 (1999) Preformed Flexible Elastomeric Cellular
Thermal Insulation in Sheet and Tubular Form
ASTM C 547 (1995) Mineral Fiber Pipe Insulation

SOW 10-1
(Am-0004)

	ASTM C 552 (1991) Cellular Glass Thermal Insulation
	ASTM C 553 (1999), Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
	ASTM C 591 (1994) Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation
	ASTM C 612 (2000) Mineral Fiber Block and Board Thermal Insulation
	ASTM C 1126 (1998) Faced or Unfaced Rigid Cellular Phenolic Thermal Insulation
	ASTM E 84 (2000) Surface Burning Characteristics of Building Materials
American Society of Heating, Refrigerating and Air Conditioning Engineers 1791 Tully Circle. NE Atlanta, GA 30329-2305	ASHRAE 90.1 (1989; 90.1b; 90.1c; 90.1d; 90.1e; 90.1g; 90.1i 90.11-1995; 90.1m-1995; 90.1n-1997) Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings
	ASHRAE Hdbk-IP (2001) Handbook, Fundamentals I-P Edition
	ASHRAE 15 (1994) Safety Code for Mechanical Refrigeration
	ASHRAE 34 (1997) Number Designation and safety Classification of Refrigerants
	ASHRAE 52.1 (1992) Gravimetric and Dust-Spot Procedures for Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter
	ASHRAE 62 (2001) Ventilation for Acceptable Indoor Air Quality
Associated Air Balance Council 1518 K Street NW, Suite 708 Washington, DC 20005	AABC MN-1 (1989) National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems
Manufacturers Standardization Society of the Valve and Fittings Industry	MSS SP-58 (1993) Pipe Hangers and Supports - Materials, Design and Manufacture MSS SP-69 (1996) Pipe Hangers and Supports - Selection and Application
National Environmental Balancing Bureau 8575 Grovemont Circle Gaithersburg, MD 20877-4121	NEBB Procedural Stds (1991) Procedural Standards for Testing Adjusting Balancing of Environmental Systems
National Fire Protection Association One Batterymarch Park Quincy, MA 02269-9101	NFPA 90A (1993) Installation of Air Conditioning and Ventilating Systems

Quincy, MA 02269-9101

NFPA 96 (2001)
Standard for Ventilation Control and Fire Protection of
Commercial Cooking Operations

NFPA 255 (1996) Method of Test of Surface Burning
Characteristics of Building Materials

Sheet Metal and Air Conditioning
Contractor's National Association

SMACNA HVAC Duct Const Stds (1995; Addenda Nov 1997)
HVAC Duct Construction Standards - Metal and Flexible

PO Box 221230
Chantilly, VA 20153-1230

Underwriters Laboratories
333 Pfingsten Road
Northbrook, IL 60062-2096

UL 181 (2002) Standard for Safety for Factory-made Air
Ducts and Air Connectors

UL 507 (1999) Electric Fans

UL 555 (1999) Fire Dampers

UL 1995 (1995; Rev thru Aug 1999)
Heating and Cooling Equipment

Unified Facilities Guide Specification (UFGS)

Section 02555, Underground Heating/Cooling Distribution
System, December 2001

Section 13080, Seismic Protection for Miscellaneous
Equipment, April 1999

Section 14210A, Elevators, Electric, August 2001

Section 15070A, Seismic Protection for Mechanical
Equipment, January 2002

Section 15080A, Thermal Insulation for Mechanical Systems,
July 2002

Section 15181A, Chilled and Condenser Water Piping and
Accessories, February 2003

Section 15182A, Refrigerant Piping, February 2003

Section 15620A, Liquid Chillers, June 2002

Section 15645A, Cooling Tower, December, 2001

Section 15652A, Cold Storage Refrigeration Systems,
December 2001

Section 15700A, Unitary Heating and Cooling Equipment,
December 2001

Section 15951A, Heating, Ventilating and Air Conditioning
(HVAC) Control Systems, December 2001

Section 15990A, Testing, Adjusting, and Balancing of HVAC
Systems, April 2003

Section 15995A, Commissioning of HVAC Systems, December
2001

US Army Corps of Engineers, HQ
 Engineering and Construction Division
 Directorate of Military Programs
 Washington, DC 20314-1000

TI 800-01, Technical Instructions, Design Criteria, 20 July 1998

TI 810-32, Technical Instructions, Heating and Cooling Distribution Systems, 10 January 2002

10-2 APPENDIX AND RECOMMENDATIONS. HVAC design criteria in general that are stated in any reference, which are either in the appendix, stated as a recommendation or addressed with a “should” shall be considered to be mandatory requirements and will be incorporated into the design.

10-3 DESIGN CALCULATIONS

10-3.1 **Heat loss and heat gain calculations.** Heating and cooling loads shall be in accordance with the current edition of the ASHRAE Handbook of Fundamentals and be based on actual building envelope, fixtures and equipment provided. Computer-generated load calculations shall be provided and shall include complete input data and output summaries. Equipment shall be sized to meet the total, sensible and latent loads determined by the computer calculation. Equipment may be oversized to no more than 15 percent of the computer generated load. For cooling load calculations, the design shall be based on the 2.5 percent weather data in TM 5-785. In addition to calculating the cooling load at maximum design temperature, cooling load calculations or thermal simulations should also be made for low load conditions to determine the greatest dehumidification load that may be encountered. The design shall maintain relative humidity in the spaces to between 35% and 65% relative humidity except as otherwise notated. Sufficient cooling shall be provided to maintain the following space temperatures.

Type of Space*	Indoor Space Temperature (°F)	Indoor Space Temperature (°C)	Remarks
Offices, Administration, Waiting Rooms	75	24	
Telecom, Comm Storage, Electronic Switch Rooms	72	22	
Arms Vaults	75	24	Maintain relative humidity between 35% and 55%
Equipment Maintenance Rooms	75	24	
Classrooms	75	24	
Specialty Storage	75	24	
Billeting, Game Rooms	75	24	
Dining Room	75	24	
Kitchen, Dishwashing	85	29	
Other Air Conditioned Rooms	75	24	
Restrooms, Toilets, Laundry Rooms, Janitor Rooms			Served by transfer air, 100% exhausted to outside
General Storage			Served by transfer air, 100% exhausted to outside

*Note: See attached calculations and drawings for rooms to be air conditioned.

10-3.1.1 **Load design criteria.** The internal loads shown in the Attached Concept Design Documents (Drawings, HVAC Calculations) shall be used as a starting point in the calculations in the design after award. Internal loads used in the final computer-generated load calculations shall be determined by occupant survey and furniture and equipment layout. Calculations submitted shall include, but not be limited to, input data used in determining the computer-generated load calculations.

10-3.1.2 **Schedule.** The heating and air conditioning calculations shown in the Attached Concept Design Documents (Drawings, HVAC Calculations) shall be used as a starting point to determine zoning characteristics of the air conditioning systems. Schedules used in the final computer-generated load calculations shall be determined by survey and discussion with the occupants.

10-3.2 **Ventilation air.** Calculations determining minimum outside ventilation air and exhaust shall be provided. Ventilation air shall be provided to each building space and shall be in accordance with the current edition of ASHRAE 62. In addition, outside air quantities shall be sufficient to maintain positive or negative pressure relative to adjacent spaces.

10-3.3 **Piping calculations.** Calculations shall be provided for pressure drop calculations for all piping systems. Water velocity through pipes shall be limited to 2440 mm/sec (8 ft/sec) unless a lower velocity is recommended by the HVAC equipment manufacturer(s). An isometric diagram of the water system shall be included in the design after award submittal.

10-3.4 **Duct calculations.** Calculations shall be provided for sizing all duct systems, including static pressure drop calculations for all fans. Air velocity through ductwork shall be limited to 7.62 m/s (1500 ft/min). Ductwork layout drawings shall be provided to indicate all fittings and devices to substantiate calculations.

10-3.5 **Outside air.** Where the outside air requirements are a significant part of the cooling load, the use of desiccant cooling, enthalpy wheels and similar devices for conditioning the outside air and transferring latent and sensible heat to the exhaust air shall be considered. Units shall be appropriately sized to eliminate or minimize the latent load in the conditioned space to save significant energy and increase the comfort level.

10-4 MECHANICAL SYSTEMS

10-4.1 **Air conditioning systems.** The buildings shall be provided with central air conditioning systems. Systems shall be designed, installed, balanced and adjusted to distribute cooling to all occupied spaces, server, telecommunication and computer rooms. Air conditioning systems shall have ducted supply and return air distribution as indicated.

10-4.2 **Exhaust systems.** Provide individual ceiling mounted fans for toilet exhausts. Provide individual ceiling mounted fans for general exhaust systems. Provide individual thermostatically controlled exhaust fans for laundry rooms, mechanical/electrical rooms and other spaces where ventilation only is required. Provide exhaust hoods individually and directly ducted to the exterior for all residential type ranges and cooking surfaces.

10-4.3 **Features.** Equipment provided shall have the features described below. Mechanical equipment shall be located and be of minimum capacities indicated in the Attached Concept Design Documents (Drawings, HVAC Calculations).

10-4.4 **Factory authorized supplier.** The equipment shall be furnished by a factory authorized

supplier within a distance of 500 miles of the installation site.

10-5 CENTRAL COOLING EQUIPMENT. Minimum equipment efficiencies shall be in accordance with DOE Buying Energy Efficient Products Recommendations (refer to www.eren.doe.gov/femp/procurement for recommended efficiencies) or Energy Star. Design shall be in accordance with TI 800-01 including, but not limited to, paragraphs referring to providing multiple chillers for systems with cooling capacities over 350 kW (100 tons). Central cooling equipment shall be provided in locations indicated and with minimum capacities as indicated.

10-5.1 Chiller.

1. Chiller shall include the following quality characteristics.
 - a. Chiller performance shall be rated in accordance with ARI Standard 550.
 - b. Equipment and installation shall be in compliance with ANSI/ASHRAE 15.
 - c. Cooler and condenser shall include ASME "U" stamp and nameplate certifying compliance with ASME Section VIII, Division 1 code for unfired pressure vessels.
 - d. Chiller shall be manufactured in a facility that has been registered by UL to the ISO 9000 Series Standards for quality.
 - e. Chiller shall be designated and constructed to meet UL requirements and shall have labels appropriately affixed.
 - f. Each compressor assembly shall undergo a mechanical run-in test to check proper operation of components and to verify that vibration levels, oil pressures/temperatures and efficiencies are within acceptable limits. Each compressor assembly shall be pneumatically proof tested at 2792 kPa (405 psig) and leak tested with a tracer gas at 1151 kPa (225 psig).
 - g. Both cooler and condenser shall be proof tested at 2586 kPa (375 psig) on the refrigerant side and leak tested with a refrigerant gas at 2086 kPa (300 psig). The water side of each heat exchanger shall be hydrostatically tested at 1.5 times rated working pressure.
 - h. The entire chiller assembly shall be leak tested with a refrigerant tracer gas.
2. Compressor variable frequency drive (VFD) motor and controls shall have the following characteristics.
 - a. Input power shall be as indicated. Voltage may vary by +/- 10%. Motor base frequency shall be 60 +/- 2 Hz. Motor design speed shall be 3550 RPM. Output frequency range shall be between 65% and 100% motor speed.
 - b. The VFD shall be capable of 100% full load continuous output.
 - c. Minimum drive efficiency shall be 97% at motor base speed and rated torque. Losses shall include all control power and cooling system losses associated with the drive. Displacement power factor shall be 95% throughout the entire operating speed range as measured at the drive input terminals.

- d. Fixed utility power (voltage and frequency) shall be converted to a variable voltage and frequency. The drive shall consist of three basic power sections. The first, a converter section consisting of a full-wave fixed diode bridge rectifier, shall convert incoming fixed voltage/frequency to a fixed DC voltage. The second section, a DC Link, shall filter and smooth the converted DC voltage. The third section, a transistorized inverter and control regulator, shall convert the fixed DC voltage to a sinusoidal wave, pulse width modulated (PWM) waveform.
 - e. The drive shall employ PWM modulation to minimize motor heating. An asynchronous carrier shall be employed to eliminate torque pulsations. Switching frequency shall be adjustable at 2, 4 or 8 kHz.
 - f. A DC Link reactor shall be included for each rating to minimize harmonic distortion and maximize input power factor.
 - g. The drive shall be housed in a unit-mounted cabinet, formed, assembled, front accessible and braced, general-purpose indoor enclosure rated NEMA 1.
 - h. Enclosures shall be single bay, sheet steel with hinged access doors and a lockable, through-the-door handle operator mechanism.
 - i. Construction safety features shall include:
 - Provisions to padlock main disconnect handle in the "OFF" position.
 - Mechanical interlock to prevent opening cabinet door with disconnect in the "ON" position or moving disconnect to the "ON" position while the door is open.
 - Warning signs on terminals that are energized with the power disconnect "OFF".
 - j. Chiller oil pump branch fused disconnect shall be provided.
 - k. The operator interface shall be at the main chiller control panel. The panel shall consist of a door mounted back-lit LCD display, capable of controlling the drive and chiller settings for proper drive operation. The drive parameters will be preset in the factory using the keypad on the door of the drive.
3. Cooler and Condenser.
- a. Cooler and condenser shall be of the shell and tube type construction, each in separate shells. Units shall be fabricated with high-performance tubing, steel shell and tube sheets. Waterboxes shall be nozzle-in-head type with nozzles either flanged or with grooves to allow for use of grooved couplings.
 - b. Tubing shall be copper, high-efficiency type, with integral internal and external enhancement.
 - c. Cooler and condenser shall display ASME nameplates that show pressure and temperature data and the "U" stamp for ASME Section VIII, Division 1.
 - d. Tubes shall be individually replaceable from either end of the heat exchanger without affecting the strength and durability of the tube sheet and without causing leakage in adjacent tubes.

4. Refrigerant Flow Control. Liquid refrigerant from the condenser shall be metered using a direct acting, float-type metering valve to maintain the proper liquid level of refrigerant in the heat exchangers under both full and part load operating conditions. By maintaining a liquid seal at the flow valve, bypassed hot gas from the condenser to the cooler is eliminated. The float valve chamber shall have a bolted access cover to allow field inspection, and the float valve be field serviceable. Fixed orifices shall not be acceptable.
5. Controls. The chiller shall be provided with a factory installed and wired microprocessor control system with individually replaceable modular component construction. Components included shall be the main processor/input-output module, power supply, starter management module, relay board, temperature and pressure sensors and all necessary auxiliary devices required for proper operation.
6. Control functions. The chiller controls shall be configurable for manual or automatic start-up and shutdown (scheduling). The controls shall provide the capability to view and change the leaving chilled water setpoint, entering chilled water setpoint and demand limit setpoint.
7. Safeties. Unit shall automatically shutdown when any of the following conditions occurs.
 - a. Motor overcurrent
 - b. Over voltage
 - c. Under voltage
 - d. Single cycle dropout
 - e. Low evaporator refrigerant temperature
 - f. High condenser pressure
 - g. High motor temperature
 - h. High compressor discharge temperature
 - i. Low oil pressure
 - j. Low oil level
 - k. Loss of cooler water flow
 - l. Loss of condenser water flow
 - m. Start fault
 - n. High oil filter differential pressure
 - o. Out-of-range sensors
 - p. Excessive starter transition time
 - q. Motor current signal loss
 - r. Motor power supply phase reversal
 - s. Temperature sensor and transducer faults
 - t. Single cycle dropout
 - u. Motor running in reverse
 - v. Motor running without control authorization
8. Insulation. Chilled water piping and cooler waterboxes shall be insulated.
9. Vibration isolation. Chiller shall be mounted on factory provided spring isolators.
10. Motors. Three phase motors of 1 HP or larger shall be premium efficiency electric motors. Motors shall have TEFC type enclosures.

10-5.1.1 **Hermetic screw liquid chiller.** Microprocessor-controlled liquid chiller using a twin rotor, direct drive, semi-hermetic, screw compressor.

1. Compressor.
 - a. One positive displacement field-serviceable helical, rotary, semi-hermetic, twin rotor-type compressor. Compressor section joints shall be sealed using O-rings instead of gaskets to reduce the occurrence of refrigerant leakage.
 - b. The compressor casing shall be cast-iron with design pressure rating of 2068 kPa (300 psig) or higher.
 - c. Bearings shall be pressure lubricated rolling element type, AFBMA Class 5 or superior.
 - d. Discharge oil separation shall be accomplished external to the compressor casing. Oil separator and return system shall be designed to ensure that oil is adequately returned to the compressor and does not collect in the heat exchangers.
 - e. Compressor safeties shall include high compressor discharge temperature, high motor winding temperature, low oil pressure, reverse rotation and high discharge pressure.
 - f. Compressor shall be equipped with internal pressure relief to protect against overpressure. For compressors not equipped with internal pressure relief, the high side of the chiller shall be protected with an external relief valve capable of passing the full load flow produced by the compressor.
 - g. Compressor shall be provided with a lubrication system to deliver oil under pressure to the bearings.
 - h. Compressor shall be fully field serviceable. Compressors which must be removed and returned to the factory for service shall not be acceptable.
2. Capacity control. Capacity control shall be by means for hydraulically operated slide valve under the compressor rotors. Load modulation shall be from 100% to 10% of compressor full load under normal ARI conditions without the use of hot gas bypass. The slide valve shall be precisely positioned by a proportional-integral-derivative (PID) control algorithm to ensure precise control of desired chilled water temperature without hunting or overshooting the setpoint.

10-5.1.2 **Hermetic centrifugal liquid chiller.** Microprocessor-controlled liquid chiller using a single stage, semi-hermetic, centrifugal compressor.

1. Compressor.
 - a. Impeller shall be open type with machined shroud contours.
 - b. Compressor, motor and transmission shall be hermetically sealed into a common assembly and arranged for easy field servicing. Internal compressor parts shall be accessible for servicing without removing the compressor base from the chiller. Connections to the compressor casing shall use O-rings instead of gaskets to reduce the occurrence of leakage. Connections to the compressor shall be flanged or bolted for easy disassembly.
 - c. Journal bearings shall be of the steel-backed, Babbitt lined type or roller element bearings.

- d. Transmission shall be single ratio, single helical, parallel shaft speed increaser. Gears shall conform to AGMA Standards, Quality II.
 - e. Compressor shall be provided with a lubrication system to deliver oil under pressure to the bearings.
 - f. Compressor shall be fully field serviceable. Compressors which must be removed and returned to the factory for service shall not be acceptable.
2. Capacity control. Capacity control shall be by means of variable inlet guide vanes located at the impeller inlet. Load modulation shall be from 100% to 15% of compressor full load under normal ARI conditions without the use of hot gas bypass. The guide vanes are precisely positioned by a PID (proportional-integral-derivative) control algorithm to ensure precise control of desired chilled water temperature without hunting or overshooting the setpoint.

10-5.2 **Cooling Towers.** Towers shall be the induced mechanical draft type and shall be certified by the Cooling Tower Institute (CTI). Towers shall be factory fabricated and assembled, shipped to the job site in separate cells or modules and shall be provided with all appropriate manufacturer's hardware for assembly in the field. Towers shall be assembled and adjusted at the job site by a factory representative.

1. Framework, Casing, Supports and Foundation.
 - a. Towers shall be designed and constructed to withstand a wind pressure of not less than indicated in the IBC. Framework, structural supports and equipment supports shall be Type 304 stainless steel. Casing shall be constructed of Type 304 stainless steel.
 - b. Foundations shall meet the requirements of the cooling tower manufacturer and be seismically designed in accordance with the IBC. Foundation design shall be based on the load calculations and the soil bearing value indicated. Foundation calculations shall be submitted with the equipment drawings.
2. Stairways and Ladders. Provide stairs, 60 degree ship ladders or straight-rung ladders of standard design, starting at ground level or at roof level, if the roof is accessible, and extending as high as required to gain access to fan decks and water distribution systems. Stairways and ladders shall be hot-dipped, zinc-coated steel. Ladders higher than 3.66 meters (12 feet) shall have a safety cage.
3. Handrailings. Steel handrailings shall be not less than 1067 mm (42 inches) high around the exterior of each working surface that is 3.66 meters (12 feet) or more above the ground, roof, or other supporting construction. Railings shall not be smaller than 32 mm (1-1/4 inch) zinc-coated steel pipe with standard zinc-coated steel railing.
4. Access doors. Each tower shall be provided with access doors at grade or roof level, if the roof is accessible, to provide entry to the interior for service maintenance without removal of the fill. Doors shall be provided on each endwall of each cooling tower cell. Frame and brace access doors to prevent damage when opening and closing. Doors shall be located adjacent to float controls.
5. Louvers. Air inlets for each cooling tower shall be provided with individually removable louvers arranged to prevent the escape of water. Louvers shall be Type 304 stainless steel.

Materials provided for casings and louvers shall be compatible; one material shall not produce stains upon the other. Air intakes shall be provided with 25 mm (1 inch) zinc-coated steel mesh.

6. Fan deck and cylinder. Each fan shall be mounted in a fan cylinder (or stack) to elevate the fan discharge air. Total extension height shall not exceed the fan diameter. Each fan cylinder shall be provided with a zinc-coated steel 2.75 mm (12 gauge) wire mesh securely mounted to the top of the cylinder in accordance with manufacturer's recommendations. Fan decks shall be designed to withstand a live load of not less than 1.9 kPa (40 psf) in addition to the concentrated or distributed loads of equipment mounted on the fan decks. Fan deck and cylinders shall be constructed of Type 304 stainless steel and be compatible with the entire tower construction.
7. Fans shall be propeller type, constructed of Type 304 stainless steel. Fans shall be variable speed or 2-speed. Variable speed drives shall be as specified in paragraph 10.6 Air Distribution. Propeller type shall have a maximum tip speed of 55 m/s (11,000 fpm). Fan blade assembly shall be both statically and dynamically balanced after assembly of the cooling tower. Fan hub shall be constructed of stainless steel. Complete fan assembly (fan and mounting) shall be designed to give maximum fan efficiency and long life when handling saturated air at high velocities. Each cooling tower fan shall be provided with a ball and pedestal type vibration limit switch which shall stop the corresponding fan motor in the event of sensing excessive fan vibration.
8. Speed reducer gears and drive shaft. Speed reducer gears shall be rated in accordance with CTI Std-111. Gear reducers shall be of the spiral bevel, single reduction, spiral or helical, double reduction type. Reducer shall be mounted in accordance with manufacturer's recommendations. Each reducer shall be provided with an oil level cutoff switch interlocked to the fan motor. Each reducer shall be provided with an oil level sight glass, fill, drain and vent lines located in a readily accessible position. Drive shafts shall be the full floating type with flexible couplings at both ends and have a service factor of 1.0 or greater. Drive shafts shall be of stainless steel, fitted each end with flexible coupling (stainless steel plate type). Each drive shaft shall be provided with a galvanized steel guard, to prevent damage to surrounding equipment in case of shaft failure. Provision shall be made for lubrication of all bearings. Bearings shall be accessible to the extent that each bearing can be lubricated without dismantling the fan.
9. Fan motors. Each motor shall be single speed, totally enclosed, insulation Class B, NEMA Design B, continuous-rated type which conforms to NEMA MG 1. Fan motors shall have totally enclosed enclosures and be located outside the discharge airstream. Motors shall be mounted according to manufacturer's recommendations. Motors of 1 HP or greater shall be premium efficiency. Motors shall have TEFC type enclosures.
10. Hardware. Bolts shall be Type 304 stainless steel. Each bolt shall be provided with neoprene and cadmium-plated steel washers under the heads. Nails shall be stainless steel. Hardware shall meet the salt-spray fog test as defined by ASTM B 117.
11. Cold water basin. Basin shall be completely watertight and constructed of Type 304 stainless steel. Basin shall be constructed and installed to ensure that air will not be entrained in outlets when operating and no water will overflow on shutdown. Each individual sump shall be provided with an individual outlet. Each outlet shall be provided with a 1/2 inch mesh, zinc-coated steel wire securely mounted to prevent rash from entering the outlet. Each basin shall be provided with overflow and valved drain connections. Each basin shall be provided with a float-controlled, makeup water valve. The makeup water shall

discharge not less than 50 mm (2 inches) or two pipe diameters, whichever is greater, above the top of the basin.

12. Water distribution system. Water distribution shall be the gravity-flow type system which distributes water evenly over the entire fill surface. Each tower cell shall be designed so that a water flow of 140 percent capacity will not cause overflowing or splashing. The distribution system for each cell shall include adjustable flow control valves. The entire distribution system shall be self-draining and nonclogging. Piping shall be either cast iron, ductile iron, threaded-glass-fiber reinforced epoxy pipe, polypropylene, or Schedule 80 black steel. System shall be provided with open basins which includes a splash box or baffles to minimize splashing of incoming water and holes or spray nozzles that evenly distribute the water over the entire decking areas. Holes shall be provided with ceramic or plastic orifice inserts. Spray nozzles shall be stainless steel, bronze or polypropylene. Nozzles shall be cleanable, nonclogging, removable and spaced for even distribution.
13. Drift eliminators. Eliminators shall be provided to limit drift loss to not over 0.005 percent of the circulating water rate.
14. Fill. Tower fill shall be splash or film, type. Fill material shall be free to expand or contract without warping or cracking. No plasticized wood cellulose shall be provided for fill material. Fill shall be removable or otherwise made accessible for cleaning. Space supports shall be stainless steel and shall prevent warping, sagging, misalignment or vibration of the fill material. Fill material and supports shall be designed to provide for an even mixing of air and water. Fill material shall be constructed of aluminum, stainless steel, tile or multi-cell set without mortar or zinc-coated steel. Fill shall conform to UFGS.
15. Noise control. Sound power level data for the cooling tower shall be based on tests conducted in accordance with ANSI S1.13. Provide noise control to meet maximum sound level indicated.

10-5.3 **Pumps.** Pumps shall be electrically driven, non-overloading, centrifugal type which conform to HI 1.1-1.5. Pump shall have sufficient capacity and selected based on the design after award. Pumps shall be selected at or within 5 percent of peak efficiency. Pump curve shall rise continuously from maximum capacity to shutoff. Pump motor shall conform to NEMA MG 1 and have sufficient wattage (horsepower) to be non-overloading at any point on the pump curve. Three phase motors of one 1 HP or greater shall be premium efficiency. Motors shall have TEFC type enclosures. Pump motor shall be equipped with an across-the-line magnetic controller in a NEMA rated enclosure appropriate for environment located. Enclosure shall have a "HAND-OFF-AUTO" switch in the cover. Pump speed shall not exceed 1,750 rpm. Pump shall be accessible for servicing without disturbing piping connections. A wye or basket strainer shall be provided at the inlet of each pump. A check valve shall be provided at the outlet of each pump. Provide a standby chilled water pump and standby condenser water pump for each chilled water plant that has these pumps. This will provide redundancy in case one pump is out for either system.

10-5.3.1 **Construction.** Shaft seal shall be mechanical-seal type. Impeller shall be statically and dynamically balanced. Each pump casing shall be designed to withstand the discharge head specified plus the static head on the system plus 50 percent of the total, but not less than 862 kPa (125 psig). Pump casing shall be close grained cast iron. High points in the casing shall be provided with manual air vents; low points shall be provided with drain plugs. Impeller, impeller wearing rings, glands, casing wear rings and shaft sleeve shall be bronze. Shaft shall be carbon or alloy steel, turned and ground. Bearings shall be ball-bearings, roller-bearings, or oil-lubricated bronze-sleeve type bearings and be efficiently sealed or isolated to prevent loss of oil or entrance of dirt or water. Pump and motor shall be mounted on a common cast iron or steel "bent-frame" base. Pump and motor shall be standard coupled. C-face, close-coupled or any non-standard coupling will not be allowed.

10-5.3.2 **Mechanical Shaft Seals.** Seals shall be single, inside mounted, en-face-elastomer bellows type with stainless steel spring, brass or stainless steel seal head, carbon rotating face and tungsten carbide or ceramic sealing face. Glands shall be bronze and of the water-flush design to provide lubrication flush across the face of the seal. Bypass line from pump discharge to flush connection in gland shall be provided, with filter or cyclone separator in line.

10-6 AIR DISTRIBUTION SYSTEMS

10-6.1 **Air handling units.** Units shall include fans, coils, airtight insulated casing, adjustable V-belt drives, belt guards for externally mounted motors, access sections for maintenance, combination sectional filter mixing box, internal vibration isolators and appurtenances required for required operation. Air handling unit shall be provided with continuous high output ultraviolet (UV) lamps on the downstream side of the cooling coil for improved air quality. Air handling unit shall have published ratings based on tests performed according to ARI 430. All sections shall be double walled, constructed of a minimum 18 gauge galvanized steel and 50 mm (2 inch) thick insulation. Casing shall be designed and constructed with an integral structural steel frame such that exterior panels are non-load bearing. Casing shall be provided with inspection doors, access sections and access doors. Inspection and access doors shall be insulated, fully gasketed, double-wall type, of a minimum 18 gauge outer and 20 gauge inner panels. Drain pans shall be constructed water tight, treated to prevent corrosion and designed for positive condensate drainage. Coils shall be fin-and-tube type constructed of seamless copper tubes and copper fins mechanically bonded or soldered to the tubes. Cooling coils shall have a maximum of 315 fins/m (8 fins/inch) to allow for easy cleaning, and shall be sized for a maximum face velocity of 2.8 m/s (550 fpm) to preclude moisture carryover. Coils shall be rated and certified according to ARI 410. Filters shall be listed according to the requirements of UL 900. Filters shall be 50 mm (2 inch) depth, sectional, disposable type of the size indicated and shall have an average efficiency of 25 to 30 percent when tested according to ASHRAE 52.1. Filters shall be UL Class 2. Air handling units with multiple fans shall be double-inlet, centrifugal or plug type with each fan in a separate scroll. Fan bearings shall be sealed against dust and dirt and shall be precision self-aligning ball or roller type. Bearing life shall be L50 rated at not less than 200,000 hours as defined by AFBMA Std 9 and accessible at the drive side of the unit. Motor shall be of sufficient size to be non-overloading at any point on the fan curve and shall be premium efficiency. Motor enclosures shall be of the totally enclosed type. Motor shall be equipped with an across-the-line magnetic controller in a NEMA 250 rated enclosure, appropriate for its location, with a "HAND-OFF-AUTO" switch in the cover. Provide constant speed or variable speed motors as indicated. Motors shall be non-overloading on any point of the fan curve.

Provide duct mounted dial thermometer (0°F to 100°F) in the supply air duct of each air handling unit so that maintenance personnel can check the supply air temperature to see if the unit is operating properly.

Variable frequency drive (VFD) motor and controls shall have the following characteristics.

1. Input power shall be as indicated. Voltage may vary by +/- 10%. Motor base frequency shall be 60 +/- 2 Hz. Motor design speed shall be 3550 RPM. Output frequency range shall be between 65% and 100% motor speed.
2. The VFD shall be capable of 100% full load continuous output.
3. Minimum drive efficiency shall be 97% at motor base speed and rated torque. Losses shall include all control power and cooling system losses associated with the drive. Displacement power factor shall be 95% throughout the entire operating speed range as measured at the drive input terminals.
4. Fixed utility power (voltage and frequency) shall be converted to a variable voltage and

frequency. The drive shall consist of three basic power sections. The first, a converter section consisting of a full-wave fixed diode bridge rectifier, shall convert incoming fixed voltage/frequency to a fixed DC voltage. The second section, a DC Link, shall filter and smooth the converted DC voltage. The third section, a transistorized inverter and control regulator, shall convert the fixed DC voltage to a sinusoidal wave, pulse width modulated (PWM) waveform.

5. The drive shall employ PWM modulation to minimize motor heating. An asynchronous carrier shall be employed to eliminate torque pulsations. Switching frequency shall be adjustable at 2, 4 or 8 kHz.
6. A DC Link reactor shall be included for each rating to minimize harmonic distortion and maximize input power factor.
7. The drive shall be housed in a unit-mounted cabinet, formed, assembled, front accessible and braced, NEMA rated enclosure appropriate for its location.
8. Enclosures shall be single bay, sheet steel with hinged access doors and a lockable, through-the-door handle operator mechanism.
9. Construction safety features shall include:
 - a. Provisions to padlock main disconnect handle in the "OFF" position.
 - b. Mechanical interlock to prevent opening cabinet door with disconnect in the "ON" position or moving disconnect to the "ON" position while the door is open.
 - c. Warning signs on terminals that are energized with the power disconnect "OFF".
10. The operator interface panel shall consist of a door mounted back-lit LCD display, capable of controlling the drive and air distribution system settings for proper drive operation. The drive parameters will be preset in the factory using the keypad on the door of the drive.

10-6.2 **Terminal units.** Variable air volume (VAV) boxes shall be certified under the ARI Standard 880-94 Certification program and carry the ARI seal. The VAV box casing shall be minimum 22 gauge galvanized steel, internally lined with 1/2 inch dual density glass fiber insulation which complies with UL 181 and NFPA 90A. All exposed insulation edges shall be coated with NFPA 90A approved sealant to prevent entrainment of fibers into the airstream. The discharge connection shall be slip and drive construction for attachment to metal ductwork. The damper shall be fabricated from heavy gauge steel with the shaft rotating in bronze self-lubricating bearings. Nylon bearings are not acceptable. VAV box shall have a multi-point, center averaging velocity sensor. Sensor shall provide control signal accuracy of +/-5%. Control shall be pressure independent, analog electric type. All controls shall be installed in an attached NEMA 1 enclosure.

10-6.3 **Fans.** Fans shall be provided in accordance with UFGS. V-belt drives shall be designed for not less than 150 percent of the connected driving capacity. Motors shall not exceed 1800 rpm. Fans shall be belt-driven or provided with speed controllers for direct-drive fans. Three phase motors of 1 HP or larger shall be premium efficiency electric motors. Motors exposed to the weather shall have totally enclosed type enclosures.

10-6.4 **Ductwork.** Provide duct systems conforming to UFGS and to the recommendations of the SMACNA Duct Construction Standards including seal class requirements. Fire and smoke dampers and smoke detectors shall be provided where required by code. Balancing dampers shall be provided at all

branch takeoffs and for all air devices. Provide permanent access to dampers through concealed actuators, through access panels or through accessible ceilings (i.e. T-bar). Internally lined ductwork shall not be allowed. Pressure sensitive tape shall not be used as a sealant.

10-6.4.1 Flexible ductwork shall be limited to runouts, shall be adequately supported to prevent kinks and shall not exceed 3.2 m (10 feet) in length. Runouts shall be pre-insulated, factory fabricated and conform with NFPA 90 and UL 181.

10-6.4.2 Ducts conveying grease laden air shall be in accordance with NFPA 96 and be constructed of stainless steel. Access panels shall be provided as required by code.

10-6.5 **Supply diffusers and registers.** Diffusers shall be located to ensure that the air distribution will completely cover all surfaces of exterior walls with a blanket of conditioned air or may be of a compact design so long as "dead spots" within air conditioned spaces are avoided. At least one diffuser shall be provided in each habitable room. Diffusers shall be provided with integral opposed bladed damper. Diffusers shall be provided with air deflectors as required for proper air flow in the space. Diffusers shall be aluminum. Core velocity shall be limited to 3 m/sec (600 fpm) maximum, with a maximum pressure drop of 0.82 Pa/m (0.1 inch water gauge). Ceiling mounted units shall have factory finish to match ceiling color, and shall be installed with rims tight against ceiling. Sponge-rubber gaskets shall be provided between ceiling or wall and surface-mounted diffusers for air leakage control. Diffuser boots shall be sealed tight to the wall or ceiling they penetrate using duct mastic or caulking. Suitable trim shall be provided for flush-mounted diffusers. Duct collar connecting the duct to the diffuser shall be airtight and shall not interfere with the volume controller. Wall supply registers shall be installed at least 150 mm (6 inches) below the ceiling.

10-6.6 **Transfer, return and exhaust registers and grilles.** Grilles shall be fixed horizontal or vertical louver type similar in appearance to the supply diffuser face. Registers shall be provided with integral opposed blade dampers. Registers shall be aluminum. Core velocity shall be limited to 2 m/sec (400 fpm) maximum, with a maximum pressure drop of 0.5 Pa/m (0.06 inch water gauge). Grilles shall be provided with sponge-rubber gasket between flanges and wall or ceiling. Register/grille boots shall be sealed tight to the wall or ceiling they penetrate using duct mastic or caulking. Wall return grilles shall be located at least 150 mm (6 inches) above the floor or below the ceiling.

10-6.7 **Fire dampers.** Fire dampers shall be located and installed in accordance with NFPA requirements, and shall conform to the requirements of UL 555. Fire dampers shall be automatic operating, and shall be rated for the maximum system velocity and pressure. Fire dampers shall be equipped with a steel sleeve or adequately sized frame installed in such a manner that disruption of the attached ductwork, if any, will not impair the operation of the damper. Damper shall not reduce the duct or the air transfer opening cross-section area. Access doors shall be provided at all fire dampers.

10-6.8 **Smoke dampers.** Smoke damper and actuator assembly required per NFPA 90A shall meet the Class II leakage requirements of UL 555S. Dampers shall be rated not less than 10 m/s (2000 fpm) air velocity.

10-6.9 **Duct smoke detectors.** Duct smoke detectors shall conform to the requirements of UL 268A. Duct smoke detectors shall have perforated sampling tubes extended into the air duct. Detector circuitry shall be mounted in a metallic enclosure exterior to the duct. Detectors shall have manual reset. Detectors shall be rated for air velocities that include air flows between 2.5 and 20 m/s (500 and 400 fpm). Detectors shall be powered from the HVAC control panel. At minimum, detectors shall have two sets of normally open alarm contacts and two sets of normally closed alarm contacts. Detectors shall be connected to the building fire alarm panel for alarm initiation. A removable annunciation lamp and accessible removable reset switch shall be provided for duct detectors that are mounted eight feet or more above the finished floor and for detectors that are not readily visible.

10-6.10 **Access doors.** Provide in ductwork and plenums at all air flow measuring devices, automatic dampers, fire dampers, coils, thermostats and other devices requiring service and inspection.

10-6.11 **Exterior penetrations.** Outside air intakes and exhaust penetrations through the building envelope, excluding the roof, shall be located in existing building openings (i.e. window openings) and be of minimum sizes indicated on the plans. These penetrations shall be provided with louvers of sufficient free area to prevent water from passing through the building envelope. Details including size, location and appearance shall be included in the design submittal for Government approval.

10-6.12 **Roof penetrations.**
Details including size, location and appearance shall be included in the design submittal for Government approval.

10-7 PIPING SYSTEMS

10-7.1 **Piping systems.** System design, component selection and system installation, including pressure containing parts and material, shall be based upon a minimum service pressure of 862 kPa at 66 degrees C (125 psi at 150 degrees F); minimum ANSI Class 125. Condenser and chilled water piping shall be steel pipe, with the exception that piping 100 mm (4 inches) and smaller may be copper tubing.

1. Steel pipe shall conform to ASTM A 53/A 53M, Schedule 40, Type E or S, Grades A or B. Type F pipe shall not be used.
2. Copper pipe shall conform to ASTM B 88, Type K or L.

10-7.1.2 **Casing.** Polyvinyl Chloride (PVC) casings shall conform to ASTM D 1784, Class 12454-B with a minimum thickness equal to the greater of 1/100 the diameter of the casing or 1.50 mm.

10-7.1.3 **Condensate drain pipe.** Condensate drain pipe shall be copper tubing, Type L. Pipe size shall be 25 mm (1 inch) for drains serving one piece of air handling equipment and 40 mm (1-1/2 inch) for drains serving multiple pieces of air handling equipment.

10-7.2 **Water treatment.** Provide water treatment based on the attached water analysis report in accordance with UFGS to mitigate corrosion and scale and to prevent biological growth in the condenser water and chilled water systems.

10-7.3 **Makeup water.** Provide a water pressure reducing valve with pressure gauge at the chilled water makeup point of connection. Pressure gauge shall be located downstream of the pressure reducing valve.

10-8 INSULATION

10-8.1 Pipe Insulation

1. Aboveground cold pipe except condensate drains. Provide cellular glass type insulation, ASTM C 552, Type II, and Type III in accordance with UFGS.
2. Aboveground condensate drains. Provide flexible elastomeric cellular insulation, ASTM C 534, Type I or II in accordance with UFGS.
3. Aboveground hot pipe. Provide mineral fiber type insulation, ASTM C 547, in accordance with UFGS.

4. Below ground cold and hot pipe. Provide prefabricated insulated pipe and fittings. Foam insulation for prefabricated insulated pipe and fittings shall be polyurethane foam meeting the requirements of ASTM C 591 having a density of not less than 32 kg per cubic meter (2 pcf). Carrier pipe shall be metallic as indicated in paragraph 10.7 Piping Systems.

10-8.2 **Duct Insulation.** Duct insulation shall be limited to the following and shall be installed in accordance with UFGS.

1. Rigid Mineral Fiber, ASTM C 612, Type IA, IB, II, III and IV.
2. Flexible Mineral Fiber, ASTM 553, Type I or Type II up to 121 degrees C (250 degrees F). ASTM C1290 Type III.

10-9 INSTRUMENTATION AND CONTROLS

All pressure gauges and thermometers exposed to the weather shall have either a stainless steel casing, aluminum casing with an epoxy coating, or chrome plated brass case with stainless steel ring and be weatherproof. All electrical panels exposed to weather shall be NEMA 4X type.

A pressure gauge and thermometer shall be provided at the inlet and discharge of each chiller, pump, air handling unit and fan coil unit.

Motor control centers (MCC's) shall be provided with reverse phase and phase failure relay to detect phase unbalance or reverse phase condition. Upon detection of 10% phase unbalance or a reverse phase condition, all motors shall stop, an audible alarm activated and green pilot light de-energized. Provide a green pilot light located on the starter labeled "Power Normal". This panel is not required for starters with internal; phase monitor.

Individual barracks sleeping rooms shall be provided with individual room temperature control.

Control system shall be direct digital control (DDC). Provide all devices required, including current transducers, transformer, thermostats, sensors, controllers, actuators, control valves, dampers, transmitters, flow meters, etc., to provide a complete and operable system. All equipment and systems shall be automatically controlled by the control system. Written and posted control system instructions shall be provided for each system. The instructions shall include half-size laminated drawings and shall include the control system schematic, equipment schedule, ladder diagram, sequence of operation, panel arrangement drawings, wiring diagram, and valve and damper schedules. Building controllers shall be fully BACNET compatible and be expandable to be able to tie into a central DDC building and energy management system at DPW HQ. Points shall include, at minimum:

1. Central Plant (includes chillers, cooling towers, pumps, hot water plant)

- Chiller on/off (each chiller)
- Chiller status (each chiller)
- Flow switch
- Load limit startup/pull down
- Chilled water temperature reset
- Chilled water supply temperature
- Chilled water return temperature
- Chilled water supply setpoint temperature
- Condenser water supply temperature
- Condenser water return temperature
- Condenser water supply setpoint temperature

Hot water supply temperature
 Hot water return temperature
 Hot water supply setpoint temperature
 Cooling tower fan on/off (each fan)
 Cooling tower fan speed (for multi-speed fans)
 Cooling tower fan status (each fan)
 Pump on/off (each pump)
 Pump status (each pump)
 Flow alarm – no chilled water flow.
 Flow alarm – no condenser water flow.

2. Air handling units

Fan on/off
 Fan status – differential pressure sensor
 Fan speed (for VFD AHU's)
 Fan high static limit switch
 Filter status – differential pressure sensor
 Chilled water control valve position
 Supply air temperature
 Supply air temperature setpoint
 Supply air duct pressure (for VFD AHU's)
 Supply air duct pressure setpoint (for VFD AHU's)
 Return air temperature (for non-VFD AHU's)
 Return air temperature setpoint (for non-VFD AHU's)
 Alarm – high supply air duct pressure
 Alarm – power phase failure
 Alarm – smoke detector (for AHU's requiring smoke detectors)

3. Variable Air Volume Boxes (through VAV unit controller)

Room temperature sensor
 VAV box on/off
 VAV box actuator
 VAV box damper position
 VAV box max CFM setpoint
 VAV box min CFM setpoint
 VAV box CFM
 Room temperature setpoint
 Room temperature readout

4. Fans

Fan on/off
 Fan status – current sensor

10-10 TESTING, ADJUSTING AND BALANCING. Testing, adjusting and balancing of each system shall be the Contractor's responsibility. Testing and balancing of the air and hydronic systems shall be accomplished by a firm certified for testing and balancing by the Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB). Prior to testing, adjusting, and balancing, the Contractor shall verify that the systems have been properly installed and are operating as specified. Testing of individual items of equipment shall be performed by a person authorized to perform such testing and startup by the equipment manufacturer. The contractor shall correct all systems and equipment not found in

compliance, and shall be responsible for all labor and materials required for this effort. AABC MN-1, NEBB-01, SMANCA-07 or ASHRAE 111 shall be used as the standard for providing testing of air and water systems. The selected standard shall be used throughout the entire project. All recommendations and suggested practices contained in the selected standard shall be considered mandatory. Instrumentation accuracy shall be in accordance with selected standard.

10-10.1 Piping systems. Each piping system including pipe, valves, fittings and equipment shall be hydrostatically tested and proved tight at a pressure of 1-1/2 times the design working pressure, but not less than 699 kPa (100 psi) for a period of not less than two hours with no appreciable loss in pressure. Piping shall not be insulated until testing is completed and acceptable. Upon completion of installation and prior to startup, each hydronic system shall be balanced. All balancing data, including deficiencies encountered and corrective action taken, shall be recorded. Following final acceptance of certified reports by the Contracting Officer, the setting of all HVAC adjustment devices shall be permanently marked by the Contractor's balancing engineer so that adjustment can be restored if disturbed at any time.

10-10.2 Equipment. Each item of central operating equipment provided, including air handling units shall be tested in accordance with the equipment manufacturer's standard testing procedures. A factory representative shall be present for the startup and testing of each item of equipment. A certified report shall be provided for each item of equipment tested.

10-11 COMMISSIONING. All HVAC systems and equipment including controls shall be commissioned in accordance with the UFGS and ASHRAE Guideline 1.

10-12 TRAINING. The Contractor shall conduct a training course for the operating for all HVAC operating systems and individual items of equipment. The field instructions shall cover all the items of equipment provided as well as the overall systems. The training period shall consist of a total of 40 hours of normal working time and shall start after the systems are functionally completed and testing, adjusting and balancing have been completed. Training shall also include a minimum of two days on-site training. Factory representatives shall be present to assist in training for every item of operating equipment provided. Contractor shall provide eight copies of operation and maintenance instructions for each item of equipment provided. Training shall consist of startup, normal operation and shutdown, as well as demonstrations of routine maintenance operations. The Contracting Officer shall be notified at least 14 days prior to date of proposed conduction of the training course.

CHAPTER 12**FIRE PROTECTION****12-1 GENERAL REQUIREMENTS**

12-1.1. **Fire Protection scope.** The fire protection requirements for the project, as indicated in this Chapter, are generally contained within this chapter unless otherwise noted. Other fire protection scope indicated by other Chapters and the Attachment Concept Design Documents (Drawings, Fire Protection Analysis), which are to be used for the design of this project, are subject to requirements within this section.

The attached Fire Protection Design Analysis and location of the fire rated walls on the drawings is provided for information only unless otherwise indicated. All requirements within this Chapter shall take precedence over any conflicting requirement in other Chapters, Attachment Concept Design Documents or any other criteria and shall be brought to the attention of the Contracting Officer for resolution in writing. All definitions and acronyms used in this section are intended to be used for this section only unless otherwise noted. All installed materials and equipment are in general to be listed by an independent laboratory such as Underwriters Laboratory. Catalog cuts in the attachments are not intended to be exact equipment provided. Equipment shall be similar to catalog cuts and based on design developed after award.

12-1.2. **Design Standards and Codes.** The design of this project shall be in accordance with the design standard and codes stated within this paragraph. The following list is not complete. Other applicable references are to be used when required by other Chapters and other references used within these standards and codes.

- 12-1.2.1. UFC 3-600-01 (UFC), Design Fire Protection Engineering for Facilities, 2003 edition.
- 12-1.2.2. International Building Code (IBC) 2000 edition.
- 12-1.2.3. NFPA 10, Portable Fire Extinguishers, 2002 edition.
- 12-1.2.4. NFPA 13 (FSC), Installation of Sprinkler Systems, 2002 edition.
- 12-1.2.5. NFPA 13R, Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and including Four Stories in Height, 2002
- 12-1.2.6. NFPA 17A, Wet Chemical Extinguishing Systems, 2002.
- 12-1.2.7. NFPA 20, Stationary Pumps for Fire Protection, 1999.
- 12-1.2.8. NFPA 24, Private Fire Service Mains, 2002 edition.
- 12-1.2.9. NFPA 30, Flammable and Combustible Liquids Code, 2000 edition.
- 12-1.2.10. NFPA 70, National Electrical Code, 2002.
- 12-1.2.11. NFPA 72 (FAC), National Fire Alarm Code, 2002 edition.
- 12-1.2.12. NFPA 75, Electronic Computer/Data Processing Equipment, 2003.
- 12-1.2.13. NFPA 80, Fire Doors and Fire Windows, 1999.
- 12-1.2.14. NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems, 2002.
- 12-1.2.15. NFPA 96, Ventilation Control and Fire Protection of Commercial Cooking Operations, 2001

edition.

- 12.1.2.16. NFPA 101 (LSC), Safety to Life from Fire in Buildings and Structures, 2003 edition.
- 12.1.2.17. NFPA 291, Recommended Practice for the Fire Flow Testing and Marking of Hydrants, 2002.**
- 12-1.2.18. ER 1110-345-700, Engineering and Design Analysis, Drawings and Specifications, 30 May 1997.
- 12-1.2.19. ADA Accessibility Guidelines for Buildings and Facilities (ADAAG).
- 12-1.2.20. MIL-HDBK-1022A (1022), Petroleum Fuel Facilities, 01 November 1999.
- 12-1.2.21. UL Fire Protection Equipment Directory (ULFPED), 2002 edition.
- 12-1.2.22. UL Building Materials Directory (ULBMD), 2002 edition.
- 12-1.2.23. UL Fire Resistance Directory (ULFRD), 2001 edition.
- 12-1.2.24. TI 800-01, Technical Instructions Design Criteria, 20 Jul 98.
- 12-1.2.25. Unified Facilities Guide Specification (UFGS).
- 12-1.2.25.1. Section 7840a, Firestopping, April 2003.
- 12-1.2.25.2. Section 13920A, Fire Pumps, December 2001.
- 12-1.2.25.3. Section 13930A, Wet Pipe Sprinkler System, Fire Protection, March 2003.
- 12-1.2.25.4. Section 13945A, Preaction and Deluge Systems, Fire Protection, March 2003.
- 12-1.2.25.5. Section 13851A, Fire Detection and Alarm System Addressable, February 2002.

12-2 APPENDIX AND RECOMMENDATIONS. Fire protection criteria in general that are stated in any reference, which are either in the appendix, stated as a recommendation or addressed with a "should" shall be considered to be mandatory requirements and will be incorporated into the design.

12-3 DEFINITIONS

- 12-3.1. **General.** Definitions as indicated in LSC shall be used unless otherwise noted.
- 12-3.2. **Fire Protection Work.** All construction materials and installation necessary to install complete fire alarm systems, automatic fire sprinkler systems, fire rated partitions, fire rated doors & hardware, fire rated windows & hardware, firestopping, fire rated construction, exit signs, automatic fan shutdown, all means of egress and any other work as designated by the DAHJ.

12-4 AUTHORITY HAVING JURISDICTION (AHJ): The AHJ is HQUSACE, CEMP-ET, Mr Robert Diangelo. The District Authority Having Jurisdiction (DAHJ) is the Honolulu Engineer District Fire Protection Engineer, CEPOH-EC-Q and will be consulted for all interpretations of fire protection criteria to be used in this project through the Contracting Officer or his representative. Contractor shall not contact the AHJ and shall direct all questions, interpretations and clarifications to the DAHJ. All requests for information by the Contractor shall be submitted to the DAHJ in writing through the Contracting Officer with the appropriate sketches, basis for waiver, specific question and any other information deemed necessary by the DAHJ. In

general, a minimum of 7 calendar days is required by the DAHJ to respond to all inquiries. The 7 days will start from the day of receipt by the DAHJ. In the event interpretation or approval is required from AHJ, an additional 7 calendar days will normally be required.

12-5 WAIVER TO CRITERIA. All waivers to be processed in accordance with UFC shall be forwarded to the DAHJ for preliminary assessment. Waivers are to be forwarded to AHJ for approval if deemed necessary by DAHJ.

12-6 PRIORITY OF CONFLICTING REQUIREMENTS. In general, Contractor to use UFC & UFGS as the main document for fire protection criteria and these documents shall take precedence over any other document in accordance with UFC. ETL's and specific code requirement will supercede general requirements found in UFC, otherwise the most restrictive requirement shall be provided. DAHJ shall be consulted on all conflicting requirements and reserves the right to make final determination or by coordinating with the AHJ if deemed necessary. Conflicting requirements of Life Safety and historical preservation shall be brought to the attention of the Contracting Officer in writing and resolved by the DAHJ and historical preservation officer.

12-7 FIRE PROTECTION ENGINEER SERVICES. Contractor shall hire a qualified Fire Protection Engineer licensed as a Professional Engineer to consult, design, inspect and prepare design drawings, specifications, calculations and supervise construction as necessary. Qualifications must be submitted in writing to the Contracting Officer for approval. Any other licensed professional engineer or architect, who is a current Member status of the Society of Fire Protection Engineers with qualifying experience can act as the Fire Protection Engineer. Approval through the Contracting Officer, in writing, by the DAHJ is required prior to commencement of the building design.

12-8 IBC REQUIREMENTS

12-8.1. **Allowable area and allowable height.** Design analysis shall confirm the allowable construction type and allowable area/height in accordance with IBC by calculating the allowable areas and submitting them in the design analysis. Any type of construction allowed by the IBC will be allowed on this project as long as IBC allowable area and height restrictions are provided.

12-8.2. **Location on property.** Design analysis shall show the exterior wall/opening protection required in accordance with IBC.

12-8.3. **Occupancy Separation walls. Occupancy separation walls shall be provided in accordance with the IBC.**

12-9 LIFE SAFETY REQUIREMENTS

12-9.1. **General.** LSC with UFC amending portions of LSC are to be provided.

12-9.2. **Stairs.** All required stairs shall be protected in accordance with LSC.

12-9.3. **Magnetic Card Locks.** Use of magnetic card type locks shall meet LSC for egress.

12-9.4. **Firefighter Access.** Firefighter access shall be provided in accordance with UFC.

12-9.5. **Fire Rated Shafts.** Use of fire rated shafts shall be minimized on all buildings. All pipe risers shall be separated from the duct risers and be firestopped at the floors. All duct risers, which penetrate more than 1 floor shall be enclosed in a 1 hr fire rated shaft. Use of subducts are prohibited. Fire dampers shall be listed with ULBMD or FM and conform to Chapter 10 – HVAC.

12-9.6. **Interior Finishes.** Interior finishes shall be provided in accordance with LSC.

12-9.7. **Exit Signs.** Internally illuminated signs using Light emitting diode (LED) type shall be used.

12-9.8. **Portable fire extinguishers.** Provide portable fire extinguishers in semi-recessed cabinets throughout the building in accordance with NFPA 10 and shall be listed with ULFPE or FM.

12-9.9. **Fire rated assemblies.** Fire rated doors/door frames and windows (glazing and window frame) shall be listed by ULBMD or FM and shall be installed in accordance with the door/window manufacturer and NFPA 80.

12-9.10. **Fire rated construction.** All fire rated walls, floors, ceilings, floor/ceilings, roof/ceilings shall meet ULFRD or FM.

12-9.11. **Firestopping.** All penetrations of fire rated walls by ducts, pipe or conduit must be protected with listed firestopping and installed in accordance with the manufacturer's listed installation instructions. Listed installation instructions shall be submitted for approval to the Contracting Officer prior to installation. Firestopping shall be listed with ULFRD or FM.

12-9.11.1 **Firestopping ID plate:** A permanent wall identification plate (WID) and a pipe tag are required to be permanently mounted adjacent to every fire barrier penetration on both sides of the wall or floor. The WID plate shall be minimum 4" X 3"(102mm X 77 mm) in size and the pipe tag shall be minimum 1.5" X 1.5"(38mm X 38mm) in size, have raised letters & constructed of 20 gage minimum corrosion proof metal. In the event there are multiple pipe penetrations with the same firestopping system, a single wall ID plate can be used if each pipe penetration is listed on the WID plate separated with commas and each pipe is identified with a pipe tag. Information on the WID must be clearly readable from a minimum of 5 feet (1524 mm) Shop drawings to be submitted for approval. All WID and pipe tags to be submitted for approval prior to installation.

The wall ID plate shall contain the following:

___hr Fire Barrier Penetration
 Pipe # _____
 UL System # _____
 Description: _____

 F rating: _____hr
 T rating: _____hr
 Wall/Floor Material: _____
 Sealant ID _____
 Manufacturer _____
 Certified Installer:
 Name: _____
 Address: _____

 Installation Date: _____

Example:

1 hr Fire Barrier Penetration
 Pipe # 1, 2, 5
 UL System # WL2078
 Description: Plastic pipe thru 1 hr
gypsum wall
 F rating: 1hr
 T rating: 1hr
 Wall/Floor Material: Gypsum wall

Sealant ID: Hilti CP 642
 Manufacturer Hilti
 Certified Installer:
 Name: Mr Chester Yamamoto
 Company: Firestopping Inc.
 Address: 1920 Ala Moana Blvd
Honolulu, HI 96818
 Installation Date: 30 June 2003

The pipe tag shall contain the following:

Pipe # _____
 Insulated: _____
 Pipe Material: _____
 Pipe Size: _____
 Use: _____

Example:

Pipe # 5
 Insulated: No
 Pipe Material: CPVC
 Pipe Size: 4"
 Use: domestic CW

12-10 FIRE SPRINKLER AND FIRE PUMP REQUIREMENTS

12-10.1. **General.** All the buildings shall be provided with new wet pipe sprinkler system meeting FSC, FSCR, UFC and UFGS 13930. Sprinkler flow switches, pressure switches and tamper switches are to be connected to the building fire alarm panel.

12-10.2. **Design area and density.** Area/density method in accordance with the UFC shall be used. Hydrant flows shall be added to all hydraulic sprinkler calculations as indicated in UFC. Available water supply must provide the fire demand equivalent to the sum of sprinkler demand + hose stream(s) demand + domestic demand. Hydrant flow test shall be performed by Contractor to obtain available water supply capacity. Hydraulic calculations are to be performed using approved computer software. Minimum design hydrant pressure shall be 20 psig at full fire demand.

12-10.3. **Fire pump.** Listed engine driven fire pumps shall be provided in a building as indicated in accordance with UFC. Water storage tanks shall be provided in the event the available water supply flow capacity is exceeded and shall meet NFPA 22. Water tank capacity shall meet UFC. Fire Pump controller shall be NEMA type 4X. Fire Pump shall meet requirements in UFGS 13920A. Fire Pump Building shall be located 50 feet minimum from Quad C buildings (follow NFPA 20) and as indicated.

12-10.4. **Fire sprinklers.** Quick response sprinkler shall be used as a minimum in all Light Hazard occupancy areas throughout the building in accordance with FSC. Decrease in design area allowed by FSC for use with quick response sprinkler heads will be allowed.

12-10.5. **Fire Department Connections.** Fire department connections must be within 150 feet of hydrant.

12-10.6. **Backflow Preventers.** Double check type backflow preventers are required on all sprinkler system connections to the potable water supply, which are listed for fire service by an independent testing

agency such as UL.

12-10.7. **Sprinkler Valves farther than 10 feet from building.** All valves controlling sprinkler water flow farther than 10 feet from building shall be chain and locked open and all the valves 10 feet or closer to the building shall be supervised with a weather resistant tamper switch connected to the fire alarm panel supervisory alarm circuit.

12-10.8. **Seismic requirements.** Seismic earthquake requirements in FSC are required.

12-10.9. **Plastic piping.** Plastic piping/fittings are not allowed.

12-10.10 **T drill fittings.** "T drill" method are not allowed.

12-10.11. **Post Indicator Valve. Post indicator valve (PIV) is required on all sprinkler system supplies, in accordance with NFPA 24.** Elimination of the PIV will be allowed if the backflow preventer/shutoff valve assembly is located in the same location as the PIV, according to NFPA 24. Backflow preventer isolation valves to be indicating type with supervision.

12-10.12. **Hydrant flow test data.** Contractor shall use attached flow data and calculations for bidding purposes. The successful contractor shall perform a hydrant flow test to validate the project design after award. The hydrant flow test shall be performed in accordance with NFPA 291 and with the Schofield Barracks Water Treatment Plant clearwell pumps off. Flow data shall be submitted in accordance with Section Design After Award.

12-11 FIRE ALARM REQUIREMENTS

12-11.1 **General.** All buildings shall have fire alarm system including fire alarm panel, transmitter, and fire alarm annunciator, meeting FAC, ADAAG, LSC, UFC and UFGS 13851. All fire alarm systems shall be Class A, looped, addressable systems. Each building shall have a fire alarm panel and annunciator located inside the building on the 1st floor in an approved location. Special fire alarm requirements are found in UFC.

12-11.2. **T tapping.** T tapping of any fire alarm circuit is not allowed.

12-11.3. **Occupant notification.** All buildings shall be provided with visible and audible occupant notification appliances in accordance with ADAAG and FAC.

12-11.4. **Sequence of operation. Fire alarm sequence of operations shown in the Fire Alarm Control Matrix (MATRIX) contained in Attachment 6.**

12-11.5. **Server and Telecom Rooms.** Automatic smoke detection system shall be provided for the Server and Telecom rooms below raised floor and below ceiling, NFPA 75.

12-12 ROOF ACCESS

12-12.1 **Access Points.** Provide two roof access points for each of the buildings in this RFP (Bldgs 355, 356, 357 and 358), in accordance with the subsequent paragraphs.

12-12.2 **Access Locations.** For Building 355, the two roof access locations shall be on the third floor at the top landing of open exit stairs at grid lines "3" and "18". For Buildings 356, 357, and 358, the two roof access locations shall be on the third floor at the top landing of enclosed exit stairs at grid lines "2" and "20". Multiple roof access from a single exit stair shall not be permitted.

12-12.3 **Roof Access.** Roof access shall consist of hatch opening to the roof with an appropriate ladder. Clear hatch opening must be not less than 1.5 m² (16 ft²) in area, with a minimum dimension of 610 mm (2

ft). Ladder shall conform to 29 CFR 1910.27, *Fixed Ladders*.

12-13 MISCELLANEOUS FIRE REQUIREMENTS

12-13.1. **Fuel tanks.** Fuel tanks installed for the fire pump shall be installed in accordance with UFGS 13920A, local and Federal requirements.

12-13.1.1 Provide single walled fuel tank as indicated on the attached drawings or aboveground concrete encased steel storage tank in an approved location. Aboveground concrete encased steel storage tanks are preferred by the Director of Public Works. Aboveground tank shall be located minimum 50 feet from above ground power lines. Distance from building and property lines shall be ½ of that indicated in 1022, 8.3.5.2.

12-13.1.2 Provide all appurtenances in 1022, Table 2 and NFPA 30, 2.3.2.3.3. General requirements of 1022, 8.5 shall be provided. Tank capacity shall not exceed 12,000 gallons. 40 CFR 112 requirements shall be provided, if the tank storage capacity exceeds 1320 gallons or a single container exceeds 660 gallons.

12-13.2. **Air handling units.** All air handling systems shall be provided with automatic shutdown in accordance with NFPA 90A. Air handling systems shall meet NFPA 90A and LSC.

12-13.4. **Server and Telecom Rooms.** Fire/smoke dampers are required in all ducts penetrating the Server and Telecom rooms. Other fire protection requirements of NFPA 75 shall be provided for the Server and Telecom rooms.

12-13.5. **Grease Ducts.** Commercial kitchen type grease hoods with fire suppression shall be provided. Except for the cooking appliances in the Billeting Modules, commercial type kitchen exhaust hoods shall be provided for all cooking appliances including, but not limited to appliances in the Dining Facility and 2nd Floor Kitchen in Building 357. Grease hood and fire suppression system shall conform to NFPA 96. Grease ducts shall conform to Chapter 10 - HVAC.

ATTACHMENT 6

FIRE ALARM SEQUENCE OF OPERATION MATRIX

(AM-0004)

