SOLICITATION, OFFER, AND AWARD (Construction, Alteration, or Repair)	1. SOLICITATION NUMBER	2. TYPE OF SOLICITATION	3. DATE ISSUED	PAGE OF PAGES
	DACA67-00-R-0006	☐ SEALED BID (IFB) ☒ NEGOTIATED (RFP)	22 Nov 1999	1

IMPORTANT - The "offer" section on the reverse must be fully completed by the offeror.

CONTRACT NUMBER	5. REQUISITION/PURCHASE REQUEST NUMBER	6. PROJECT NUMBER
DACA67-00-C-0220	W68MD9-9917-62870	

7. ISSUED BY CODE W68MD9

Seattle District, Corps of Engineers
ATTN: CENWS-CT-CB
PO Box 3755
Seattle, WA 98124-3755

8. ADDRESS OFFER TO

Seattle District, Corps of Engineers
PO Box 3755 ATTN: CENWS-CT-CB-MU
Seattle, WA 98124-3755

HAND CARRY: Column C-5
4735 East Marginal Way South
Seattle, WA 98134-2385

9. FOR INFORMATION CALL	A. NAME	B. TELEPHONE NUMBER (Include area code) (NO COLLECT CALLS)
▶	See Information Page inside Front Cover	See Information Page inside Front Cover

SOLICITATION

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".

10. THE GOVERNMENT REQUIRES PERFORMANCE OF THE WORK DESCRIBED IN THESE DOCUMENTS (Title, identifying number, date):

Furnish all labor, materials and equipment and perform all work for Design/Build Replace Military Family Housing (Phase 2), Mountain Home Air Force Base, Idaho in accordance with the attached Contract Clauses, Special Clauses, Technical Specifications and Drawings.

1. Solicitation No. DACA67-00-R-0006 dated 22 Noc 1999 with 7 amendments thereto.

2. Wage Determination No ID00-0006 with 0 modifications/

3. Contractor's proposal, dated 25 January 2000, revised proposal dated 1 March 2000, and final revised proposal dated 14 March 2000 are hereby incorporated into the contract.

NOTE: Award will be made pursuant to the Small Business Competitive Development Program.

11. The Contractor shall begin performance within 10 calendar days and complete it within * calendar days after receiving

☐ award, ☒ notice to proceed. This performance period is ☒ mandatory, ☐ negotiable. (See * Paragraph SC-1 .)

12A. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE PAYMENT BONDS? (If "YES," indicate within how many calendar days after award in Item 12B.)	12B. CALENDAR DAYS
☒ YES ☐ NO	10

13. ADDITIONAL SOLICITATION REQUIREMENTS:

A. Sealed offers in original and 0 copies to perform the work required are due at the place specified in Item 8 by 3:00 PM (hour) local time 7 January 2000 (date). If this is a sealed bid solicitation, offers will be publicly opened at that time. Sealed envelopes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.

B. An offer guarantee ☒ is, ☐ is not required.

offers are subject to the (1) work requirements, and (2) other provisions and clauses incorporated in the solicitation in full text or by reference.

D. Offers providing less than 120 calendar days for Government acceptance after the date offers are due will not be considered and will be rejected.

SLC: DACA67-00-R-0006 **OFFER** *(Must be fully completed by offeror)* Contract : DACA67-00-C-0220

14. NAME AND ADDRESS OF OFFEROR *(Include ZIP Code)*

AMERICAN RENOVATION & CONSTRUCTION COMPANY
3645 CAMINO DEL RIO SOUTH
SAN DIEGO, CA 92108-4004

Tax ID No: 33-0260362 DUNS No: 62-479-9201
eMail: americanrenovation@msn.com

CODE OR7R5 FACILITY CODE

15. TELEPHONE NUMBER *(Include area code)*
(619) 284-1168 | FAX: 619/284-8140

16. REMITTANCE ADDRESS *(Include only if different than Item 14)*

SAME TIN # 33-0260362

17. The offeror agrees to perform the work required at the prices specified below in strict accordance with the terms of this solicitation, if this offer is accepted by the Government in writing within _____ calendar days after the date offers are due. *(Insert any number equal or greater than the minimum requirement stated in 13D. Failure to insert any number means the offeror accepts the minimum in Item 13D.)*

AMOUNTS ▶ See page 00010-4 thru 6

18. The offeror agrees to furnish any required performance and payment bonds.

19. ACKNOWLEDGEMENT OF AMENDMENTS
(The offeror acknowledges receipt of amendments to the solicitation - give number and date of each)

AMENDMENT NO.	0001	0002		0003		0004		0005	0006	0007
DATE	12-14-99	1-7-00		1-12-00		1-14-00		1-14-00	2/16/00	2/24/00

20A. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER *(Type or print)*
ANTHONY J. JEMISON, VICE PRESIDENT

20B. SIGNATURE
Anthony J. Jemison

20C. OFFER DATE
1/25/00

AWARD *(To be completed by Government)* Anthony J. Jemison 3/1/00

ITEMS ACCEPTED

0001, 0002, 0003, 0004, 0005

22. AMOUNT
$10,112,000.00

23. ACCOUNTING AND APPROPRIATION DATA
27Mar2000 21 NA 2000 2050.0000 G3 2000 08 8082 70000000000 35026 3200 0033NB

24. SUBMIT INVOICES TO ADDRESS SHOWN IN ▶ *(4 copies unless otherwise specified)*
ITEM 26

25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO
☐ 10 U.S.C. 2304(c) ( ) ☐ 41 U.S.C. 253(c) ( )

26. ADMINISTERED BY CODE
See Page 00010-3

27. PAYMENT WILL BE MADE BY
US Army Corps of Engineers Finance Center
CEFC-AO-P
5722 Integrity Drive
Millington, TN 38054-5005

CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE

☐ 28. NEGOTIATED AGREEMENT *(Contractor is required to sign this document and return copies to the issuing office.)* Contractor agrees to furnish and deliver all items or perform all work requirements identified on this form and any continuation sheets for the consideration stated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications incorporated by reference in or attached to this contract.

☒ 29. AWARD. *(Contractor is not required to sign this document.)* Your offer on this solicitation is hereby accepted as to the items listed. This award consummates the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.

AME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN *(Type or print)*

30B. SIGNATURE

30C. DATE

31A. NAME OF CONTRACTING OFFICER *(Type or print)*
CHERYL A. ANDERSON

31B. UNITED STATES OF AMERICA
BY Cheryl A. Anderson

31C. AWARD DATE
31 Mar 2000

STANDARD FORM 1442 BACK (REV. 4-85)

Submit Invoices as follows:

Submit 3 Copies of Invoice to:

Fairchild Resident Office
USAED, Seattle
PO Box 1929
Airway Heights, WA, 99001

Submit 1 Copy of Invoice to:

Mountain Home AFB Resident Office
USAED, Seattle
390 Gunfighter Ave
Mt. Home AFB, ID 83648-5264

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99049
Replace Military Family Housing (Phase 2), Mtn Home AFB

DACA67-00-C-0220

SCHEDULE

Item No.	Description of Item	Quantity	Unit	Unit Price	Amount
	Replace Military Family Housing (Phase 2) Mountain Home Air Force Base, Idaho PN: QYZH985003				
	BASE ITEMS				
0001	Provide all labor, professional services, materials, equipment and transportation necessary for the complete design (including professional oversight services during construction), for Replace Military Family Housing (Phase 2), Mountain Home Air Force Base, Idaho, including all related site and utility work, as described herein and as further required to provide for development in accordance with the Contractor's proposed design and construction schedule, except for Base Items 0003 through 0005 and Optional Items 0006 through 0009.	1	JOB	L.S.	$264,000.00
0002	Provide all labor, material, equipment, and transportation necessary for the complete construction and equipping for Replace Military Family Housing (Phase 2), Mountain Home Air Force Base, Idaho, including all related site and utility work, as described herein and as further required to provide for development in accordance with the Contractor's proposed design and construction schedule, except for Base Item 0003 and Optional Items 0006 through 0009.	1	JOB	L.S.	$9,300,000.00
0003	All work for demolition and disposal of 60 family housing units, including removal of all associated utilities and other site improvements and the filling and level grading of the site to match established drainage patterns in accordance with the Contractor's proposed design and construction schedule. (Additional site restoration as further required to provide for development of the site is covered under Item 0009)	1	JOB	L.S.	$468,000.00

99049
Replace Military Family Housing (Phase 2), Mtn Home AFB

DACA67-00-C-0220

0004	All work for AS-Built Drawings in Electronic Format as Specified herein, from Preparation to Final Submittal.	1	JOB	L.S.	$ 30,000
0005	All work for O&M Manuals, including Occupant Maintenance Manuals as Specified herein, from Preparation to Final Submittal.	1	JOB	L.S.	$ 50,000

TOTAL BASE ITEMS $10,112,000.00

OPTIONAL ITEMS

0006	Provide all labor, professional services, material, equipment, and transportation necessary for the complete design and construction, establishment and maintenance of windbreaks as specified in Section 00860 (paragraph 8.4) of the specifications, and as further required to provide in accordance with the Contractor's proposed design and construction schedule.	1	JOB	L.S.	$ 258,655.00
0007	Provide all labor, professional services, material, equipment and transportation necessary for the complete design and construction of a Water Storage System as specified in Section 00860 (paragraph 6.2) of the specifications, and as further required to provide in accordance with the Contractor's proposed design and construction schedule. ~~New Electrical Feeder "I", as specified in Section 00860 (paragraph 6.5), in lieu of extending existing Feeder "E" as provided in Base Items 0001 and 0002.~~	1	JOB	L.S.	$ 445,000.00
0008	Provide all labor, professional services, material, equipment and transportation necessary for the complete design and construction of Bus Stops, Playgrounds and Jogging/Bicycle Paths.	1	JOB	L.S.	$ 211,000.00
0009	Provide all labor, professional services, material, equipment and transportation necessary for the complete design and construction of remaining site restoration at the removed housing site as described herein, including irrigation system, topsoil and seeding, in accordance with the Contractor's proposed design and construction schedule.	1	JOB	L.S.	$ 284,585.00

99049
Replace Military Family Housing (Phase 2), Mtn Home AFB

DACA67-00-C-0220

TOTAL OPTIONAL ITEMS	$ 1,199,240.00
TOTAL BASE AND OPTIONAL ITEMS	$ 11,311,240.00

ATTENTION:

TOTAL AMOUNT OF FUNDS AVAILABLE FOR DESIGN AND CONSTRUCTION IS $ 10,182,536

NOTE: 1. The dollar amounts established for Items 0004 and 0005 shall not be revised by the offeror.

2. No partial or total payment will be made for Items 0004 and 0005, until the as-built drawings and the O&M Manuals are fully approved (A or B action).

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CONTRACT NUMBER: DACA67-00-C-0220

IF THE CONTRACTOR IS A CORPORATION OR PARTNERSHIP, THE **APPLICABLE PORTION** OF THE FORM LISTED BELOW MUST BE COMPLETED. IN THE ALTERNATIVE, OTHER EVIDENCE MUST BE SUBMITTED TO SUBSTANTIATE THE AUTHORITY OF THE PERSON SIGNING THE CONTRACT. IF A CORPORATION, **THE SAME OFFICER SHALL NOT EXECUTE BOTH THE CONTRACT AND THE CERTIFICATE.**

CORPORATE CERTIFICATE

I, BLANCHE RICHARDSON, certify that I am the CORPORATE SECRETARY Secretary of the Corporation named as Contractor herein; that ANTHONY J. JEMISON, who signed this contract on behalf of the Contractor was then VICE PRESIDENT of said corporation; that said contract was duly signed for and on behalf of said corporation by authority of its governing body and is within the scope of its corporate powers.

Blanche Richardson (CORPORATE
(Secretary) SEAL)
BLANCHE RICHARDSON, CORPORATE SECRETARY 1/25/00

AUTHORITY TO BIND PARTNERSHIP

This is to certify that the names, signatures and Social Security Numbers of all partners are listed below and that the person signing the contract has authority actually to bind the partnership pursuant to its partnership agreements. Each of the partners individually has full authority to enter into and execute contractual instruments on behalf of said partnership with the United States of America, except as follows: (state "none" or describe limitations, if any) _____

This authority shall remain in full force and effect until such time as the revocation of authority by any cause whatsoever has been furnished in writing to, and acknowledged by, the Contracting Officer.

(Names, Signatures and Social Security Numbers of all Partners)

NAME	SIGNATURE	SOCIAL SECURITY NO.

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AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES	
J	1	4

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO.(If applicable)
0007	24-Feb-2000	W68MD9-9176-2870	

6. ISSUED BY CODE DACA67
USA ENGINEER DISTRICT, SEATTLE
ATTN: CENWS-CT
P.O. BOX C-3755

SEATTLE, WA 98124-3755

7. ADMINISTERED BY (If other than item 6) CODE

See Item 6

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)

CODE FACILITY CODE

X	9A. AMENDMENT OF SOLICITATION NO. DACA67-00-R-0006
X	9B. DATED (SEE ITEM 11) 22-Nov-1999
	10A. MOD. OF CONTRACT/ORDER NO.
	10B. DATED (SEE ITEM 13)

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[X] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer [ ] is extended, [X] 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 1 copies of the document; (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 THE REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

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

[ ] A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

[ ] B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).

[ ] C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

[ ] D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor [ ] 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.)

Project: D/B Replace Military Family Housing, Mt. Home AFB Idaho

CONTINUED NEXT PAGE.

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) ELIZABETH M KEYS / ADDED BY SUMI	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY (Signature of Contracting Officer)	16C. DATE SIGNED

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

A. This amendment is issued to incorporate Davis Bacon Wage Rate, ID000006 of 11 Feb 00, as a total replacement to the existing Wage Rate, ID990006 of 12 Mar 99.

B. The following clauses are incorporated to SECTION 00700 of the solicitation:

52.212-4007 ENVIRONMENTAL LITIGATION

(a) If the performance of all or any part of the work is suspended, delayed, or interrupted due to an order of a court of competent jurisdiction as a result of environmental litigation, as defined below, the Contracting Officer, at the request of the Contractor, shall determine whether the order is due in any part to the acts or omissions of the Contractor or a Subcontractor at any tier not required by the terms of this contract. If it is determined that the order is not due in any part to acts or omissions of the Contractor or a Subcontractor at any tier other than as required by the terms of this contract, such suspension, delay, or interruption shall be considered as if ordered by the Contracting Officer in the administration of this contract under the terms of the "Suspension of Work" clause of this contract. The period of such suspension, delay or interruption shall be considered unreasonable, and an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) as provided in that clause, subject to all the provisions thereof.

(b) The term "environmental litigation", as used herein, means a lawsuit alleging that the work will have an adverse effect on the environment or that the Government has not duly considered, either substantially or procedurally, the effect of the work on the environment.

52.223-14 TOXIC CHEMICAL RELEASE REPORTING (OCT 1996)

(a) Unless otherwise exempt, the Contractor, as owner or operator of a facility used in the performance of this contract, shall file by July 1 for the prior calendar year an annual Toxic Chemical Release Inventory Form (Form R) as described in sections 313(a) and (g) of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11023(a) and (g)), and section 6607 of the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13106). The Contractor shall file, for each facility subject to the Form R filing and reporting requirements, the annual Form R throughout the life of the contract.

(b) A Contractor owned or operated facility used in the performance of this contract is exempt from the requirement to file an annual Form R if--

(1) The facility does not manufacture, process, or otherwise use any toxic chemicals listed under section 313(c) of EPCRA, 42 U.S.C. 11023(c);

(2) The facility does not have 10 or more full-time employees as specified in section 313(b)(1)(A) of EPCRA, 42 U.S.C. 11023(b)(1)(A);

(3) The facility does not meet the reporting thresholds of toxic chemicals established under of EPCRA, 42 U.S.C. 11023(f) (including the alternate thresholds at 40 CFR 372.27, provided an appropriate certification form has been filed with EPA);

(4) The facility does not fall within Standard Industrial Classification Code (SIC) designations 20 through 39 as set forth in section 19.102 of the Federal Acquisition Regulation (FAR); or

(5) The facility is not located within any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Northern Mariana Islands, or any other territory or possession over which the United States has jurisdiction.

(c) If the Contractor has certified to an exemption in accordance with one or more of the criteria in paragraph (b) of this clause, and after award of the contract circumstances change so that any of its owned or operated facilities used in the performance of this contract is no longer exempt--

(1) The Contractor shall notify the Contracting Officer; and

(2) The Contractor, as owner or operator of a facility used in the performance of this contract that is no longer exempt, shall (i) submit a Toxic Chemical Release Inventory Form (Form R) on or before July 1 for the prior calendar year during which the facility becomes eligible; and (ii) continue to file the annual Form R for the life of the contract for such facility.

(d) The Contracting Officer may terminate this contract or take other action as appropriate, if the Contractor fails to comply accurately and fully with the EPCRA and PPA toxic chemical release filing and reporting requirements.

(e) Except for acquisitions of commercial items, as defined in FAR Part 2, the Contractor shall--

(1) For competitive subcontracts expected to exceed $100,000 (including all options), include a solicitation provision substantially the same as the provision at FAR 52.223-13, Certification of Toxic Chemical Release Reporting; and

(2) Include in any resultant subcontract exceeding $100,000 (including all options), the substance of this clause, except this paragraph (e).

(End)

52.227-2 NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT (AUG 1996)

(a) The Contractor shall report to the Contracting Officer, promptly and in reasonable written detail, each notice or claim of patent or copyright infringement based on the performance of this contract of which the Contractor has knowledge.

(b) In the event of any claim or suit against the Government on account of any alleged patent or copyright infringement arising out of the performance of this contract or out of the use of any supplies furnished or work or services performed under this contract, the Contractor shall furnish to the Government, when requested by the Contracting Officer, all evidence and information in possession of the Contractor pertaining to such suit or claim. Such evidence and information shall be furnished at the expense of the Government except where the Contractor has agreed to indemnify the Government.

(c) The Contractor agrees to include, and require inclusion of, this clause in all subcontracts at any tier for supplies or services (including construction and architect-engineer subcontracts and those for material, supplies, models,

samples, or design or testing services) expected to exceed the simplified acquisition threshold at (FAR) 2.101.to exceed the dollar amount set forth in 13.000 of the Federal Acquisition Regulation (FAR).

(End of clause)

C. The following clauses are deleted from SECTION 00700:

52.248-3 VALUE ENGINEERING—CONSTRUCTION (MAR 1989)
52.249-5000 BASIS OF SETTLEMENT OF PROPOSALS

D. Offerors must acknowledge all amendments to the solicitation in final proposal revisions.

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES	
J	1	3

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO.(If applicable)
0006	16-Feb-2000	W68MD9-9176-2870	

6. ISSUED BY CODE DACA67
USA ENGINEER DISTRICT, SEATTLE
ATTN: CENWS-CT
P.O. BOX C-3755

SEATTLE, WA 98124-3755

7. ADMINISTERED BY (If other than item 6) CODE

See Item 6

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)

CODE FACILITY CODE

X	9A. AMENDMENT OF SOLICITATION NO. DACA67-00-R-0006
X	9B. DATED (SEE ITEM 11) 22-Nov-1999
	10A. MOD. OF CONTRACT/ORDER NO.
	10B. DATED (SEE ITEM 13)

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[X] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer [ ] is extended, [X] 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 1 copies of the document; (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 THE REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

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

[ ] A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

[ ] B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).

[ ] C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

[ ] D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor [ ] 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.)

SEE FOLLOWING TEXT.

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) ELIZABETH M KEYS / ADDED BY SUMI	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY (Signature of Contracting Officer)	16C. DATE SIGNED

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

Changes in Section A

The issued by organization contact has changed from ELIZABETH M KEYS to Cheryl Anderson.

Changes in Section SF 30

PROJECT: D/B Replace Military Family Housing at Mt. Home AFB Idaho

A. This amendment is issued to incorporate the following changes:

1. Schedule - Optional Item 0007: Changed to cover the design and construction of a Water ‘Storage System as specified in Section 00860, paragraph 6.2. Requirement for the New Electrical Feeder deleted form the RFP.

2. Section 00800 Special Clauses: Changed SC-1.1 to allow award of Optional Item 0007 later than the other Optional Items.

3. Section 00860 Design Development Technical Criteria, has been amended as follows:

(a) Paragraph 1.3: Clarification to the sequencing of construction and demolition of housing units.

(b) Paragraph 6.2: Changed the water distribution system requirements for the Base Schedule and made the Water Storage System an Optional Item.

(c) Paragraph 6.5: Changed the electrical distribution system requirements for the Base Schedule and deleted the Electrical System Optional Item.

(d) Minor changes/clarifications were made to the following paragraphs:

9.2.1.1 Crawl Spaces.

9.2.3.3 Factory Finished Soffits, Fascia Cover, Shutters, and Covering for Brick Mold around Doors, Other Siding.

B. Offerors must acknowledge all amendments to this solicitation.

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AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
J	1

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO.(If applicable)
0005	14-Jan-2000	W68MD9-9176-2870	

6. ISSUED BY CODE DACA67
USA ENGINEER DISTRICT, SEATTLE
ATTN: CENWS-CT
P.O. BOX C-3755

SEATTLE, WA 98124-3755

7. ADMINISTERED BY (If other than item 6) CODE

See Item 6

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)

CODE FACILITY CODE

X	9A. AMENDMENT OF SOLICITATION NO. DACA67-00-R-0006
X	9B. DATED (SEE ITEM 11) 22-Nov-1999
	10A. MOD. OF CONTRACT/ORDER NO.
	10B. DATED (SEE ITEM 13)

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

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12. ACCOUNTING AND APPROPRIATION DATA (If required)

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

[ ] A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

[ ] B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).

[ ] C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

[ ] D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor [ ] 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.)

A. PROJECT: D/B Replace Family Military Housing, Mt. Home AFB ID. This amendment is issued to identify an environmentally sensitive area requiring protection.

B. Accordingly, the following provision and figure is incorporated into the solicitation:

1) "A small environmentally sensitive area, approximately 25 feet in diameter, is located at the following UTM coordinates: 47 68250 N, 11594059 E (these are from a hand-held GPS unit with a +/- 150 ft. accuracy). The site is .2 miles from the edge of the pavement along the dirt road running from the Bus Shelter by Fire Station 2 to the Water Tower and Base Well 6, just north of the Presidential Acres. The perimeter of the site is marked with 3 green T-posts and should be avoided during construction as well as preserved against future impacts."

2) Figure 3.6-1, Biological Resources, Mountain Home AFB, Idaho, applies (see following page).

C. The closing date and time of 25 Jan 00 at 4:00PM LOCAL TIME remain unchanged.

D. Offerors must acknowledge all amendments with their offers, preferrably in Block 19. of the SF 1442.

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) ELIZABETH M KEYS / ADDED BY SUMI	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY (Signature of Contracting Officer)	16C. DATE SIGNED

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AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
J	1

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO.(If applicable)
0004	14-Jan-2000	W68MD9-9176-2870	

6. ISSUED BY CODE DACA67
USA ENGINEER DISTRICT, SEATTLE
ATTN: CENWS-CT
P.O. BOX C-3755

SEATTLE, WA 98124-3755

7. ADMINISTERED BY (If other than item 6) CODE

See Item 6

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)

CODE FACILITY CODE

X	9A. AMENDMENT OF SOLICITATION NO. DACA67-00-R-0006
X	9B. DATED (SEE ITEM 11) 22-Nov-1999
	10A. MOD. OF CONTRACT/ORDER NO.
	10B. DATED (SEE ITEM 13)

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[X] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer [ ] is extended, [X] 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 1 copies of the document; (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 THE REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

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

[ ] A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

[ ] B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).

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[ ] 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.)

A. D/B Replace Family Military Housing, Mt. Home AFB ID. This amendment is issued to incorporate a revised SCHEDULE in SECTION 00010, to incorporate revisions to pages 5 & 38 in SECTION 00860, and to reissue of pages 96 & 97 for the Air Force Family Housing Guide.

B. Accordingly, the revised SCHEDULE hereby incorporates additional OPTION items. The reissue of SECTION 00860 incorporates revisions to paragraphs 4.2.1.1 and 9.3.2. Pages 96 & 97 of the Air Force Family Housing Guide, Attachment I are replaced for clarity purposes. *

C. The closing date and time of 25 Jan 00 at 4:00PM Local Time remain unchanged.

D. Offerors must acknowledge all amendments with their offers, preferrably in Block 19. of the SF 1442.

* (Line Items 1-3 are also revised in the Schedule.)

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.

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15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY (Signature of Contracting Officer)	16C. DATE SIGNED

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0003	12-Jan-2000	W68MD9-9176-2870	

6. ISSUED BY CODE DACA67
USA ENGINEER DISTRICT, SEATTLE
ATTN: CENWS-CT
P.O. BOX C-3755

SEATTLE, WA 98124-3755

7. ADMINISTERED BY (If other than item 6) CODE

See Item 6

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	10A. MOD. OF CONTRACT/ORDER NO.
	10B. DATED (SEE ITEM 13)

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[X] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer [X] 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 1 copies of the document; (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 THE 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.

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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.)

A. PROJECT: D/B Replace Family Military Housing, Mt. Home AFB ID. This amendment is issued to incorporate a clarification to the SCHEDULE, SECTION 00010, to incorporate a change to the submission requirements of SECTION 00100-2 INTRO and EXTEND THE PROPOSAL CLOSING,, and to incorporate an updated version of FAR 52.219-1 in SECT 00600, and to provide responses to contractor inquiries.

B. The change to SECTION 00010 SCHEDULE, page 00010-5, as issued in Amendment 0002, inadvertently omitted the dollar amount in the "Total Amount of Funds Available..." This amount remains $10,182,536 and the SCHEDULE is re-issued.

C. SECTION 00100-2 INTRO, page 00100-INTRO-9, is changed to allow facsimile transmission of the Price Proposal, except for the Bid Bond which MUST be submitted in original by the closing date. THE CLOSING DATE IS EXTENDED TO 25 Jan 00 at 4:00 PM Local Time.

D. SECTION 00600 is revised to incorporate a revision to FAR 52.219-1.

E. Responses to contractor inquiries are provided in Question and Answer format for clarification purposes only.

F. Offerors must acknowledge all amendments with their offers, perferrably in Block 19. of the SF 1442.

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) ELIZABETH M KEYS / ADDED BY SUMI	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY (Signature of Contracting Officer)	16C. DATE SIGNED

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0002	07-Jan-2000	W68MD9-9176-2870	

6. ISSUED BY CODE DACA67
USA ENGINEER DISTRICT, SEATTLE
ATTN: CENWS-CT
P.O. BOX C-3755

SEATTLE, WA 98124-3755

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	10A. MOD. OF CONTRACT/ORDER NO.
	10B. DATED (SEE ITEM 13)

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[X] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer [ ] is extended, [X] 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 document; (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 THE 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.

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[ ] B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).

[ ] C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

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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.)

A. PROJECT: D/B Replace Family Military Housing, Mt. Home AFB ID. This amendment is issued to incorporate changes to the schedule Section 00010-4 through 00010-6, incorporate changes to the specification SECTIONS 00800, 00810, 00860, to incorporate a revised Attachment D Table of Contents (TOC), to incorporate 7 new reference drawings for the substation (52159, 52160, 52161, 52165, 52166, 52877, H Circuit), to add the following Clauses 52.222-21, 52.228-4003, 52.236-17, 52.244-5, 52.249-5000. (SEE ATTACHED ELECTRONIC FILES FOR THE SCHEDULE, SECTIONS, and DRAWINGS).

B. Offerors are reminded that Large Businesses must submit a Subcontracting Plan with their offer.

C. As clarification, the goals referred to in the Technical Criteria, Extent of Small Business Participation, are the sub-contracting goals established in SECTION 00010 FOR THIS PROJECT.

D. Amendment 0003 will be issued on or about 12 January 2000 with responses to remaining inquiries.
E. Offerors must acknowledge this amendment with their offer, preferrably in Block 18. of the SF 1442.
ATTACHMENTS: Schedule 00010-4,5,6, SECTIONS 00800, 00810, 00860, Attachment D TOC, 7 Drawings.

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) LORRAINE KUNIYUKI / ADDED BY SUMI	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY (Signature of Contracting Officer)	16C. DATE SIGNED

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AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES	
J	1	2

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO.(If applicable)
0001	14-Dec-1999	W68MD9-9176-2870	

6. ISSUED BY CODE DACA67
USA ENGINEER DISTRICT, SEATTLE
ATTN: CENWS-CT
P.O. BOX C-3755

SEATTLE, WA 98124-3755

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X	9B. DATED (SEE ITEM 11) 22-Nov-1999
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11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[X] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer [X] 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 1 copies of the document; (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 THE 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)

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IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

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[ ] C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

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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.)

A. PROJECT: D/B Replace Family Military Housing, Mt. Home AFB ID. This amendment is issued to revise the solicitation closing date and time, to incorporate changes to the specification SECTIONS 00810 & 00860, to incorporate a new SECTION 13280 (Asbestos Abatement), and to incorporate 3 drawings with SECTION 13280. (SEE ATTACHED ELECTRONIC FILES FOR THE SECTIONS/DRAWINGS.)

B. The solicitation closing date and time is changed to: 21 JANUARY 2000 at 4:00PM LOCAL TIME.

C. In addition, a transcript, including a list of those in attendance, from the PreProposal Conference/Site Visit is provided for information purposes. This transcript is not incorporated to the solicitation.

D. Questions and answers are also provided, but not incorporated. Amendment 0002 will be issued on or about 22 Dec 1999 with responses to remaining inquiries.

E. Offerors must acknowledge this amendment with their offer, preferrably in Block 18. of the SF 1442.

ATTACHMENTS: SECTIONS 00810, 00860, 13280 (including drawings)

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) ELIZABETH M KEYS / ADDED BY SUMI	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY (Signature of Contracting Officer)	16C. DATE SIGNED

NAME OF OFFEROR OR CONTRACTOR

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

Changes in Section A

The required response date/time has changed from 07-Jan-2000 15:00 to 21-Jan-2000 16:00

SECTION 00700

FAR 52.222-21 PROHIBITION OF SEGREGATED FACILITIES

(a) Segregated facilities, as used in this clause, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, sec, or national origin because of written or oral policies or employee custom. The term does not include separate or single-user rest rooms or necessary dressing or sleeping areas provided to assure privacy between the sexes.
(b) The Contractor agrees that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The Contractor agrees that a breach of this clause is a violation of the Equal Opportunity clause in this contract.
(c) The Contractor shall include this clause in every subcontract and purchase order that is subject to the Equal Opportunity clause of this contract.

FAR 52.228-4003 INDIVIDUAL SURETIES

As prescribed in FAR 28.203, individual sureties are acceptable for all types of bonds except position schedule bonds.

One individual surety is adequate support for a bond, provided the unencumbered value of the assets pledged by that individual surety equal or exceed the amount of the bond. An offeror may submit up to three individual sureties for each bond, in which case the pledged assets, when combined, must equal or exceed the penal amount of the bond. Each individual surety must accept both joint and several liability to the extent of the penal amount of the bond.

An individual surety may be accepted only if a security interest in acceptable assets is provided to the Government by the individual surety.
THE SECURITY INTEREST SHALL BE FURNISHED WITH THE BOND.

Acceptable assets include:

(a) Cash, or certificates of deposit, or other cash equivalents with a federally insured financial institution;

(b) United States Government securities at market value.

(c) Stocks and bonds actively traded on a national U.S. security exchange with certificates issued in the name of the individual surety. (See FAR 28.203-2(b)(3) for list of acceptable exchanges).
(d) Real property owned in fee simple by the surety without any form of concurrent ownership, except as provided in FAR 28.203-2(c) (3)(iii), and located within the 50 United States, its territories, or possessions. These assets will be accepted at 100% of the most current tax assessment value (exclusive of encumbrances) or 75% of the properties' unencumbered market value provided a current appraisal is furnished. (See clause entitled "Pledges of Assets").

(e) Irrevocable letters of credit (ILC) issued by a federally insured financial institution in the name of the contracting agency and which identify the agency and solicitation or contract number for which the ILC is provided.

Unacceptable assets include but are not limited to:

(a) Notes or accounts receivable;

(b) Foreign securities;

(c) Real property as follows:

(1) Real property located outside the United States, its territories, or possessions.

(2) Real property which is a principal residence of the surety.

(3) Real property owned concurrently regardless of the form of co-tenancy (including joint tenancy, tenancy by the entirety, and tenancy in common) except where all co-tenants agree to act jointly.

(4) Life estates, leasehold estates, or future interests in real property.

(d) Personal property other than that listed as acceptable assets above (e.g., jewelry, furs, antiques);

(e) Stocks and bonds of the individual surety in a controlled, affiliated, or closely held concern of the offeror/contractor;

(f) corporate assets (e.g., plant and equipment);

(g) Speculative assets (e.g., mineral rights);

(h) Letters of credit, except as provided above.

In order for the Contracting Officer to determine the acceptability of individuals proposed as sureties, all bidders/offerors who submit bonds which are executed by individual sureties shall furnish with the bonds:

(a) SF28, Affidavit of Individual Surety,

(b) Security interest provided to the Government for all pledged assets (See clause entitled "Pledge of Assets") and

(c) A current list of all other bonds (including Bid Bonds) on which each individual surety is a surety and bonds for which the individual is requesting to be a surety, together with a statement as to the percent of completion of these bonded jobs. The list will include Contract or Solicitation Numbers, the name, address and telephone number of the contracting office, the type of bond (bid, performance or payment), and the amount of each original obligation. (Note: Performance and Payment bonds must be listed separately.)

Failure to furnish this information may result in non-approval of the surety and a determination of nonresponsibility.

FAR 52.236-17 LAYOUT OF WORK (APR 1984)

The Contractor shall lay out its work from Government established base lines and bench marks indicated on the drawings, and shall be responsible for all measurements in connection with the layout. The Contractor shall furnish, at its own expense, all stakes, templates, platforms, equipment tools, materials, and labor required to lay out any part of the work. The Contractor shall be responsible for executing the work to the lines and grades that may be established or indicated by the Contracting Officer. The contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the Contracting Officer until authorized to remove them. If such marks are destroyed by the Contractor or through its negligence before their removal is authorized, the Contracting Officer may replace them and deduct the expense of the replacement from any amounts due or to become due to the Contractor.

FAR 52.244-5 COMPETITION IN SUBCONTRACT (DEC 1996)

(a) The Contractor shall select subcontractors (including suppliers) on a competitive basis to the maximum practical extent consistent with the objectives and requirements of the contract.
(b) If the Contractor is an approved mentor under the Department of Defense Pilot Mentor-Protégé Program (Pub. L. 101-510, section 831 as amended), the Contractor may award subcontracts under this contract on a noncompetitive basis to its proteges.

FAR 52.249-5000 BASIS FOR SETTLEMENT OF PROPOSALS

Actual costs will be used to determine equipment costs for a settlement proposal submitted on the total cost basis under FAR 49.206-2(b). In evaluating a terminations settlement proposal using the total cost basis, the following principles will be applied to determine allowable equipment costs:

(1) Actual costs for each piece of equipment, or groups of similar serial or series equipment, need not be available in the contractor's accounting records to determine total actual equipment costs.

(2) If equipment costs have been allocated to a contract using predetermined rates, those charges will be adjusted to actual costs.

(3) Recorded job costs adjusted for unallowable expenses will be used to determine equipment operating expenses.

(4) Ownership costs (depreciation) will be determined using the contractor's depreciation schedule (subject to the provisions of FAR 31.205-11).

(5) License taxes, storage and insurance costs are normally recovered as an indirect expense and unless the contractor charges these costs directly to contracts, they will be recovered through the indirect expense rate.

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SECTION SF 30 BLOCK 14 CONTINUATION PAGE

A. This amendment is issued to incorporate Davis Bacon Wage Rate, ID000006 of 11 Feb 00, as a total replacement to the existing Wage Rate, ID990006 of 12 Mar 99.

B. The following clauses are incorporated to SECTION 00700 of the solicitation:

52.212-4007 ENVIRONMENTAL LITIGATION

(a) If the performance of all or any part of the work is suspended, delayed, or interrupted due to an order of a court of competent jurisdiction as a result of environmental litigation, as defined below, the Contracting Officer, at the request of the Contractor, shall determine whether the order is due in any part to the acts or omissions of the Contractor or a Subcontractor at any tier not required by the terms of this contract. If it is determined that the order is not due in any part to acts or omissions of the Contractor or a Subcontractor at any tier other than as required by the terms of this contract, such suspension, delay, or interruption shall be considered as if ordered by the Contracting Officer in the administration of this contract under the terms of the "Suspension of Work" clause of this contract. The period of such suspension, delay or interruption shall be considered unreasonable, and an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) as provided in that clause, subject to all the provisions thereof.

(b) The term "environmental litigation", as used herein, means a lawsuit alleging that the work will have an adverse effect on the environment or that the Government has not duly considered, either substantially or procedurally, the effect of the work on the environment.

52.223-14 TOXIC CHEMICAL RELEASE REPORTING (OCT 1996)

(a) Unless otherwise exempt, the Contractor, as owner or operator of a facility used in the performance of this contract, shall file by July 1 for the prior calendar year an annual Toxic Chemical Release Inventory Form (Form R) as described in sections 313(a) and (g) of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11023(a) and (g)), and section 6607 of the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13106). The Contractor shall file, for each facility subject to the Form R filing and reporting requirements, the annual Form R throughout the life of the contract.

(b) A Contractor owned or operated facility used in the performance of this contract is exempt from the requirement to file an annual Form R if--

(1) The facility does not manufacture, process, or otherwise use any toxic chemicals listed under section 313(c) of EPCRA, 42 U.S.C. 11023(c);

(2) The facility does not have 10 or more full-time employees as specified in section 313(b)(1)(A) of EPCRA, 42 U.S.C. 11023(b)(1)(A);

(3) The facility does not meet the reporting thresholds of toxic chemicals established under of EPCRA, 42 U.S.C. 11023(f) (including the alternate thresholds at 40 CFR 372.27, provided an appropriate certification form has been filed with EPA);

(4) The facility does not fall within Standard Industrial Classification Code (SIC) designations 20 through 39 as set forth in section 19.102 of the Federal Acquisition Regulation (FAR); or

(5) The facility is not located within any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Northern Mariana Islands, or any other territory or possession over which the United States has jurisdiction.

(c) If the Contractor has certified to an exemption in accordance with one or more of the criteria in paragraph (b) of this clause, and after award of the contract circumstances change so that any of its owned or operated facilities used in the performance of this contract is no longer exempt--

(1) The Contractor shall notify the Contracting Officer; and

(2) The Contractor, as owner or operator of a facility used in the performance of this contract that is no longer exempt, shall (i) submit a Toxic Chemical Release Inventory Form (Form R) on or before July 1 for the prior calendar year during which the facility becomes eligible; and (ii) continue to file the annual Form R for the life of the contract for such facility.

(d) The Contracting Officer may terminate this contract or take other action as appropriate, if the Contractor fails to comply accurately and fully with the EPCRA and PPA toxic chemical release filing and reporting requirements.

(e) Except for acquisitions of commercial items, as defined in FAR Part 2, the Contractor shall--

(1) For competitive subcontracts expected to exceed $100,000 (including all options), include a solicitation provision substantially the same as the provision at FAR 52.223-13, Certification of Toxic Chemical Release Reporting; and

(2) Include in any resultant subcontract exceeding $100,000 (including all options), the substance of this clause, except this paragraph (e).

(End)

52.227-2 NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT (AUG 1996)

(a) The Contractor shall report to the Contracting Officer, promptly and in reasonable written detail, each notice or claim of patent or copyright infringement based on the performance of this contract of which the Contractor has knowledge.

(b) In the event of any claim or suit against the Government on account of any alleged patent or copyright infringement arising out of the performance of this contract or out of the use of any supplies furnished or work or services performed under this contract, the Contractor shall furnish to the Government, when requested by the Contracting Officer, all evidence and information in possession of the Contractor pertaining to such suit or claim. Such evidence and information shall be furnished at the expense of the Government except where the Contractor has agreed to indemnify the Government.

(c) The Contractor agrees to include, and require inclusion of, this clause in all subcontracts at any tier for supplies or services (including construction and architect-engineer subcontracts and those for material, supplies, models,

samples, or design or testing services) expected to exceed the simplified acquisition threshold at (FAR) 2.101.to exceed the dollar amount set forth in 13.000 of the Federal Acquisition Regulation (FAR).

(End of clause)

C. The following clauses are deleted from SECTION 00700:

52.248-3 VALUE ENGINEERING—CONSTRUCTION (MAR 1989)
52.249-5000 BASIS OF SETTLEMENT OF PROPOSALS

D. Offerors must acknowledge all amendments to the solicitation in final proposal revisions.

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SECTION 00700

CONTRACT CLAUSES

1 52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at these addresses:

http://www.arnet.gov/far
http://farsite.hill.af.mil
http://www.dtic.mil/dfars

(End of clause)

2 52.201-4001 SUCCESSOR CONTRACTING OFFICERS (52.0201-4001)

The Contracting Officer who signed this contract is the primary Contracting Officer for the contract. Nevertheless, any Contracting Officer assigned to the Seattle District and acting within his/her authority may take formal action on this contract when a contract action needs to be taken and the primary Contracting Officer is unavailable.

3 52.201-7000 CONTRACTING OFFICER'S REPRESENTATIVE (DEC 1991)

(a) Definition. "Contracting officer's representative" means an individual designated in accordance with subsection 201.602-2 of the Defense Federal Acquisition Regulation Supplement and authorized in writing by the Contracting Officer to perform specific technical or administrative functions.

(b) If the Contracting Officer designates a contracting officer's representative (COR), the Contractor will receive a copy of the written designation. It will specify the extent of the COR's authority to act on behalf of the Contracting Officer. The COR is not authorized to make any commitments or changes that will affect price, quality, quantity, delivery, or any other term or condition of the contract.

(End of clause)

4 52.202-1 I DEFINITIONS (OCT 1995)--ALTERNATE I (APR 1984)

(a) "Head of the agency" (also called "agency head") or "Secretary" means the Secretary (or Attorney General, Administrator, Governor, Chairperson, or other chief official, as appropriate) of the agency, including any deputy or assistant chief official of the agency; and the term "authorized representative" means any person, persons, or board (other than the Contracting Officer) authorized to act for the head of the agency or Secretary.

(b) Commercial component means any component that is a commercial item.

(c) Component means any item supplied to the Federal Government as part of an end item or of another component.

(d) Nondevelopmental item means--

(1) Any previously developed item of supply used exclusively for governmental purposes by a Federal agency, a State or local government, or a foreign government with which the United States has a mutual defense

cooperation agreement;

(2) Any item described in paragraph (e)(1) of this definition that requires only minor modification or modifications of a type customarily available in the commercial marketplace in order to meet the requirements of the procuring department or agency; or

(3) Any item of supply being produced that does not meet the requirements of paragraph (e)(1) or (e)(2) solely because the item is not yet in use.

(e) "Contracting Officer" means a person with the authority to enter into, administer, and/or terminate contracts and make related determinations and findings. The term includes certain authorized representatives of the Contracting Officer acting within the limits of their authority as delegated by the Contracting Officer.

(f) Except as otherwise provided in this contract, the term "subcontracts" includes, but is not limited to, purchase orders and changes and modifications to purchase orders under this contract.

(End of clause)

5 52.203-3 GRATUITIES (APR 1984)

(a) The right of the Contractor to proceed may be terminated by written notice if, after notice and hearing, the agency head or a designee determines that the Contractor, its agent, or another representative--

(1) Offered or gave a gratuity (e.g., an entertainment or gift) to an officer, official, or employee of the Government; and

(2) Intended, by the gratuity, to obtain a contract or favorable treatment under a contract.

(b) The facts supporting this determination may be reviewed by any court having lawful jurisdiction.

(c) If this contract is terminated under paragraph (a) above, the Government is entitled--

(1) To pursue the same remedies as in a breach of the contract; and

(2) In addition to any other damages provided by law, to exemplary damages of not less than 3 nor more than 10 times the cost incurred by the Contractor in giving gratuities to the person concerned, as determined by the agency head or a designee. (This subparagraph (c)(2) is applicable only if this contract uses money appropriated to the Department of Defense.)

(d) The rights and remedies of the Government provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract.

(End of clause)

(R 7-104.16 1952 MAR)

6 52.203-5 COVENANT AGAINST CONTINGENT FEES (APR 1984)

(a) The Contractor warrants that no person or agency has been employed or retained to solicit or obtain this contract upon an agreement or understanding for a contingent fee, except a bona fide employee or agency. For breach or violation of this warranty, the Government shall have the right to annul this contract without liability or, in its discretion, to deduct from the contract price or consideration, or otherwise recover, the full amount of the contingent fee.

(b) "Bona fide agency," as used in this clause, means an established commercial or selling agency, maintained by a contractor for the purpose

of securing business, that neither exerts nor proposes to exert improper influence to solicit or obtain Government contracts nor holds itself out as being able to obtain any Government contract or contracts through improper influence.

"Bona fide employee," as used in this clause, means a person, employed by a Contractor and subject to the Contractor's supervision and control as to time, place, and manner of performance, who neither exerts nor proposes to exert improper influence to solicit or obtain Government contracts nor holds out as being able to obtain any Government contract or contracts through improper influence.

"Contingent fee," as used in this clause, means any commission, percentage, brokerage, or other fee that is contingent upon the success that a person or concern has in securing a Government contract.

"Improper influence," as used in this clause, means any influence that induces or tends to induce a Government employee or officer to give consideration or to act regarding a Government contract on any basis other than the merits of the matter.

(End of clause)
(R 7-103.20 1958 JAN)
(R 1-1.503)
(R 1-7.102-18)

7 52.203-7 ANTI-KICKBACK PROCEDURES (JUL 1995)

(a) Definitions.

"Kickback," as used in this clause, means any money, fee, commission, credit, gift, gratuity, thing of value, or compensation of any kind which is provided, directly or indirectly, to any prime Contractor, prime Contractor employee, subcontractor, or subcontractor employee for the purpose of improperly obtaining or rewarding favorable treatment in connection with a prime contract or in connection with a subcontract relating to a prime contract.

"Person," as used in this clause, means a corporation, partnership, business association of any kind, trust, joint-stock company, or individual.

"Prime contract," as used in this clause, means a contract or contractual action entered into by the United States for the purpose of obtaining supplies, materials, equipment, or services of any kind.

"Prime Contractor" as used in this clause, means a person who has entered into a prime contract with the United States.

"Prime Contractor employee," as used in this clause, means any officer, partner, employee, or agent of a prime Contractor.

"Subcontract," as used in this clause, means a contract or contractual action entered into by a prime Contractor or subcontractor for the purpose of obtaining supplies, materials, equipment, or services of any kind under a prime contract.

"Subcontractor," as used in this clause, (1) means any person, other than the prime Contractor, who offers to furnish or furnishes any supplies, materials, equipment, or services of any kind under a prime contract or a subcontract entered into in connection with such prime contract, and (2) includes any person who offers to furnish or furnishes general supplies to the prime Contractor or a higher tier subcontractor.

"Subcontractor employee," as used in this clause, means any officer, partner, employee, or agent of a subcontractor.

(b) The Anti-Kickback Act of 1986 (41 U.S.C. 51-58) (the Act), prohibits any person from--

(1) Providing or attempting to provide or offering to provide any kickback;

(2) Soliciting, accepting, or attempting to accept any kickback; or

(3) Including, directly or indirectly, the amount of any kickback in the contract price charged by a prime Contractor to the United States or in the contract price charged by a subcontractor to a prime Contractor or higher tier subcontractor.

(c)(1) The Contractor shall have in place and follow reasonable procedures designed to prevent and detect possible violations described in paragraph (b) of this clause in its own operations and direct business relationships.

(2) When the Contractor has reasonable grounds to believe that a violation described in paragraph (b) of this clause may have occurred, the Contractor shall promptly report in writing the possible violation. Such reports shall be made to the inspector general of the contracting agency, the head of the contracting agency if the agency does not have an inspector general, or the Department of Justice.

(3) The Contractor shall cooperate fully with any Federal agency investigating a possible violation described in paragraph (b) of this clause.

(4) The Contracting Officer may (i) offset the amount of the kickback against any monies owed by the United States under the prime contract and/or (ii) direct that the Prime Contractor withhold from sums owed a subcontractor under the prime contract the amount of the kickback. The Contracting Officer may order that monies withheld under subdivision (c)(4)(ii) of this clause be paid over to the Government unless the Government has already offset those monies under subdivision (c)(4)(i) of this clause. In either case, the Prime Contractor shall notify the Contracting Officer when the monies are withheld.

(5) The Contractor agrees to incorporate the substance of this clause, including subparagraph (c)(5) but excepting subparagraph (c)(1), in all subcontracts under this contract which exceed $100,000.

(End of clause)

8 52.203-8 CANCELLATION, RESCISSION, AND RECOVERY OF FUNDS FOR ILLEGAL OR IMPROPER ACTIVITY (JAN 1997)

(a) If the Government receives information that a contractor or a person has engaged in conduct constituting a violation of subsection (a), (b), (c), or (d) of Section 27 of the Office of Federal Procurement Policy Act (41 U.S.C. 423) (the Act), as amended by section 4304 of the National Defense Authorization Act for Fiscal Year 1996 (Pub. L. 104-106), the Government may--

(1) Cancel the solicitation, if the contract has not yet been awarded or issued; or

(2) Rescind the contract with respect to which--

(i) The Contractor or someone acting for the Contractor has been convicted for an offense where the conduct constitutes a violation of subsection 27 (a) or (b) of the Act for the purpose of either--

(A) Exchanging the information covered by such subsections for anything of value; or

(B) Obtaining or giving anyone a competitive advantage in the award of a Federal agency procurement contract; or

(ii) The head of the contracting activity has determined, based upon a preponderance of the evidence, that the Contractor or someone acting for the Contractor has engaged in conduct constituting an offense

punishable under subsection 27(e)(1) of the Act.

(b) If the Government rescinds the contract under paragraph (a) of this clause, the Government is entitled to recover, in addition to any penalty prescribed by law, the amount expended under the contract.

(c) The rights and remedies of the Government specified herein are not exclusive, and are in addition to any other rights and remedies provided by law, regulation, or under this contract.

(End of clause)

9 52.203-10 PRICE OR FEE ADJUSTMENT FOR ILLEGAL OR IMPROPER ACTIVITY (JAN 1997)

(a) The Government, at its election, may reduce the price of a fixed-price type contract and the total cost and fee under a cost-type contract by the amount of profit or fee determined as set forth in paragraph (b) of this clause if the head of the contracting activity or designee determines that there was a violation of subsection 27 (a), (b), or (c) of the Office of Federal Procurement Policy Act, as amended (41 U.S.C. 423), as implemented in section 3.104 of the Federal Acquisition Regulation.

(b) The price or fee reduction referred to in paragraph (a) of this clause shall be--

(1) For cost-plus-fixed-fee contracts, the amount of the fee specified in the contract at the time of award;

(2) For cost-plus-incentive-fee contracts, the target fee specified in the contract at the time of award, notwithstanding any minimum fee or "fee floor" specified in the contract;

(3) For cost-plus-award-fee contracts--

(i) The base fee established in the contract at the time of contract award;

(ii) If no base fee is specified in the contract, 30 percent of the amount of each award fee otherwise payable to the Contractor for each award fee evaluation period or at each award fee determination point.

(4) For fixed-price-incentive contracts, the Government may--

(i) Reduce the contract target price and contract target profit both by an amount equal to the initial target profit specified in the contract at the time of contract award; or

(ii) If an immediate adjustment to the contract target price and contract target profit would have a significant adverse impact on the incentive price revision relationship under the contract, or adversely affect the contract financing provisions, the Contracting Officer may defer such adjustment until establishment of the total final price of the contract. The total final price established in accordance with the incentive price revision provisions of the contract shall be reduced by an amount equal to the initial target profit specified in the contract at the time of contract award and such reduced price shall be the total final contract price.

(5) For firm-fixed-price contracts, by 10 percent of the initial contract price or a profit amount determined by the Contracting Officer from records or documents in existence prior to the date of the contract award.

(c) The Government may, at its election, reduce a prime contractor's price or fee in accordance with the procedures of paragraph (b) of this clause for violations of the Act by its subcontractors by an amount not to exceed the amount of profit or fee reflected in the subcontract at the time the subcontract was first definitively priced.

(d) In addition to the remedies in paragraphs (a) and (c) of this clause, the Government may terminate this contract for default. The rights and remedies of the Government specified herein are not exclusive, and are in addition to any other rights and remedies provided by law or under this contract.

(End of clause)

10 52.203-12 LIMITATION ON PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (JUN 1997)

(a) Definitions.

"Agency," as used in this clause, means executive agency as defined in 2.101.

"Covered Federal action," as used in this clause, means any of the following Federal actions:

(1) The awarding of any Federal contract.

(2) The making of any Federal grant.

(3) The making of any Federal loan.

(4) The entering into of any cooperative agreement.

(5) The extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

"Indian tribe" and "tribal organization," as used in this clause, have the meaning provided in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450B) and include Alaskan Natives.

"Influencing or attempting to influence," as used in this clause, means making, with the intent to influence, any communication to or appearance before an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any covered Federal action.

"Local government," as used in this clause, means a unit of government in a State and, if chartered, established, or otherwise recognized by a State for the performance of a governmental duty, including a local public authority, a special district, an intrastate district, a council of governments, a sponsor group representative organization, and any other instrumentality of a local government.

"Officer or employee of an agency," as used in this clause, includes the following individuals who are employed by an agency:

(1) An individual who is appointed to a position in the Government under title 5, United States Code, including a position under a temporary appointment.

(2) A member of the uniformed services, as defined in subsection 101(3), title 37, United States Code.

(3) A special Government employee, as defined in section 202, title 18, United States Code.

(4) An individual who is a member of a Federal advisory committee, as defined by the Federal Advisory Committee Act, title 5, United States Code, appendix 2.

"Person," as used in this clause, means an individual, corporation, company, association, authority, firm, partnership, society, State, and local government, regardless of whether such entity is operated for profit, or not for profit. This term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Reasonable compensation," as used in this clause, means, with respect to a regularly employed officer or employee of any person, compensation that is consistent with the normal compensation for such officer or

employee for work that is not furnished to, not funded by, or not furnished in cooperation with the Federal Government.

"Reasonable payment," as used in this clause, means, with respect to professional and other technical services, a payment in an amount that is consistent with the amount normally paid for such services in the private sector.

"Recipient," as used in this clause, includes the Contractor and all subcontractors. This term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Regularly employed," as used in this clause, means, with respect to an officer or employee of a person requesting or receiving a Federal contract, an officer or employee who is employed by such person for at least 130 working days within 1 year immediately preceding the date of the submission that initiates agency consideration of such person for receipt of such contract. An officer or employee who is employed by such person for less than 130 working days within 1 year immediately preceding the date of the submission that initiates agency consideration of such person shall be considered to be regularly employed as soon as he or she is employed by such person for 130 working days.

"State," as used in this clause, means a State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, a territory or possession of the United States, an agency or instrumentality of a State, and multi-State, regional, or interstate entity having governmental duties and powers.

(b) Prohibitions.

(1) Section 1352 of title 31, United States Code, among other things, prohibits a recipient of a Federal contract, grant, loan, or cooperative agreement from using appropriated funds to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract; the making of any Federal grant; the making of any Federal loan; the entering into of any cooperative agreement; or the modification of any Federal contract, grant, loan, or cooperative agreement.

(2) The Act also requires Contractors to furnish a disclosure if any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a Federal contract, grant, loan, or cooperative agreement.

(3) The prohibitions of the Act do not apply under the following conditions:

(i) Agency and legislative liaison by own employees.

(A) The prohibition on the use of appropriated funds, in subparagraph (b)(1) of this clause, does not apply in the case of a payment of reasonable compensation made to an officer or employee of a person requesting or receiving a covered Federal action if the payment is for agency and legislative liaison activities not directly related to a covered Federal action.

(B) For purposes of subdivision (b)(3)(i)(A) of this clause, providing any information specifically requested by an agency or Congress is permitted at any time.

(C) The following agency and legislative liaison activities are permitted at any time where they are not related to a specific

solicitation for any covered Federal action:

(1) Discussing with an agency the qualities and characteristics (including individual demonstrations) of the person's products or services, conditions or terms of sale, and service capabilities.

(2) Technical discussions and other activities regarding the application or adaptation of the person's products or services for an agency's use.

(D) The following agency and legislative liaison activities are permitted where they are prior to formal solicitation of any covered Federal action--

(1) Providing any information not specifically requested but necessary for an agency to make an informed decision about initiation of a covered Federal action;

(2) Technical discussions regarding the preparation of an unsolicited proposal prior to its official submission; and

(3) Capability presentations by persons seeking awards from an agency pursuant to the provisions of the Small Business Act, as amended by Pub. L. 95-507, and subsequent amendments.

(E) Only those services expressly authorized by subdivision (b)(3)(i)(A) of this clause are permitted under this clause.

(ii) Professional and technical services.

(A) The prohibition on the use of appropriated funds, in subparagraph (b)(1) of this clause, does not apply in the case of--

(1) A payment of reasonable compensation made to an officer or employee of a person requesting or receiving a covered Federal action or an extension, continuation, renewal, amendment, or modification of a covered Federal action, if payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal action or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal action.

(2) Any reasonable payment to a person, other than an officer or employee of a person requesting or receiving a covered Federal action or an extension, continuation, renewal, amendment, or modification of a covered Federal action if the payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal action or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal action. Persons other than officers or employees of a person requesting or receiving a covered Federal action include consultants and trade associations.

(B) For purposes of subdivision (b)(3)(ii)(A) of this clause, "professional and technical services" shall be limited to advice and analysis directly applying any professional or technical discipline. For example, drafting of a legal document accompanying a bid or proposal by a lawyer is allowable. Similarly, technical advice provided by an engineer on the performance or operational capability of a piece of equipment rendered directly in the negotiation of a contract is allowable. However, communications with the intent to influence made by a professional (such as a licensed lawyer) or a technical person (such as a licensed accountant) are not allowable under this section unless they provide advice and analysis directly applying their professional or technical expertise and unless the advice or analysis is rendered directly and solely in the preparation, submission or negotiation of a covered Federal action. Thus, for example,

communications with the intent to influence made by a lawyer that do not provide legal advice or analysis directly and solely related to the legal aspects of his or her client's proposal, but generally advocate one proposal over another are not allowable under this section because the lawyer is not providing professional legal services. Similarly, communications with the intent to influence made by an engineer providing an engineering analysis prior to the preparation or submission of a bid or proposal are not allowable under this section since the engineer is providing technical services but not directly in the preparation, submission or negotiation of a covered Federal action.

(C) Requirements imposed by or pursuant to law as a condition for receiving a covered Federal award include those required by law or regulation and any other requirements in the actual award documents.

(D) Only those services expressly authorized by subdivisions (b)(3)(ii)(A)(1) and (2) of this clause are permitted under this clause.

(E) The reporting requirements of FAR 3.803(a) shall not apply with respect to payments of reasonable compensation made to regularly employed officers or employees of a person.

(c) Disclosure.

(1) The Contractor who requests or receives from an agency a Federal contract shall file with that agency a disclosure form, OMB standard form LLL, Disclosure of Lobbying Activities, if such person has made or has agreed to make any payment using nonappropriated funds (to include profits from any covered Federal action), which would be prohibited under subparagraph (b)(1) of this clause, if paid for with appropriated funds.

(2) The Contractor shall file a disclosure form at the end of each calendar quarter in which there occurs any event that materially affects the accuracy of the information contained in any disclosure form previously filed by such person under subparagraph (c)(1) of this clause. An event that materially affects the accuracy of the information reported includes--

(i) A cumulative increase of $25,000 or more in the amount paid or expected to be paid for influencing or attempting to influence a covered Federal action; or

(ii) A change in the person(s) or individual(s) influencing or attempting to influence a covered Federal action; or

(iii) A change in the officer(s), employee(s), or Member(s) contacted to influence or attempt to influence a covered Federal action.

(3) The Contractor shall require the submittal of a certification, and if required, a disclosure form by any person who requests or receives any subcontract exceeding $100,000 under the Federal contract.

(4) All subcontractor disclosure forms (but not certifications) shall be forwarded from tier to tier until received by the prime Contractor. The prime Contractor shall submit all disclosures to the Contracting Officer at the end of the calendar quarter in which the disclosure form is submitted by the subcontractor. Each subcontractor certification shall be retained in the subcontract file of the awarding Contractor.

(d) Agreement. The Contractor agrees not to make any payment prohibited by this clause.

(e) Penalties.

(1) Any person who makes an expenditure prohibited under paragraph (a) of this clause or who fails to file or amend the disclosure form to be filed or amended by paragraph (b) of this clause shall be subject to civil penalties as provided for by 31 U.S.C. 1352. An imposition of a

civil penalty does not prevent the Government from seeking any other remedy that may be applicable.

(2) Contractors may rely without liability on the representation made by their subcontractors in the certification and disclosure form.

(f) Cost allowability. Nothing in this clause makes allowable or reasonable any costs which would otherwise be unallowable or unreasonable. Conversely, costs made specifically unallowable by the requirements in this clause will not be made allowable under any other provision.

(End of clause)

11 52.203-7001 PROHIBITION ON PERSONS CONVICTED OF FRAUD OR OTHER DEFENSE-CONTRACT-RELATED FELONIES (MAR 1999)

(a) Definitions.

As used in this clause--

(1) "Arising out of a contract with the DoD" means any act in connection with--

(i) Attempting to obtain;

(ii) Obtaining; or

(iii) Performing a contract or first-tier subcontract of any agency, department, or component of the Department of Defense (DoD).

(2) "Conviction of fraud or any other felony" means any conviction for fraud or a felony in violation of state or Federal criminal statutes, whether entered on a verdict or plea, including a plea of nolo contendere, for which sentence has been imposed.

(3) "Date of conviction" means the date judgment was entered against the individual.

(b) Any individual who is convicted after September 29, 1988, of fraud or any other felony arising out of a contract with the DoD is prohibited from serving--

(1) In a management or supervisory capacity on any DoD contract or first-tier subcontract;

(2) On the board of directors of any DoD contractor or first-tier subcontractor;

(3) As a consultant, agent, or representative for any DoD contractor or first-tier subcontractor; or

(4) In any other capacity with the authority to influence, advise, or control the decisions of any DoD contractor or subcontractor with regard to any DoD contract or first-tier subcontract.

(c) Unless waived, the prohibition in paragraph (b) of this clause applies for not less than 5 years from the date of conviction.

(d) 10 U.S.C. 2408 provides that a defense Contractor or first-tier subcontractor shall be subject to a criminal penalty of not more than $500,000 if convicted of knowingly--

(1) Employing a person under a prohibition specified in paragraph (b) of this clause; or

(2) Allowing such a person to serve on the board of directors of the Contractor or first-tier subcontractor.

(e) In addition to the criminal penalties contained in 10 U.S.C. 2408, the Government may consider other available remedies, such as--

(1) Suspension or debarment;

(2) Cancellation of the contract at no cost to the Government; or

(3) Termination of the contract for default.

(f) The Contractor may submit written requests for waiver of the prohibition in paragraph (b) of this clause to the Contracting Officer. Requests shall clearly identify--

(1) The person involved;

(2) The nature of the conviction and resultant sentence or punishment imposed;

(3) The reasons for the requested waiver; and

(4) An explanation of why a waiver is in the interest of national security.

(g) The Contractor agrees to include the substance of this clause, appropriately modified to reflect the identity and relationship of the parties, in all first-tier subcontracts exceeding the simplified acquisition threshold in Part 2 of the Federal Acquisition Regulation, except those for commercial items or components.

(h) Pursuant to 10 U.S.C. 2408(c), defense contractors and subcontractors may obtain information as to whether a particular person has been convicted of fraud or any other felony arising out of a contract with the DoD by contacting The Office of Justice Programs, The Denial of Federal Benefits Office, U.S. Department of Justice, telephone (202) 616-3507.

(End of clause)

12 52.203-7002 DISPLAY OF DOD HOTLINE POSTER (DEC 1991)

(a) The Contractor shall display prominently in common work areas within business segments performing work under Department of Defense (DoD) contracts, DoD Hotline Posters prepared by the DoD Office of the Inspector General.

(b) DoD Hotline Posters may be obtained from the DoD Inspector General, ATTN: Defense Hotline, 400 Army Navy Drive, Washington, DC 22202-2884.

(c) The Contractor need not comply with paragraph (a) of this clause if it has established a mechanism, such as a hotline, by which employees may report suspected instances of improper conduct, and instructions that encourage employees to make such reports.

(End of clause)

13 52.204-4 PRINTING/COPYING DOUBLE-SIDED ON RECYCLED PAPER (JUN 1996)

(a) In accordance with Executive Order 12873, dated October 20, 1993, as amended by Executive Order 12995, dated March 25, 1996, the Offeror/Contractor is encouraged to submit paper documents, such as offers, letters, or reports, that are printed/copied double-sided on recycled paper that has at least 20 percent postconsumer material.

(b) The 20 percent standard applies to high-speed copier paper, offset paper, forms bond, computer printout paper, carbonless paper, file folders, white woven envelopes, and other uncoated printed and writing paper, such as writing and office paper, book paper, cotton fiber paper, and cover stock. An alternative to meeting the 20 percent postconsumer material standard is 50 percent recovered material content of certain industrial by-products.

(End of clause)

14 52.204-7001 COMMERCIAL AND GOVERNMENT ENTITY (CAGE) CODE REPORTING (AUG 1999)

(a) The offeror is requested to enter its CAGE code on its offer in the block with its name and address. The CAGE code entered must be for that name and address. Enter "CAGE" before the number.

(b) If the offeror does not have a CAGE code, it may ask the Contracting Officer to request one from the Defense Logistics Information Service (DLIS). The Contracting Officer will--

(1) Ask the Contractor to complete section B of a DD Form 2051, Request for Assignment of a Commercial and Government Entity (CAGE) Code;

(2) Complete section A and forward the form to DLIS; and

(3) Notify the Contractor of its assigned CAGE code.

(c) Do not delay submission of the offer pending receipt of a CAGE code.

(End of provision)

15 52.204-7003 CONTROL OF GOVERNMENT PERSONNEL WORK PRODUCT (APR 1992)

The Contractor's procedures for protecting against unauthorized disclosure of information shall not require Department of Defense employees or members of the Armed Forces to relinquish control of their work products, whether classified or not, to the Contractor.

(End of clause)

16 52.209-6 PROTECTING THE GOVERNMENT'S INTEREST WHEN SUBCONTRACTING WITH CONTRACTORS DEBARRED, SUSPENDED, OR PROPOSED FOR DEBARMENT (JUL 1995)

(a) The Government suspends or debars Contractors to protect the Government's interest. The Contractor shall not enter into any subcontract in excess of $25,000 with a Contractor that is debarred, suspended, or proposed for debarment unless there is a compelling reason to do so.

(b) The Contractor shall require each proposed first-tier subcontractor, whose subcontract will exceed $25,000, to disclose to the Contractor, in writing, whether as of the time of award of the subcontract, the subcontractor, or its principals, is or is not debarred, suspended, or proposed for debarment by the Federal Government.

(c) A corporate officer or a designee of the Contractor shall notify the Contracting Officer, in writing, before entering into a subcontract with a party that is debarred, suspended, or proposed for debarment (see FAR 9.404 for information on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs). The notice must include the following:

(1) The name of the subcontractor.

(2) The Contractor's knowledge of the reasons for the subcontractor being on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs.

(3) The compelling reason(s) for doing business with the subcontractor notwithstanding its inclusion on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs.

(4) The systems and procedures the Contractor has established to ensure that it is fully protecting the Government's interests when dealing with

such subcontractor in view of the specific basis for the party's debarment, suspension, or proposed debarment.

(End of clause)

17 52.209-7004 SUBCONTRACTING WITH FIRMS THAT ARE OWNED OR CONTROLLED BY THE GOVERNMENT OF A TERRORIST COUNTRY (MAR 1998)

(a) Unless the Government determines that there is a compelling reason to do so, the Contractor shall not enter into any subcontract in excess of $25,000 with a firm, or a subsidiary of a firm, that is identified, on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs, as being ineligible for the award of Defense contracts or subcontracts because it is owned or controlled by the government of a terrorist country.

(b) A corporate officer or a designee of the Contractor shall notify the Contracting Officer, in writing, before entering into a subcontract with a party that is identified, on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs, as being ineligible for the award of Defense contracts or subcontracts because it is owned or controlled by the government of a terrorist country. The notice must include the name of the proposed subcontractor and the compelling reason(s) for doing business with the subcontractor notwithstanding its inclusion on the List of Parties Excluded From Federal Procurement and Nonprocurement Programs.

(End of clause)

18 52.215-2 AUDIT AND RECORDS--NEGOTIATION (JUN 1999) (Reference 15.209(b))

19 52.215-10 PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA (OCT 1997)

(a) If any price, including profit or fee, negotiated in connection with this contract, or any cost reimbursable under this contract, was increased by any significant amount because--

(1) The Contractor or a subcontractor furnished cost or pricing data that were not complete, accurate, and current as certified in its Certificate of Current Cost or Pricing Data;

(2) A subcontractor or prospective subcontractor furnished the Contractor cost or pricing data that were not complete, accurate, and current as certified in the Contractor's Certificate of Current Cost or Pricing Data; or

(3) Any of these parties furnished data of any description that were not accurate, the price or cost shall be reduced accordingly and the contract shall be modified to reflect the reduction.

(b) Any reduction in the contract price under paragraph (a) of this clause due to defective data from a prospective subcontractor that was not subsequently awarded the subcontract shall be limited to the amount, plus applicable overhead and profit markup, by which--

(1) The actual subcontract; or

(2) The actual cost to the Contractor, if there was no subcontract, was less than the prospective subcontract cost estimate submitted by the Contractor; provided, that the actual subcontract price was not itself affected by defective cost or pricing data.

(c)(1) If the Contracting Officer determines under paragraph (a) of this

clause that a price or cost reduction should be made, the Contractor agrees not to raise the following matters as a defense:

(i) The Contractor or subcontractor was a sole source supplier or otherwise was in a superior bargaining position and thus the price of the contract would not have been modified even if accurate, complete, and current cost or pricing data had been submitted.

(ii) The Contracting Officer should have known that the cost or pricing data in issue were defective even though the Contractor or subcontractor took no affirmative action to bring the character of the data to the attention of the Contracting Officer.

(iii) The contract was based on an agreement about the total cost of the contract and there was no agreement about the cost of each item procured under the contract.

(iv) The Contractor or subcontractor did not submit a Certificate of Current Cost or Pricing Data.

(2)(i) Except as prohibited by subdivision (c)(2)(ii) of this clause, an offset in an amount determined appropriate by the Contracting Officer based upon the facts shall be allowed against the amount of a contract price reduction if--

(A) The Contractor certifies to the Contracting Officer that, to the best of the Contractor's knowledge and belief, the Contractor is entitled to the offset in the amount requested; and

(B) The Contractor proves that the cost or pricing data were available before the "as of" date specified on its Certificate of Current Cost or Pricing Data, and that the data were not submitted before such date.

(ii) An offset shall not be allowed if--

(A) The understated data were known by the Contractor to be understated before the "as of" date specified on its Certificate of Current Cost or Pricing Data; or

(B) The Government proves that the facts demonstrate that the contract price would not have increased in the amount to be offset even if the available data had been submitted before the "as of" date specified on its Certificate of Current Cost or Pricing Data.

(d) If any reduction in the contract price under this clause reduces the price of items for which payment was made prior to the date of the modification reflecting the price reduction, the Contractor shall be liable to and shall pay the United States at the time such overpayment is repaid--

(1) Simple interest on the amount of such overpayment to be computed from the date(s) of overpayment to the Contractor to the date the Government is repaid by the Contractor at the applicable underpayment rate effective for each quarter prescribed by the Secretary of the Treasury under 26 U.S.C. 6621(a)(2); and

(2) A penalty equal to the amount of the overpayment, if the Contractor or subcontractor knowingly submitted cost or pricing data that were incomplete, inaccurate, or noncurrent.

(End of clause)

20 52.215-11 PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA--MODIFICATIONS (OCT 1997)
(Reference 15.408(c))

21 52.215-12 SUBCONTRACTOR COST OR PRICING DATA (OCT 1997)

(a) Before awarding any subcontract expected to exceed the threshold for submission of cost or pricing data at FAR 15.403-4, on the date of agreement on price or the date of award, whichever is later; or before

pricing any subcontract modification involving a pricing adjustment expected to exceed the threshold for submission of cost or pricing data at FAR 15.403-4, the Contractor shall require the subcontractor to submit cost or pricing data (actually or by specific identification in writing), unless an exception under FAR 15.403-1 applies.

(b) The Contractor shall require the subcontractor to certify in substantially the form prescribed in FAR 15.406-2 that, to the best of its knowledge and belief, the data submitted under paragraph (a) of this clause were accurate, complete, and current as of the date of agreement on the negotiated price of the subcontract or subcontract modification.

(c) In each subcontract that exceeds the threshold for submission of cost or pricing data at FAR 15.403-4, when entered into, the Contractor shall insert either--

(1) The substance of this clause, including this paragraph (c), if paragraph (a) of this clause requires submission of cost or pricing data for the subcontract; or

(2) The substance of the clause at FAR 52.215-13, Subcontractor Cost or Pricing Data--Modifications.

(End of clause)

22 52.215-13 SUBCONTRACTOR COST OR PRICING DATA--MODIFICATIONS (OCT 1997)

(a) The requirements of paragraphs (b) and (c) of this clause shall--

(1) Become operative only for any modification to this contract involving a pricing adjustment expected to exceed the threshold for submission of cost or pricing data at FAR 15.403-4; and

(2) Be limited to such modifications.

(b) Before awarding any subcontract expected to exceed the threshold for submission of cost or pricing data at FAR 15.403-4, on the date of agreement on price or the date of award, whichever is later; or before pricing any subcontract modification involving a pricing adjustment expected to exceed the threshold for submission of cost or pricing data at FAR 15.403-4, the Contractor shall require the subcontractor to submit cost or pricing data (actually or by specific identification in writing), unless an exception under FAR 15.403-1 applies.

(c) The Contractor shall require the subcontractor to certify in substantially the form prescribed in FAR 15.406-2 that, to the best of its knowledge and belief, the data submitted under paragraph (b) of this clause were accurate, complete, and current as of the date of agreement on the negotiated price of the subcontract or subcontract modification.

(d) The Contractor shall insert the substance of this clause, including this paragraph (d), in each subcontract that exceeds the threshold for submission of cost or pricing data at FAR 15.403-4 on the date of agreement on price or the date of award, whichever is later.

(End of clause)

23 52.219-8 UTILIZATION OF SMALL BUSINESS CONCERNS (OCT 1999)

(a) It is the policy of the United States that small business concerns, HUBZone small business concerns, small business concerns owned and controlled by socially and economically disadvantaged individuals, and small business concerns owned and controlled by women shall have the maximum practicable opportunity to participate

in performing contracts let by any Federal agency, including contracts and subcontracts for subsystems, assemblies, components, and related services for major systems. It is further the policy of the United States that its prime contractors establish procedures to ensure the timely payment of amounts due pursuant to the terms of their subcontracts with small business concerns, HUBZone small business concerns, small business concerns owned and controlled by socially and economically disadvantaged individuals, and small business concerns owned and controlled by women.

(b) The Contractor hereby agrees to carry out this policy in the awarding of subcontracts to the fullest extent consistent with efficient contract performance. The Contractor further agrees to cooperate in any studies or surveys as may be conducted by the United States Small Business Administration or the awarding agency of the United States as may be necessary to determine the extent of the Contractor's compliance with this clause.

(c) Definitions. As used in this contract

(1) Small business concern means a small business as defined pursuant to section 3 of the Small Business Act and relevant regulations promulgated pursuant thereto.

(2) HUBZone small business concern means a small business concern that appears on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration.

(3) Small business concern owned and controlled by socially and economically disadvantaged individuals and small disadvantaged business concern mean a small business concern that represents, as part of its offer that--

(i) It has received certification as a small disadvantaged business concern consistent with 13 CFR 124, Subpart B;

(ii) No material change in disadvantaged ownership and control has occurred since its certification;

(iii) Where the concern is owned by one or more individuals, the net worth of each individual upon whom the certification is based does not exceed $750,000 after taking into account the applicable exclusions set forth at 13 CFR 124.104(c)(2); and

(iv) It is identified, on the date of its representation, as a certified small disadvantaged business in the database maintained by the Small Business Administration (PRO-Net).

(4) Small business concern owned and controlled by women means a small business concern--

(i) Which is at least 51 percent owned by one or more women, or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and

(ii) Whose management and daily business operations are controlled by one or more women.

(d) Contractors acting in good faith may rely on written representations by their subcontractors regarding their status as a small business concern, a HUBZone small business concern, a small business concern owned and controlled by socially and economically disadvantaged individuals, or a small business concern owned and controlled by women.

(End of clause)

24 52.219-9 II SMALL BUSINESS SUBCONTRACTING PLAN (JAN 1999)--
ALTERNATE II (JAN 1999)

(a) This clause does not apply to small business concerns.

(b) Definitions. As used in this clause--

Commercial item means a product or service that satisfies the definition of commercial item in section 2.101 of the Federal Acquisition Regulation.

Commercial plan means a subcontracting plan (including goals) that covers the offeror's fiscal year and that applies to the entire production of commercial items sold by either the entire company or a portion thereof (e.g., division, plant, or product line).

Individual contract plan means a subcontracting plan that covers the entire contract period (including option periods), applies to a specific contract, and has goals that are based on the offeror's planned subcontracting in support of the specific contract, except that indirect costs incurred for common or joint purposes may be allocated on a prorated basis to the contract.

Master plans means a subcontracting plan that contains all the required elements of an individual contract plan, except goals, and may be incorporated into individual contract plans, provided the master plan has been approved.

Subcontract means any agreement (other than one involving an employer-employee relationship) entered into by a Federal Government prime Contractor or subcontractor calling for supplies or services required for performance of the contract or subcontract.

(c) Proposals submitted in response to this solicitation shall include a subcontracting plan that separately addresses subcontracting with small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns. If the offeror is submitting an individual contract plan, the plan must separately address subcontracting with small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns, with a separate part for the basic contract and separate parts for each option (if any). The plan shall be included in and made a part of the resultant contract. The subcontracting plan shall be negotiated within the time specified by the Contracting Officer. Failure to submit and negotiate a subcontracting plan shall make the offeror ineligible for award of a contract.

(d) The offeror's subcontracting plan shall include the following:

(1) Goals, expressed in terms of percentages of total planned subcontracting dollars, for the use of small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns as subcontractors. The offeror shall include all subcontracts that contribute to contract performance, and may include a proportionate share of products and services that are normally allocated as indirect costs.

(2) A statement of--

(i) Total dollars planned to be subcontracted for an individual contract plan; or the offeror's total projected sales, expressed in dollars, and the total value of projected subcontracts to support the sales for a commercial plan;

(ii) Total dollars planned to be subcontracted to small business concerns;

(iii) Total dollars planned to be subcontracted to HUBZone small business concerns;

(iv) Total dollars planned to be subcontracted to small disadvantaged business concerns; and

(v) Total dollars planned to be subcontracted to women-owned small business concerns.

(3) A description of the principal types of supplies and services to be subcontracted, and an identification of the types planned for subcontracting to--

(i) Small business concerns;

(ii) HUBZone small business concerns;

(iii) Small disadvantaged business concerns; and

(iv) Women-owned small business concerns.

(4) A description of the method used to develop the subcontracting goals in paragraph (d)(1) of this clause.

(5) A description of the method used to identify potential sources for solicitation purposes (e.g., existing company source lists, the Procurement Marketing and Access Network (PRO-Net) of the Small Business Administration (SBA), the list of certified small disadvantaged business concerns of the SBA, the National Minority Purchasing Council Vendor Information Service, the Research and Information Division of the Minority Business Development Agency in the Department of Commerce, or small, HUBZone small, small disadvantaged, and women-owned small business trade associations). A firm may rely on the information contained in PRO-Net as an accurate representation of a concern's size and ownership characteristics for the purposes of maintaining a small and women-owned small business source list. A firm shall rely on the information contained in SBA's list of small disadvantaged business concerns as an accurate representation of a concern's size and ownership characteristics for the purposes of maintaining a small disadvantaged business source list. Use of PRO-Net and/or the SBA list of small disadvantaged business concerns as its source lists does not relieve a firm of its responsibilities (e.g., outreach, assistance, counseling, publicizing subcontracting opportunities) in this clause.

(6) A statement as to whether or not the offeror included indirect costs in establishing subcontracting goals, and a description of the method used to determine the proportionate share of indirect costs to be incurred with--

(i) Small business concerns;

(ii) HUBZone small business concerns;

(iii) Small disadvantaged business concerns; and

(iv) Women-owned small business concerns.

(7) The name of the individual employed by the offeror who will administer the offeror's subcontracting program, and a description of the duties of the individual.

(8) A description of the efforts the offeror will make to assure that small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns have an equitable opportunity to compete for subcontracts.

(9) Assurances that the offeror will include the clause of this contract entitled "Utilization of Small Business Concerns" in all subcontracts that offer further subcontracting opportunities, and that the offeror will require all subcontractors (except small business concerns) that receive subcontracts in excess of $500,000 ($1,000,000 for construction of any public facility) to adopt a subcontracting plan that complies with the requirements of this clause.

(10) Assurances that the offeror will--

(i) Cooperate in any studies or surveys as may be required;

(ii) Submit periodic reports so that the Government can determine the extent of compliance by the offeror with the subcontracting plan;

(iii) Submit Standard Form (SF) 294, Subcontracting Report for Individual Contracts, and/or SF 295, Summary Subcontract Report, in accordance with the instructions on the forms or as provided in agency regulations and in paragraph (j) of this clause; and

(iv) Ensure that its subcontractors agree to submit SF 294 and SF 295.

(11) A description of the types of records that will be maintained concerning procedures that have been adopted to comply with the requirements and goals in the plan, including establishing source lists; and a description of the offeror's efforts to locate small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns and award subcontracts to them. The records shall include at least the following (on a plant-wide or company-wide basis, unless otherwise indicated):

(i) Source lists (e.g., PRO-Net), guides, and other data that identify small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns.

(ii) Organizations contacted in an attempt to locate sources that are small business, HUBZone small business, small disadvantaged business, or women-owned small business concerns.

(iii) Records on each subcontract solicitation resulting in an award of more than $100,000, indicating--

(A) Whether small business concerns were solicited and, if not, why not;

(B) Whether HUBZone small business concerns were solicited and, if not, why not;

(C) Whether small disadvantaged business concerns were solicited and, if not, why not;

(D) Whether women-owned small business concerns were solicited and, if not, why not; and

(E) If applicable, the reason award was not made to a small business concern.

(iv) Records of any outreach efforts to contact--

(A) Trade associations;

(B) Business development organizations; and

(C) Conferences and trade fairs to locate small, HUBZone small, small disadvantaged, and women-owned small business sources.

(v) Records of internal guidance and encouragement provided to buyers through--

(A) Workshops, seminars, training, etc.; and

(B) Monitoring performance to evaluate compliance with the program's requirements.

(vi) On a contract-by-contract basis, records to support award data submitted by the offeror to the Government, including the name, address, and business size of each subcontractor. Contractors having commercial plans need not comply with this requirement.

(e) In order to effectively implement this plan to the extent consistent with efficient contract performance, the Contractor shall perform the following functions:

(1) Assist small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns by arranging solicitations, time for the preparation of bids,

quantities, specifications, and delivery schedules so as to facilitate the participation by such concerns. Where the Contractor's lists of potential small business, HUBZone small business, small disadvantaged business, and women-owned small business subcontractors are excessively long, reasonable effort shall be made to give all such small business concerns an opportunity to compete over a period of time.

(2) Provide adequate and timely consideration of the potentialities of small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns in all "make-or-buy" decisions.

(3) Counsel and discuss subcontracting opportunities with representatives of small business, HUBZone small business, small disadvantaged business, and women-owned small business firms.

(4) Provide notice to subcontractors concerning penalties and remedies for misrepresentations of business status as small, HUBZone small, small disadvantaged, or women-owned small business for the purpose of obtaining a subcontract that is to be included as part or all of a goal contained in the Contractor's subcontracting plan.

(f) A master plan on a plant or division-wide basis that contains all the elements required by paragraph (d) of this clause, except goals, may be incorporated by reference as a part of the subcontracting plan required of the offeror by this clause; provided--(1) the master plan has been approved, (2) the offeror ensures that the master plan is updated as necessary and provides copies of the approved master plan, including evidence of its approval, to the Contracting Officer, and (3) goals and any deviations from the master plan deemed necessary by the Contracting Officer to satisfy the requirements of this contract are set forth in the individual subcontracting plan.

(g) A commercial plan is the preferred type of subcontracting plan for contractors furnishing commercial items. The commercial plan shall relate to the offeror's planned subcontracting generally, for both commercial and Government business, rather than solely to the Government contract. Commercial plans are also preferred for subcontractors that provide commercial items under a prime contract, whether or not the prime contractor is supplying a commercial item.

(h) Prior compliance of the offeror with other such subcontracting plans under previous contracts will be considered by the Contracting Officer in determining the responsibility of the offeror for award of the contract.

(i) The failure of the Contractor or subcontractor to comply in good faith with (1) the clause of this contract entitled "Utilization Of Small Business Concerns," or (2) an approved plan required by this clause, shall be a material breach of the contract.

(j) The Contractor shall submit the following reports:

(1) Standard Form 294, Subcontracting Report for Individual Contracts. This report shall be submitted to the Contracting Officer semiannually and at contract completion. The report covers subcontract award data related to this contract. This report is not required for commercial plans.

(2) Standard Form 295, Summary Subcontract Report. This report encompasses all the contracts with the awarding agency. It must be submitted semi-annually for contracts with the Department of Defense and annually for contracts with civilian agencies. If the reporting activity is covered by a commercial plan, the reporting activity must report annually all subcontract awards under that plan. All reports submitted at the close of each fiscal year (both individual and commercial plans) shall include a breakout, in the Contractor's

format, of subcontract awards, in whole dollars, to small disadvantaged business concerns by Standard Industrial Classification (SIC) Major Group. For a commercial plan, the Contractor may obtain from each of its subcontractors a predominant SIC Major Group and report all awards to that subcontractor under its predominant SIC Major Group.

(End of clause)

25 52.219-16 LIQUIDATED DAMAGES--SUBCONTRACTING PLAN (JAN 1999)

(a) "Failure to make a good faith effort to comply with the subcontracting plan," as used in this clause, means a willful or intentional failure to perform in accordance with the requirements of the subcontracting plan approved under the clause in this contract entitled "Small Business Subcontracting Plan," or willful or intentional action to frustrate the plan.

(b) Performance shall be measured by applying the percentage goals to the total actual subcontracting dollars or, if a commercial plan is involved, to the pro rata share of actual subcontracting dollars attributable to Government contracts covered by the commercial plan. If, at contract completion or, in the case of a commercial plan, at the close of the fiscal year for which the plan is applicable, the Contractor has failed to meet its subcontracting goals and the Contracting Officer decides in accordance with paragraph (c) of this clause that the Contractor failed to make a good faith effort to comply with its subcontracting plan, established in accordance with the clause in this contract entitled "Small Business Subcontracting Plan," the Contractor shall pay the Government liquidated damages in an amount stated. The amount of probable damages attributable to the Contractor's failure to comply shall be an amount equal to the actual dollar amount by which the Contractor failed to achieve each subcontract goal.

(c) Before the Contracting Officer makes a final decision that the Contractor has failed to make such good faith effort, the Contracting Officer shall give the Contractor written notice specifying the failure and permitting the Contractor to demonstrate what good faith efforts have been made and to discuss the matter. Failure to respond to the notice may be taken as an admission that no valid explanation exists. If, after consideration of all the pertinent data, the Contracting Officer finds that the Contractor failed to make a good faith effort to comply with the subcontracting plan, the Contracting Officer shall issue a final decision to that effect and require that the Contractor pay the Government liquidated damages as provided in paragraph (b) of this clause.

(d) With respect to commercial plans, the Contracting Officer who approved the plan will perform the functions of the Contracting Officer under this clause on behalf of all agencies with contracts covered by the commercial plan.

(e) The Contractor shall have the right of appeal, under the clause in this contract entitled, Disputes, from any final decision of the Contracting Officer.

(f) Liquidated damages shall be in addition to any other remedies that the Government may have.

(End of clause)

26 52.219-25 SMALL DISADVANTAGED BUSINESS PARTICIPATION PROGRAM--DISADVANTAGED STATUS AND REPORTING (OCT 1999)

(a) Disadvantaged status for joint venture partners, team members, and subcontractors. This clause addresses disadvantaged status for joint venture partners, teaming arrangement members, and subcontractors and is applicable if this contract contains small disadvantaged business (SDB) participation targets. The Contractor shall obtain representations of small disadvantaged status from joint venture partners, teaming arrangement members, and subcontractors through use of a provision substantially the same as paragraph (b)(1)(i) of the provision at FAR 52.219-22, Small Disadvantaged Business Status. The Contractor shall confirm that a joint venture partner, team member, or subcontractor representing itself as a small disadvantaged business concern, is identified as a certified small disadvantaged business in the database maintained by the Small Business Administration (PRO-Net) or by contacting the SBA's Office of Small Disadvantaged Business Certification and Eligibility.

(b) Reporting requirement. If this contract contains SDB participation targets, the Contractor shall report on the participation of SDB concerns at contract completion, or as otherwise provided in this contract. Reporting may be on Optional Form 312, Small Disadvantaged Business Participation Report, or in the Contractor's own format providing the same information. This report is required for each contract containing SDB participation targets. If this contract contains an individual Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan, reports may be submitted with the final Subcontracting Report for Individual Contracts (Standard Form 294) at the completion of the contract.

(End of clause)

27 52.219-7003 SMALL, SMALL DISADVANTAGED AND WOMEN-OWNED SMALL BUSINESS SUBCONTRACTING PLAN (DoD CONTRACTS) (APR 1996)

This clause supplements the Federal Acquisition Regulation 52.219-9, Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan, clause of this contract.

(a) Definitions.

"Historically black colleges and universities," as used in this clause, means institutions determined by the Secretary of Education to meet the requirements of 34 CFR 608.2. The term also means any nonprofit research institution that was an integral part of such a college or university before November 14, 1986.

"Minority institutions," as used in this clause, means institutions meeting the requirements of section 1046(3) of the Higher Education Act of 1965 (20 U.S.C. 1135d-5(3)). The term also includes Hispanic-serving institutions as defined in section 316(b)(1) of such Act (20 U.S.C. 1059c(b)(1)).

(b) Except for company or division-wide commercial items subcontracting plans, the term "small disadvantaged business," when used in the FAR 52.219-9 clause, includes historically black colleges and universities and minority institutions, in addition to small disadvantaged business concerns.

(c) Work under the contract or its subcontracts shall be credited toward

meeting the small disadvantaged business concern goal required by paragraph (d) of the FAR 52.219-9 clause when:

(1) It is performed on Indian lands or in joint venture with an Indian tribe or a tribally-owned corporation, and

(2) It meets the requirements of 10 U.S.C. 2323a.

(d) Subcontracts awarded to workshops approved by the Committee for Purchase from People Who are Blind or Severely Disabled (41 U.S.C. 46-48), may be counted toward the Contractor's small business subcontracting goal.

(e) A mentor firm, under the Pilot Mentor-Protege Program established under Section 831 of Pub. L. 101-510, as amended, may count toward its small disadvantaged business goal, subcontracts awarded--

(1) Protege firms which are qualified organizations employing the severely handicapped; and

(2) Former protege firms that meet the criteria in Section 831(g)(4) of Pub. L. 101-510.

(f) The master plan approval referred to in paragraph (f) of the FAR 52.219-9 clause is approval by the Contractor's cognizant contract administration activity.

(g) In those subcontracting plans which specifically identify small, small disadvantaged, and women-owned small businesses, the Contractor 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.

(End of clause)

28 52.222-1 NOTICE TO THE GOVERNMENT OF LABOR DISPUTES (FEB 1997)
(Reference 22.103-5(a))

29 52.222-3 CONVICT LABOR (AUG 1996)

The Contractor agrees not to employ in the performance of this contract any person undergoing a sentence of imprisonment which has been imposed by any court of a State, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, or the Trust Territory of the Pacific Islands. This limitation, however, shall not prohibit the employment by the Contractor in the performance of this contract of persons on parole or probation to work at paid employment during the term of their sentence or persons who have been pardoned or who have served their terms. Nor shall it prohibit the employment by the Contractor in the performance of this contract of persons confined for violation of the laws of any of the States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, or the Trust Territory of the Pacific Islands who are authorized to work at paid employment in the community under the laws of such jurisdiction, if--

(a)(1) The worker is paid or is in an approved work training program on a voluntary basis;

(2) Representatives of local union central bodies or similar labor union organizations have been consulted;

(3) Such paid employment will not result in the displacement of employed workers, or be applied in skills, crafts, or trades in which there is a surplus of available gainful labor in the locality, or impair existing contracts for services; and

(4) The rates of pay and other conditions of employment will not be

less than those paid or provided for work of a similar nature in the locality in which the work is being performed; and

(b) The Attorney General of the United States has certified that the work-release laws or regulations of the jurisdiction involved are in conformity with the requirements of Executive Order 11755, as amended by Executive Orders 12608 and 12943.

(End of clause)

30 52.222-4 CONTRACT WORK HOURS AND SAFETY STANDARDS ACT--OVERTIME COMPENSATION (JUL 1995)

(a) Overtime requirements. No Contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics (see Federal Acquisition Regulation (FAR) 22.300) shall require or permit any such laborers or mechanics in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than 1 1/2 times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(b) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the provisions set forth in paragraph (a) of this clause, the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic employed in violation of the provisions set forth in paragraph (a) of this clause in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by provisions set forth in paragraph (a) of this clause.

(c) Withholding for unpaid wages and liquidated damages. The Contracting Officer shall upon his or her own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or subcontractor under any such contract or any other Federal contract with the same Prime Contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same Prime Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the provisions set forth in paragraph (b) of this clause.

(d) Payrolls and basic records. (1) The Contractor or subcontractor shall maintain payrolls and basic payroll records during the course of contract work and shall preserve them for a period of 3 years from the completion of the contract for all laborers and mechanics working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Nothing in this paragraph shall require the duplication of records required to be maintained for construction work by Department of Labor regulations at 29 CFR 5.5(a)(3) implementing the Davis-Bacon Act.

(2) The records to be maintained under paragraph (d)(1) of this clause shall be made available by the Contractor or subcontractor for inspection, copying, or transcription by authorized representatives of

the Contracting Officer or the Department of Labor. The Contractor or subcontractor shall permit such representatives to interview employees during working hours on the job.

(e) Subcontracts. The Contractor or subcontractor shall insert in any subcontracts exceeding $100,000, the provisions set forth in paragraphs (a) through (e) of this clause and also a clause requiring the subcontractors to include these provisions in any lower tier subcontracts. The Prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the provisions set forth in paragraphs (a) through (e) of this clause.

(End of clause)

31 52.222-6 DAVIS-BACON ACT (FEB 1995)

(a) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (d) of this clause; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such period. Such laborers and mechanics shall be paid not less than the appropriate wage rate and fringe benefits in the wage determination for the classification of work actually performed, without regard to skill, except as provided in the clause entitled Apprentices and Trainees. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein; provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classifications and wage rates conformed under paragraph (b) of this clause) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(b)(1) The Contracting Officer shall require that any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The Contracting Officer shall approve an additional classification and wage rate and fringe benefits therefor only when all the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination.

(ii) The classification is utilized in the area by the construction industry.

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained

in the wage determination.

(iv) With respect to helpers, such a classification prevails in the area in which the work is performed.

(2) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the Contracting Officer agree on the classification and wage rate (including the amount designated for fringe benefits, where appropriate), a report of the action taken shall be sent by the Contracting Officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator or an authorized representative will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the Contracting Officer or will notify the Contracting Officer within the 30-day period that additional time is necessary.

(3) In the event the Contractor, the laborers or mechanics to be employed in the classification, or their representatives, and the Contracting Officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the Contracting Officer shall refer the questions, including the views of all interested parties and the recommendation of the Contracting Officer, to the Administrator of the Wage and Hour Division for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the Contracting Officer or will notify the Contracting Officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits, where appropriate) determined pursuant to subparagraphs (b)(2) and (b)(3) of this clause shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(c) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(d) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program; provided, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(End of clause)

32 52.222-7 WITHHOLDING OF FUNDS (FEB 1988)

The Contracting Officer shall, upon his or her own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same Prime Contractor, or any other Federally assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same Prime Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by

the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the Contracting Officer may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(End of clause)

33 52.222-8 PAYROLLS AND BASIC RECORDS (FEB 1988)

(a) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of 3 years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made, and actual wages paid. Whenever the Secretary of Labor has found, under paragraph (d) of the clause entitled Davis-Bacon Act, that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(b)(1) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Contracting Officer. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under paragraph (a) of this clause. This information may be submitted in any form desired. Optional Form WH-347 (Federal Stock Number 029-005-00014-1) is available for this purpose and may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. The Prime Contractor is responsible for the submission of copies of payrolls by all subcontractors.

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify--

(i) That the payroll for the payroll period contains the information required to be maintained under paragraph (a) of this clause and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than

permissible deductions as set forth in the Regulations, 29 CFR Part 3; and

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph (b)(2) of this clause.

(4) The falsification of any of the certifications in this clause may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 3729 of Title 31 of the United States Code.

(c) The Contractor or subcontractor shall make the records required under paragraph (a) of this clause available for inspection, copying, or transcription by the Contracting Officer or authorized representatives of the Contracting Officer or the Department of Labor. The Contractor or subcontractor shall permit the Contracting Officer or representatives of the Contracting Officer or the Department of Labor to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit required records or to make them available, the Contracting Officer may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(End of clause)

34 52.222-9 APPRENTICES AND TRAINEES (FEB 1988)

(a) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in this paragraph, shall be paid not less than the applicable wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice

must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(b) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed in the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate in the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate in the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate in the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(c) Equal employment opportunity. The utilization of apprentices, trainees, and journeymen under this clause shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

(End of clause)

35 52.222-10 COMPLIANCE WITH COPELAND ACT REQUIREMENTS (FEB 1988)

The Contractor shall comply with the requirements of 29 CFR Part 3, which are hereby incorporated by reference in this contract.

(End of clause)

36 52.222-11 SUBCONTRACTS (LABOR STANDARDS) (FEB 1988)

(a) The Contractor or subcontractor shall insert in any subcontracts the clauses entitled Davis-Bacon Act, Contract Work Hours and Safety Standards Act--Overtime Compensation, Apprentices and Trainees, Payrolls and Basic Records, Compliance with Copeland Act Requirements, Withholding of Funds, Subcontracts (Labor Standards), Contract Termination--Debarment, Disputes Concerning Labor Standards, Compliance with Davis-Bacon and Related Act Regulations, and Certification of Eligibility, and such other clauses as the Contracting Officer may, by appropriate instructions, require, and also a clause requiring subcontractors to include these clauses in any lower tier subcontracts. The Prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with all the contract clauses cited in this paragraph.

(b)(1) Within 14 days after award of the contract, the Contractor shall deliver to the Contracting Officer a completed Statement and Acknowledgment Form (SF 1413) for each subcontract, including the subcontractor's signed and dated acknowledgment that the clauses set forth in paragraph (a) of this clause have been included in the subcontract.

(2) Within 14 days after the award of any subsequently awarded subcontract the Contractor shall deliver to the Contracting Officer an updated completed SF 1413 for such additional subcontract.

(End of clause)

37 52.222-12 CONTRACT TERMINATION--DEBARMENT (FEB 1988)

A breach of the contract clauses entitled Davis-Bacon Act, Contract Work Hours and Safety Standards Act--Overtime Compensation, Apprentices and Trainees, Payrolls and Basic Records, Compliance with Copeland Act Requirements, Subcontracts (Labor Standards), Compliance with Davis-Bacon and Related Act Regulations, or Certification of Eligibility may be grounds for termination of the contract, and for debarment as a Contractor and subcontractor as provided in 29 CFR 5.12.

(End of clause)

38 52.222-13 COMPLIANCE WITH DAVIS-BACON AND RELATED ACT REGULATIONS (FEB 1988)

All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are hereby incorporated by reference in this contract.

(End of clause)

39 52.222-14 DISPUTES CONCERNING LABOR STANDARDS (FEB 1988)

The United States Department of Labor has set forth in 29 CFR Parts 5, 6, and 7 procedures for resolving disputes concerning labor standards requirements. Such disputes shall be resolved in accordance with those procedures and not the Disputes clause of this contract. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees of their representatives.

(End of clause)

40 52.222-15 CERTIFICATION OF ELIGIBILITY (FEB 1988)

(a) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(b) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(c) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

(End of clause)

41 52.222-23 NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY FOR CONSTRUCTION (FEB 1999)

(a) The offeror's attention is called to the Equal Opportunity clause and the Affirmative Action Compliance Requirements for Construction clause of this solicitation.

(b) The goals for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Goals for minority participation for each trade	Goals for female participation for each trade
MINORITY PARTICIPATION for ELMORE COUNTY ID is 4.4%	
FEMALE PARTICIPATION for ALL COUNTIES is 6.9%	

These goals are applicable to all the Contractor's construction work performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, the Contractor shall apply the goals established for the geographical area where the work is actually performed. Goals are published periodically in the Federal Register in notice form, and these notices may be obtained from any Office of Federal Contract Compliance Programs office.

(c) The Contractor's compliance with Executive Order 11246, as amended, and the regulations in 41 CFR 60-4 shall be based on (1) its implementation of the Equal Opportunity clause, (2) specific affirmative action obligations required by the clause entitled "Affirmative Action Compliance Requirements for Construction," and (3) its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade. The Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor, or from project to project, for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, Executive Order 11246, as amended, and the regulations in 41 CFR 60-4. Compliance with the goals will be measured against the total work hours performed.

(d) The Contractor shall provide written notification to the Deputy Assistant Secretary for Federal Contract Compliance, U.S. Department of Labor, within 10 working days following award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this

solicitation. The notification shall list the--

(1) Name, address, and telephone number of the subcontractor;

(2) Employer's identification number of the subcontractor;

(3) Estimated dollar amount of the subcontract;

(4) Estimated starting and completion dates of the subcontract; and

(5) Geographical area in which the subcontract is to be performed.

(e) As used in this Notice, and in any contract resulting from this solicitation, the "covered area" is ID/Elmore/Mt. Home.

(End of provision)

(R 7-2003.14(d) 1978 SEP)

42 52.222-26 EQUAL OPPORTUNITY (FEB 1999)

(a) If, during any 12-month period (including the 12 months preceding the award of this contract), the Contractor has been or is awarded nonexempt Federal contracts and/or subcontracts that have an aggregate value in excess of $10,000, the Contractor shall comply with subparagraphs (b)(1) through (11) of this clause. Upon request, the Contractor shall provide information necessary to determine the applicability of this clause.

(b) During performance of this contract, the Contractor agrees as follows:

(1) The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. However, it shall not be a violation of this clause for the Contractor to extend a publicly announced preference in employment to Indians living on or near an Indian reservation, in connection with employment opportunities on or near an Indian reservation, as permitted by 41 CFR 60-1.5.

(2) The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. This shall include, but not be limited to, (i) employment, (ii) upgrading, (iii) demotion, (iv) transfer, (v) recruitment or recruitment advertising, (vi) layoff or termination, (vii) rates of pay or other forms of compensation, and (viii) selection for training, including apprenticeship.

(3) The Contractor shall post in conspicuous places available to employees and applicants for employment the notices to be provided by the Contracting Officer that explain this clause.

(4) The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(5) The Contractor shall send, to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, the notice to be provided by the Contracting Officer advising the labor union or workers' representative of the Contractor's commitments under this clause, and post copies of the notice in conspicuous places available to employees and applicants for employment.

(6) The Contractor shall comply with Executive Order 11246, as amended, and the rules, regulations, and orders of the Secretary of Labor.

(7) The Contractor shall furnish to the contracting agency all information required by Executive Order 11246, as amended, and by

the rules, regulations, and orders of the Secretary of Labor. The Contractor shall also file Standard Form 100 (EEO-1), or any successor form, as prescribed in 41 CFR part 60-1. Unless the Contractor has filed within the 12 months preceding the date of contract award, the Contractor shall, within 30 days after contract award, apply to either the regional Office of Federal Contract Compliance Programs (OFCCP) or the local office of the Equal Employment Opportunity Commission for the necessary forms.

(8) The Contractor shall permit access to its premises, during normal business hours, by the contracting agency or the OFCCP for the purpose of conducting on-site compliance evaluations and complaint investigations. The Contractor shall permit the Government to inspect and copy any books, accounts, records (including computerized records), and other material that may be relevant to the matter under investigation and pertinent to compliance with Executive Order 11246, as amended, and rules and regulations that implement the Executive Order.

(9) If the OFCCP determines that the Contractor is not in compliance with this clause or any rule, regulation, or order of the Secretary of Labor, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts, under the procedures authorized in Executive Order 11246, as amended. In addition, sanctions may be imposed and remedies invoked against the Contractor as provided in Executive Order 11246, as amended; in the rules, regulations, and orders of the Secretary of Labor; or as otherwise provided by law.

(10) The Contractor shall include the terms and conditions of subparagraphs (b)(1) through (11) of this clause in every subcontract or purchase order that is not exempted by the rules, regulations, or orders of the Secretary of Labor issued under Executive Order 11246, as amended, so that these terms and conditions will be binding upon each subcontractor or vendor.

(11) The Contractor shall take such action with respect to any subcontract or purchase order as the contracting officer may direct as a means of enforcing these terms and conditions, including sanctions for noncompliance; provided, that if the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of any direction, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

(c) Notwithstanding any other clause in this contract, disputes relative to this clause will be governed by the procedures in 41 CFR 60-1.1.

(End of clause)

43 52.222-27 AFFIRMATIVE ACTION COMPLIANCE REQUIREMENTS FOR CONSTRUCTION (FEB 1999)

(a) Definitions.

"Covered area," as used in this clause, means the geographical area described in the solicitation for this contract.

"Deputy Assistant Secretary," as used in this clause, means the Deputy Assistant Secretary for Federal Contract Compliance, U.S. Department of Labor, or a designee.

"Employer's identification number," as used in this clause, means the Federal Social Security number used on the employer's quarterly federal tax return, U.S. Treasury Department Form 941.

"Minority," as used in this clause, means--

(1) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

(2) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands);

(3) Black (all persons having origins in any of the black African racial groups not of Hispanic origin); and

(4) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race).

(b) If the Contractor, or a subcontractor at any tier, subcontracts a portion of the work involving any construction trade, each such subcontract in excess of $10,000 shall include this clause and the Notice containing the goals for minority and female participation stated in the solicitation for this contract.

(c) If the Contractor is participating in a Hometown Plan (41 CFR 60-4) approved by the U.S. Department of Labor in a covered area, either individually or through an association, its affirmative action obligations on all work in the plan area (including goals) shall comply with the plan for those trades that have unions participating in the plan. Contractors must be able to demonstrate participation in, and compliance with, the provisions of the plan. Each Contractor or subcontractor participating in an approved plan is also required to comply with its obligations under the Equal Opportunity clause, and to make a good faith effort to achieve each goal under the plan in each trade in which it has employees. The overall good-faith performance by other Contractors or subcontractors toward a goal in an approved plan does not excuse any Contractor's or subcontractor's failure to make good-faith efforts to achieve the plan's goals.

(d) The Contractor shall implement the affirmative action procedures in subparagraphs (g)(1) through (16) of this clause. The goals stated in the solicitation for this contract are expressed as percentages of the total hours of employment and training of minority and female utilization that the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for the geographical area where that work is actually performed. The Contractor is expected to make substantially uniform progress toward its goals in each craft.

(e) Neither the terms and conditions of any collective bargaining agreement, nor the failure by a union with which the Contractor has a collective bargaining agreement, to refer minorities or women shall excuse the Contractor's obligations under this clause, Executive Order 11246, as amended, or the regulations thereunder.

(f) In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

(g) The Contractor shall take affirmative action to ensure equal employment opportunity. The evaluation of the Contractor's compliance with this clause shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully and implement affirmative action steps at least as extensive as the following:

(1) Ensure a working environment free of harassment, intimidation, and coercion at all sites and in all facilities where the Contractor's employees are assigned to work. The Contractor, if possible, will assign two or more women to each construction project. The Contractor shall ensure that foremen, superintendents, and other onsite supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at these sites or facilities.

(2) Establish and maintain a current list of sources for minority and female recruitment. Provide written notification to minority and female recruitment sources and community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

(3) Establish and maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant, referrals of minorities or females from unions, recruitment sources, or community organizations, and the action taken with respect to each individual. If an individual was sent to the union hiring hall for referral and not referred back to the Contractor by the union or, if referred back, not employed by the Contractor, this shall be documented in the file, along with whatever additional actions the Contractor may have taken.

(4) Immediately notify the Deputy Assistant Secretary when the union or unions with which the Contractor has a collective bargaining agreement has not referred back to the Contractor a a minority or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

(5) Develop on-the-job training opportunities and/or participate in training programs for the area that expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under subparagraph (g)(2) of this clause.

(6) Disseminate the Contractor's equal employment policy by--

(i) Providing notice of the policy to unions and to training, recruitment, and outreach programs, and requesting their cooperation in assisting the Contractor in meeting its contract obligations;

(ii) Including the policy in any policy manual and in collective bargaining agreements;

(iii) Publicizing the policy in the company newspaper, annual report, etc.;

(iv) Reviewing the policy with all management personnel and with all minority and female employees at least once a year; and

(v) Posting the policy on bulletin boards accessible to employees at each location where construction work is performed.

(7) Review, at least annually, the Contractor's equal employment policy and affirmative action obligations with all employees having responsibility for hiring, assignment, layoff, termination, or other employment decisions. Conduct review of this policy with all on-site supervisory personnel before initiating construction work at a job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

(8) Disseminate the Contractor's equal employment policy externally by including it in any advertising in the news media, specifically

including minority and female news media. Provide written notification to, and discuss this policy with, other Contractors and subcontractors with which the Contractor does or anticipates doing business.

(9) Direct recruitment efforts, both oral and written, to minority, female, and community organizations, to schools with minority and female students, and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than 1 month before the date for acceptance of applications for apprenticeship or training by any recruitment source, send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

(10) Encourage present minority and female employees to recruit minority persons and women. Where reasonable, provide after-school, summer, and vacation employment to minority and female youth both on the site and in other areas of the Contractor's workforce.

(11) Validate all tests and other selection requirements where required under 41 CFR 60-3.

(12) Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities. Encourage these employees to seek or to prepare for, through appropriate training, etc., opportunities for promotion.

(13) Ensure that seniority practices job classifications, work assignments, and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment-related activities to ensure that the Contractor's obligations under this contract are being carried out.

(14) Ensure that all facilities and company activities are nonsegregated except that separate or single-user rest rooms and necessary dressing or sleeping areas shall be provided to assure privacy between the sexes.

(15) Maintain a record of solicitations for subcontracts for minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

(16) Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's equal employment policy and affirmative action obligations.

(h) The Contractor is encouraged to participate in voluntary associations that may assist in fulfilling one or more of the affirmative action obligations contained in subparagraphs (g)(1) through (16) of this clause. The efforts of a contractor association, joint contractor-union, contractor-community, or similar group of which the contractor is a member and participant may be asserted as fulfilling one or more of its obligations under subparagraphs (g)(1) through (16) of this clause, provided the Contractor--

(1) Actively participates in the group;

(2) Makes every effort to ensure that the group has a positive impact on the employment of minorities and women in the industry;

(3) Ensures that concrete benefits of the program are reflected in the Contractor's minority and female workforce participation;

(4) Makes a good-faith effort to meet its individual goals and timetables; and

(5) Can provide access to documentation that demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply is the Contractor's, and failure of such a group to fulfill an obligation shall not be a defense for the

Contractor's noncompliance.

(i) A single goal for minorities and a separate single goal for women shall be established. The Contractor is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and nonminority. Consequently, the Contractor may be in violation of Executive Order 11246, as amended, if a particular group is employed in a substantially disparate manner.

(j) The Contractor shall not use goals or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

(k) The Contractor shall not enter into any subcontract with any person or firm debarred from Government contracts under Executive Order 11246, as amended.

(l) The Contractor shall carry out such sanctions and penalties for violation of this clause and of the Equal Opportunity clause, including suspension, termination, and cancellation of existing subcontracts, as may be imposed or ordered under Executive Order 11246, as amended, and its implementing regulations, by the OFCCP. Any failure to carry out these sanctions and penalties as ordered shall be a violation of this clause and Executive Order 11246, as amended.

(m) The Contractor in fulfilling its obligations under this clause shall implement affirmative action procedures at least as extensive as those prescribed in paragraph (g) of this clause, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of Executive Order 11246, as amended, the implementing regulations, or this clause, the Deputy Assistant Secretary shall take action as prescribed in 41 CFR 60-4.8.

(n) The Contractor shall designate a responsible official to--

(1) Monitor all employment-related activity to ensure that the Contractor's equal employment policy is being carried out;

(2) Submit reports as may be required by the Government; and

(3) Keep records that shall at least include for each employee the name, address, telephone number, construction trade, union affiliation (if any), employee identification number, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, separate records are not required to be maintained.

(o) Nothing contained herein shall be construed as a limitation upon the application of other laws that establish different standards of compliance or upon the requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

(End of clause)

44 52.222-35 AFFIRMATIVE ACTION FOR DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA (APR 1998)

(a) Definitions. As used in this clause--

"All employment openings" includes all positions except executive and top management, those positions that will be filled from within the contractor's organization, and positions lasting 3 days or less. This term includes full-time employment, temporary employment of

more than 3 days' duration, and part-time employment.

"Appropriate office of the State employment service system" means the local office of the Federal-State national system of public employment offices with assigned responsibility to serve the area where the employment opening is to be filled, including the District of Columbia, Guam, the Commonwealth of Puerto Rico, and the Virgin Islands.

"Positions that will be filled from within the Contractor's organization" means employment openings for which no consideration will be given to persons outside the Contractor's organization (including any affiliates, subsidiaries, and parent companies) and includes any openings that the Contractor proposes to fill from regularly established "recall" lists. The exception does not apply to a particular opening once an employer decides to consider applicants outside of its organization.

"Veteran of the Vietnam era" means a person who--

(1) Served on active duty for a period of more than 180 days, any part of which occurred between August 5, 1964, and May 7, 1975, and was discharged or released therefrom with other than a dishonorable discharge; or

(2) Was discharged or released from active duty for a service-connected disability if any part of such active duty was performed between August 5, 1964, and May 7, 1975.

(b) General. (1) Regarding any position for which the employee or applicant for employment is qualified, the Contractor shall not discriminate against the individual because the individual is a disabled veteran or a veteran of the Vietnam era. The Contractor agrees to take affirmative action to employ, advance in employment, and otherwise treat qualified disabled veterans and veterans of the Vietnam era without discrimination based upon their disability or veterans' status in all employment practices such as--

(i) Employment;
(ii) Upgrading;
(iii) Demotion or transfer;
(iv) Recruitment;
(v) Advertising;
(vi) Layoff or termination;
(vii) Rates of pay or other forms of compensation; and
(viii) Selection for training, including apprenticeship.

(2) The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor (Secretary) issued under the Vietnam Era Veterans' Readjustment Assistance Act of 1972 (the Act), as amended.

(c) Listing openings. (1) The Contractor agrees to list all employment openings existing at contract award or occurring during contract performance, at an appropriate office of the State employment service system in the locality where the opening occurs. These openings include those occurring at any Contractor facility, including one not connected with performing this contract. An independent corporate affiliate is exempt from this requirement.

(2) State and local government agencies holding Federal contracts of $10,000 or more shall also list all employment openings with the appropriate office of the State employment service.

(3) The listing of employment openings with the State employment service system is required at least concurrently with using any other recruitment source or effort and involves the obligations of placing a bona fide job order, including accepting referrals of veterans

and nonveterans. This listing does not require hiring any particular job applicant or hiring from any particular group of job applicants and is not intended to relieve the Contractor from any requirements of Executive orders or regulations concerning nondiscrimination in employment.

(4) Whenever the Contractor becomes contractually bound to the listing terms of this clause, it shall advise the State employment service system, in each State where it has establishments, of the name and location of each hiring location in the State. As long as the Contractor is contractually bound to these terms and has so advised the State system, it need not advise the State system of subsequent contracts. The Contractor may advise the State system when it is no longer bound by this contract clause.

(d) Applicability. This clause does not apply to the listing of employment openings that occur and are filled outside the 50 States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, and the Virgin Islands.

(e) Postings. (1) The Contractor agrees to post employment notices stating (i) the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified disabled veterans and veterans of the Vietnam era, and (ii) the rights of applicants and employees.

(2) These notices shall be posted in conspicuous places that are available to employees and applicants for employment. They shall be in a form prescribed by the Deputy Assistant Secretary for Federal Contract Compliance Programs, Department of Labor (Deputy Assistant Secretary), and provided by or through the Contracting Officer.

(3) The Contractor shall notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of the Act, and is committed to take affirmative action to employ, and advance in employment, qualified disabled veterans and veterans of the Vietnam era.

(f) Noncompliance. If the Contractor does not comply with the requirements of this clause, appropriate actions may be taken under the rules, regulations, and relevant orders of the Secretary issued pursuant to the Act.

(g) Subcontracts. The Contractor shall include the terms of this clause in every subcontract or purchase order of $10,000 or more unless exempted by rules, regulations, or orders of the Secretary. The Contractor shall act as specified by the Deputy Assistant Secretary to enforce the terms, including action for noncompliance.

(End of clause)

45 52.222-36 AFFIRMATIVE ACTION FOR WORKERS WITH DISABILITIES (JUN 1998)

(a) General. (1) Regarding any position for which the employee or applicant for employment is qualified, the Contractor shall not discriminate against any employee or applicant because of physical or mental disability. The Contractor agrees to take affirmative action to employ, advance in employment, and otherwise treat qualified individuals with disabilities without discrimination based upon their physical or mental disability in all employment practices such as--

(i) Recruitment, advertising, and job application procedures;

(ii) Hiring, upgrading, promotion, award of tenure, demotion, transfer, layoff, termination, right of return from layoff, and rehiring;

(iii) Rates of pay or any other form of compensation and changes in compensation;

(iv) Job assignments, job classifications, organizational structures, position descriptions, lines of progression, and seniority lists;

(v) Leaves of absence, sick leave, or any other leave;

(vi) Fringe benefits available by virtue of employment, whether or not administered by the Contractor;

(vii) Selection and financial support for training, including apprenticeships, professional meetings, conferences, and other related activities, and selection for leaves of absence to pursue training;

(viii) Activities sponsored by the Contractor, including social or recreational programs; and

(ix) Any other term, condition, or privilege of employment.

(2) The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor (Secretary) issued under the Rehabilitation Act of 1973 (29 U.S.C. 793) (the Act), as amended.

(b) Postings. (1) The Contractor agrees to post employment notices stating--

(i) The Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified individuals with disabilities; and

(ii) The rights of applicants and employees.

(2) These notices shall be posted in conspicuous places that are available to employees and applicants for employment. The Contractor shall ensure that applicants and employees with disabilities are informed of the contents of the notice (e.g., the Contractor may have the notice read to a visually disabled individual, or may lower the posted notice so that it might be read by a person in a wheelchair). The notices shall be in a form prescribed by the Deputy Assistant Secretary for Federal Contract Compliance of the U.S. Department of Labor (Deputy Assistant Secretary) and shall be provided by or through the Contracting Officer.

(3) The Contractor shall notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of Section 503 of the Act and is committed to take affirmative action to employ, and advance in employment, qualified individuals with physical or mental disabilities.

(c) Noncompliance. If the Contractor does not comply with the requirements of this clause, appropriate actions may be taken under the rules, regulations, and relevant orders of the Secretary issued pursuant to the Act.

(d) Subcontracts. The Contractor shall include the terms of this clause in every subcontract or purchase order in excess of $10,000 unless exempted by rules, regulations, or orders of the Secretary. The Contractor shall act as specified by the Deputy Assistant Secretary to enforce the terms, including action for noncompliance.

(End of clause)

46 52.222-37 EMPLOYMENT REPORTS ON DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA (JAN 1999)

(a) Unless the Contractor is a State or local government agency, the Contractor shall report at least annually, as required by the Secretary of Labor, on--

(1) The number of disabled veterans and the number of veterans of the Vietnam era in the workforce of the Contractor by job category and hiring location; and

(2) The total number of new employees hired during the period covered by the report, and of that total, the number of disabled veterans, and the number of veterans of the Vietnam era.

(b) The above items shall be reported by completing the form entitled "Federal Contractor Veterans' Employment Report VETS-100."

(c) Reports shall be submitted no later than September 30 of each year beginning September 30, 1988.

(d) The employment activity report required by paragraph (a)(2) of this clause shall reflect total hires during the most recent 12-month period as of the ending date selected for the employment profile report required by paragraph (a)(1) of this clause. Contractors may select an ending date: (1) As of the end of any pay period during the period January through March 1st of the year the report is due, or (2) as of December 31, if the contractor has previous written approval from the Equal Employment Opportunity Commission to do so for purposes of submitting the Employer Information Report EEO-1 (Standard Form 100).

(e) The count of veterans reported according to paragraph (a) of this clause shall be based on voluntary disclosure. Each Contractor subject to the reporting requirements at 38 U.S.C. 4212 shall invite all disabled veterans and veterans of the Vietnam era who wish to benefit under the affirmative action program at 38 U.S.C. 4212 to identify themselves to the Contractor. The invitation shall state that the information is voluntarily provided; that the information will be kept confidential; that disclosure or refusal to provide the information will not subject the applicant or employee to any adverse treatment; and that the information will be used only in accordance with the regulations promulgated under 38 U.S.C. 4212.

(f) Subcontracts. The Contractor shall include the terms of this clause in every subcontract or purchase order of $10,000 or more unless exempted by rules, regulations, or orders of the Secretary.

(End of clause)

47 52.223-2 CLEAN AIR AND WATER (APR 1984)

(a) "Air Act", as used in this clause, means the Clean Air Act (42 U.S.C. 7401, et seq.).

"Clean air standards," as used in this clause, means--

(1) Any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, work practices, or other requirements contained in, issued under, or otherwise adopted under the Air Act or Executive Order 11738;

(2) An applicable implementation plan as described in section 110(d) of the Air Act (42 U.S.C. 7410(d));

(3) An approved implementation procedure or plan under section 111(c) or section 111(d) of the Air Act (42 U.S.C. 7411(c) or (d)); or

(4) An approved implementation procedure under section 112(d) of the Air Act (42 U.S.C. 7412(d)).

"Clean water standards," as used in this clause, means any enforceable limitation, control, condition, prohibition, standard, or other requirement promulgated under the Water Act or contained in a permit issued to a discharger by the EPA or by a State under an approved program, as authorized by section 402 of the Water Act (33 U.S.C. 1342), or by local government to ensure compliance with pretreatment regulations as required by section 307 of the Water Act (33 U.S.C. 1317).

"Compliance," as used in this clause, means compliance with--

(1) Clean air or water standards; or

(2) A schedule or plan ordered or approved by a court of competent jurisdiction, the EPA, or an air or water pollution control agency under the requirements of the Air Act or Water Act and related regulations.

"Facility," as used in this clause, means any building, plant, installation, structure, mine, vessel or other floating craft, location, or site of operations, owned, leased, or supervised by a Contractor or subcontractor, used in the performance of a contract or subcontract. When a location or site of operations includes more than one building, plant, installation, or structure, the entire location or site shall be deemed a facility except when the Administrator, or a designee, of the EPA determines that independent facilities are collocated in one geographical area.

"Water Act," as used in this clause, means Clean Water Act (33 U.S.C. 1251, et seq.).

(b) The Contractor agrees--

(1) To comply with all the requirements of section 114 of the Clean Air Act (42 U.S.C. 7414) and section 308 of the Clean Water Act (33 U.S.C. 1318) relating to inspection, monitoring, entry, reports, and information, as well as other requirements specified in section 114 and section 308 of the Air Act and the Water Act, and all regulations and guidelines issued to implement those acts before the award of this contract;

(2) That no portion of the work required by this prime contract will be performed in a facility listed on the EPA List of Violating Facilities on the date when this contract was awarded unless and until the EPA eliminates the name of the facility from the listing;

(3) To use best efforts to comply with clean air standards and clean water standards at the facility in which the contract is being performed; and

(4) To insert the substance of this clause into any nonexempt subcontract, including this subparagraph (b)(4).

(End of clause)
(R 7-103.29 1975 OCT)
(R 1-1.2302)

48 52.223-3 HAZARDOUS MATERIAL IDENTIFICATION AND MATERIAL SAFETY DATA (JAN 1997)

(a) "Hazardous material," as used in this clause, includes any material defined as hazardous under the latest version of Federal Standard No. 313 (including revisions adopted during the term of the contract).

(b) The Offeror must list any hazardous material, as defined in paragraph (a) of this clause, to be delivered under this contract. The hazardous material shall be properly identified and include any applicable identification number, such as National Stock Number or Special Item Number. This information shall also be included on the Material Safety Data Sheet submitted under this contract.

Material	Identification No. (If none, insert None)

(c) This list must be updated during performance of the contract whenever the Contractor determines that any other material to be delivered under this contract is hazardous.

(d) The apparently successful Offeror agrees to submit, for each item as required prior to award, a Material Safety Data Sheet, meeting the requirements of 29 CFR 1910.1200(g) and the latest version of Federal Standard No. 313, for all hazardous material identified in paragraph (b) of this clause. Data shall be submitted in accordance with Federal Standard No. 313, whether or not the apparently successful Offeror is the actual manufacturer of these items. Failure to submit the Material Safety Data Sheet prior to award may result in the apparently successful Offeror being considered nonresponsible and ineligible for award.

(e) If, after award, there is a change in the composition of the item(s) or a revision to Federal Standard No. 313, which renders incomplete or inaccurate the data submitted under paragraph (d) of this clause, the Contractor shall promptly notify the Contracting Officer and resubmit the data.

(f) Neither the requirements of this clause nor any act or failure to act by the Government shall relieve the Contractor of any responsibility or liability for the safety of Government, Contractor, or subcontractor personnel or property.

(g) Nothing contained in this clause shall relieve the Contractor from complying with applicable Federal, State, and local laws, codes, ordinances, and regulations (including the obtaining of licenses and permits) in connection with hazardous material.

(h) The Government's rights in data furnished under this contract with respect to hazardous material are as follows:

(1) To use, duplicate and disclose any data to which this clause is applicable. The purposes of this right are to--

(i) Apprise personnel of the hazards to which they may be exposed in using, handling, packaging, transporting, or disposing of hazardous materials;

(ii) Obtain medical treatment for those affected by the material; and

(iii) Have others use, duplicate, and disclose the data for the Government for these purposes.

(2) To use, duplicate, and disclose data furnished under this clause, in accordance with subparagraph (h)(1) of this clause, in precedence over any other clause of this contract providing for rights in data.

(3) The Government is not precluded from using similar or data acquired from other sources.

(End of clause)

49 52.223-5 POLLUTION PREVENTION AND RIGHT-TO-KNOW INFORMATION (APR 1998)

(a) Executive Order 12856 of August 3, 1993, requires Federal facilities to comply with the provisions of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11001-11050) and the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13101-13109).

(b) The Contractor shall provide all information needed by the Federal

facility to comply with the emergency planning reporting requirements of Section 302 of EPCRA; the emergency notice requirements of Section 304 of EPCRA; the list of Material Data Safety Sheets required by Section 311 of EPCRA; the emergency and hazardous chemical inventory forms of Section 312 of EPCRA; the toxic chemical release inventory of Section 313 of EPCRA, which includes the reduction and recycling information required by Section 6607 of PPA; and the toxic chemical reduction goals requirements of Section 3-302 of Executive Order 12856.

(End of clause)

50 52.223-6 DRUG-FREE WORKPLACE (JAN 1997)

(a) Definitions. As used in this clause--

"Controlled substance" means a controlled substance in schedules I through V of section 202 of the Controlled Substances Act (21 U.S.C. 812) and as further defined in regulation at 21 CFR 1308.11 - 1308.15.

"Conviction" means a finding of guilt (including a plea of nolo contendere) or imposition of sentence, or both, by any judicial body charged with the responsibility to determine violations of the Federal or State criminal drug statutes.

"Criminal drug statute" means a Federal or non-Federal criminal statute involving the manufacture, distribution, dispensing, possession or use of any controlled substance.

"Drug-free workplace" means the site(s) for the performance of work done by the Contractor in connection with a specific contract at which employees of the Contractor are prohibited from engaging in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance.

"Employee" means an employee of a Contractor directly engaged in the performance of work under a Government contract. "Directly engaged" is defined to include all direct cost employees and any other Contractor employee who has other than a minimal impact or involvement in contract performance.

"Individual" means an offeror/contractor that has no more than one employee including the offeror/contractor.

(b) The Contractor, if other than an individual, shall--within 30 days after award (unless a longer period is agreed to in writing for contracts of 30 days or more performance duration), or as soon as possible for contracts of less than 30 days performance duration--

(1) Publish a statement notifying its employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition;

(2) Establish an ongoing drug-free awareness program to inform such employees about--

(i) The dangers of drug abuse in the workplace;

(ii) The Contractor's policy of maintaining a drug-free workplace;

(iii) Any available drug counseling, rehabilitation, and employee assistance programs; and

(iv) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;

(3) Provide all employees engaged in performance of the contract with a copy of the statement required by subparagraph (b)(1) of this clause;

(4) Notify such employees in writing in the statement required by subparagraph (b)(1) of this clause that, as a condition of continued employment on this contract, the employee will--

(i) Abide by the terms of the statement; and

(ii) Notify the employer in writing of the employee's conviction under a criminal drug statute for a violation occurring in the workplace no later than 5 days after such conviction.

(5) Notify the Contracting Officer in writing within 10 days after receiving notice under subdivision (b)(4)(ii) of this clause, from an employee or otherwise receiving actual notice of such conviction. The notice shall include the position title of the employee;

(6) Within 30 days after receiving notice under subdivision (b)(4)(ii) of this clause of a conviction, take one of the following actions with respect to any employee who is convicted of a drug abuse violation occurring in the workplace:

(i) Taking appropriate personnel action against such employee, up to and including termination; or

(ii) Require such employee to satisfactorily participate in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency, and

(7) Make a good faith effort to maintain a drug-free workplace through implementation of subparagraphs (b)(1) through (b)(6) of this clause.

(c) The Contractor, if an individual, agrees by award of the contract or acceptance of a purchase order, not to engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance while performing this contract.

(d) In addition to other remedies available to the Government, the Contractor's failure to comply with the requirements of paragraph (b) or (c) of this clause may, pursuant to FAR 23.506, render the Contractor subject to suspension of contract payments, termination of the contract for default, and suspension or debarment.

(End of clause)

51 52.223-7001 HAZARD WARNING LABELS (DEC 1991)

(a) "Hazardous material," as used in this clause, is defined in the Hazardous Material Identification and Material Safety Data clause of this contract.

(b) The Contractor shall label the item package (unit container) of any hazardous material to be delivered under this contract in accordance with the Hazard Communication Standard (29 CFR 1910.1200 et seq.). The Standard requires that the hazard warning label conform to the requirements of the standard unless the material is otherwise subject to the labelling requirements of one of the following statutes:

(1) Federal Insecticide, Fungicide and Rodenticide Act;

(2) Federal Food, Drug and Cosmetics Act;

(3) Consumer Product Safety Act;

(4) Federal Hazardous Substances Act; or

(5) Federal Alcohol Administration Act.

(c) The Offeror shall list which hazardous material listed in the Hazardous Material Identification and Material Safety Data clause of this contract will be labelled in accordance with one of the Acts in paragraphs (b)(1) through (5) of this clause instead of the Hazard Communication Standard. Any hazardous material not listed will be interpreted to mean that a label is required in accordance with the Hazard Communication Standard.

Material (if none, insert "none.")	Act
_____	_____
_____	_____

(d) The apparently successful Offeror agrees to submit, before award, a copy of the hazard warning label for all hazardous materials not listed in paragraph (c) of this clause. The Offeror shall submit the label with the Material Safety Data Sheet being furnished under the Hazardous Material Identification and Material Safety Data clause of this contract.

(e) The Contractor shall also comply with MIL-STD-129, Marking for Shipment and Storage (including revisions adopted during the term of this contract).

(End of clause)

52 52.223-7004 DRUG-FREE WORK FORCE (SEP 1988)

(a) Definitions.

(1) "Employee in a sensitive position," as used in this clause, means an employee who has been granted access to classified information; or employees in other positions that the Contractor determines involve national security, health or safety, or functions other than the foregoing requiring a high degree of trust and confidence.

(2) "Illegal drugs," as used in this clause, means controlled substances included in Schedules I and II, as defined by section 802(6) of Title 21 of the United States Code, the possession of which is unlawful under Chapter 13 of that Title. The term "illegal drugs" does not mean the use of a controlled substance pursuant to a valid prescription or other uses authorized by law.

(b) The Contractor agrees to institute and maintain a program for achieving the objective of a drug-free work force. While this clause defines criteria for such a program, contractors are encouraged to implement alternative approaches comparable to the criteria in paragraph (c) that are designed to achieve the objectives of this clause.

(c) Contractor programs shall include the following, or appropriate alternatives:

(1) Employee assistance programs emphasizing high level direction, education, counseling, rehabilitation, and coordination with available community resources;

(2) Supervisory training to assist in identifying and addressing illegal drug use by Contractor employees;

(3) Provision for self-referrals as well as supervisory referrals to treatment with maximum respect for individual confidentiality consistent with safety and security issues;

(4) Provision for identifying illegal drug users, including testing on a controlled and carefully monitored basis. Employee drug testing programs shall be established taking account of the following:

(i) The Contractor shall establish a program that provides for testing for the use of illegal drugs by employees in sensitive positions. The extent of and criteria for such testing shall be determined by the Contractor based on considerations that include the nature of the work being performed under the contract, the employee's duties, the efficient use of Contractor resources, and the risks to health, safety, or national security that could result from the failure of an employee adequately to discharge his or her position.

(ii) In addition, the Contractor may establish a program for employee drug testing--

(A) When there is a reasonable suspicion that an employee uses illegal drugs; or

(B) When an employee has been involved in an accident or unsafe practice;

(C) As part of or as a follow-up to counseling or rehabilitation for illegal drug use;

(D) As part of a voluntary employee drug testing program.

(iii) The Contractor may establish a program to test applicants for employment for illegal drug use.

(iv) For the purpose of administering this clause, testing for illegal drugs may be limited to those substances for which testing is prescribed by section 2.1 of Subpart B of the "Mandatory Guidelines for Federal Workplace Drug Testing Programs" (53 FR 11980 (April 11 1988)), issued by the Department of Health and Human Services.

(d) Contractors shall adopt appropriate personnel procedures to deal with employees who are found to be using drugs illegally. Contractors shall not allow any employee to remain on duty or perform in a sensitive position who is found to use illegal drugs until such time as the Contractor, in accordance with procedures established by the Contractor, determines that the employee may perform in such a position.

(e) The provisions of this clause pertaining to drug testing programs shall not apply to the extent they are inconsistent with state or local law, or with an existing collective bargaining agreement; provided that with respect to the latter, the Contractor agrees that those issues that are in conflict will be a subject of negotiation at the next collective bargaining session.

(End of clause)

53 52.225-11 RESTRICTIONS ON CERTAIN FOREIGN PURCHASES (AUG 1998)

(a) Unless advance written approval of the Contracting Officer is obtained, the Contractor shall not acquire, for use in the performance of this contract, any supplies or services originating from sources within, or that were located in or transported from or through, countries whose products are banned from importation into the United States by Executive order or regulations of the Office of Foreign Assets Control, Department of the Treasury. Those countries include Cuba, Iran, Iraq, Libya, North Korea, and Sudan.

(b) The Contractor shall not acquire for use in the performance of this contract any supplies or services from entities controlled by the Government of Iraq.

(c) The Contractor agrees to insert the provisions of this clause, including this paragraph (c), in all subcontracts hereunder.

(End of clause)

54 52.225-15 BUY AMERICAN ACT--CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS ACT AND NORTH AMERICAN FREE TRADE AGREEMENT (JUN 1997)

(a) Definitions. As used in this clause--

"Components" means those articles, materials, and supplies incorporated directly into construction materials.

"Construction material" means an article, material, or supply brought to

the construction site for incorporation into the building or work. Construction material also includes an item brought to the site pre-assembled from articles, materials, or supplies. However, emergency life safety systems, such as emergency lighting, fire alarm, and audio evacuation systems, which are discrete systems incorporated into a public building or work and which are produced as a complete system, shall be evaluated as a single and distinct construction material regardless of when or how the individual parts or components of such systems are delivered to the construction site.

"Designated country construction material" means a construction material that (a) is wholly the growth, product, or manufacture of a designated country (as defined at FAR 25.401), or (b) in the case of a construction material which consists in whole or in part of materials from another country or instrumentality, has been substantially transformed in a designated country into a new and different construction material distinct from the materials from which it was transformed.

"Domestic construction material" means (l) an unmanufactured construction material mined or produced in the United States, or (2) a construction material manufactured in the United States, if the cost of its components mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. Components of foreign origin of the same class or kind as the construction materials determined to be unavailable pursuant to subparagraph 25.202(a)(2) of the Federal Acquisition Regulation (FAR) shall be treated as domestic.

"North American Free Trade Agreement (NAFTA) country" means Canada or Mexico.

"NAFTA country construction material" means a construction material that (a) is wholly the growth, product, or manufacture of a NAFTA country, or (b) in the case of a construction material which consists in whole or in part of materials from another country or instrumentality, has been substantially transformed in a NAFTA country into a new and different construction material distinct from the materials from which it was transformed.

(b)(1) The Buy American Act (41 U.S.C. 10a--10d) requires that only domestic construction material be used in performing this contract, except as provided in paragraphs (b)(2), (b)(3), and (b)(4) of this clause.

(2) The Trade Agreements Act and the North American Free Trade Agreement (NAFTA) provide that designated country and NAFTA country construction materials are exempted from application of the Buy American Act.

(3) The requirement in paragraph (b)(1) of this clause does not apply to the excepted construction material or components listed by the Government as follows:

%%Insert list of applicable accepted materials or indicate "none"

NONE

(4) Other foreign construction material may be added to the list in paragraph (b)(3) of this clause if the Government determines that--

(i) The cost would be unreasonable (the cost of a particular domestic construction material shall be determined to be unreasonable when the cost of such material exceeds the cost of foreign material by more than 6 percent, unless the agency head determines a higher percentage to be appropriate);

(ii) The application of the restriction of the Buy American Act to a particular construction material would be impracticable or inconsistent with the public interest; or (iii) The construction material is not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality.

(5) The Contractor agrees that only domestic construction materials, NAFTA country construction materials, or designated country construction materials will be used by the Contractor, subcontractors, material men, and suppliers in the performance of this contract, except for foreign construction materials, if any, listed in paragraph (b)(3) of this clause.

(c) Request for determination.

(1) Contractors requesting to use foreign construction material under paragraph (b)(4) of this clause shall provide adequate information for Government evaluation of the request for a determination regarding the inapplicability of the Buy American Act. Each submission shall include a description of the foreign and domestic construction materials, including unit of measure, quantity, price, time of delivery or availability, location of the construction project, name and address of the proposed contractor, and a detailed justification of the reason for use of foreign materials cited in accordance with paragraph (b)(4) of this clause. A submission based on unreasonable cost shall include a reasonable survey of the market and a completed price comparison table in the format in paragraph (d) of this clause. The price of construction material shall include all delivery costs to the construction site and any applicable duty (whether or not a duty-free certificate may be issued).

(2) If the Government determines after contract award that an exception to the Buy American Act applies, the contract shall be modified to allow use of the foreign construction material, and adequate consideration shall be negotiated. However, when the basis for the exception is the unreasonable price of a domestic construction material, adequate consideration shall not be less than the differential established in paragraph (b)(4)(i) of this clause.

(3) If the Government does not determine that an exception to the Buy American Act applies, the use of that particular foreign construction material will be a failure to comply with the Act.

(d) For evaluation of requests under paragraph (c) of this clause based on unreasonable cost, the following information and any applicable supporting data based on the survey of suppliers shall be included in the request:

Foreign and Domestic Construction Materials Price Comparison

Construction material description	Unit of measure	Quantity	Price (dollars) +
Item 1:			
Foreign construction material.....	.....	.....	.....
Domestic construction material.....	.....	.....	.....
Item 2:			
Foreign construction material.....	.....	.....	.....
Domestic construction material.....	.....	.....	.....

List name, address, telephone number, and contact for suppliers surveyed. Attach copy of response; if oral, attach summary. Include other applicable supporting information.

+ Include all delivery costs to the construction site and any applicable duty (whether or not a duty-free entry certificate is issued).

(End of clause)

55 52.226-1 UTILIZATION OF INDIAN ORGANIZATIONS AND INDIAN-OWNED ECONOMIC ENTERPRISES (MAY 1999)

(a) For Department of Defense contracts, this clause applies only if the contract includes a subcontracting plan incorporated under the terms of the clause at 52.219-9, Small Business Subcontracting Plan. It does not apply to contracts awarded based on a subcontracting plan submitted and approved under paragraph (g) of the clause at 52.219.

(b) Definitions. As used in this clause:

"Indian" means any person who is a member of any Indian tribe, band, group, pueblo or community which is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs (BIA) in accordance with 25 U.S.C. 1452(c) and any "Native" as defined in the Alaska Native Claims Settlement Act (43 U.S.C. 1601).

"Indian organization" means the governing body of any Indian tribe or entity established or recognized by the governing body of an Indian tribe for the purposes of 25 U.S.C., Chapter 17.

"Indian-owned economic enterprise" means any Indian-owned (as determined by the Secretary of the Interior) commercial, industrial, or business activity established or organized for the purpose of profit, provided that Indian ownership shall constitute not less than 51 percent of the enterprise.

"Indian tribe" means any Indian tribe, band, group, pueblo or community, including native villages and native groups (including corporations organized by Kenai, Juneau, Sitka, and Kodiak) as defined in the Alaska Native Claims Settlement Act, which is recognized by the Federal Government as eligible for services from BIA in accordance with 25 U.S.C. 1542(c).

"Interested party" means a prime contractor or an actual or prospective offeror whose direct economic interest would be affected by the award of a subcontract or by the failure to award a subcontract.

(c) The Contractor agrees to use its best efforts to give Indian organizations and Indian-owned economic enterprises (25 U.S.C. 1544) the maximum practicable opportunity to participate in the subcontracts it awards to the fullest extent consistent with efficient performance of its contract.

(1) The Contracting Officer and the Contractor, acting in good faith, may rely on the representation of an Indian organization or Indian-owned economic enterprise as to its eligibility, unless an interested party challenges its status or the Contracting Officer has independent reason to question that status. In the event of a challenge to the representation of a subcontractor, the Contracting Officer shall refer the matter to the U.S. Department of the Interior, Bureau of Indian Affairs (BIA), Attn: Chief, Division of Contracting and Grants Administration, 1849 C Street, NW, MS-334A-SIB, Washington, DC 20245. The BIA will determine the eligibility and notify the Contracting Officer. The 5 percent incentive payment will not be made within 50 working days of subcontract award or while a challenge is pending. If a subcontractor is determined to be an ineligible participant, no incentive payment will be made under the Indian Incentive Program.

(2) The Contractor may request an adjustment under the Indian Incentive Program to the following:

(i) The estimated cost of a cost-type contract.

(ii) The target cost of a cost-plus-incentive-fee prime contract.

(iii) The target cost and ceiling price of a fixed-price incentive prime contract.

(iv) The price of a firm-fixed-price prime contract.

(3) The amount of the equitable adjustment to the prime contract shall be 5 percent of the estimated cost, target cost or firm-fixed-price included in the subcontract initially awarded to the Indian organization or Indian-owned economic enterprise.

(4) The Contractor has the burden of proving the amount claimed and must assert its request for an adjustment prior to completion of contract performance.

(d) The Contracting Officer, subject to the terms and conditions of the contract and the availability of funds, shall authorize an incentive payment of 5 percent of the amount paid to the subcontractor. Contracting Officers shall seek funding in accordance with agency procedures. The Contracting Officer's decision is final and not subject to the Disputes clause of this contract.

(End of clause)

56 52.227-1 AUTHORIZATION AND CONSENT (JUL 1995)

(a) The Government authorizes and consents to all use and manufacture, in performing this contract or any subcontract at any tier, of any invention described in and covered by a United States patent (1) embodied in the structure or composition of any article the delivery of which is accepted by the Government under this contract or (2) used in machinery, tools, or methods whose use necessarily results from compliance by the Contractor or a subcontractor with (i) specifications or written provisions forming a part of this contract or (ii) specific written instructions given by the Contracting Officer directing the manner of performance. The entire liability to the Government for infringement of a patent of the United States shall be determined solely by the provisions of the indemnity clause, if any, included in this contract or any subcontract hereunder (including any lower-tier subcontract), and the Government assumes liability for all other infringement to the extent of the authorization and consent hereinabove granted.

(b) The Contractor agrees to include, and require inclusion of, this clause, suitably modified to identify the parties, in all subcontracts at any tier for supplies or services (including construction, architect-engineer services, and materials, supplies, models, samples, and design or testing services expected to exceed the simplified acquisition threshold); however, omission of this clause from any subcontract, including those at or below the simplified acquisition threshold, does not affect this authorization and consent.

(End of clause)

57 52.227-7023 DRAWINGS AND OTHER DATA TO BECOME PROPERTY OF GOVERNMENT (MAR 1979)

All designs, drawings, specifications, notes and other works developed in the performance of this contract shall become the sole property of the Government and may be used on any other design or construction without additional compensation to the Contractor. The Government shall be considered the "person for whom the work was prepared" for the purpose of authorship in any copyrightable work under 17 U.S.C. 201(b). With respect thereto, the Contractor agrees not to assert or authorize others to assert any rights nor establish any claim under the design patent or copyright laws. The Contractor for a period of three (3) years after completion of the project agrees to furnish all retained works on the request of the

Contracting Officer. Unless otherwise provided in this contract, the Contractor shall have the right to retain copies of all works beyond such period.

(End of clause)

58 52.227-7033 RIGHTS IN SHOP DRAWINGS (APR 1966)

(a) Shop drawings for construction means drawings, submitted to the Government by the Construction Contractor, subcontractor or any lower-tier subcontractor pursuant to a construction contract, showing in detail (i) the proposed fabrication and assembly of structural elements and (ii) the installation (i.e., form, fit, and attachment details) of materials or equipment. The Government may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.

(b) This clause, including this paragraph (b), shall be included in all subcontracts hereunder at any tier.

(End of clause)

59 52.228-2 ADDITIONAL BOND SECURITY (OCT 1997)

The Contractor shall promptly furnish additional security required to protect the Government and persons supplying labor or materials under this contract if--

(a) Any surety upon any bond, or issuing financial institution for other security, furnished with this contract becomes unacceptable to the Government;

(b) Any surety fails to furnish reports on its financial condition as required by the Government;

(c) The contract price is increased so that the penal sum of any bond becomes inadequate in the opinion of the Contracting Officer; or

(d) An irrevocable letter of credit (ILC) used as security will expire before the end of the period of required security. If the Contractor does not furnish an acceptable extension or replacement ILC, or other acceptable substitute, at least 30 days before an ILC's scheduled expiration, the Contracting officer has the right to immediately draw on the ILC.

(End of clause)

60 52.228-5 INSURANCE--WORK ON A GOVERNMENT INSTALLATION (JAN 1997)

(a) The Contractor shall, at its own expense, provide and maintain during the entire performance of this contract, at least the kinds and minimum amounts of insurance required in the Schedule or elsewhere in the contract.

(b) Before commencing work under this contract, the Contractor shall notify the Contracting Officer in writing that the required insurance has been obtained. The policies evidencing required insurance shall contain an endorsement to the effect that any cancellation or any material change adversely affecting the Government's interest shall not be effective (1) for such period as the laws of the State in which this contract is to be performed prescribe, or (2) until 30 days after the insurer or the Contractor gives written notice to the Contracting Officer, whichever period is longer.

(c) The Contractor shall insert the substance of this clause, including this paragraph (c), in subcontracts under this contract that require work

on a Government installation and shall require subcontractors to provide and maintain the insurance required in the Schedule or elsewhere in the contract. The Contractor shall maintain a copy of all subcontractors' proofs of required insurance, and shall make copies available to the Contracting Officer upon request.

(End of clause)

61 52.228-11 PLEDGES OF ASSETS (FEB 1992)

(a) Offerors shall obtain from each person acting as an individual surety on a bid guarantee, a performance bond, or a payment bond--

(1) Pledge of assets; and

(2) Standard Form 28, Affidavit of Individual Surety.

(b) Pledges of assets from each person acting as an individual surety shall be in the form of--

(1) Evidence of an escrow account containing cash, certificates of deposit, commercial or Government securities, or other assets described in FAR 28.203-2 (except see 28.203-2(b)(2) with respect to Government securities held in book entry form) and/or;

(2) A recorded lien on real estate. The offeror will be required to provide--

(i) Evidence of title in the form of a certificate of title prepared by a title insurance company approved by the United States Department of Justice. This title evidence must show fee simple title vested in the surety along with any concurrent owners; whether any real estate taxes are due and payable; and any recorded encumbrances against the property, including the lien filed in favor of the Government as required by FAR 28.203-3(d);

(ii) Evidence of the amount due under any encumbrance shown in the evidence of title;

(iii) A copy of the current real estate tax assessment of the property or a current appraisal dated no earlier than 6 months prior to the date of the bond, prepared by a professional appraiser who certifies that the appraisal has been conducted in accordance with the generally accepted appraisal standards as reflected in the Uniform Standards of Professional Appraisal Practice, as promulgaged by the Appraisal Foundation.

(End of clause)

62 52.228-12 PROSPECTIVE SUBCONTRACTOR REQUESTS FOR BONDS (OCT 1995)

In accordance with Section 806(a)(3) of Pub. L. 102-190, as amended by Sections 2091 and 8105 of Pub. L. 103-355, upon the request of a prospective subcontractor or supplier offering to furnish labor or material for the performance of this contract for which a payment bond has been furnished to the Government pursuant to the Miller Act, the Contractor shall promptly provide a copy of such payment bond to the requester.

(End of clause)

63 52.228-14 IRREVOCABLE LETTER OF CREDIT (OCT 1997)

(a) "Irrevocable letter of credit" (ILC), as used in this clause, means a written commitment by a federally insured financial institution to pay all or part of a stated amount of money, until the expiration date of the

letter, upon presentation by the Government (the beneficiary) of a written demand therefor. Neither the financial institution nor the offeror/Contractor can revoke or condition the letter of credit.

(b) If the offeror intends to use an ILC in lieu of a bid bond, or to secure other types of bonds such as performance and payment bonds, the letter of credit and letter of confirmation formats in paragraphs (e) and (f) of this clause shall be used.

(c) The letter of credit shall be irrevocable, shall require presentation of no document other than a written demand and the ILC (including confirming letter, if any), shall be issued/confirmed by an acceptable federally insured financial institution as provided in paragraph (d) of this clause, and--

(1) If used as a bid guarantee, the ILC shall expire no earlier than 60 days after the close of the bid acceptance period;

(2) If used as an alternative to corporate or individual sureties as security for a performance or payment bond, the offeror/Contractor may submit an ILC with an initial expiration date estimated to cover the entire period for which financial security is required or may submit an ILC with an initial expiration date that is a minimum period of one year from the date of issuance. The ILC shall provide that, unless the issuer provides the beneficiary written notice of non-renewal at least 60 days in advance of the current expiration date, the ILC is automatically extended without amendment for one year from the expiration date, or any future expiration date, until the period of required coverage is completed and the Contracting Officer provides the financial institution with a written statement waiving the right to payment. The period of required coverage shall be:

(i) For contracts subject to the Miller Act, the later of--

(A) One year following the expected date of final payment;

(B) For performance bonds only, until completion of any warranty period; or

(C) For payment bonds only, until resolution of all claims filed against the payment bond during the one-year period following final payment.

(ii) For contracts not subject to the Miller Act, the later of--

(A) 90 days following final payment; or

(B) For performance bonds only, until completion of any warranty period.

(d) Only federally insured financial institutions rated investment grade or higher shall issue or confirm the ILC. The offeror/Contractor shall provide the Contracting Officer a credit rating that indicates the financial institution has the required rating(s) as of the date of issuance of the ILC. Unless the financial institution issuing the ILC had letter of credit business of at least $25 million in the past year, ILCs over $5 million must be confirmed by another acceptable financial institution that had letter of credit business of at least $25 million in the past year.

(e) The following format shall be used by the issuing financial institution to create an ILC:

(Issuing Financial Institution's Letterhead or Name and Address)

Issue Date_____

Irrevocable Letter of Credit No._____

Account party's name_____

Account party's address_____

For Solicitation No._____

(For reference only)

TO: (U.S. Government agency)

(U.S. Government agency's address)

1. We hereby establish this irrevocable and transferable Letter of Credit in your favor for one or more drawings up to United States $_____. This Letter of Credit is payable at (issuing financial institution's and, if any, confirming financial institution's) office at (issuing financial institution's address and, if any, confirming financial institution's address) and expires with our close of business on _____, or any automatically extended expiration date.

2. We hereby undertake to honor your or the transferee's sight draft(s) drawn on the issuing or, if any, the confirming financial institution, for all or any part of this credit if presented with this Letter of Credit and confirmation, if any, at the office specified in paragraph 1 of this Letter of Credit on or before the expiration date or any automatically extended expiration date.

3. (This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.) It is a condition of this Letter of Credit that it is deemed to be automatically extended without amendment for one year from the expiration date hereof, or any future expiration date, unless at least 60 days prior to any expiration date, we notify you or the transferee by registered mail, or other receipted means of delivery, that we elect not to consider this Letter of Credit renewed for any such additional period. At the time we notify you, we also agree to notify the account party (and confirming financial institution, if any) by the same means of delivery.

4. This Letter of Credit is transferable. Transfers and assignments of proceeds are to be effected without charge to either the beneficiary or the transferee/assignee of proceeds. Such transfer or assignment shall be only at the written direction of the Government (the beneficiary) in a form satisfactory to the issuing financial institution and the confirming financial institution, if any.

5. This Letter of Credit is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, 1993 Revision, International Chamber of Commerce Publication No. 500, and to the extent not inconsistent therewith, to the laws of _____ (state of confirming financial institution, if any, otherwise state of issuing financial institution).

6. If this credit expires during an interruption of business of this financial institution as described in Article 17 of the UCP, the financial institution specifically agrees to effect payment if this credit is drawn against within 30 days after the resumption of our business.

Sincerely,
(Issuing financial institution)

(f) The following format shall be used by the financial institution to confirm an ILC:

(Confirming Financial Institution's Letterhead or Name and Address)

Date _____ 19_____

Our Letter of Credit Advice Number_____

Beneficiary:_____

(U.S. Government agency)

Issuing Financial Institution:_____

Issuing Financial Institution's LC No.:_____

Gentlemen:

1. We hereby confirm the above indicated Letter of Credit, the original of which is attached, issued by _____ (name of issuing financial institution) for drawings of up to United States dollars _____/U.S. $_____ and expiring with our close of business on _____ (the expiration date), or any automatically extended expiration date.

2. Draft(s) drawn under the Letter of Credit and this Confirmation are payable at our office located at _____.

3. We hereby undertake to honor sight draft(s) drawn under and presented with the Letter of Credit and this Confirmation at our offices as specified herein.

4. (This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.) It is a condition of this confirmation that it be deemed automatically extended without amendment for one year from the expiration date hereof, or any automatically extended expiration date, unless:

(a) At least 60 days prior to any such expiration date, we shall notify the Contracting Officer, or the transferee and the issuing financial institution, by registered mail or other receipted means of delivery, that we elect not to consider this confirmation extended for any such additional period; or

(b) The issuing financial institution shall have exercised its right to notify you or the transferee, the account party, and ourselves, of its election not to extend the expiration date of the Letter of Credit.

5. This confirmation is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, 1993 Revision, International Chamber of Commerce Publication No. 500, and to the extent not inconsistent therewith, to the laws of _____ (state of confirming financial institution).

6. If this confirmation expires during an interruption of business of this financial institution as described in Article 17 of the UCP, we specifically agree to effect payment if this credit is drawn against within 30 days after the resumption of our business.

Sincerely,
(Confirming financial institution)

(g) The following format shall be used by the Contracting Officer for a sight draft to draw on the Letter of Credit:

SIGHT DRAFT

_____
(City, State)

_____, 19_____

_____
(Name and address of financial institution)

Pay to the order of_____
(Beneficiary Agency)

the sum of United States $ _____

This draft is drawn under_____

Irrevocable Letter of Credit No._____

By: _____
(Beneficiary Agency)

(End of clause)

64 52.228-15 Performance and Payment Bonds--Construction (SEP 1996)
(Reference 28.102-3(a))

65 52.229-3 FEDERAL, STATE, AND LOCAL TAXES (JAN 1991)

(a) "Contract date," as used in this clause, means the date set for bid opening or, if this is a negotiated contract or a modification, the effective date of this contract or modification.

"All applicable Federal, State, and local taxes and duties," as used in this clause, means all taxes and duties, in effect on the contract date, that the taxing authority is imposing and collecting on the transactions or

property covered by this contract.

"After-imposed Federal tax," as used in this clause, means any new or increased Federal excise tax or duty, or tax that was exempted or excluded on the contract date but whose exemption was later revoked or reduced during the contract period, on the transactions or property covered by this contract that the Contractor is required to pay or bear as the result of legislative, judicial, or administrative action taking effect after the contract date. It does not include social security tax or other employment taxes.

"After-relieved Federal tax," as used in this clause, means any amount of Federal excise tax or duty, except social security or other employment taxes, that would otherwise have been payable on the transactions or property covered by this contract, but which the Contractor is not required to pay or bear, or for which the Contractor obtains a refund or drawback, as the result of legislative, judicial, or administrative action taking effect after the contract date.

(b) The contract price includes all applicable Federal, State, and local taxes and duties.

(c) The contract price shall be increased by the amount of any after-imposed Federal tax, provided the Contractor warrants in writing that no amount for such newly imposed Federal excise tax or duty or rate increase was included in the contract price, as a contingency reserve or otherwise.

(d) The contract price shall be decreased by the amount of any after-relieved Federal tax.

(e) The contract price shall be decreased by the amount of any Federal excise tax or duty, except social security or other employment taxes, that the Contractor is required to pay or bear, or does not obtain a refund of, through the Contractor's fault, negligence, or failure to follow instructions of the Contracting Officer.

(f) No adjustment shall be made in the contract price under this clause unless the amount of the adjustment exceeds $250.

(g) The Contractor shall promptly notify the Contracting Officer of all matters relating to any Federal excise tax or duty that reasonably may be expected to result in either an increase or decrease in the contract price and shall take appropriate action as the Contracting Officer directs.

(h) The Government shall, without liability, furnish evidence appropriate to establish exemption from any Federal, State, or local tax when the Contractor requests such evidence and a reasonable basis exists to sustain the exemption.

(End of clause)

66 52.231-7000 SUPPLEMENTAL COST PRINCIPLES (DEC 1991)

When the allowability of costs under this contract is determined in accordance with Part 31 of the Federal Acquisition Regulation (FAR), allowability shall also be determined in accordance with Part 231 of the Defense FAR Supplement, in effect on the date of this contract.

(End of clause)

67 52.232-5 PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS (MAY 1997)

(a) Payment of price. The Government shall pay the Contractor the contract price as provided in this contract.

(b) Progress payments. The Government shall make progress payments

monthly as the work proceeds, or at more frequent intervals as determined by the Contracting Officer, on estimates of work accomplished which meets the standards of quality established under the contract, as approved by the Contracting Officer.

(1) The Contractor's request for progress payments shall include the following substantiation:

(i) An itemization of the amounts requested, related to the various elements of work required by the contract covered by the payment requested.

(ii) A listing of the amount included for work performed by each subcontractor under the contract.

(iii) A listing of the total amount of each subcontract under the contract.

(iv) A listing of the amounts previously paid to each such subcontractor under the contract.

(v) Additional supporting data in a form and detail required by the Contracting Officer.

(2) In the preparation of estimates, the Contracting Officer may authorize material delivered on the site and preparatory work done to be taken into consideration. Material delivered to the Contractor at locations other than the site also may be taken into consideration if--

(i) Consideration is specifically authorized by this contract; and

(ii) The Contractor furnishes satisfactory evidence that it has acquired title to such material and that the material will be used to perform this contract.

(c) Contractor certification. Along with each request for progress payments, the Contractor shall furnish the following certification, or payment shall not be made: (However, if the Contractor elects to delete paragraph (c)(4) from the certification, the certification is still acceptable.)

I hereby certify, to the best of my knowledge and belief, that--

(1) The amounts requested are only for performance in accordance with the specifications, terms, and conditions of the contract;

(2) Payments to subcontractors and suppliers have been made from previous payments received under the contract, and timely payments will be made from the proceeds of the payment covered by this certification, in accordance with subcontract agreements and the requirements of chapter 39 of Title 31, United States Code;

(3) This request for progress payments does not include any amounts which the prime contractor intends to withhold or retain from a subcontractor or supplier in accordance with the terms and conditions of the subcontract; and

(4) This certification is not to be construed as final acceptance of a subcontractor's performance.

_____
(Name)

_____
(Title)

_____
(Date)

(d) Refund of unearned amounts. If the Contractor, after making a certified request for progress payments, discovers that a portion or all of such request constitutes a payment for performance by the Contractor that fails to conform to the specifications, terms, and conditions of this contract (hereinafter referred to as the "unearned amount"), the Contractor shall--

(1) Notify the Contracting Officer of such performance deficiency; and

(2) Be obligated to pay the Government an amount (computed by the Contracting Officer in the manner provided in paragraph (j) of this clause) equal to interest on the unearned amount from the 8th day after the date of receipt of the unearned amount until--

(i) The date the Contractor notifies the Contracting Officer that the performance deficiency has been corrected; or

(ii) The date the Contractor reduces the amount of any subsequent certified request for progress payments by an amount equal to the unearned amount.

(e) Retainage. If the Contracting Officer finds that satisfactory progress was achieved during any period for which a progress payment is to be made, the Contracting Officer shall authorize payment to be made in full. However, if satisfactory progress has not been made, the Contracting Officer may retain a maximum of 10 percent of the amount of the payment until satisfactory progress is achieved. When the work is substantially complete, the Contracting Officer may retain from previously withheld funds and future progress payments that amount the Contracting Officer considers adequate for protection of the Government and shall release to the Contractor all the remaining withheld funds. Also, on completion and acceptance of each separate building, public work, or other division of the contract, for which the price is stated separately in the contract, payment shall be made for the completed work without retention of a percentage.

(f) Title, liability, and reservation of rights. All material and work covered by progress payments made shall, at the time of payment, become the sole property of the Government, but this shall not be construed as--

(1) Relieving the Contractor from the sole responsibility for all material and work upon which payments have been made or the restoration of any damaged work; or

(2) Waiving the right of the Government to require the fulfillment of all of the terms of the contract.

(g) Reimbursement for bond premiums. In making these progress payments, the Government shall, upon request, reimburse the Contractor for the amount of premiums paid for performance and payment bonds (including coinsurance and reinsurance agreements, when applicable) after the Contractor has furnished evidence of full payment to the surety. The retainage provisions in paragraph (e) of this clause shall not apply to that portion of progress payments attributable to bond premiums.

(h) Final payment. The Government shall pay the amount due the Contractor under this contract after--

(1) Completion and acceptance of all work;

(2) Presentation of a properly executed voucher; and

(3) Presentation of release of all claims against the Government arising by virtue of this contract, other than claims, in stated amounts, that the Contractor has specifically excepted from the operation of the release. A release may also be required of the assignee if the Contractor's claim to amounts payable under this contract has been assigned under the Assignment of Claims Act of 1940 (31 U.S.C. 3727 and 41 U.S.C. 15).

(i) Limitation because of undefinitized work. Notwithstanding any provision of this contract, progress payments shall not exceed 80 percent on work accomplished on undefinitized contract actions. A "contract action" is any action resulting in a contract, as defined in FAR Subpart 2.1, including contract modifications for additional supplies or services, but not including contract modifications that are within the scope and under the terms of the contract, such as contract modifications issued pursuant to the Changes clause, or funding and other administrative changes.

(j) Interest computation on unearned amounts. In accordance with 31 U.S.C. 3903(c)(1), the amount payable under subparagraph (d)(2) of this clause shall be--

(1) Computed at the rate of average bond equivalent rates of 91-day Treasury bills auctioned at the most recent auction of such bills prior to the date the Contractor receives the unearned amount; and

(2) Deducted from the next available payment to the Contractor.

(End of clause)

68 52.232-17 INTEREST (JUN 1996)

(a) Except as otherwise provided in this contract under a Price Reduction for Defective Cost or Pricing Data clause or a Cost Accounting Standards clause, all amounts that become payable by the Contractor to the Government under this contract (net of any applicable tax credit under the Internal Revenue Code (26 U.S.C. 1481)) shall bear simple interest from the date due until paid unless paid within 30 days of becoming due. The interest rate shall be the interest rate established by the Secretary of the Treasury as provided in Section 12 of the Contract Disputes Act of 1978 (Public Law 95-563), which is applicable to the period in which the amount becomes due, as provided in paragraph (b) of this clause, and then at the rate applicable for each six-month period as fixed by the Secretary until the amount is paid.

(b) Amounts shall be due at the earliest of the following dates:

(1) The date fixed under this contract.

(2) The date of the first written demand for payment consistent with this contract, including any demand resulting from a default termination.

(3) The date the Government transmits to the Contractor a proposed supplemental agreement to confirm completed negotiations establishing the amount of debt.

(4) If this contract provides for revision of prices, the date of written notice to the Contractor stating the amount of refund payable in connection with a pricing proposal or a negotiated pricing agreement not confirmed by contract modification.

(c) The interest charge made under this clause may be reduced under the procedures prescribed in 32.614-2 of the Federal Acquisition Regulation in effect on the date of this contract.

(End of clause)

69 52.232-23 ASSIGNMENT OF CLAIMS (JAN 1986)

(a) The Contractor, under the Assignment of Claims Act, as amended, 31 U.S.C. 3727, 41 U.S.C. 15 (hereafter referred to as "the Act"), may assign its rights to be paid amounts due or to become due as a result of the performance of this contract to a bank, trust company, or other financing institution, including any Federal lending agency. The assignee under such an assignment may thereafter further assign or reassign its right under the original assignment to any type of financing institution described in the preceding sentence.

(b) Any assignment or reassignment authorized under the Act and this clause shall cover all unpaid amounts payable under this contract, and shall not be made to more than one party, except that an assignment or reassignment may be made to one party as agent or trustee for two or more parties participating in the financing of this contract.

(c) The Contractor shall not furnish or disclose to any assignee under

this contract any classified document (including this contract) or information related to work under this contract until the Contracting Officer authorizes such action in writing.

(End of clause)

70 52.232-27 PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS (JUN 1997)

Notwithstanding any other payment terms in this contract, the Government will make invoice payments and contract financing payments under the terms and conditions specified in this clause. Payment shall be considered as being made on the day a check is dated or the date of an electronic funds transfer. Definitions of pertinent terms are set forth in section 32.902 of the Federal Acquisition Regulation. All days referred to in this clause are calendar days, unless otherwise specified. (However, see subparagraph (a)(3) concerning payments due on Saturdays, Sundays, and legal holidays.)

(a) Invoice payments--

(1) Types of invoice payments. For purposes of this clause, there are several types of invoice payments that may occur under this contract, as follows:

(i) Progress payments, if provided for elsewhere in this contract, based on Contracting Officer approval of the estimated amount and value of work or services performed, including payments for reaching milestones in any project:

(A) The due date for making such payments shall be 14 days after receipt of the payment request by the designated billing office. If the designated billing office fails to annotate the payment request with the actual date of receipt at the time of receipt, the payment due date shall be the 14th day after the date of the Contractor's payment request, provided a proper payment request is received and there is no disagreement over quantity, quality, or Contractor compliance with contract requirements.

(B) The due date for payment of any amounts retained by the Contracting Officer in accordance with the clause at 52.232-5, Payments Under Fixed-Price Construction Contracts, shall be as specified in the contract or, if not specified, 30 days after approval for release to the Contractor by the Contracting Officer.

(ii) Final payments based on completion and acceptance of all work and presentation of release of all claims against the Government arising by virtue of the contract, and payments for partial deliveries that have been accepted by the Government (e.g., each separate building, public work, or other division of the contract for which the price is stated separately in the contract):

(A) The due date for making such payments shall be either the 30th day after receipt by the designated billing office of a proper invoice from the Contractor, or the 30th day after Government acceptance of the work or services completed by the Contractor, whichever is later. If the designated billing office fails to annotate the invoice with the date of actual receipt at the time of receipt, the invoice payment due date shall be the 30th day after the date of the Contractor's invoice, provided a proper invoice is received and there is no disagreement over quantity, quality, or Contractor compliance with contract requirements.

(B) On a final invoice where the payment amount is subject to contract settlement actions (e.g., release of claims), acceptance shall be deemed to have occurred on the effective date of the contract settlement.

(2) Contractor's invoice. The Contractor shall prepare and submit invoices to the designated billing office specified in the contract. A proper invoice must include the items listed in paragraphs (a)(2)(i) through (a)(2)(ix) of this clause. If the invoice does not comply with these requirements, it shall be returned within 7 days after the date the designated billing office received the invoice, with a statement of the reasons why it is not a proper invoice. Untimely notification will be taken into account in computing any interest penalty owed the Contractor in the manner described in subparagraph (a)(4) of this clause.

(i) Name and address of the Contractor.

(ii) Invoice date. (The Contractor is encouraged to date invoices as close as possible to the date of mailing or transmission.)

(iii) Contract number or other authorization for work or services performed (including order number and contract line item number).

(iv) Description of work or services performed.

(v) Delivery and payment terms (e.g., prompt payment discount terms).

(vi) Name and address of Contractor official to whom payment is to be sent (must be the same as that in the contract or in a proper notice of assignment).

(vii) Name (where practicable), title, phone number, and mailing address of person to be notified in the event of a defective invoice.

(viii) For payments described in paragraph (a)(1)(i) of this clause, substantiation of the amounts requested and certification in accordance with the requirements of the clause at 52.232-5, Payments Under Fixed-Price Construction Contracts.

(ix) Any other information or documentation required by the contract.

(x) While not required, the Contractor is strongly encouraged to assign an identification number to each invoice.

(3) Interest penalty. An interest penalty shall be paid automatically by the designated payment office, without request from the Contractor, if payment is not made by the due date and the conditions listed in paragraphs (a)(3)(i) through (a)(3)(iii) of this clause are met, if applicable. However, when the due date falls on a Saturday, Sunday, or legal holiday when Federal Government offices are closed and Government business is not expected to be conducted, payment may be made on the following business day without incurring a late payment interest penalty.

(i) A proper invoice was received by the designated billing office.

(ii) A receiving report or other Government documentation authorizing payment was processed and there was no disagreement over quantity, quality, Contractor compliance with any contract term or condition, or requested progress payment amount.

(iii) In the case of a final invoice for any balance of funds due the Contractor for work or services performed, the amount was not subject to further contract settlement actions between the Government and the Contractor.

(4) Computing penalty amount. The interest penalty shall be at the rate established by the Secretary of the Treasury under section 12 of the Contract Disputes Act of 1978 (41 U.S.C. 611) that is in effect on the day after the due date, except where the interest penalty is prescribed by other governmental authority (e.g., tariffs). This rate is referred to as the "Renegotiation Board Interest Rate," and it is published in the Federal Register semiannually on or about January 1 and July 1. The interest penalty shall accrue daily on the invoice principal payment amount approved by the Government until the payment date of such approved principal amount; and will be compounded in 30-day increments inclusive from the first day after the due date through the payment date. That is, interest accrued at the end of any 30-day period will be added to the

approved invoice principal payment amount and will be subject to interest penalties if not paid in the succeeding 30-day period. If the designated billing office failed to notify the Contractor of a defective invoice within the periods prescribed in subparagraph (a)(2) of this clause, the due date on the corrected invoice will be adjusted by subtracting from such date the number of days taken beyond the prescribed notification of defects period. Any interest penalty owed the Contractor will be based on this adjusted due date. Adjustments will be made by the designated payment office for errors in calculating interest penalties.

(i) For the sole purpose of computing an interest penalty that might be due the Contractor for payments described in paragraph (a)(1)(ii) of this clause, Government acceptance or approval shall be deemed to have occurred constructively on the 7th day after the Contractor has completed the work or services in accordance with the terms and conditions of the contract. In the event that actual acceptance or approval occurs within the constructive acceptance or approval period, the determination of an interest penalty shall be based on the actual date of acceptance or approval. Constructive acceptance or constructive approval requirements do not apply if there is a disagreement over quantity, quality, or Contractor compliance with a contract provision. These requirements also do not compel Government officials to accept work or services, approve Contractor estimates, perform contract administration functions, or make payment prior to fulfilling their responsibilities.

(ii) The following periods of time will not be included in the determination of an interest penalty:

(A) The period taken to notify the Contractor of defects in invoices submitted to the Government, but this may not exceed 7 days.

(B) The period between the defects notice and resubmission of the corrected invoice by the Contractor.

(C) For incorrect electronic funds transfer (EFT) information, in accordance with the EFT clause of this contract.

(iii) Interest penalties will not continue to accrue after the filing of a claim for such penalties under the clause at 52.233-1, Disputes, or for more than 1 year. Interest penalties of less than $1 need not be paid.

(iv) Interest penalties are not required on payment delays due to disagreement between the Government and the Contractor over the payment amount or other issues involving contract compliance, or on amounts temporarily withheld or retained in accordance with the terms of the contract. Claims involving disputes, and any interest that may be payable, will be resolved in accordance with the clause at 52.233-1, Disputes.

(5) Prompt payment discounts. An interest penalty also shall be paid automatically by the designated payment office, without request from the Contractor, if a discount for prompt payment is taken improperly. The interest penalty will be calculated on the amount of discount taken for the period beginning with the first day after the end of the discount period through the date when the Contractor is paid.

(6) Additional interest penalty.

(i) A penalty amount, calculated in accordance with subdivision (a)(6)(iii) of this clause, shall be paid in addition to the interest penalty amount if the Contractor--

(A) Is owed an interest penalty of $1 or more;

(B) Is not paid the interest penalty within 10 days after the date the invoice amount is paid; and

(C) Makes a written demand to the designated payment office for

additional penalty payment, in accordance with subdivision (a)(6)(ii) of this clause, postmarked not later than 40 days after the date the invoice amount is paid.

(ii)(A) Contractors shall support written demands for additional penalty payments with the following data. No additional data shall be required. Contractors shall--

(1) Specifically assert that late payment interest is due under a specific invoice, and request payment of all overdue late payment interest penalty and such additional penalty as may be required;

(2) Attach a copy of the invoice on which the unpaid late payment interest was due; and

(3) State that payment of the principal has been received, including the date of receipt.

(B) Demands must be postmarked on or before the 40th day after payment was made, except that--

(1) If the postmark is illegible or nonexistent, the demand must have been received and annotated with the date of receipt by the designated payment office on or before the 40th day after payment was made; or

(2) If the postmark is illegible or nonexistent and the designated payment office fails to make the required annotation, the demand's validity will be determined by the date the Contractor has placed on the demand; provided such date is no later than the 40th day after payment was made.

(iii)(A) The additional penalty shall be equal to 100 percent of any original late payment interest penalty, except--

(1) The additional penalty shall not exceed $5,000;

(2) The additional penalty shall never be less than $25; and

(3) No additional penalty is owed if the amount of the underlying interest penalty is less than $1.

(B) If the interest penalty ceases to accrue in accordance with the limits stated in subdivision (a)(4)(iii) of this clause, the amount of the additional penalty shall be calculated on the amount of interest penalty that would have accrued in the absence of these limits, subject to the overall limits on the additional penalty specified in subdivision (a)(6)(iii)(A) of this clause.

(C) For determining the maximum and minimum additional penalties, the test shall be the interest penalty due on each separate payment made for each separate contract. The maximum and minimum additional penalty shall not be based upon individual invoices unless the invoices are paid separately. Where payments are consolidated for disbursing purposes, the maximum and minimum additional penalty determination shall be made separately for each contract therein.

(D) The additional penalty does not apply to payments regulated by other Government regulations (e.g., payments under utility contracts subject to tariffs and regulation).

(b) Contract financing payments--

(1) Due dates for recurring financing payments. If this contract provides for contract financing, requests for payment shall be submitted to the designated billing office as specified in this contract or as directed by the Contracting Officer. Contract financing payments shall be made on the 14th day after receipt of a proper contract financing request by the designated billing office. In the event that an audit or other review of a specific financing request is required to ensure compliance with the terms and conditions of the contract, the designated payment office is not compelled to make payment by the due date specified.

(2) Due dates for other contract financing. For advance payments, loans, or other arrangements that do not involve recurring submissions of contract financing requests, payment shall be made in accordance with the corresponding contract terms or as directed by the Contracting Officer.

(3) Interest penalty not applicable. Contract financing payments shall not be assessed an interest penalty for payment delays.

(c) Subcontract clause requirements. The Contractor shall include in each subcontract for property or services (including a material supplier) for the purpose of performing this contract the following:

(1) Prompt payment for subcontractors. A payment clause that obligates the Contractor to pay the subcontractor for satisfactory performance under its subcontract not later than 7 days from receipt of payment out of such amounts as are paid to the Contractor under this contract.

(2) Interest for subcontractors. An interest penalty clause that obligates the Contractor to pay to the subcontractor an interest penalty for each payment not made in accordance with the payment clause--

(i) For the period beginning on the day after the required payment date and ending on the date on which payment of the amount due is made; and

(ii) Computed at the rate of interest established by the Secretary of the Treasury, and published in the Federal Register, for interest payments under section 12 of the Contract Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty.

(3) Subcontractor clause flowdown. A clause requiring each subcontractor to include a payment clause and an interest penalty clause conforming to the standards set forth in subparagraphs (c)(1) and (c)(2) of this clause in each of its subcontracts, and to require each of its subcontractors to include such clauses in their subcontracts with each lower-tier subcontractor or supplier.

(d) Subcontract clause interpretation. The clauses required by paragraph (c) of this clause shall not be construed to impair the right of the Contractor or a subcontractor at any tier to negotiate, and to include in their subcontract, provisions that--

(1) Retainage permitted. Permit the Contractor or a subcontractor to retain (without cause) a specified percentage of each progress payment otherwise due to a subcontractor for satisfactory performance under the subcontract without incurring any obligation to pay a late payment interest penalty, in accordance with terms and conditions agreed to by the parties to the subcontract, giving such recognition as the parties deem appropriate to the ability of a subcontractor to furnish a performance bond and a payment bond;

(2) Withholding permitted. Permit the Contractor or subcontractor to make a determination that part or all of the subcontractor's request for payment may be withheld in accordance with the subcontract agreement; and

(3) Withholding requirements. Permit such withholding without incurring any obligation to pay a late payment penalty if--

(i) A notice conforming to the standards of paragraph (g) of this clause previously has been furnished to the subcontractor; and

(ii) A copy of any notice issued by a Contractor pursuant to subdivision (d)(3)(i) of this clause has been furnished to the Contracting Officer.

(e) Subcontractor withholding procedures. If a Contractor, after making a request for payment to the Government but before making a payment to a subcontractor for the subcontractor's performance covered by the payment request, discovers that all or a portion of the payment otherwise due such subcontractor is subject to withholding from the subcontractor in

accordance with the subcontract agreement, then the Contractor shall--

(1) Subcontractor notice. Furnish to the subcontractor a notice conforming to the standards of paragraph (g) of this clause as soon as practicable upon ascertaining the cause giving rise to a withholding, but prior to the due date for subcontractor payment;

(2) Contracting Officer notice. Furnish to the Contracting Officer, as soon as practicable, a copy of the notice furnished to the subcontractor pursuant to subparagraph (e)(1) of this clause;

(3) Subcontractor progress payment reduction. Reduce the subcontractor's progress payment by an amount not to exceed the amount specified in the notice of withholding furnished under subparagraph (e)(1) of this clause;

(4) Subsequent subcontractor payment. Pay the subcontractor as soon as practicable after the correction of the identified subcontract performance deficiency, and--

(i) Make such payment within--

(A) Seven days after correction of the identified subcontract performance deficiency (unless the funds therefor must be recovered from the Government because of a reduction under paragraph (e)(5)(i)) of this clause; or

(B) Seven days after the Contractor recovers such funds from the Government; or

(ii) Incur an obligation to pay a late payment interest penalty computed at the rate of interest established by the Secretary of the Treasury, and published in the Federal Register, for interest payments under section 12 of the Contracts Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty;

(5) Notice to Contracting Officer. Notify the Contracting Officer upon--

(i) Reduction of the amount of any subsequent certified application for payment; or

(ii) Payment to the subcontractor of any withheld amounts of a progress payment, specifying--

(A) The amounts withheld under subparagraph (e)(1) of this clause; and

(B) The dates that such withholding began and ended; and

(6) Interest to Government. Be obligated to pay to the Government an amount equal to interest on the withheld payments (computed in the manner provided in 31 U.S.C. 3903(c)(1)), from the 8th day after receipt of the withheld amounts from the Government until--

(i) The day the identified subcontractor performance deficiency is corrected; or

(ii) The date that any subsequent payment is reduced under subdivision (e)(5)(i) of this clause.

(f) Third-party deficiency reports--

(1) Withholding from subcontractor. If a Contractor, after making payment to a first-tier subcontractor, receives from a supplier or subcontractor of the first-tier subcontractor (hereafter referred to as a "second-tier subcontractor") a written notice in accordance with section 2 of the Act of August 24, 1935 (40 U.S.C. 270b, Miller Act), asserting a deficiency in such first-tier subcontractor's performance under the contract for which the Contractor may be ultimately liable, and the Contractor determines that all or a portion of future payments otherwise due such first-tier subcontractor is subject to withholding in accordance with the subcontract agreement, the Contractor may, without incurring an obligation to pay an interest penalty under subparagraph (e)(6) of this

clause--

(i) Furnish to the first-tier subcontractor a notice conforming to the standards of paragraph (g) of this clause as soon as practicable upon making such determination; and

(ii) Withhold from the first-tier subcontractor's next available progress payment or payments an amount not to exceed the amount specified in the notice of withholding furnished under paragraph (f)(1)(i) of this clause.

(2) Subsequent payment or interest charge. As soon as practicable, but not later than 7 days after receipt of satisfactory written notification that the identified subcontract performance deficiency has been corrected, the Contractor shall--

(i) Pay the amount withheld under paragraph (f)(1)(ii) of this clause to such first-tier subcontractor; or

(ii) Incur an obligation to pay a late payment interest penalty to such first-tier subcontractor computed at the rate of interest established by the Secretary of the Treasury, and published in the Federal Register, for interest payments under section 12 of the Contracts Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty.

(g) Written notice of subcontractor withholding. A written notice of any withholding shall be issued to a subcontractor (with a copy to the Contracting Officer of any such notice issued by the Contractor), specifying--

(1) The amount to be withheld;

(2) The specific causes for the withholding under the terms of the subcontract; and

(3) The remedial actions to be taken by the subcontractor in order to receive payment of the amounts withheld.

(h) Subcontractor payment entitlement. The Contractor may not request payment from the Government of any amount withheld or retained in accordance with paragraph (d) of this clause until such time as the Contractor has determined and certified to the Contracting Officer that the subcontractor is entitled to the payment of such amount.

(i) Prime-subcontractor disputes. A dispute between the Contractor and subcontractor relating to the amount or entitlement of a subcontractor to a payment or a late payment interest penalty under a clause included in the subcontract pursuant to paragraph (c) of this clause does not constitute a dispute to which the United States is a party. The United States may not be interpleaded in any judicial or administrative proceeding involving such a dispute.

(j) Preservation of prime-subcontractor rights. Except as provided in paragraph (i) of this clause, this clause shall not limit or impair any contractual, administrative, or judicial remedies otherwise available to the Contractor or a subcontractor in the event of a dispute involving late payment or nonpayment by the Contractor or deficient subcontract performance or nonperformance by a subcontractor.

(k) Non-recourse for prime contractor interest penalty. The Contractor's obligation to pay an interest penalty to a subcontractor pursuant to the clauses included in a subcontract under paragraph (c) of this clause shall not be construed to be an obligation of the United States for such interest penalty. A cost-reimbursement claim may not include any amount for reimbursement of such interest penalty.

(End of clause)

71 52.232-33 PAYMENT BY ELECTRONIC FUNDS TRANSFER--CENTRAL CONTRACTOR REGISTRATION (MAY 1999)

(a) Method of payment. (1) All payments by the Government under this contract shall be made by electronic funds transfer (EFT), except as provided in paragraph (a)(2) of this clause. As used in this clause, the term "EFT" refers to the funds transfer and may also include the payment information transfer.

(2) In the event the Government is unable to release one or more payments by EFT, the Contractor agrees to either--

(i) Accept payment by check or some other mutually agreeable method of payment; or

(ii) Request the Government to extend the payment due date until such time as the Government can make payment by EFT (but see paragraph (d) of this clause).

(b) Contractor's EFT information. The Government shall make payment to the Contractor using the EFT information contained in the Central Contractor Registration (CCR) database. In the event that the EFT information changes, the Contractor shall be responsible for providing the updated information to the CCR database.

(c) Mechanisms for EFT payment. The Government may make payment by EFT through either the Automated Clearing House (ACH) network, subject to the rules of the National Automated Clearing House Association, or the Fedwire Transfer System. The rules governing Federal payments through the ACH are contained in 31 CFR part 210.

(d) Suspension of payment. If the Contractor's EFT information in the CCR database is incorrect, then the Government need not make payment to the Contractor under this contract until correct EFT information is entered into the CCR database; and any invoice or contract financing request shall be deemed not to be a proper invoice for the purpose of prompt payment under this contract. The prompt payment terms of the contract regarding notice of an improper invoice and delays in accrual of interest penalties apply.

(e) Contractor EFT arrangements. If the Contractor has identified multiple payment receiving points (i.e., more than one remittance address and/or EFT information set) in the CCR database, and the Contractor has not notified the Government of the payment receiving point applicable to this contract, the Government shall make payment to the first payment receiving point (EFT information set or remittance address as applicable) listed in the CCR database.

(f) Liability for uncompleted or erroneous transfers. (1) If an uncompleted or erroneous transfer occurs because the Government used the Contractor's EFT information incorrectly, the Government remains responsible for--

(i) Making a correct payment;

(ii) Paying any prompt payment penalty due; and

(iii) Recovering any erroneously directed funds.

(2) If an uncompleted or erroneous transfer occurs because the Contractor's EFT information was incorrect, or was revised within 30 days of Government release of the EFT payment transaction instruction to the Federal Reserve System, and--

(i) If the funds are no longer under the control of the payment office, the Government is deemed to have made payment and the Contractor is responsible for recovery of any erroneously directed funds; or

(ii) If the funds remain under the control of the payment office, the Government shall not make payment, and the provisions

of paragraph (d) of this clause shall apply.

(g) EFT and prompt payment. A payment shall be deemed to have been made in a timely manner in accordance with the prompt payment terms of this contract if, in the EFT payment transaction instruction released to the Federal Reserve System, the date specified for settlement of the payment is on or before the prompt payment due date, provided the specified payment date is a valid date under the rules of the Federal Reserve System.

(h) EFT and assignment of claims. If the Contractor assigns the proceeds of this contract as provided for in the assignment of claims terms of this contract, the Contractor shall require as a condition of any such assignment, that the assignee shall register in the CCR database and shall be paid by EFT in accordance with the terms of this clause. In all respects, the requirements of this clause shall apply to the assignee as if it were the Contractor. EFT information that shows the ultimate recipient of the transfer to be other than the Contractor, in the absence of a proper assignment of claims acceptable to the Government, is incorrect EFT information within the meaning of paragraph (d) of this clause.

(i) Liability for change of EFT information by financial agent. The Government is not liable for errors resulting from changes to EFT information made by the Contractor's financial agent.

(j) Payment information. The payment or disbursing office shall forward to the Contractor available payment information that is suitable for transmission as of the date of release of the EFT instruction to the Federal Reserve System. The Government may request the Contractor to designate a desired format and method(s) for delivery of payment information from a list of formats and methods the payment office is capable of executing. However, the Government does not guarantee that any particular format or method of delivery is available at any particular payment office and retains the latitude to use the format and delivery method most convenient to the Government. If the Government makes payment by check in accordance with paragraph (a) of this clause, the Government shall mail the payment information to the remittance address contained in the CCR database.

(End of Clause)

72 52.233-1 I DISPUTES (OCT 1995)--ALTERNATE I (DEC 1991)

(a) This contract is subject to the Contract Disputes Act of 1978, as amended (41 U.S.C. 601-613).

(b) Except as provided in the Act, all disputes arising under or relating to this contract shall be resolved under this clause.

(c) "Claim," as used in this clause, means a written demand or written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of contract terms, or other relief arising under or relating to this contract. A claim arising under a contract, unlike a claim relating to that contract, is a claim that can be resolved under a contract clause that provides for the relief sought by the claimant. However, a written demand or written assertion by the Contractor seeking the payment of money exceeding $100,000 is not a claim under the Act until certified as required by subparagraph (d)(2) of this clause. A voucher, invoice, or other routine request for payment that is not in dispute when submitted is not a claim under the Act. The submission may be converted to a claim under the Act, by complying with

the submission and certification requirements of this clause, if it is disputed either as to liability or amount or is not acted upon in a reasonable time.

(d)(1) A claim by the Contractor shall be made in writing and, unless otherwise stated in this contract, submitted within 6 years after accrual of the claim to the Contracting Officer for a written decision. A claim by the Government against the Contractor shall be subject to a written decision by the Contracting Officer.

(2)(i) Contractors shall provide the certification specified in subparagraph (d)(2)(iii) of this clause when submitting any claim--

(A) Exceeding $100,000; or

(B) Regardless of the amount claimed, when using--

(1) Arbitration conducted pursuant to 5 U.S.C. 575-580; or

(2) Any other alternative means of dispute resolution (ADR) technique that the agency elects to handle in accordance with the Administrative Dispute Resolution Act (ADRA).

(ii) The certification requirement does not apply to issues in controversy that have not been submitted as all or part of a claim.

(iii) The certification shall state as follows:

"I certify that the claim is made in good faith; that the supporting data are accurate and complete to the best of my knowledge and belief; that the amount requested accurately reflects the contract adjustment for which the Contractor believes the Government is liable; and that I am duty authorized to certify the claim on behalf of the Contractor."

(3) The certification may be executed by any person duly authorized to bind the Contractor with respect to the claim.

(e) For Contractor claims of $100,000 or less, the Contracting Officer must, if requested in writing by the Contractor, render a decision within 60 days of the request. For Contractor-certified claims over $100,000, the Contracting Officer must, within 60 days, decide the claim or notify the Contractor of the date by which the decision will be made.

(f) The Contracting Officer's decision shall be final unless the Contractor appeals or files a suit as provided in the Act.

(g) If the claim by the Contractor is submitted to the Contracting Officer or a claim by the Government is presented to the Contractor, the parties, by mutual consent, may agree to use ADR. If the Contractor refuses an offer for alternative disputes resolution, the Contractor shall inform the Contracting Officer, in writing, of the Contractor's specific reasons for rejecting the request. When using arbitration conducted pursuant to 5 U.S.C. 575-580, or when using any other ADR technique that the agency elects to handle in accordance with the ADRA, any claim, regardless of amount, shall be accompanied by the certification described in subparagraph (d)(2)(iii) of this clause, and executed in accordance with subparagraph (d)(3) of this clause.

(h) The Government shall pay interest on the amount found due and unpaid from (1) the date that the Contracting Officer receives the claim (certified, if required); or (2) the date that payment otherwise would be due, if that date is later, until the date of payment. With regard to claims having defective certifications, as defined in (FAR) 48 CFR 33.201, interest shall be paid from the date that the Contracting Officer initially receives the claim. Simple interest on claims shall be paid at the rate, fixed by the Secretary of the Treasury as provided in the Act, which is applicable to the period during which the Contracting Officer receives the claim and then at the rate applicable for each 6-month period as fixed by the Treasury Secretary during the pendency of the claim.

(i) The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim,

appeal, or action arising under or relating to the contract, and comply with any decision of the Contracting Officer.

(End of clause)

73 52.233-3 PROTEST AFTER AWARD (AUG 1996)

(a) Upon receipt of a notice of protest (as defined in FAR 33.101) or a determination that a protest is likely (see FAR 33.102(d)), the Contracting Officer may, by written order to the Contractor, direct the Contractor to stop performance of the work called for by this contract. The order shall be specifically identified as a stop-work order issued under this clause. Upon receipt of the order, the Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of costs allocable to the work covered by the order during the period of work stoppage. Upon receipt of the final decision in the protest, the Contracting Officer shall either--

(1) Cancel the stop-work order; or

(2) Terminate the work covered by the order as provided in the Default, or the Termination for Convenience of the Government, clause of this contract.

(b) If a stop-work order issued under this clause is canceled either before or after a final decision in the protest, the Contractor shall resume work. The Contracting Officer shall make an equitable adjustment in the delivery schedule or contract price, or both, and the contract shall be modified, in writing, accordingly, if--

(1) The stop-work order results in an increase in the time required for, or in the Contractor's cost properly allocable to, the performance of any part of this contract; and

(2) The Contractor asserts its right to an adjustment within 30 days after the end of the period of work stoppage; provided, that if the Contracting Officer decides the facts justify the action, the Contracting Officer may receive and act upon a proposal at any time before final payment under this contract.

(c) If a stop-work order is not canceled and the work covered by the order is terminated for the convenience of the Government, the Contracting Officer shall allow reasonable costs resulting from the stop-work order in arriving at the termination settlement.

(d) If a stop-work order is not canceled and the work covered by the order is terminated for default, the Contracting Officer shall allow, by equitable adjustment or otherwise, reasonable costs resulting from the stop-work order.

(e) The Government's rights to terminate this contract at any time are not affected by action taken under this clause.

(f) If, as the result of the Contractor's intentional or negligent misstatement, misrepresentation, or miscertification, a protest related to this contract is sustained, and the Government pays costs, as provided in FAR 33.102(b)(2) or 33.104(h)(1), the Government may require the Contractor to reimburse the Government the amount of such costs. In addition to any other remedy available, and pursuant to the requirements of Subpart 32.6, the Government may collect this debt by offsetting the amount against any payment due the Contractor under any contract between the Contractor and the Government.

(End of clause)

74 52.236-2 DIFFERING SITE CONDITIONS (APR 1984)

(a) The Contractor shall promptly, and before the conditions are disturbed, give a written notice to the Contracting Officer of (1) subsurface or latent physical conditions at the site which differ materially from those indicated in this contract, or (2) unknown physical conditions at the site, of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in the contract.

(b) The Contracting Officer shall investigate the site conditions promptly after receiving the notice. If the conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performing any part of the work under this contract, whether or not changed as a result of the conditions, an equitable adjustment shall be made under this clause and the contract modified in writing accordingly.

(c) No request by the Contractor for an equitable adjustment to the contract under this clause shall be allowed, unless the Contractor has given the written notice required; provided, that the time prescribed in (a) above for giving written notice may be extended by the Contracting Officer.

(d) No request by the Contractor for an equitable adjustment to the contract for differing site conditions shall be allowed if made after final payment under this contract.

(End of clause)

75 52.236-3 SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK (APR 1984)

(a) The Contractor acknowledges that it has taken steps reasonably necessary to ascertain the nature and location of the work, and that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost, including but not limited to (1) conditions bearing upon transportation, disposal, handling, and storage of materials; (2) the availability of labor, water, electric power, and roads; (3) uncertainties of weather, river stages, tides, or similar physical conditions at the site; (4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during work performance. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the Government, as well as from the drawings and specifications made a part of this contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the Government.

(b) The Government assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available by the Government. Nor does the Government assume responsibility for any understanding reached or representation made concerning conditions which can affect the work by any of its officers or agents before the execution of this contract, unless that understanding

or representation is expressly stated in this contract.

(End of clause)

76 52.236-5 MATERIAL AND WORKMANSHIP (APR 1984)

(a) All equipment, material, and articles incorporated into the work covered by this contract shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in this contract. References in the specifications to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. The Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of the Contracting Officer, is equal to that named in the specifications, unless otherwise specifically provided in this contract.

(b) The Contractor shall obtain the Contracting Officer's approval of the machinery and mechanical and other equipment to be incorporated into the work. When requesting approval, the Contractor shall furnish to the Contracting Officer the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the machinery and mechanical and other equipment. When required by this contract or by the Contracting Officer, the Contractor shall also obtain the Contracting Officer's approval of the material or articles which the Contractor contemplates incorporating into the work. When requesting approval, the Contractor shall provide full information concerning the material or articles. When directed to do so, the Contractor shall submit samples for approval at the Contractor's expense, with all shipping charges prepaid. Machinery, equipment, material, and articles that do not have the required approval shall be installed or used at the risk of subsequent rejection.

(c) All work under this contract shall be performed in a skillful and workmanlike manner. The Contracting Officer may require, in writing, that the Contractor remove from the work any employee the Contracting Officer deems incompetent, careless, or otherwise objectionable.

(End of clause)

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77 52.236-6 SUPERINTENDENCE BY THE CONTRACTOR (APR 1984)

At all times during performance of this contract and until the work is completed and accepted, the Contractor shall directly superintend the work or assign and have on the work site a competent superintendent who is satisfactory to the Contracting Officer and has authority to act for the Contractor.

(End of clause)

78 52.236-7 PERMITS AND RESPONSIBILITIES (NOV 1991)

The Contractor shall, without additional expense to the Government, be responsible for obtaining any necessary licenses and permits, and for complying with any Federal, State, and municipal laws, codes, and regulations applicable to the performance of the work. The Contractor shall also be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence. The Contractor

shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire work, except for any completed unit of work which may have been accepted under the contract.

(End of clause)

79 52.236-8 OTHER CONTRACTS (APR 1984)

The Government may undertake or award other contracts for additional work at or near the site of the work under this contract. The Contractor shall fully cooperate with the other contractors and with Government employees and shall carefully adapt scheduling and performing the work under this contract to accommodate the additional work, heeding any direction that may be provided by the Contracting Officer. The Contractor shall not commit or permit any act that will interfere with the performance of work by any other contractor or by Government employees.

(End of clause)

80 52.236-9 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS (APR 1984)

(a) The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed and which do not unreasonably interfere with the work required under this contract. The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during contract performance, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Officer.

(b) The Contractor shall protect from damage all existing improvements and utilities (1) at or near the work site, and (2) on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. The Contractor shall repair any damage to those facilities, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

(End of clause)

81 52.236-10 OPERATIONS AND STORAGE AREAS (APR 1984)

(a) The Contractor shall confine all operations (including storage of materials) on Government premises to areas authorized or approved by the Contracting Officer. The Contractor shall hold and save the Government, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance.

(b) Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by the Contractor only with the approval of the Contracting Officer and shall be built with labor and materials furnished by the Contractor without expense to the Government. The temporary buildings and utilities shall remain the property of the

Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Contracting Officer, the buildings and utilities may be abandoned and need not be removed.

(c) The Contractor shall, under regulations prescribed by the Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Contracting Officer. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.

(End of clause)

82 52.236-11 USE AND POSSESSION PRIOR TO COMPLETION (APR 1984)

(a) The Government shall have the right to take possession of or use any completed or partially completed part of the work. Before taking possession of or using any work, the Contracting Officer shall furnish the Contractor a list of items of work remaining to be performed or corrected on those portions of the work that the Government intends to take possession of or use. However, failure of the Contracting Officer to list any item of work shall not relieve the Contractor of responsibility for complying with the terms of the contract. The Government's possession or use shall not be deemed an acceptance of any work under the contract.

(b) While the Government has such possession or use, the Contractor shall be relieved of the responsibility for the loss of or damage to the work resulting from the Government's possession or use, notwithstanding the terms of the clause in this contract entitled "Permits and Responsibilities." If prior possession or use by the Government delays the progress of the work or causes additional expense to the Contractor, an equitable adjustment shall be made in the contract price or the time of completion, and the contract shall be modified in writing accordingly.

(End of clause)

83 52.236-12 CLEANING UP (APR 1984)

The Contractor shall at all times keep the work area, including storage areas, free from accumulations of waste materials. Before completing the work, the Contractor shall remove from the work and premises any rubbish, tools, scaffolding, equipment, and materials that are not the property of the Government. Upon completing the work, the Contractor shall leave the work area in a clean, neat, and orderly condition satisfactory to the Contracting Officer.

(End of clause)

84 52.236-13 ACCIDENT PREVENTION (NOV 1991)

(a) The Contractor shall provide and maintain work environments and procedures which will (1) safeguard the public and Government personnel, property, materials, supplies, and equipment exposed to Contractor operations and activities; (2) avoid interruptions of Government operations

and delays in project completion dates; and (3) control costs in the performance of this contract.

(b) For these purposes on contracts for construction or dismantling, demolition, or removal of improvements, the Contractor shall--

(1) Provide appropriate safety barricades, signs, and signal lights;

(2) Comply with the standards issued by the Secretary of Labor at 29 CFR Part 1926 and 29 CFR Part 1910; and

(3) Ensure that any additional measures the Contracting Officer determines to be reasonably necessary for the purposes are taken.

(c) If this contract is for construction or dismantling, demolition or removal of improvements with any Department of Defense agency or component, the Contractor shall comply with all pertinent provisions of the latest version of U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, in effect on the date of the solicitation.

(d) Whenever the Contracting Officer becomes aware of any noncompliance with these requirements or any condition which poses a serious or imminent danger to the health or safety of the public or Government personnel, the Contracting Officer shall notify the Contractor orally, with written confirmation, and request immediate initiation of corrective action. This notice, when delivered to the Contractor or the Contractor's representative at the work site, shall be deemed sufficient notice of the noncompliance and that corrective action is required. After receiving the notice, the Contractor shall immediately take corrective action. If the Contractor fails or refuses to promptly take corrective action, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall not be entitled to any equitable adjustment of the contract price or extension of the performance schedule on any stop work order issued under this clause.

(e) The Contractor shall insert this clause, including this paragraph (e), with appropriate changes in the designation of the parties, in subcontracts.

(End of clause)

85 52.236-15 SCHEDULES FOR CONSTRUCTION CONTRACTS (APR 1984)

(a) The Contractor shall, within five days after the work commences on the contract or another period of time determined by the Contracting Officer, prepare and submit to the Contracting Officer for approval three copies of a practicable schedule showing the order in which the Contractor proposes to perform the work, and the dates on which the Contractor contemplates starting and completing the several salient features of the work (including acquiring materials, plant, and equipment). The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period. If the Contractor fails to submit a schedule within the time prescribed, the Contracting Officer may withhold approval of progress payments until the Contractor submits the required schedule.

(b) The Contractor shall enter the actual progress on the chart as directed by the Contracting Officer, and upon doing so shall immediately deliver three copies of the annotated schedule to the Contracting Officer. If, in the opinion of the Contracting Officer, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve its progress, including those that may be required by the Contracting Officer, without additional cost to the Government. In this circumstance, the Contracting Officer may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of

construction plant, and to submit for approval any supplementary schedule or schedules in chart form as the Contracting Officer deems necessary to demonstrate how the approved rate of progress will be regained.

(c) Failure of the Contractor to comply with the requirements of the Contracting Officer under this clause shall be grounds for a determination by the Contracting Officer that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the contract. Upon making this determination, the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the default terms of this contract.

(End of clause)

86 52.236-22 DESIGN WITHIN FUNDING LIMITATIONS (APR 1984)

(a) The Contractor shall accomplish the design services required under this contract so as to permit the award of a contract, using standard Federal Acquisition Regulation procedures for the construction of the facilities designed at a price that does not exceed the estimated construction contract price as set forth in paragraph (c) below. When bids or proposals for the construction contract are received that exceed the estimated price, the contractor shall perform such redesign and other services as are necessary to permit contract award within the funding limitation. These additional services shall be performed at no increase in the price of this contract. However, the Contractor shall not be required to perform such additional services at no cost to the Government if the unfavorable bids or proposals are the result of conditions beyond its reasonable control.

(b) The Contractor will promptly advise the Contracting Officer if it finds that the project being designed will exceed or is likely to exceed the funding limitations and it is unable to design a usable facility within these limitations. Upon receipt of such information, the Contracting Officer will review the Contractor's revised estimate of construction cost. The Government may, if it determines that the estimated construction contract price set forth in this contract is so low that award of a construction contract not in excess of such estimate is improbable, authorize a change in scope or materials as required to reduce the estimated construction cost to an amount within the estimated construction contract price set forth in paragraph (c) below, or the Government may adjust such estimated construction contract price. When bids or proposals are not solicited or are unreasonably delayed, the Government shall prepare an estimate of constructing the design submitted and such estimate shall be used in lieu of bids or proposals to determine compliance with the funding limitation.

(c) The estimated construction contract price for the project described in this contract is $SEE SCHEDULE.

(End of clause)

(R 608.3(a) and (b) 1971 APR)

87 52.236-23 RESPONSIBILITY OF THE ARCHITECT-ENGINEER CONTRACTOR (APR 1984)

(a) The Contractor shall be responsible for the professional quality, technical accuracy, and the coordination of all designs, drawings, specifications, and other services furnished by the Contractor under this contract. The Contractor shall, without additional compensation, correct

or revise any errors or deficiencies in its designs, drawings, specifications, and other services.

(b) Neither the Government's review, approval or acceptance of, nor payment for, the services required under this contract shall be construed to operate as a waiver of any rights under this contract or of any cause of action arising out of the performance of this contract, and the Contractor shall be and remain liable to the Government in accordance with applicable law for all damages to the Government caused by the Contractor's negligent performance of any of the services furnished under this contract.

(c) The rights and remedies of the Government provided for under this contract are in addition to any other rights and remedies provided by law.

(d) If the Contractor is comprised of more than one legal entity, each such entity shall be jointly and severally liable hereunder.

(End of clause)

(R 7-607.2 1972 APR)

(V 7-607.20 1972 APR)

88 52.236-21 SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FEB 1997)

(a) The Contractor shall keep on the work site a copy of the drawings and specifications and shall at all times give the Contracting Officer access thereto. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, the specifications shall govern. In case of discrepancy in the figures, in the drawings, or in the specifications, the matter shall be promptly submitted to the Contracting Officer, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at its own risk and expense. The Contracting Officer shall furnish from time to time such detailed drawings and other information as considered necessary, unless otherwise provided.

(b) Wherever in the specifications or upon the drawings the words "directed", "required", "ordered", "designated", "prescribed", or words of like import are used, it shall be understood that the "direction", "requirement", "order", "designation", or "prescription", of the Contracting Officer is intended and similarly the words "approved", "acceptable", "satisfactory", or words of like import shall mean "approved by", or "acceptable to", or "satisfactory to" the Contracting Officer, unless otherwise expressly stated.

(c) Where "as shown," "as indicated", "as detailed", or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise. The word "provided" as used herein shall be understood to mean "provide complete in place," that is "furnished and installed".

(d) Shop drawings means drawings, submitted to the Government by the Contractor, subcontractor, or any lower tier subcontractor pursuant to a construction contract, showing in detail (1) the proposed fabrication and assembly of structural elements, and (2) the installation (i.e., fit, and attachment details) of materials or equipment. It includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the contractor to explain in detail specific portions of the work required by the contract. The Government may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.

(e) If this contract requires shop drawings, the Contractor shall

coordinate all such drawings, and review them for accuracy, completeness, and compliance with contract requirements and shall indicate its approval thereon as evidence of such coordination and review. Shop drawings submitted to the Contracting Officer without evidence of the Contractor's approval may be returned for resubmission. The Contracting Officer will indicate an approval or disapproval of the shop drawings and if not approved as submitted shall indicate the Government's reasons therefor. Any work done before such approval shall be at the Contractor's risk. Approval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract, except with respect to variations described and approved in accordance with (f) below.

(f) If shop drawings show variations from the contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at the time of submission. If the Contracting Officer approves any such variation, the Contracting Officer shall issue an appropriate contract modification, except that, if the variation is minor or does not involve a change in price or in time of performance, a modification need not be issued.

(g) The Contractor shall submit to the Contracting Officer for approval four copies (unless otherwise indicated) of all shop drawings as called for under the various headings of these specifications. Three sets (unless otherwise indicated) of all shop drawings, will be retained by the Contracting Officer and one set will be returned to the Contractor.

(End of clause)

89 52.236-25 REQUIREMENTS FOR REGISTRATION OF DESIGNERS (APR 1984)
(Reference 36.609-4)

90 52.236-26 PRECONSTRUCTION CONFERENCE (FEB 1995)

If the Contracting Officer decides to conduct a preconstruction conference, the successful offeror will be notified and will be required to attend. The Contracting Officer's notification will include specific details regarding the date, time, and location of the conference, any need for attendance by subcontractors, and information regarding the items to be discussed.

(End of clause)

91 52.236-7000 MODIFICATION PROPOSALS--PRICE BREAKDOWN (DEC 1991)

(a) The Contractor shall furnish a price breakdown, itemized as required and within the time specified by the Contracting Officer, with any proposal for a contract modification.

(b) The price breakdown--

(1) Must include sufficient detail to permit an analysis of profit, and of all costs for--

(i) Material;

(ii) Labor;

(iii) Equipment;

(iv) Subcontracts; and

(v) Overhead; and

(2) Must cover all work involved in the modification, whether the work was deleted, added, or changed.

(c) The Contractor shall provide similar price breakdowns to support any

amounts claimed for subcontracts.

(d) The Contractor's proposal shall include a justification for any time extension proposed.

(End of clause)

92 52.242-13 BANKRUPTCY (JUL 1995)

In the event the Contractor enters into proceedings relating to bankruptcy, whether voluntary or involuntary, the Contractor agrees to furnish, by certified mail or electronic commerce method authorized by the contract, written notification of the bankruptcy to the Contracting Officer responsible for administering the contract. This notification shall be furnished within five days of the initiation of the proceedings relating to bankruptcy filing. This notification shall include the date on which the bankruptcy petition was filed, the identity of the court in which the bankruptcy petition was filed, and a listing of Government contract numbers and contracting offices for all Government contracts against which final payment has not been made. This obligation remains in effect until final payment under this contract.

(End of clause)

93 52.242-14 SUSPENSION OF WORK (APR 1984)

(a) The Contracting Officer may order the Contractor, in writing, to suspend, delay, or interrupt all or any part of the work of this contract for the period of time that the Contracting Officer determines appropriate for the convenience of the Government.

(b) If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted (1) by an act of the Contracting Officer in the administration of this contract, or (2) by the Contracting Officer's failure to act within the time specified in this contract (or within a reasonable time if not specified), an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) necessarily caused by the unreasonable suspension, delay, or interruption, and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor, or for which an equitable adjustment is provided for or excluded under any other term or condition of this contract.

(c) A claim under this clause shall not be allowed (1) for any costs incurred more than 20 days before the Contractor shall have notified the Contracting Officer in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order), and (2) unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of the suspension, delay, or interruption, but not later than the date of final payment under the contract.

(End of clause)

94 52.243-4 CHANGES (AUG 1987)

(a) The Contracting Officer may, at any time, without notice to the

sureties, if any, by written order designated or indicated to be a change order, make changes in the work within the general scope of the contract, including changes--

(1) In the specifications (including drawings and designs);

(2) In the method or manner of performance of the work;

(3) In the Government-furnished facilities, equipment, materials, services, or site; or

(4) Directing acceleration in the performance of the work.

(b) Any other written or oral order (which, as used in this paragraph (b), includes direction, instruction, interpretation, or determination) from the Contracting Officer that causes a change shall be treated as a change order under this clause; provided, that the Contractor gives the Contracting Officer written notice stating (1) the date, circumstances, and source of the order and (2) that the Contractor regards the order as a change order.

(c) Except as provided in this clause, no order, statement, or conduct of the Contracting Officer shall be treated as a change under this clause or entitle the Contractor to an equitable adjustment.

(d) If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the work under this contract, whether or not changed by any such order, the Contracting Officer shall make an equitable adjustment and modify the contract in writing. However, except for an adjustment based on defective specifications, no adjustment for any change under paragraph (b) of this clause shall be made for any costs incurred more than 20 days before the Contractor gives written notice as required. In the case of defective specifications for which the Government is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with the defective specifications.

(e) The Contractor must assert its right to an adjustment under this clause within 30 days after (1) receipt of a written change order under paragraph (a) of this clause or (2) the furnishing of a written notice under paragraph (b) of this clause, by submitting to the Contracting Officer a written statement describing the general nature and amount of the proposal, unless this period is extended by the Government. The statement of proposal for adjustment may be included in the notice under paragraph (b) above.

(f) No proposal by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this contract.

(End of clause)

95 52.243-7001 PRICING OF CONTRACT MODIFICATIONS (DEC 1991)

When costs are a factor in any price adjustment under this contract, the contract cost principles and procedures in FAR Part 31 and DFARS Part 231, in effect on the date of this contract, apply.

(End of clause)

96 52.243-7002 REQUESTS FOR EQUITABLE ADJUSTMENT (MAR 1998)

(a) The amount of any request for equitable adjustment to contract terms shall accurately reflect the contract adjustment for which the Contractor believes the Government is liable. The request shall include only costs for performing the change, and shall not include any costs that already have been reimbursed or that have

been separately claimed. All indirect costs included in the request shall be properly allocable to the change in accordance with applicable acquisition regulations.

(b) In accordance with 10 U.S.C. 2410(a), any request for equitable adjustment to contract terms that exceeds the simplified acquisition threshold shall bear, at the time of submission, the following certificate executed by an individual authorized to certify the request on behalf of the Contractor:

I certify that the request is made in good faith, and that the supporting data are accurate and complete to the best of my knowledge and belief.

_____
(Official's Name)

_____
(Title)

(c) The certification in paragraph (b) of this clause requires full disclosure of all relevant facts, including--

(1) Cost or pricing data if required in accordance with subsection 15.403-4 of the Federal Acquisition Regulation (FAR); and

(2) Information other than cost or pricing data, in accordance with subsection 15.403-3 of the FAR, including actual cost data and data to support any estimated costs, even if cost or pricing data are not required.

(d) The certification requirement in paragraph (b) of this clause does not apply to--

(1) Requests for routine contract payments; for example, requests for payment for accepted supplies and services, routine vouchers under a cost-reimbursement type contract, or progress payment invoices; or

(2) Final adjustment under an incentive provision of the contract.

(End of clause)

97 52.244-1 RESERVED

98 52.244-4 SUBCONTRACTORS AND OUTSIDE ASSOCIATES AND CONSULTANTS (ARCHITECT-ENGINEER SERVICES) (AUG 1998)

Any subcontractors and outside associates or consultants required by the Contractor in connection with the services covered by the contract will be limited to individuals or firms that were specifically identified and agreed to during negotiations. The Contractor shall obtain the Contracting Officer's written consent before making any substitution for these subcontractors, associates, or consultants.

(End of clause)

99 52.244-6 SUBCONTRACTS FOR COMMERCIAL ITEMS AND COMMERCIAL COMPONENTS (OCT 1998)

(a) Definition.

"Commercial item," as used in this clause, has the meaning contained in the clause at 52.202-1, Definitions.

"Subcontract," as used in this clause, includes a transfer of

commercial items between divisions, subsidiaries, or affiliates of the Contractor or subcontractor at any tier.

(b) To the maximum extent practicable, the Contractor shall incorporate, and require its subcontractors at all tiers to incorporate, commercial items or nondevelopmental items as components of items to be supplied under this contract.

(c) Notwithstanding any other clause of this contract, the Contractor is not required to include any FAR provision or clause, other than those listed below to the extent they are applicable and as may be required to establish the reasonableness of prices under Part 15, in a subcontract at any tier for commercial items or commercial components:

(1) 52.222-26, Equal Opportunity (E.O. 11246);

(2) 52.222-35, Affirmative Action for Disabled Veterans and Veterans of the Vietnam Era (38 U.S.C. 4212(a));

(3) 52.222-36, Affirmative Action for Workers with Disabilities (29 U.S.C.793); and

(4) 52.247-64, Preference for Privately Owned U.S.-Flagged Commercial Vessels (46 U.S.C. 1241) (flow down not required for subcontracts awarded beginning May 1, 1996).

(d) The Contractor shall include the terms of this clause, including this paragraph (d), in subcontracts awarded under this contract.

(End of clause)

100 52.246-12 INSPECTION OF CONSTRUCTION (AUG 1996)

(a) Definition. "Work" includes, but is not limited to, materials, workmanship, and manufacture and fabrication of components.

(b) The Contractor shall maintain an adequate inspection system and perform such inspections as will ensure that the work performed under the contract conforms to contract requirements. The Contractor shall maintain complete inspection records and make them available to the Government. All work shall be conducted under the general direction of the Contracting Officer and is subject to Government inspection and test at all places and at all reasonable times before acceptance to ensure strict compliance with the terms of the contract.

(c) Government inspections and tests are for the sole benefit of the Government and do not--

(1) Relieve the Contractor of responsibility for providing adequate quality control measures;

(2) Relieve the Contractor of responsibility for damage to or loss of the material before acceptance;

(3) Constitute or imply acceptance; or

(4) Affect the continuing rights of the Government after acceptance of the completed work under paragraph (i) below.

(d) The presence or absence of a Government inspector does not relieve the Contractor from any contract requirement, nor is the inspector authorized to change any term or condition of the specification without the Contracting Officer's written authorization.

(e) The Contractor shall promptly furnish, at no increase in contract price, all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by the Contracting Officer. The Government may charge to the Contractor any additional cost of inspection or test when work is not ready at the time specified by the Contractor for inspection or test, or when prior rejection makes reinspection or retest necessary. The Government shall perform all inspections and tests in a manner that will not unnecessarily delay the

work. Special, full size, and performance tests shall be performed as described in the contract.

(f) The Contractor shall, without charge, replace or correct work found by the Government not to conform to contract requirements, unless in the public interest the Government consents to accept the work with an appropriate adjustment in contract price. The Contractor shall promptly segregate and remove rejected material from the premises.

(g) If the Contractor does not promptly replace or correct rejected work, the Government may (1) by contract or otherwise, replace or correct the work and charge the cost to the Contractor or (2) terminate for default the Contractor's right to proceed.

(h) If, before acceptance of the entire work, the Government decides to examine already completed work by removing it or tearing it out, the Contractor, on request, shall promptly furnish all necessary facilities, labor, and material. If the work is found to be defective or nonconforming in any material respect due to the fault of the Contractor or its subcontractors, the Contractor shall defray the expenses of the examination and of satisfactory reconstruction. However, if the work is found to meet contract requirements, the Contracting Officer shall make an equitable adjustment for the additional services involved in the examination and reconstruction, including, if completion of the work was thereby delayed, an extension of time.

(i) Unless otherwise specified in the contract, the Government shall accept, as promptly as practicable after completion and inspection, all work required by the contract or that portion of the work the Contracting Officer determines can be accepted separately. Acceptance shall be final and conclusive except for latent defects, fraud, gross mistakes amounting to fraud, or the Government's rights under any warranty or guarantee.

(End of clause)

101 52.248-3 VALUE ENGINEERING--CONSTRUCTION (MAR 1989)

(a) General. The Contractor is encouraged to develop, prepare, and submit value engineering change proposals (VECP's) voluntarily. The Contractor shall share in any instant contract savings realized from accepted VECP's, in accordance with paragraph (f) below.

(b) Definitions. "Collateral costs," as used in this clause, means agency costs of operation, maintenance, logistic support, or Government-furnished property.

"Collateral savings," as used in this clause, means those measurable net reductions resulting from a VECP in the agency's overall projected collateral costs, exclusive of acquisition savings, whether or not the acquisition cost changes.

"Contractor's development and implementation costs," as used in this clause, means those costs the Contractor incurs on a VECP specifically in developing, testing, preparing, and submitting the VECP, as well as those costs the Contractor incurs to make the contractual changes required by Government acceptance of a VECP.

"Government costs," as used in this clause, means those agency costs that result directly from developing and implementing the VECP, such as any net increases in the cost of testing, operations, maintenance, and logistic support. The term does not include the normal administrative costs of processing the VECP.

"Instant contract savings," as used in this clause, means the estimated reduction in Contractor cost of performance resulting from acceptance of the VECP, minus allowable Contractor's development and implementation

costs, including subcontractors' development and implementation costs (see paragraph (h) below).

"Value engineering change proposal (VECP)" means a proposal that--

(1) Requires a change to this, the instant contract, to implement; and

(2) Results in reducing the contract price or estimated cost without impairing essential functions or characteristics; provided, that it does not involve a change--

(i) In deliverable end item quantities only; or

(ii) To the contract type only.

(c) VECP preparation. As a minimum, the Contractor shall include in each VECP the information described in subparagraphs (1) through (7) below. If the proposed change is affected by contractually required configuration management or similar procedures, the instructions in those procedures relating to format, identification, and priority assignment shall govern VECP preparation. The VECP shall include the following:

(1) A description of the difference between the existing contract requirement and that proposed, the comparative advantages and disadvantages of each, a justification when an item's function or characteristics are being altered, and the effect of the change on the end item's performance.

(2) A list and analysis of the contract requirements that must be changed if the VECP is accepted, including any suggested specification revisions.

(3) A separate, detailed cost estimate for (i) the affected portions of the existing contract requirement and (ii) the VECP. The cost reduction associated with the VECP shall take into account the Contractor's allowable development and implementation costs, including any amount attributable to subcontracts under paragraph (h) below.

(4) A description and estimate of costs the Government may incur in implementing the VECP, such as test and evaluation and operating and support costs.

(5) A prediction of any effects the proposed change would have on collateral costs to the agency.

(6) A statement of the time by which a contract modification accepting the VECP must be issued in order to achieve the maximum cost reduction, noting any effect on the contract completion time or delivery schedule.

(7) Identification of any previous submissions of the VECP, including the dates submitted, the agencies and contract numbers involved, and previous Government actions, if known.

(d) Submission. The Contractor shall submit VECP's to the Resident Engineer at the worksite, with a copy to the Contracting Officer.

(e) Government action. (1) The Contracting Officer shall notify the Contractor of the status of the VECP within 45 calendar days after the contracting office receives it. If additional time is required, the Contracting Officer shall notify the Contractor within the 45-day period and provide the reason for the delay and the expected date of the decision. The Government will process VECP's expeditiously; however, it shall not be liable for any delay in acting upon a VECP.

(2) If the VECP is not accepted, the Contracting Officer shall notify the Contractor in writing, explaining the reasons for rejection. The Contractor may withdraw any VECP, in whole or in part, at any time before it is accepted by the Government. The Contracting Officer may require that the Contractor provide written notification before undertaking significant expenditures for VECP effort.

(3) Any VECP may be accepted, in whole or in part, by the Contracting Officer's award of a modification to this contract citing this clause. The Contracting Officer may accept the VECP, even though an agreement on

price reduction has not been reached, by issuing the Contractor a notice to proceed with the change. Until a notice to proceed is issued or a contract modification applies a VECP to this contract, the Contractor shall perform in accordance with the existing contract. The Contracting Officer's decision to accept or reject all or part of any VECP shall be final and not subject to the Disputes clause or otherwise subject to litigation under the Contract Disputes Act of 1978 (41 U.S.C. 601-613).

(f) Sharing. (1) Rates. The Government's share of savings is determined by subtracting Government costs from instant contract savings and multiplying the result by (i) 45 percent for fixed-price contracts or (ii) 75 percent for cost-reimbursement contracts.

(2) Payment. Payment of any share due the Contractor for use of a VECP on this contract shall be authorized by a modification to this contract to--

(i) Accept the VECP;

(ii) Reduce the contract price or estimated cost by the amount of instant contract savings; and

(iii) Provide the Contractor's share of savings by adding the amount calculated to the contract price or fee.

(g) Collateral savings. If a VECP is accepted, the instant contract amount shall be increased by 20 percent of any projected collateral savings determined to be realized in a typical year of use after subtracting any Government costs not previously offset. However, the Contractor's share of collateral savings shall not exceed (1) the contract's firm-fixed-price or estimated cost, at the time the VECP is accepted, or (2) $100,000, whichever is greater. The Contracting Officer shall be the sole determiner of the amount of collateral savings, and that amount shall not be subject to the Disputes clause or otherwise subject to litigation under 41 U.S.C. 601-613.

(h) Subcontracts. The Contractor shall include an appropriate value engineering clause in any subcontract of $50,000 or more and may include one in subcontracts of lesser value. In computing any adjustment in this contract's price under paragraph (f) above, the Contractor's allowable development and implementation costs shall include any subcontractor's allowable development and implementation costs clearly resulting from a VECP accepted by the Government under this contract, but shall exclude any value engineering incentive payments to a subcontractor. The Contractor may choose any arrangement for subcontractor value engineering incentive payments; provided, that these payments shall not reduce the Government's share of the savings resulting from the VECP.

(i) Data. The Contractor may restrict the Government's right to use any part of a VECP or the supporting data by marking the following legend on the affected parts:

"These data, furnished under the Value Engineering--Construction clause of contract _____, shall not be disclosed outside the Government or duplicated, used, or disclosed, in whole or in part, for any purpose other than to evaluate a value engineering change proposal submitted under the clause. This restriction does not limit the Government's right to use information contained in these data if it has been obtained or is otherwise available from the Contractor or from another source without limitations."

If a VECP is accepted, the Contractor hereby grants the Government unlimited rights in the VECP and supporting data, except that, with respect to data qualifying and submitted as limited rights technical data, the Government shall have the rights specified in the contract modification implementing the VECP and shall appropriately mark the data. (The terms "unlimited rights" and "limited rights" are defined

in Part 27 of the Federal Acquisition Regulation.)
(End of clause)

102 52.249-2 I TERMINATION FOR CONVENIENCE OF THE GOVERNMENT (FIXED-PRICE) (SEP 1996)--ALTERNATE I (SEP 1996)

(a) The Government may terminate performance of work under this contract in whole or, from time to time, in part if the Contracting Officer determines that a termination is in the Government's interest. The Contracting Officer shall terminate by delivering to the Contractor a Notice of Termination specifying the extent of termination and the effective date.

(b) After receipt of a Notice of Termination, and except as directed by the Contracting Officer, the Contractor shall immediately proceed with the following obligations, regardless of any delay in determining or adjusting any amounts due under this clause:

(1) Stop work as specified in the notice.

(2) Place no further subcontracts or orders (referred to as subcontracts in this clause) for materials, services, or facilities, except as necessary to complete the continued portion of the contract.

(3) Terminate all subcontracts to the extent they relate to the work terminated.

(4) Assign to the Government, as directed by the Contracting Officer, all right, title, and interest of the Contractor under the subcontracts terminated, in which case the Government shall have the right to settle or to pay any termination settlement proposal arising out of those terminations.

(5) With approval or ratification to the extent required by the Contracting Officer, settle all outstanding liabilities and termination settlement proposals arising from the termination of subcontracts; the approval or ratification will be final for purposes of this clause.

(6) As directed by the Contracting Officer, transfer title and deliver to the Government (i) the fabricated or unfabricated parts, work in process, completed work, supplies, and other material produced or acquired for the work terminated, and (ii) the completed or partially completed plans, drawings, information, and other property that, if the contract had been completed, would be required to be furnished to the Government.

(7) Complete performance of the work not terminated.

(8) Take any action that may be necessary, or that the Contracting Officer may direct, for the protection and preservation of the property related to this contract that is in the possession of the Contractor and in which the Government has or may acquire an interest.

(9) Use its best efforts to sell, as directed or authorized by the Contracting Officer, any property of the types referred to in subparagraph (b)(6) of this clause; provided, however, that the Contractor (i) is not required to extend credit to any purchaser and (ii) may acquire the property under the conditions prescribed by, and at prices approved by, the Contracting Officer. The proceeds of any transfer or disposition will be applied to reduce any payments to be made by the Government under this contract, credited to the price or cost of the work, or paid in any other manner directed by the Contracting Officer.

(c) The Contractor shall submit complete termination inventory schedules no later than 120 days from the effective date of termination, unless extended in writing by the Contracting Officer upon written request of the

Contractor within this 120-day period.

(d) After expiration of the plant clearance period as defined in Subpart 45.6 of the Federal Acquisition Regulation, the Contractor may submit to the Contracting Officer a list, certified as to quantity and quality, of termination inventory not previously disposed of, excluding items authorized for disposition by the Contracting Officer. The Contractor may request the Government to remove those items or enter into an agreement for their storage. Within 15 days, the Government will accept title to those items and remove them or enter into a storage agreement. The Contracting Officer may verify the list upon removal of the items, or if stored, within 45 days from submission of the list, and shall correct the list, as necessary, before final settlement.

(e) After termination, the Contractor shall submit a final termination settlement proposal to the Contracting Officer in the form and with the certification prescribed by the Contracting Officer. The Contractor shall submit the proposal promptly, but no later than 1 year from the effective date of termination, unless extended in writing by the Contracting Officer upon written request of the Contractor within this 1 year period. However, if the Contracting Officer determines that the facts justify it, a termination settlement proposal may be received and acted on after 1 year or any extension. If the Contractor fails to submit the proposal within the time allowed, the Contracting Officer may determine, on the basis of information available, the amount, if any, due the Contractor because of the termination and shall pay the amount determined.

(f) Subject to paragraph (e) of this clause, the Contractor and the Contracting Officer may agree upon the whole or any part of the amount to be paid or remaining to be paid because of the termination. The amount may include a reasonable allowance for profit on work done. However, the agreed amount, whether under this paragraph (f) or paragraph (g) of this clause, exclusive of costs shown in subparagraph (g)(3) of this clause, may not exceed the total contract price as reduced by (1) the amount of payments previously made and (2) the contract price of work not terminated. The contract shall be modified, and the Contractor paid the agreed amount. Paragraph (g) of this clause shall not limit, restrict, or affect the amount that may be agreed upon to be paid under this paragraph.

(g) If the Contractor and Contracting Officer fail to agree on the whole amount to be paid the Contractor because of the termination of work, the Contracting Officer shall pay the Contractor the amounts determined as follows, but without duplication of any amounts agreed upon under paragraph (f) of this clause:

(1) For contract work performed before the effective date of termination, the total (without duplication of any items) of--

(i) The cost of this work;

(ii) The cost of settling and paying termination settlement proposals under terminated subcontracts that are properly chargeable to the terminated portion of the contract if not included in subdivision (g)(1)(i) of this clause; and

(iii) A sum, as profit on subdivision (g)(1)(i) of this clause, determined by the Contracting Officer under 49.202 of the Federal Acquisition Regulation, in effect on the date of this contract, to be fair and reasonable; however, if it appears that the Contractor would have sustained a loss on the entire contract had it been completed, the Contracting Officer shall allow no profit under this subdivision (iii) and shall reduce the settlement to reflect the indicated rate of loss.

(2) The reasonable costs of settlement of the work terminated, including--

(i) Accounting, legal, clerical, and other expenses reasonably

necessary for the preparation of termination settlement proposals and supporting data;

(ii) The termination and settlement of subcontracts (excluding the amounts of such settlements); and

(iii) Storage, transportation, and other costs incurred, reasonably necessary for the preservation, protection, or disposition of the termination inventory.

(h) Except for normal spoilage, and except to the extent that the Government expressly assumed the risk of loss, the Contracting Officer shall exclude from the amounts payable to the Contractor under paragraph (g) of this clause, the fair value, as determined by the Contracting Officer, of property that is destroyed, lost, stolen, or damaged so as to become undeliverable to the Government or to a buyer.

(i) The cost principles and procedures of Part 31 of the Federal Acquisition Regulation, in effect on the date of this contract, shall govern all costs claimed, agreed to, or determined under this clause.

(j) The Contractor shall have the right of appeal, under the Disputes clause, from any determination made by the Contracting Officer under paragraph (e), (g), or (l) of this clause, except that if the Contractor failed to submit the termination settlement proposal or request for equitable adjustment within the time provided in paragraph (e) or (l), respectively, and failed to request a time extension, there is no right of appeal.

(k) In arriving at the amount due the Contractor under this clause, there shall be deducted--

(1) All unliquidated advance or other payments to the Contractor under the terminated portion of this contract;

(2) Any claim which the Government has against the Contractor under this contract; and

(3) The agreed price for, or the proceeds of sale of, materials, supplies, or other things acquired by the Contractor or sold under the provisions of this clause and not recovered by or credited to the Government.

(l) If the termination is partial, the Contractor may file a proposal with the Contracting Officer for an equitable adjustment of the price(s) of the continued portion of the contract. The Contracting Officer shall make any equitable adjustment agreed upon. Any proposal by the Contractor for an equitable adjustment under this clause shall be requested within 90 days from the effective date of termination unless extended in writing by the Contracting Officer.

(m)(1) The Government may, under the terms and conditions it prescribes, make partial payments and payments against costs incurred by the Contractor for the terminated portion of the contract, if the Contracting Officer believes the total of these payments will not exceed the amount to which the Contractor will be entitled.

(2) If the total payments exceed the amount finally determined to be due, the Contractor shall repay the excess to the Government upon demand, together with interest computed at the rate established by the Secretary of the Treasury under 50 U.S.C. App. 1215(b)(2). Interest shall be computed for the period from the date the excess payment is received by the Contractor to the date the excess is repaid. Interest shall not be charged on any excess payment due to a reduction in the Contractor's termination settlement proposal because of retention or other disposition of termination inventory until 10 days after the date of the retention or disposition, or a later date determined by the Contracting Officer because of the circumstances.

(n) Unless otherwise provided in this contract or by statute, the

Contractor shall maintain all records and documents relating to the terminated portion of this contract for 3 years after final settlement. This includes all books and other evidence bearing on the Contractor's costs and expenses under this contract. The Contractor shall make these records and documents available to the Government, at the Contractor's office, at all reasonable times, without any direct charge. If approved by the Contracting Officer, photographs, microphotographs, or other authentic reproductions may be maintained instead of original records and documents.

(End of clause)

103 52.249-10 DEFAULT (FIXED-PRICE CONSTRUCTION) (APR 1984)

(a) If the Contractor refuses or fails to prosecute the work or any separable part, with the diligence that will insure its completion within the time specified in this contract including any extension, or fails to complete the work within this time, the Government may, by written notice to the Contractor, terminate the right to proceed with the work (or the separable part of the work) that has been delayed. In this event, the Government may take over the work and complete it by contract or otherwise, and may take possession of and use any materials, appliances, and plant on the work site necessary for completing the work. The Contractor and its sureties shall be liable for any damage to the Government resulting from the Contractor's refusal or failure to complete the work within the specified time, whether or not the Contractor's right to proceed with the work is terminated. This liability includes any increased costs incurred by the Government in completing the work.

(b) The Contractor's right to proceed shall not be terminated nor the Contractor charged with damages under this clause, if-

(1) The delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include (i) acts of God or of the public enemy, (ii) acts of the Government in either its sovereign or contractual capacity, (iii) acts of another Contractor in the performance of a contract with the Government, (iv) fires, (v) floods, (vi) epidemics, (vii) quarantine restrictions, (viii) strikes, (ix) freight embargoes, (x) unusually severe weather, or (xi) delays of subcontractors or suppliers at any tier arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and the subcontractors or suppliers; and

(2) The Contractor, within 10 days from the beginning of any delay (unless extended by the Contracting Officer), notifies the Contracting Officer in writing of the causes of delay. The Contracting Officer shall ascertain the facts and the extent of delay. If, in the judgment of the Contracting Officer, the findings of fact warrant such action, the time for completing the work shall be extended. The findings of the Contracting Officer shall be final and conclusive on the parties, but subject to appeal under the Disputes clause.

(c) If, after termination of the Contractor's right to proceed, it is determined that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination had been issued for the convenience of the Government.

(d) The rights and remedies of the Government in this clause are in addition to any other rights and remedies provided by law or under this contract.

(End of clause)

104 52.252-4 ALTERATIONS IN CONTRACT (APR 1984)

Portions of this contract are altered as follows:
_____

(End of clause)
(R 7-105.1(a) 1949 JUL)

105 52.252-6 AUTHORIZED DEVIATIONS IN CLAUSES (APR 1984)

(a) The use in this solicitation or contract of any Federal Acquisition Regulation (48 CFR Chapter 1) clause with an authorized deviation is indicated by the addition of "(DEVIATION)" after the date of the clause.
(b) The use in this solicitation or contract of any _____ (48 CFR _____) clause with an authorized deviation is indicated by the addition of "(DEVIATION)" after the name of the regulation.

(End of clause)
(NM)

106 52.253-1 COMPUTER GENERATED FORMS (JAN 1991)

(a) Any data required to be submitted on a Standard or Optional Form prescribed by the Federal Acquisition Regulation (FAR) may be submitted on a computer generated version of the form, provided there is no change to the name, content, or sequence of the data elements on the form, and provided the form carries the Standard or Optional Form number and edition date.
(b) Unless prohibited by agency regulations, any data required to be submitted on an agency unique form prescribed by an agency supplement to the FAR may be submitted on a computer generated version of the form provided there is no change to the name, content, or sequence of the data elements on the form and provided the form carries the agency form number and edition date.
(c) If the Contractor submits a computer generated version of a form that is different than the required form, then the rights and obligations of the parties will be determined based on the content of the required form.

(End of clause)

END OF SECTION 00700

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SPECIAL CLAUSES

SC-1. COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984) (FAR 52.211-10).

The Contractor shall be required to (a) commence work under this Contract within 10 calendar days after the date the Contractor receives the notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than 700 calendar days after date of receipt by Contractor of notice to proceed. The time stated for completion shall include final cleanup of the premises. See Section 00860 – DESIGN DEVELOPMENT TECHNICAL CRITERIA, paragraph "Sequencing of Construction and Demolition" for scheduling and sequence of work.

SC-1.1 OPTION FOR INCREASED QUANTITY

a. The Government may increase the quantity of work awarded by exercising the Optional Items 0006, 0008 and 0009 at the time of award, or not at all, and by exercising Optional Item 0007 at any time, or not at all, but no later than 394 calendar days after receipt by Contractor of notice to proceed. Notice to proceed on work Items added by exercise of the option will be given upon execution of consent of surety.

b. The parties hereto further agree that any option herein shall be considered to have been exercised at the time the Government deposits written notification to the Contractor in the mails.

c. The time allowed for completion of any optional items awarded under this contract will be the same as that for the base items, and will be measured from the date of receipt of the notice to proceed for the base items.

SC-2. LIQUIDATED DAMAGES - CONSTRUCTION (APR 1984) (FAR 52.211-12)

(a) If the Contractor fails to complete the work within the time specified in the Special Clause SC-1, or any extension, the Contractor shall pay to the Government as liquidated damages, the sum of $968. for each day of delay.

(b) If the Government terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final completion of the work together with any increased costs occasioned the Government in completing the work.

(c) If the Government does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the work is completed or accepted.

SC-3. TIME EXTENSIONS

Notwithstanding any other provisions of this Contract, it is mutually understood that the time extensions for changes in the work will depend upon the extent, if any, by which the changes cause delay in the completion of the various elements of construction. The change order granting the time extension may provide that the Contract completion date will be extended only for those specific elements so delayed and

that the remaining Contract completion dates for all other portions of the work will not be altered and may further provide for an equitable readjustment of liquidated damages under the new completion schedule.

SC-4. DELETED.

SC-5. INSURANCE - WORK ON A GOVERNMENT INSTALLATION (SEP 1989) (FAR 52.228-5)

(a) The Contractor shall, at its own expense, provide and maintain during the entire performance period of this Contract at least the kinds and minimum amounts of insurance required in the Insurance Liability Schedule or elsewhere in the Contract.

(b) Before commencing work under this Contract, the Contractor shall certify to the Contracting Officer in writing that the required insurance has been obtained. The policies evidencing required insurance shall contain an endorsement to the effect that any cancellation or any material change adversely affecting the Government's interest shall not be effective:

(1) for such period as the laws of the State in which this Contract is to be performed prescribe; or

(2) until 30 days after the insurer or the Contractor gives written notice to the Contracting Officer, whichever period is longer.

(c) The Contractor shall insert the substance of this clause, including this paragraph (c), in subcontracts under this Contract that require work on a Government installation and shall require subcontractors to provide and maintain the insurance required in the Schedule or elsewhere in the Contract. The Contractor shall maintain a copy of all subcontractors' proofs of required insurance, and shall make copies available to the Contracting Officer upon request.

(d) Insurance Liability Schedule (FAR 28.307-2)

(1) Workers' compensation and employer's liability. Contractors are required to comply with applicable Federal and State workers' compensation and occupational disease statutes. If occupational diseases are not compensable under those statutes, they shall be covered under the employer's liability section of the insurance policy, except when Contract operations are so commingled with a Contractor's commercial operation that it would not be practical to require this coverage. Employer's liability coverage of at least $100,000 shall be required, except in states with exclusive or monopolistic funds that do not permit workers' compensation to be written by private carriers.

(2) General Liability.

(i) The Contracting Officer shall require bodily injury liability insurance coverage written on the comprehensive form of policy of at least $500,000 per occurrence.

(ii) Property damage liability insurance shall be required only in special circumstances as determined by the agency.

(3) Automobile liability. The Contracting Officer shall require automobile liability insurance written on the comprehensive form of policy. The policy shall provide for bodily injury and property damage liability covering the operation of all automobiles used in connection with performing the Contract. Policies covering automobiles operated in the United States shall provide coverage of at least $200,000 per person and $500,000 per occurrence for bodily injury and $20,000 per occurrence for property damage. The amount of liability coverage on other policies shall be commensurate with any legal requirements of the locality and sufficient to meet normal and customary claims.

(4) Aircraft public and passenger liability. When aircraft are used in connection with performing the Contract, the Contracting Officer shall require aircraft public and passenger liability insurance. Coverage shall be at least $200,000 per person and $500,000 per occurrence for bodily injury, other than passenger liability, and $200,000 per occurrence for property damage. Coverage for passenger liability bodily injury shall be at least $200,000 multiplied by the number of seats or passengers, whichever is greater.

(5) Environmental Liability If this contract includes the transport, treatment, storage, or disposal of hazardous material waste the following coverage is required.

The Contractor shall ensure the transporter and disposal facility have liability insurance if effect for claims arising out of the death or bodily injury and property damage from hazardous material/waste transport, treatment, storage and disposal, including vehicle liability and legal defense costs in the amount of $1,000,000.00 as evidenced by a certificate of insurance for General, Automobile, and Environmental Liability Coverage. Proof of this insurance shall be provided to the Contracting Officer.

SC-6. DELETED.

SC-7. PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984) (FAR 52.236-1): The Contractor shall perform on the site, and with its own organization, work equivalent to at least fifteen (15) percent of the total amount of work to be performed under the Contract. The percentage may be reduced by a supplemental agreement to this Contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

SC-8. PHYSICAL DATA (APR 1984) (FAR 52.236-4): Data and information furnished or referred to below is for the Contractor's information. The Government will not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

(a) Physical Conditions: The indications of physical conditions on the drawings and in the specifications are the result of site investigations by test holes shown on the drawings.

(b) Weather Conditions: Each bidder shall be satisfied before submitting his bid as to the hazards likely to arise from weather conditions. Complete weather records and reports may be obtained from any National Weather Service Office.

(c) Transportation Facilities: Each bidder, before submitting his bid, shall make an investigation of the conditions of existing public and private roads and of clearances, restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress at the jobsite. The unavailability of

transportation facilities or limitations thereon shall not become a basis for claims for damages or extension of time for completion of the work.

SC-9. DELETED.

SC-10. LAYOUT OF WORK (APR 1984) (FAR 52.236-17): The Contractor shall lay out its work from Government-established base lines and bench marks indicated on the drawings and marked in the field by the Government, and shall be responsible for all measurements in connection with the layout. The Contractor shall furnish, at its own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the work. The Contractor shall be responsible for executing the work to the lines and grades that may be established or indicated by the Contracting Officer. The Contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the Contracting Officer until authorized to remove them. If such marks are destroyed by the Contractor or through its negligence before their removal is authorized, the Contracting Officer may replace them and deduct the expense of the replacement from any amounts due, or to become due, to the Contractor.

SC-11. THROUGH SC-13. DELETED.

SC-14. EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE (MAR 1995)-(EFARS 52.231-5000

(a) This clause does not apply to terminations. See 52.249-5000, Basis for Settlement of Proposals and FAR Part 49.

(b) Allowable cost for construction and marine plant and equipment in sound workable condition owned or controlled and furnished by a contractor or subcontractor at any tier shall be based on actual cost data for each piece of equipment or groups of similar serial and series for which the Government can determine both ownership and operating costs from the contractor's accounting records. When both ownership and operating costs cannot be determined for any piece of equipment or groups of similar serial or series equipment from the contractor's accounting records, costs for that equipment shall be based upon the applicable provisions of EP 1110-1-8, Construction Equipment Ownership and Operating Expense Schedule, Region VIII. Working conditions shall be considered to be average for determining equipment rates using the schedule unless specified otherwise by the contracting officer. For equipment not included in the schedule, rates for comparable pieces of equipment may be used or a rate may be developed using the formula provided in the schedule. For forward pricing, the schedule in effect at the time of negotiations shall apply. For retroactive pricing, the schedule in effect at the time the work was performed shall apply.

(c) Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d)(ii) and FAR 31.205-36. Rates for equipment rented from an organization under common control, lease-purchase arrangements, and sale-leaseback arrangements, will be determined using the schedule, except that actual rates will be used for equipment leased from an organization under common control that has an established practice of leasing the same or similar equipment to unaffiliated lessees.

(d) When actual equipment costs are proposed and the total amount of the pricing action exceeds the small purchase threshold, the contracting officer shall request the contractor to submit either certified cost

or pricing data, or partial/limited data, as appropriate. The data shall be submitted on Standard Form 1411, Contract Pricing Proposal Cover Sheet.

(e) Copies of EP1110-1-8 "Construction Equipment Ownership and Operating Expense Schedule" Volume 4 (Montana) and Volume 8 (Washington, Oregon and Idaho) are available from the Superintendent of Documents, P.O. Box 371954, Pittsburg, PA 15250-7954, phone (202) 512-1800 and fax (202) 512-2250, OR from the Government Bookstore in the Jackson Federal Building, Seattle, WA, phone (206) 553-4279. The cost is $33.00 for each volume. Use the following stock numbers when ordering schedules:

S/N 008-022-00317-7	Volume 4
S/N 008-022-00321-5	Volume 8

SC-15. PAYMENT FOR MATERIALS DELIVERED OFF-SITE (MAR 1995)-(EFARS 52.232-5000)

(a) Pursuant to FAR clause 52.232-5, Payments Under Fixed Priced Construction Contracts, materials delivered to the contractor at locations other than the site of the work may be taken into consideration in making payments if included in payment estimates and if all the conditions of the General Provisions are fulfilled. Payment for items delivered to locations other than the work site will be limited to: (1) materials required by the technical provisions; or (2) materials that have been fabricated to the point where they are identifiable to an item of work required under this contract.

(b) Such payment will be made only after receipt of paid or receipted invoices or invoices with canceled check showing title to the items in the prime contractor and including the value of material and labor incorporated into the item. In addition to petroleum products, payment for materials delivered off-site is limited to the following items: Any other construction material stored offsite may be considered in determining the amount of a progress payment.

SC-16. ORDER OF PRECEDENCE - DESIGN/BUILD CONTRACT

(a) The contract includes the standard contract clauses and schedules current at the time of contract award. It entails (1) the solicitation in its entirety, including all drawings, cuts, and illustrations and any amendments, and (2) the successful offeror's accepted proposal. The contract constitutes and defines the entire agreement between the Contractor and the Government. No documentation shall be omitted which in any way bears upon the terms of that agreement.

(b) In the event of conflict or inconsistency between any of the provisions of this contract, including the Request for Proposal, Contractor's proposal, or contract deliverable, precedence shall be given in the following order:

(1) Betterments: Any portions of the accepted proposal, or any subsequent design or other submittal, which both conform to and exceed the provisions of the Request for Proposal. "Betterment" is defined as any product, component, or system, which exceeds the minimum requirements stated in the Request for Proposal.

(2) The provisions of the solicitation: (See also Contract Clause: SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION)

(3) All other provisions of the accepted proposal including RFP Section 00010.

(4) Any design products including, but not limited to, plans, specifications, engineering studies and analyses, shop drawings, equipment installation drawings, etc. These are “deliverables” under the contract and must conform to or exceed all provisions of the contract, in order of precedence herein.

SC-17 LIMITATION OF PAYMENT FOR DESIGN: If it should be necessary to terminate this contract, for any reason, prior to completion, the Government will pay the Contractor a fair and reasonable price for the design or construction services performed and delivered to the Government. However, such payment will not exceed a sum greater than the amount allowable under 10 USC 4540 regardless of the actual costs the Contractor may be able to substantiate.

SC-18. - DELETED.

SC-19. TECHNICAL PROPOSAL - COPIES TO BE FURNISHED UPON AWARD

THE SELECTED FIRM IS REQUIRED TO FURNISH THE FOLLOWING ADDITIONAL COPIES OF THE TECHNICAL PROPOSAL, INCLUDING ANY REVISIONS THERETO AND FINAL PROPOSAL REVISIONS (FPRs), IF APPLICABLE, WITHIN 5 WORKING DAYS OF AWARD:

- Volume 1 (3 SETS)
- Volume 2 (3 SETS)

Volume 1 shall consist of:

- Technical Proposal Letter
- Table of Contents. List all sections of the technical proposal.
- Outline Specifications
- Supporting Data (Catalog cuts and etc.)
- Schedule

Volume 2 shall consist of: Drawings

SC-20. COMPLIANCE CERTIFICATION

The offeror shall certify, in the technical proposal cover letter and by note on each sheet of working drawings, that all items submitted in proposal and final design documents comply with RFP requirements. The requirements specified in the RFP are binding contract requirements. In case of any conflicts after the contract award between the requirements stated in the RFP and the offeror's proposal, the RFP requirements shall govern.

SC-21. VALUE ENGINEERING: The Corps of Engineers encourages all offeror’s to utilize the Value Engineering methodology and functional analysis techniques. These techniques will most often result in a quality and cost effective product.

SC-22. DELETED.

SC-23. YEAR 2000 COMPLIANCE:

(a) In accordance with FAR 39.106, the Contractor shall ensure that with respect to any design, construction, goods, or services under this contract as well as any subsequent task/delivery orders issued under this contract (if applicable), all information technology contained therein shall be Year 2000 compliant. Specifically:

(b) The Contractor shall:

(1) Perform, maintain, and provide an inventory of all major components to include structures, equipment, items, parts, and furnishings under this contract and each task/delivery order which may be affected by the Year 2000 compliance requirement.

(2) Indicate whether each component is currently Year 2000 compliant or requires an upgrade for compliance prior to Government acceptance.

SC-24. RECOVERED MATERIALS: The Corps of Engineers encourages all bidders to utilize recovered materials to the maximum extent practicable. The attached APPENDIX R contains procurement guidelines for products containing recovered materials.

APPENDIX R

PART 247 - COMPREHENSIVE PROCUREMENT GUIDELINE FOR PRODUCTS CONTAINING RECOVERED MATERIALS

40 CFR Ch. 1 (7-7-96 Edition)

Subpart B-Item Designations

§ 247.10 Paper and paper products.

Paper and paper products, excluding building and construction paper grades.

§ 247.11 Vehicular products.

(a) Lubricating oils containing refined oil, including engine lubricating oils, hydraulic fluids, and gear oils, excluding marine and aviation oils.
(b) Tires. excluding airplane tire
(c) Reclaimed engine coolants, excluding coolants used in non-vehicular applications.

247.12 Construction products.

(a) Building insulation product including the following items:
(1) Loose-fill insulation, including but not limited to cellulose fiber, mineral fibers (fiberglass and rock vermiculite, and perlite;
(2) Blanket and batt insulation, including but not limited to mineral fibers (fiberglass and rock wool);
(3) Board (sheathing, roof decking wall panel) insulation, including but not limited to structural fiber and laminated paperboard products perlite composite board, polyurethane, polyisocyanurate, polystyrene, phenolics, and composites; and
(4) Spray-in-place insulation, including but not limited to foam-in polyurethane and polyisocyanurate and spray-on cellulose.
(b) Structural fiberboard and laminated paperboard products for applications other than building insulation, including building board, sheathing shingle backer, sound deadening roof insulating board, insulating board, acoustical and non-acoustical ceiling tile, acoustical and non-acoustical lay-in panels underlayments, and roof overlay (coverboard).
(c) Cement and concrete, including concrete products such as pipe block, containing coal fly as ground granulated blast furnace (GGBF) slag.
(d) Carpet made of polyester fiber use in low- and medium-wear applications.
(e) Floor tiles and patio block containing recovered rubber or plastic.

§247.13 Transportation products.

Traffic barricades and traffic used in controlling or restricting vehicular traffic.

§ 247.14 Park and recreation products

Playground surfaces and running tracks containing recovered rubber or plastic.

247.15 Landscaping products.

(a) Hydraulic mulch products containing recovered paper or recovered wood used for hydroseeding and over-spray for straw mulch in landscaping, erosion control, and soil reclamation.
(b) Compost made from yard trimmings, leaves, and/or grass clippings for use in landscaping, seeding of or other plants on roadsides and embankments, as a nutritious under trees and shrubs, and in erosion control and soil reclamation.

§ 247.16 Non-paper office product.

(a) Office recycling containers and office waste receptacles.
(b) Plastic desktop accessories.
(c) Toner cartridges.
(d) Binders.
(e) Plastic trash bags.

END OF SECTION

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SECTION 00810

SPECIAL CONTRACT REQUIREMENTS
NEW FAMILY HOUSING

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SECTION 00810

SPECIAL CONTRACT REQUIREMENTS
NEW FAMILY HOUSING

1. GENERAL CONTRACT PROCEDURES The contract will be conducted in two phases: Phase I consists of the Contractor's preparation of project design documents, and the Government's review of these design documents. Phase II consists of construction of the facility designed in Phase I and the demolition and site restoration of the Woodland Groves Housing Area project site. In order to assist the Contractor in meeting the contract completion date, Phase I and Phase II will each consist of three parts. The first part will be New Family Housing Site Foundation and Site Utilities, the second part will be All Other Work for New Family Housing, and the third part will be Demolition and Site Renovation for the Woodland Groves Housing Area project site. Construction is not to commence until the Government has reviewed and approved the applicable design documents for that part of the construction. The Contractor is totally and solely responsible for coordination, compatibility, and completeness of each and all phases and compliance with contract requirements. Prior to start of each phase there will be a meeting to discuss Contractor's Quality Control Plan. See Specification Section 01451 CONTRACTOR QUALITY CONTROL, for details.

1.2 PREDESIGN CONFERENCE Within five working days after notice to proceed with the contract a predesign conference will be held to acquaint the Contractor with the general plan of contract administration and requirements under which the design is to proceed.

1.3 PHASE I - REQUIREMENTS

1.3.1 Design Submittals. The Contractor shall prepare and distribute project design documents in accordance with the following schedule. Each submittal MUST be in accordance with the requirements of the contract documents, the Contractor's proposal, and all other terms and conditions of the contract.

DESIGN SUBMITTAL SCHEDULE

Submittal	Suspense (Calendar Days After Notice to Proceed with the Contract)	Submittal Items
New Family Housing Site Foundation and Site Utilities Design (Developed to 95%); All Other Work, for New Family Housing Design (Developed to 65%)	*	Twenty (20) copies each of One-half size drawings, specifications, and design analysis; all stamped and signed (see paragraph 2.5c).

Revised New Family Housing Final Site Foundation and Utilities Design	**	Ten (10) copies each one-half size drawings and specifications, and two copies design analysis and calculations; all signed and stamped. Annotated Government review comments (two copies).
All other Work for New Family Housing Design (developed to 95%).	***	Twenty (20) copies each One-half size drawings, specifications, and design analysis; all stamped and signed.
Revised Final All other Work for New Family Housing Design (include Site Foundation and Utilities Design documents with this final back check submittal).	**	Ten (10) copies each one-half size drawings and specifications, and two copies design analysis and calculations; all signed and stamped. Annotated Government review comments (two copies).
Demolition and Site Renovation Plans and Specifications for the Woodland Groves Housing Area project site (developed to 95%).	****	Ten (10) copies each one-half size drawings, specifications, design analysis and calculations and four copies of the Tree Preservation Plan; all signed and stamped.
Revised Demolition and Site Renovation Plans and Specifications for the Woodland Groves Housing Area project site.	**	Five (5) copies each one-half size drawings, specifications, design analysis and calculations and three copies of the Tree Preservation Plan; all signed and stamped. Annotated Government review comments (two copies).

NOTES: The Contractor shall complete the above schedule as follows:

* The number of calendar days for completion shall be no later than 45 calendar days after NTP with the contract.

** The number of calendar days for completion of the revised submittal shall include Government review time as specified in paragraph Design Reviews below and time for the Contractor to complete required corrections and shall be no later than 14 calendar days after Contractor receipt of the Government review comments.

*** The number of calendar days for completion shall be no later than 90 calendar days after NTP with the contract.

**** The number of calendar days for completion shall be determined by the Contractor to assure compliance with the contract completion date.

The design review addresses and distribution are as follows:

Agency	65% Design	95% Design	Revised Final
Commander HQ Air Combat Command 129 Andrews St. Ste. 346 Langley AFB, VA 23665-2769 Attn.: Marlow Pantalo	2 half size 1 color board	2 half size	2 half size 1 color board
Commander U.S. Army Corps of Engineers Seattle District ATTN.: CENWS-EC-DB-SP (NISARGAND) P.O. Box 3755 Seattle, WA 98124-2255	5 half size	5 half size	2 half size 2 design analysis and calculations
Commander U.S. Army Corps of Engineers Seattle District ATTN: CENWS-EC-NW-MH (P.O. BOX 4086) Corner of Liberator & Ardvark Mountain Home AFB, ID 83648-4086	13 half size 1 color board	13 half size	6 half size 1 color board

NOTE: Both the 95% and the Revised submittals for the Demolition and Site Restoration design are to be submitted to the U.S. Army Corps of Engineers Mountain Home Office at the above address.

1.3.2 Design Reviews.

(1) The Government intends to use no more than 14 calendar days for review of submittals. Design submissions found to be incomplete or not in compliance with the contract will be returned to the Contractor for correction and resubmission. Under such circumstances the Government will have an additional 14 calendar days review period to commence upon receipt of the revised submittals and there will be no increase in the contract completion date provided. Contract completion time (see contract clause entitled "Commencement, Prosecution, and Completion of Work") includes time for Government review of drawings and specifications.

(2) Government review does not constitute approval nor acceptance of any variations from the RFP or from the Contractor's proposal unless such variations have been specifically pointed out by the Contractor in writing and authorized in writing by the Government. The responsibility for a total design in accordance with the contract will remain with the Contractor and the interim NOTICE TO PROCEED (site foundation and site utilities construction), will in no way mitigate against that responsibility.

(3) The Contractor is required to respond to all review comments and submit the annotated comments as a design analysis appendix in the subsequent design submittal. All comments must either be accepted and incorporated into the design or satisfactorily rebutted.

1.3.3 Design Review Conferences. Approximately 2 weeks after submission of design material for Government review a design review conference may be held between the Government and the Contractor to discuss the submission and the Government's review comments.

1.3.4 Project Design Documents. After the Governments final back check of design documents, CD's containing corrected contract drawings (construction drawings) in electronic file format (coordinate with paragraph 2.2 Construction Drawings) and contract specifications shall be submitted, along with one complete set of ½ size prints taken from the CD's, to all addresses in the above distribution list. The Contractor shall also provide the following printed copies to the Government:

(a) Twelve (12) copies each one-half size drawings
(b) Twelve (12) copies specifications.
(c) Two (2) copies full size drawings.

Distribution of these design documents shall be as directed by the Government at the final design review conference.

1.4 PHASE II - REQUIREMENTS.

After Government acceptance of project design documents the Contractor will be notified to proceed with construction.

1.4.1 Preconstruction Conference. Prior to commencement of construction a Preconstruction Conference will be held to acquaint the Contractor with the general plan of contract administration and requirements under which the construction operation is to proceed. This conference will also discuss the Contractor's Quality Control Plan for the upcoming phase of the contract and inform the Contractor of the obligations concerning equal opportunity and Federal wage rates reporting system.

1.4.2 Contract Closeout. Completion, acceptance, and contract settlement are accomplished when final punch list items (see SECTION 00700 - Contract Clause INSPECTION OF CONSTRUCTION) have been completed and approved, "as-built" drawings and O&M Manuals are complete, and warranty provisions and dates are established.

2. PREPARATION OF PHASE I PROJECT DESIGN DOCUMENTS

2.1 GENERAL The Phase I project design documents shall include construction drawings, specifications, and design analysis for categories such as, but not limited to, architectural, fire protection/life safety, civil, structural, mechanical, electrical, grading, drainage, paving, telecommunications, and utility service. Provide specifications in sufficient detail to fully describe and demonstrate the quality of materials, the installation, and performance of equipment, and the quality of workmanship. Detailing and installation of all equipment and materials shall comply with the manufacturer's recommendations, best industry practice and the guidance provided herein. Provide a design analysis for each discipline of work

with sufficient backup data including the necessary calculations, tables, methods, and sources used in determining equipment and material sizes and capacities. Design development shall conform to the criteria and requirements of SECTION 00860 - Design Development Technical Criteria –Replace Military Family Housing (Ph. 2).

2.1.1 Dimensioning

This is a metric project and all project design documents, except as noted herein, are to be prepared in metric units. Convert all English units herein to metric. For utility interface requirements, provide "soft metric" dimensions. The following publications are recommended as guides to aid the Contractor in the preparation of the project design documents:

METRIC GUIDE FOR FEDERAL CONSTRUCTION - First Edition

Published by - National Institute of Building Sciences
1201 L Street N.W.
Washington, D.C. 20005
(202) 289-7800

MASTERMETRIC - A Guide for Using the International System of Units (SI) in Construction Documents

Published by - AIA Master Systems - MASTERSPEC Specifications
332 East 500 South Street
Salt Lake City, Utah 84111-3309
(800) 424-5080

This guidance supersedes the Air Force Family Housing Guide for Planning, Programming, Design and Construction, (FHG) dated December 1995 for use of metric measurements. All measurements shown in English units in the FHG shall be converted to the metric measurement system. Specific guidance for preparing contract documents is included under Section 01415, METRIC MEASUREMENTS included under the attached Division 1.

2.2 ARCHITECT OF RECORD: All construction drawings and design calculations of the Contractor and any changes to these documents shall be affixed with the registration stamp (seal) of the Architect of Record (see Section 01451 Contractor Quality Control, paragraph 3.4 Quality Control Organization) and that of all consultants, as appropriate, (i.e. structural, civil, mechanical, and electrical~~, and fire protection~~ engineers) before submittal to the Government. All design professionals shall have current professional registration to practice their appropriate discipline in the United States except for the requirement as specified in Section 00860, Paragraph 7.0 Grading and Drainage. Professional approval shall be indicated on all documents by having the professional stamp/seal of architect or engineer with personal signature over same appearing on all sheets as applicable to their specialties.

2.3 CONSTRUCTION DRAWINGS AutoCAD version 13 or higher shall be utilized by the Contractor in preparing the construction drawings. The AutoCAD electronic file format and layering shall be as specified in Section 01702, As Built Record Drawings. The project title is: REPLACE MILITARY

FAMILY HOUSING, PHASE 2, MOUNTAIN HOME AFB, IDAHO, PN: QYZH985003. The project drawing file number is 227s/ 711-15-03, and individual drawing plates shall be identified as follows:

Title/Location/Index	G-1
Civil	C-1 and Following
Landscape	L-1 and Following
Architectural	A-1 and Following
Structural	S-1 and Following
Mechanical	M-1 and Following
Electrical	E-1 and Following

Construction drawings shall include all details necessary to portray the design and construction requirements. All drawings shall be signed by the responsible registered professional engineer or architect and the Architect of Record (see paragraph Architect of Record above). Drawings should include but not be limited to the following:

a. Site plan(s) (1:500) which accurately show grading, location of streets, driveways, parking, utilities, features to be retained or removed, and project boundaries.

b. Profiles (1:500 horizontal and 1:50 vertical) of all underground utilities and roads.

c. Typical site, paving, and utility details which show road, driveway, and sidewalk cross sections; utility lines; and service details. Include single-line electrical site distribution diagrams.

d. Landscaping schedule which shows number, size, location, and species of trees and shrubs proposed for the entire project.

e. Architectural floor plans (1:100) which show overall dimensions, room dimensions and areas, equipment and fixtures and door swings. (1:50 shall be used for plans of toilets, kitchens, etc., as necessary for clarity).

f. Foundation plans (1:100) showing sections, details, and type.

g. Mechanical/electrical plans (1:100) which show(s) HVAC, plumbing, water heater, stacks, flues, vents, service entrance panel, light fixtures, receptacles, switches, etc. Electrical to include separate plans for power, lighting, and auxiliaries; which in addition, are separate from mechanical. Also include riser diagrams for power for auxiliaries and schedules for panels, lighting, etc. Auxiliaries to include telephone, fire alarm, etc. Telecommunications plans and specifications which show telephone service, conduit runs, and locations.

h. Exterior elevations (1:100) which show all elevations and identify exterior materials proposed.

i. Restroom elevations (1:50 or larger) which show floor, ceiling, wall materials and type of fixtures.

j. Typical sections (1:20 or larger) for each type of foundation, floor, wall, and roof construction proposed. Include exterior walls, interior bearing walls/floors, partitions, and all other typical conditions.

k. Interior finish schedule which shows materials, colors, and patterns for wall, ceiling, and floor finishes for each room. Indicate ceiling heights.

l. Equipment schedules and installation details (1:20 or larger) for each special detail.

m. Door schedule which shows type, size, material, fire rating, hardware group, and frame information.

n. Fixture and Equipment Plans (1:50) showing compatibility of equipment and fixture placement.

o. Finish Grading Plan at scale of 1:500 with a contour interval of one half meter. Slopes 2 : 1 (two horizontal to one vertical) or steeper may be shown by one and one half meter contour intervals. All drainage swales and ditches shall be provided with controlling invert elevations at the beginning and at all grade breaks, including drainage swales around the buildings.

p. Storm drainage plan and profile to scale of 1:500 horizontally and 1:50 vertically. Profiles of all underground storm drains shall be provided. Details of all storm drainage structures shall be shown on the final drawings.

q. Water Supply Plan of the proposed system at scale of 1:500 horizontally. Details of all water distribution structures shall be shown on the final drawings.

r. Sanitary sewer system plan and profile to scale of 1:500 horizontally and 1:50 vertically. Details of all sanitary sewage structures shall be shown on the final drawings.

s. Electrical Distribution System. Furnish complete single line diagrams with calculations of available short circuit currents at transformers and circuit breakers, connected and demand loads on all transformers and feeders with spare capacity identified, length and voltage drop on primary lines, and secondary service laterals.

2.4 SPECIFICATIONS For the preparation of construction specifications the Contractor shall utilize the guidance provided in SECTION 00860 - DESIGN DEVELOPMENT TECHNICAL CRITERIA, and the following: Contractor is to provide specifications covering all work for Divisions 2 through 16. All specifications shall be prepared and submitted in CSI three-part format. The Division 1 Specifications attached herein (see Sections 01001 through 01705) have been prepared by the Government but require the following input from the proposer/contractor:

a. Section 01330 Submittals. Complete the submittal register ENG Form 4288.

b. Section 01451 Contractor Quality Control. Review Table 1 - Minimum Sampling and Testing Frequency to assure that the materials and minimum sampling and testing frequency shown are applicable for the work being done.

2.5 DESIGN ANALYSIS Design analysis includes complete site and building design narrative and backup calculations to support each discipline of work. These analysis should include but not be limited to

utility distribution systems, structural elements, and electrical and mechanical systems. Include computations for sizing equipment, air duct design, ventilation design, and U-factors for ceilings, roofs, and exterior walls and floors. Provide zonal cavity lighting calculations for all interior rooms and point lighting calculations for all exterior lightning. Design analyses shall be presented in a clear and legible form incorporating a title page, and a table of contents. Sources of information, formula, and references shall be explained. Design analysis shall be accomplished by Registered Professional Engineers qualified in the respective design field (see paragraph 2.2 Architect of Record).

a. Water Supply and Distribution. Provide a general explanation of the existing service. Where major extensions are required, describe system, indicating type, storage, condition, water pressures, and unsatisfactory elements. Provide statement on type of construction, proposed materials, required flows or capacities, including designer's basic estimate of tentative pipe sizes. Where storage and pump stations, are involved, include tentative sizes and basic data (population, fire flows, etc.) which will be used in sizing equipment. Provide the domestic and fire protection demand(s), and any special demands and state the static and residual pressure at the proposed hydrant locations. Cross reference the mechanical design analysis for the determination of the water demand. State requirements for valves, meters, and fire hydrants. Attach complete calculations for sizing water piping and storage facility.

b. When a computer program is used, the program will be named and described. This description must be sufficient to verify the validity of methods, assumptions, theories, and formulas.

c) Spread sheet style programs are acceptable for structural analysis and design. Under a repetitive condition, at least one manual computation must be performed for each unique condition. All data, formulas and any referenced items should be clearly shown before initiation of the program. Any computer models generated for use with modeling programs should be accompanied by drawings indicating coordinate system, joint numbering and element/member numbering scheme.

2.6 ADDITIONAL REQUIREMENTS

a. Coordinated Interior and Exterior Color Schemes. One scheme is required. Provide interior and exterior Color Boards (three sets required) complete with samples and/or chips of the colors, materials, textures, and finishes proposed, including floor, wall, ceiling finishes, roofing, siding, and trim. Schemes shall be submitted on 216 mm by 279 mm boards, bound in 3-ring binders.

b. Architectural Rendering. The Contractor shall provide a professionally produced and framed color rendering of the project. The frame is to be either bronze or natural anodized aluminum, with 3.175 mm non-glare, non- yellowing Plexiglass (or equal), minimum overall dimensions 458 mm by 610 mm. Rendering view shall be submitted for Contracting Officer’s review and acceptance two weeks minimum before start of work on the actual rendering, along with brief description of the type of view to be taken. The Contractor shall also provide five (5) 203 mm by 254 mm color photographic prints, five (5) 35 mm color slides, and one (1) duplicate color negative of the rendering at the time of submission of the revised final design documents.

c. Equipment and Fixtures. The Contractor shall furnish equipment and fixture schedules, catalog data, applicable Government or Commercial Specification numbers, and indicate sizes, capacities, manufacturer, model numbers, and manufacturer's warranties for all equipment and fixtures included in the

proposal. Originals of catalog data (six copies only) shall be submitted in lieu of reproducibles or copies to ensure legible data.

3. PHASE I DESIGN SUBMITTALS

3.1 GENERAL Design reviews will be conducted by the Government for: New Family Housing Site Foundation and Site Utilities Design (Developed to 95%) and All Other Work, for New Family Housing Design (Developed to 65%); All other Work for New Family Housing Design (developed to 95%); and Demolition and Site Renovation Plans and Specifications for the Woodland Groves Housing Area project site (developed to 95%). Design submittal schedule and distribution requirements are given in paragraph 1. GENERAL CONTRACT PROCEDURES. Requirements for preparation of submittal materials is given in paragraph 2. PREPARATION OF PHASE I PROJECT DESIGN DOCUMENTS. Submittal materials required for these design reviews are construction drawings, specifications, design analysis and supporting data as necessary to fully depict the design and assure that all work conforms with the criteria contained in the contract.

3.2 REVISED SUBMITTALS. Resubmit all materials as required in previous submittal incorporating all comments from the previous submittal into the design and furnishing any additional materials as requested by the Government to support the proposed design. Submit annotated Government review comments from previous submittal. All comments shall be incorporated into the design or rebutted to the satisfaction of the CO.

END OF SECTION 00810

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SECTION 00860

Replace Military Family Housing (Ph 2)

DESIGN DEVELOPMENT TECHNICAL CRITERIA

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SECTION 00860

REPLACE MILITARY FAMILY HOUSING (Ph.2)
DESIGN DEVELOPMENT TECHNICAL CRITERIA

1.0 GENERAL

1.1 SCOPE

This project includes design and construction of a complete and usable project consisting of all labor, consultant services, materials and equipment and all necessary site and utility improvements, and structures as may be required for the construction of 60 Units of New Family Housing (Phase 2) on unimproved Government owned land at Mountain Home AFB, Idaho. Attachment D contains the Project Location Maps and Site Plans. The Design and Construction shall comply with the requirements of this Request for Proposal (RFP) and the latest versions of applicable industry standards (see Paragraph 5.0 Applicable Standards). Special attention should be given to the fact that the 60 new family housing units will be considered "turn-key" design and construction with all operational equipment, except as noted herein, to be provided by the Contractor. Included in the scope of this project is; (a) the demolition of an equal number of existing family housing units along with their associated utilities and site improvements and the restoration of the site in accordance with the requirements of this RFP, and (b) a comprehensive site plan providing for a total of 110 family housing units. Sixty of the family housing units and their associated site improvements shall be designed and constructed in accordance with the guidance provided herein. A separate procurement “Replace Military Family Housing (Phase 3) will provide for the design and construction of the additional 50 family housing units. For conceptual planning purposes Contractor is to assume all the Phase 3 Housing will be 3 bedroom units with 50 percent being two-story units, 80 percent to be duplex units and 20 percent single family buildings.

1.2 UTILITIES

Upgrading of the existing electrical and water distribution systems are a part of this project to the extent specified herein. Connections to the existing utility mains/supplies and the extensions from the point(s) of connection to the 60 family housing units being provided in Phase 2 are part of the work . Utility extensions shall be designed to support the additional loading that the 50 additional units of family housing, being provided in Phase 3, will impose on the utility. Natural gas shall be used for space

heating and domestic water heating. The existing utility connections into the family housing being demolished shall be disconnected from the service mains serving the housing with the exception of the water service. The water service distribution within the area shall be abandoned in place, and new irrigation service lines installed to the restored site. (see paragraph 13.0 Demolition and Restoration).

1.3 SEQUENCING OF CONSTRUCTION AND DEMOLITION

The existing 60 family housing units scheduled to be demolished are located in the Woodland Groves Housing Area in 30 duplex buildings. These units are currently occupied and will be vacated for Contractor demolition and site restoration after completion of the 60 units of new family housing. The Government requires 60 days advance written notice from the Contractor as to the date he will give beneficial occupancy of the 60 new family housing units, to allow the Government time to plan and schedule the moving of families. After acceptance of the 60 new family housing units the Government will require an additional 45 days for relocation of tenants before turning vacated units over to the Contractor for demolition and site restoration. The Contractor's plan is expected to optimize the Contractor's resources and the anticipated construction season in order to provide the lowest cost to the Government.

1.4 DESIRABLE FEATURES

Within this section of the RFP, the Government has identified certain desirable design features, which are beyond the minimum requirements for family housing. Proposals may include these features to the extent they can be provided within the funds available for the award of this project (see Section 00010 Schedule A for funds available).

2.0 PRODUCTS

2.1 REFERENCES

The Design Development and Technical Criteria contained in this Section of the RFP are intended to illustrate minimum acceptable standards. Those sections which do include products by reference to industry standards or particular type are intended to demonstrate the Government's minimum need in that area of work. Where minimum standards are not indicated herein the guidelines provided in Attachment I, Air Force Family Housing Guide (December 1995), define the minimum acceptable standards and the objectives to be met. Where the Air Force Family Housing Guide allows options, the Contractor will use the most beneficial option given.

2.2 EXAMPLES/QUALITY

Building systems, materials, and methods specified herein are not intended to restrict the Design/Build Team. They are proposed as examples of minimum preferred quality standards or compatibility requirements and should not be construed as a sole source requirement by the Government (unless otherwise indicated herein). Any appropriate building systems, operational equipment, materials, and methods that meet minimum standards or compatibility requirements may be proposed by the Design/Build Team. These shall be clearly specified within the proposal.

3.0 EXECUTION

3.1 STANDARDS

Comply with the requirements of product manufacturer's, authorities having jurisdiction, applicable standards contained herein, the approved design documents, referenced standards, and in coordination with the trades involved.

3.2 DESIGN

After contract award and upon receipt of Notice to Proceed, the Contractor shall prepare detailed project design documents that are suitable to adequately demonstrate that the design, materials and methods of construction are in accordance with the contract. The project design documents shall consist of drawings, design analysis, catalogue cuts and corresponding specifications prepared in CSI format. Section 00810, Special Contract Requirements, contains the requirements, procedures and schedules for Contractor preparation of and subsequent Government review of project design documents.

3.3 CONSTRUCTION/DEMOLITION

In order to assist the Contractor in meeting the contract completion date, the work has been divided into segments as explained in Section 00810. Construction/demolition is not to commence until the Government has reviewed and accepted the applicable design documents for that part of the work.

4.0 FAMILY HOUSING DESIGN AND CONSTRUCTION CRITERIA

Design and construct the family housing community in accordance with the objectives and requirements listed in this Section of the RFP.

4.1 OBJECTIVES

4.1.1 HOUSING TYPES

The objective is to allow Contractors latitude in providing housing types, designs and materials to serve the Government's needs as owner operator of suitable permanent quarters for military personnel and their families. Contractor owned standard house plans or modifications thereof that meet the design and construction criteria specified herein may be submitted.

4.1.2 WHOLE NEIGHBORHOOD CONCEPT

The Whole Neighborhood Concept is intended to establish a neighborhood identity through compatible housing styles, architectural features and landscaping.

4.1.2.1 DESIGN CHARACTER. The general character of the neighborhood desired is a series of “prairie” style houses where the horizontal and slightly rolling quality of the prairie is expressed in the various design elements of the dwellings. The horizontal character may be expressed by providing long roof lines and reasonably generous roof overhangs, with the dwellings projecting a feeling of being a natural part of the site with form, materials and color being in harmony with the environment. The prairie house style is reminiscent of house designs pioneered by the legendary architect Frank Lloyd Wright, particularly his smaller house designs and some of his housing studies for the “Broadacres” development. For further design impact, the units should display a strong sense of entry with side lights at the main entrances to provide a transition between the exterior and the interior. Further emphasis may be provided with the detailing of door ways and windows to produce strong horizontal and vertical elements reminiscent of the prairie style. Although the functional requirements for each dwelling are similar, the provider is encouraged to submit a variety of floor plans and exterior elevation designs and color schemes in order to create interesting streetscapes and provide individuality to the housing units. As a minimum provide unique floor plans and exterior elevations for each unit type with two or more unique plans and exterior elevations for the JNCO 3 bedroom units(minimum total of 6 floor plans). See paragraph 4.2.1.1 for unit types.

4.2 GENERAL REQUIREMENTS

4.2.1 FAMILY HOUSING UNITS

Family housing units shall consist of variously configured one and two story buildings. The total number of family housing units shall be accommodated on the land available. Buildings are limited to 2 stories maximum and the respective net floor areas as identified in the table in Paragraph 4.2.1.1. Three (3) of the family housing units shall be adaptable to persons with disabilities; see Paragraph 4.2.1.1. for identification of adaptable family housing units. Adaptable family housing units shall be 1 story and are to be distributed throughout the project. A mix of Single and Duplex family housing units are to be provided in accordance with the following:

- All of the Two Bedroom family housing units are to be Duplex units.
- Two and Three Bedroom family housing units may be combined in a Duplex unit.
- Three Bedroom family housing units may be provided as either Single, Duplex or a combination of Single and Duplex units.
- Single Four Bedroom family housing units are desired.

4.2.1.1 NET FLOOR AREA. The maximum Net Floor Areas for the family housing units are as prescribed in the table below. Proposals reflecting a decrease in Net Floor Area as prescribed below may be considered less desirable than those meeting the maximum. The guidelines for calculating Net Floor Areas are found in the Air Force Family Housing Guide, Chapter 4, Figures 4.1, 4.2 and 4.3. NOTE: Exceptions “a” and “c – f” noted in Figure 4.1 of the Housing Guide are not applicable to this project.

MAXIMUM NET FLOOR AREAS

UNIT TYPE	NUMBER OF UNITS	FLOOR AREA
JNCO 2BR	9	88 SM (950 SF)
JNCO 3BR	39 [1]	111 SM (1,200 SF)
JNCO 4BR	4	125 SM (1,350 SF)
SNCO 3BR	6	125 SM (1,350 SF)
SNCO 4BR	2 [1]	135 SM (1,450 SF)

1. Three of the family housing units are to be adaptable to persons with disabilities (2 – JNCO 3BR units and 1 – SNCO 4BR unit).

4.3 TECHNICAL CRITERIA AND STANDARDS

The Air Force Family Housing Goal is – "To house Air Force families in the highest quality, energy-efficient housing that supports the needs of the military family and reinforces a strong sense of community." The technical criteria specified herein and in the referenced standards represents the minimum design standards and material quality acceptable to support the achievement of this goal. Replace Military Family Housing (Phase 2) is to be designed and constructed in accordance with the guidance provided in this RFP, the Air Force Family Housing Guide, the latest editions of the Codes and Standards listed in the Air Force Family Housing Guide, and local construction practices. In the event of a conflict between the guidance provided the order of precedence is as presented herein. Drawings describing the existing site conditions are provided in Attachment D. The standards and documents referenced in this RFP are considered as part of this RFP (although they may not be physically attached). The Contractor is responsible for securing copies of these standards and documents, complete with revisions specified.

4.4 CLIMATE

Mountain Home AFB is located in south-central Idaho (60 miles SE of Boise) at a surface elevation of 2,996 feet above mean sea level. Heating and cooling design temperatures are provided in paragraph 11.1.2 Design Temperatures.

5.0 SITE DATA

5.1 SITE CONDITIONS AND SITE PLANNING

The Contractor's plan shall include streets, parking areas, curbs and gutters, sidewalks and house walks, utility systems, street lights, grading, surface and storm drainage, landscaping, recreation facilities, and other work as necessary to support a complete and fully functional military family housing complex as described in this RFP. Government provided topographical site survey, utility plans and geotechnical information, (Attachments B and D) are provided as information to assist the Contractor in preparing his proposal. Any errors identified shall be brought to the attention of the CO immediately for resolution and direction. The Contractor shall take all professionally prudent and reasonable actions to verify the accuracy of the data provided. During design and construction, the Contractor shall be responsible for obtaining any additional data necessary for the execution of this project.

5.1.1 SITE PLANNING

This project shall be developed within the boundaries shown. The information provided in Attachments B and D indicate existing conditions, project limits and locations of existing utilities. The enclosed geotechnical-technical survey logs of exploration are provided for proposal submittal requirements only. The Contractor will be responsible for verification of actual soil conditions present at each building site (see Paragraph 5.2). Family housing site planning shall follow the guidance provided in the Air Force Family Housing Guide for neighborhood design and the guidance provided in this RFP. The Contractor's site planning shall be developed to provide for a total of 110 family housing units. The plan shall be developed to allow the construction of the Phase 2 Family Housing with it's associated site improvements while providing for the separate construction of the Phase 3 Family Housing with minimal disturbance to the occupants of the units completed in Phase 2. The site plan developed for the Phase 3 Family Housing is to be conceptual in nature using the guidance provided herein. It is recommended that the Phase 3 Family Housing be sited in the Northern third of the project site to take advantage of the Geotechnical information provided in Attachment B. Family housing unit density shall follow the guidance provided in the Air Force Family Housing Guide, Figure 3.1: Housing Density, for Enlisted/Company Grade – One/Two family housing located in Rural areas.

5.1.2 STREETS, DRIVEWAYS, SIDEWALKS AND FENCES

5.1.2.1 GENERAL The new street system shall provide convenient and safe access and circulation (including collections, deliveries, fire protection, moving vans and snow removal), within the housing area and should discourage through traffic. Size cul-de-

sacs to accommodate the minimum turning radii of emergency vehicles on the base and the largest legal size moving vans. Two entrance roads shall be provided from the existing access road into the housing area. Street design shall be in accordance with applicable industry standards and the guidance provided in the Air Force Family Housing Guide and as stated herein. The street system design is to be completed for the Phase 2 housing with provision made to extend the street system in order to add the additional Phase 3 housing. Streets shall be designed as a minimum to allow parking on one side of the street. Streets designed to provide space for parking on both sides are desirable. Traffic signage and pavement marking shall be in accordance with the Manual on Uniform Traffic Control Devices for Streets and Highways published by the US Department of Transportation - Federal Highway Administration. Signs shall be made of zinc coated bonderized steel.

5.1.2.2 CURBS AND GUTTERS. Curbs shall be provided at all pavements and shall be portland cement concrete and shall comply with the curb design details provided in the Mountain Home AFB Architectural Compatibility and Engineering Standards. Minimum curb radii at intersections shall be 20 feet. Curbs shall be depressed at entrances to driveways and at all other areas where ramping for vehicular or pedestrian access is provided. All gradients shall provide positive drainage (no ponding).

5.1.2.3 CURB RAMPS. Curb ramps shall be provided wherever an accessible route crosses a curb including intersections, pedestrian crossings, mail boxes, playgrounds, parks, and recreational areas. Accessibility shall be considered for bike riders, strollers, and persons with disabilities.

5.1.2.4 PAVEMENT DESIGN. The recommendations of the Geotechnical Survey Report (Attachment B) shall be used except vehicle pavements on the base are generally not designed for frost. The base course typically is 6” of NFS base placed directly on the subgrade.

5.1.2.5 DRIVEWAYS. Provide minimum 14 foot wide concrete driveways. Driveways shall slope down from the garage with an algebraic difference of grades at any one point not greater than 10 percent. Pavement for the driveways shall be concrete (5 inch minimum thickness with WWF). Concrete shall be poured over minimum 6 inch compacted granular base course. See Paragraph 10.5 Concrete Design for additional requirements.

5.1.2.6 OFF STREET PARKING. Off street parking space shall be provided at a minimum rate of 2 (two) spaces for each 2 bedroom dwelling unit and 3 (three) spaces for each 3 and 4 bedroom unit. Each garage space can be counted as 1 off street parking space. Driveways used for parking shall have a minimum distance of 25 feet measured from the house edge of sidewalk to the vehicle entrance. Where garages for duplex units are placed side by side driveways shall be separated by a minimum 3 foot wide lawn strip or planting buffer.

5.1.2.7 SIDEWALKS. Provide continuous network of new sidewalks along both sides of all streets. Tie new sidewalks into existing sidewalks at project boundaries and make provision to extend new sidewalks to include the additional fifty family housing units to be add under a separate procurement. Sidewalks should be a minimum of five (5) feet wide, and shall predominately meet the back of curb. Where desirable to separate walk from curb, a low-maintenance landscape treatment shall be provided. House entry walks and other pedestrian walkways shall be a minimum of 3 feet wide. House entry walks and street walks shall be of non-reinforced concrete with a minimum nominal thickness of 4 inches. Maximum preferred slope for all sidewalks shall be 5 percent. Cross slopes shall not exceed 2%. ***Patterned house entry walks are considered a desirable feature.***

5.1.2.8 STREETS SIGNS. Street name and traffic control signs shall be provided at all street intersections and shall conform to requirements of the Bureau of Public Roads Manual, Uniform Traffic Control Devices for Streets and Highways. Street names will be provided by the Contracting Officer. Integration of street name signage and street lighting is desirable. Street name sign typography shall be Clarendon medium style as shown in Attachment F - Standard Typography. Details of the street name signs, including mounting details, shall be submitted to the CO for approval

5.1.2.9 BACKYARD PRIVACY FENCES. Backyard privacy fences shall be provided for each housing unit and shall be 6' high board on board cedar fencing to match existing adjacent housing areas. All wood in fences shall be stained, not painted. Enclosed backyard area shall be a minimum of 1200 square feet for 2 bedroom units and minimum of 2000 square feet for 3 and 4 bedroom units. Posts shall be spaced maximum 8'-0" O.C. if horizontal 2x4 rails are installed with 4" face vertically. If latter are installed with 4" face horizontally, post spacing shall not exceed 6'-0" O.C. Provide one pedestrian gate within each unit's fencing. Metal fence posts shall be galvanized/zinc coated, have a factory applied protective finish and be furnished with a standard post cap.

5.2 GEOTECHNICAL SURVEY REPORT (ATTACHMENT B)

All earthwork shall be in accordance with the design requirements stated herein and in the Geotechnical Survey Report included as Attachment B. Requirements stated herein take precedence over similar requirements stated in the Geotechnical Survey Report.

NOTE: References in the Geotechnical Survey Report to verifying, observing and the like shall be interpreted to read as "the services of a registered professional engineer experienced in soil mechanics shall be retained to ....." Also, where reference is made

to determination of soil compaction the test method specified in Paragraph 5.3 below shall be used in place of the test method noted in the Geotechnical Survey Report.

5.2.1 ROCK EXCAVATION

Depth to rock is quite variable and in previous explorations at other sites on the base has varied from just below the surface to more than 8 meters. For purposes of rock excavation for this project the Contractor is to assume that rock will be found at an average depth of 600 mm for all foundation and utility work. Contractor is to quantify actual rock encountered during construction. Claims for rock excavation in excess of this base line will be handled in accordance with the Changes Clause of the Contract. Rock shall be removed by rippers or other mechanical methods. The Contractor may use blasting to fracture rock to facilitate removal. Contractor's blasting operations shall be in strict conformance to the following.

5.2.1.1 GENERAL. All blasting operations shall be performed in accordance with the applicable provisions of Corps of Engineers Safety and Health Requirements Manual EM 385-1-1, September 1996, and all other pertinent Federal, State and local regulations. If one of the ammonium nitrate compound type of explosives is used, storage and procedures for use shall conform to the requirements set forth in the Bureau of Mines information Circular 8179, SAFETY RECOMMENDATIONS FOR SENSITIZED AMMONIUM NITRATE BLASTING AGENTS. No drilling or blasting will be permitted without the Contracting Officers approval. Mats or other approved means shall be employed as necessary to control flying rock and prevent damage to structures or equipment.

5.2.1.2 BLASTING CONSULTANT. The Contractor shall retain a recognized blasting consultant to review all blasting plans and calculate the predicted vibrations and air over pressure from each blast. The blasting consultant shall not be affiliated with any blasting powder company and shall have no less than 10 years of successful experience in blasting design. The Contractor shall submit the blasting consultants qualifications to the Contracting Officer for approval at least 45 days prior to any planned blasting operations. The blasting consultant shall be responsible for assuring that all blasting operations including handling, transportation, storage, and use of explosives are in compliance with all applicable Federal, State, and Local laws and regulations. The blasting consultant shall also assure that all blasters and blasting foremen are qualified by training and experience and licensed in accordance with all applicable laws and regulations. The blasting consultant shall be on-site for all blasting operations and shall sign all blasting reports and submittals, requested by the Contracting Officer, which relate to the blasting operations.

5.2.1.3 BLASTING PLAN SUBMITTAL. Thirty days prior to commencing blasting work, the Contractor shall submit a blasting plan and schedule to the Contracting Officer for

review and approval. As a minimum the plan shall describe the Contractor's methods for transportation, handling, storage, types and maximum amount of explosive materials to be stored in each magazine, location of storage magazines, typical blast patterns and locations in the excavation where the patterns would be applicable, complete blast hole drilling patterns including hole diameters, explosives loading scheme and details of the delay system. The blasting plan shall also consider the safety considerations, risk management, test blasting, and misfire management. The Contracting Officer has the right to reject any such plan as inadequate if, in the Contracting Officer's opinion, such plan is not safe or will not achieve the desired result. When such plan is rejected, the Contractor will be required to resubmit an alternative plan at no additional cost to the Government.

5.2.1.4 OBJECTIVES. Blasting will be permitted only to fracture rock to facilitate removal and not transport material beyond excavation prism. The work shall be conducted in a manner that assures the rock to be excavated can be handled with suitable power equipment and that the rock outside the excavation prism remains undisturbed.

5.2.1.5 PROTECTION OF GOVERNMENT FACILITIES. Safeguards shall be taken to protect all Government facilities from blasting. If directed, the blasting design shall be changed to reduce vibration, both particle velocity and air vibration, to lower levels to protect existing facilities. The existing hospital is not to be subjected to perceptible blast vibration (peak particle velocity [PV] in excess of 0.5 ips). Housing and other facilities and site improvements are not to be subjected PV's in excess of 1.0 ips at the nearest facility. The Contractor shall use a minimum of two portable seismographs for monitoring ground vibrations at the hospital and the nearest structure to the blast excavation area. These instruments shall be placed as directed for each blast. Permanent records of blast vibrations shall be furnished to the Contracting Officer immediately after each shot. Small test blasts may be required by the Contracting Officer to confirm the viability of the blasting operations to meet the PV criteria.

5.2.1.6 AIRBLAST MONITORING AND CONTROL. A Government approved airblast monitoring system shall be used between the blasting area and the nearest structure subject to blast damage or annoyance. Peak overpressure shall be held below 0.01 psi at the nearest structure or other designated location. All blasting work shall be performed so as to keep airblast and resulting complaints at a minimum. If airblast at nearby structure is objectionable, the Contractor shall reduce charges, increase stemming, change time of blasting, or make other adjustments in the blasting program necessary to diminish complaints. All blasting shall be done during daylight hours. A permanent record of peak overpressure shall be furnished to the Contracting Officer immediately after each shot.

5.2.1.7 BLASTING REPORT. Immediately following each shot a blasting report shall be submitted to the Contracting Officer. Contractor shall use either a Government furnished Form NPS 305, "Blasting Report," which can be provided by the Contracting Officer or a similar form provided by the Contractor and approved by the Contracting Officer. The blasting report shall be signed by the blasting consultant. The blasting report is for quality control and record purposes only and will not absolve the Contractor of responsibility of any damage or injury.

5.3 SOIL COMPACTION

As required in Attachment B, soil compaction shall be achieved by approved equipment well suited to the particular soil being compacted. Material shall be moistened or aerated as necessary to provide the moisture content that will readily facilitate obtaining the compaction specified with the equipment used. Compact each layer to not less than the percentage of maximum density specified below, determined in accordance with ASTM D 1557.78 Method D

Subgrade Preparation, Fills, Embankments, and Backfill	Compaction Requirements (% of Maximum Density)
Under structures, building slabs and paved areas and in trenches under pipes beneath concrete slabs on grade. Under sidewalks, patios, and other miscellaneous slabs.	95 %

6.0 SITE UTILITIES

6.1 SITE UTILITIES - GENERAL

All utilities shall be installed underground except as noted herein. Gas, electric, telephone and cable TV utilities serving housing units shall be located in a utility corridor located at the rear of the housing units outside the fenced in backyards. Water and sewer mains may be located either in this utility corridor or in front of the housing units, at the discretion of the Contractor. It is desirable to use concrete turf pavers for the utility corridor to make it accessible to and usable for service trucks year round. Place necessary above-ground items such as electric transformers, gas meters, cable TV boxes, and telephone boxes between the utility corridor and the back yard fence with consideration being given to the visual impact and safety/maintainability issues. Provision is to be made for the future extension of utilities to serve the Phase 3 Family Housing. Utility crossings for the following roads shall be accomplished by trenchless means: Gunfighter and Aardvark Avenues; Desert, Chestnut and Playground Streets; and the road along the west boundary of the housing site between building 6300 and the Hospital.

6.1.1 UTILITIES SYSTEMS METERING

Master metering of gas, electric, and water utilities is required for this new family housing area. Contractor shall provide and install all taps, valves, and cover plates necessary for the future installation of individual gas and electric meters for each family housing unit.

6.1.2 UTILITY APPURTENANT LOCATIONS

New underground utility lines, including appurtenant structures such as valve boxes, manholes, vaults, etc., will not be located under pavement, road shoulders or drainage ditches to the extent practicable. Service entrances for each housing unit gas system, electrical system, telephone, and cable television shall be located at the mechanical rooms in accordance with the applicable utility paragraph (also see paragraph 9.3.2).

6.2 WATER DISTRIBUTION AND OPTIONAL WATER STORAGE SYSTEM

6.2.1 GENERAL

Under the Base Schedule the Contractor shall design and provide a complete, usable, new water distribution ~~and storage~~ system for the new family housing area. The Optional Water Storage System shall include a ground mounted storage tank sized to

meet all required demands, including fire, domestic and irrigation for both Phase 2 and Phase 3 Family Housing in accordance with the requirements specified herein.

6.2.2 WATER DISTRIBUTION DESIGN CRITERIA

All connections made by the Contractor to the existing water distribution system shall be in accordance with applicable industry standards and as stated herein. The piping pressure class is 150 psi for water distribution. Mains shall be considered as that part of the water system supplying fire hydrants. Pipes supplying groups of dwelling units exclusively shall be referred to as branches. Mains are to be valved so that not more than two hydrants will be out of service due to a single break in the water distribution system. Isolation valves shall be installed such that interruptions to service can be confined to no more than 10 family housing units or one-half of street or cul-de-sac. Isolation valves shall be easily accessible and as a minimum shall be at the intersection of mains. Mains as well as interior family housing piping shall be disinfected in accordance with AWWA Specification C-651. Service lines to each family housing unit shall be not less than 25 mm (1 inch) size.

6.2.2.1 MAINS. Water distribution main extensions shall be of adequate size to satisfy both domestic and fire flow requirements. No main extension shall be less than 152 mm (6 inches) in diameter. Distribution piping shall generally be a looped system design. Dead ends up to 91.5 meters (300 feet) long are permitted if terminated by fire hydrants or flushing hydrants. The static pressure is approximately 310 to 345 kPa (45 to 50 psi) with delivery pressure to the base being 620.5 kPa (90 psi), however, the Contractor shall verify all existing conditions. See Attachment H2 for static pressure and fire flow data.

6.2.2.1.1 A new water supply line shall be provided from Well no. 11 which shall be used to supply the new housing water distribution system ~~storage tank~~. Location of the supply line shall be immediately north of the existing Dunes Housing Area (no encroachment within existing developed areas) and south of the existing wind break. Under the Base Schedule this line shall also tie/loop into the existing 8 inch water line that extends east from Chestnut Street between the southern boundary of the new housing site and the existing housing along Tamarack Street. Under the Optional Water Storage System this line shall also be extended to supply water to the new water storage tank.

6.2.2.2 FLOW REQUIREMENTS. Total unit domestic requirements will be based on average daily and peak day consumption data for the size family of the individual unit. . System design shall provide a minimum residual pressure of 138 kPa (20 psi) at each fire hydrant. Minimum required fire suppression flow rates and duration shall conform to MIL HDBK-1008C which is available on the internet at the following web address: [HYPERLINK http://www.hnd.usace.army.mil/techinfo/ti/html

http://www.hnd.usace.army.mil/techinfo/milhbk.htm]. This is mandatory flow ove and above domestic requirements. Domestic pressure shall be minimum of 138 kPa (20 psi). All plugs, caps, tees, bends, and hydrants on water mains and hydrant laterals shall be provided with reaction backing or movement plastic pipe.

6.2.2.3 TRENCHES. Water, sewer, storm drains, and gas mains shall not be installed in the same trench. See also Paragraph 6.4. In accordance with NFPA 24, new water mains and branches shall have a minimum of 1219 mm (48 inches) of earth cover while new service connections to individual units shall have a minimum of 1219 mm (48 inches) of cover. Compaction of trenches shall be as specified in Paragraph 5.3 and the Geotechnical Survey Report (Attachment B).

6.2.2.4 FIRE HYDRANTS. All fire hydrants shall be UL listed, dry barrel type, and conform to AWWA- C-502 as applicable. Hydrants to be Mueller "Centurion" or equal. The Contractor shall provide a hose connection adapter from 114 mm (4.5 inch) to 127 mm (5 inch) diameter compatible with the existing base fire hose standard, which is Storx. Fire hydrant spacing shall be no greater than 152 meters (500 feet) apart by paved road, with no dwelling unit more than 92 meters (300 feet) by paved road from at least one
hydrant. Preference is to install hydrants at intersections whenever possible. Hydrant laterals shall be 152 mm (6 inches) minimum size, shall not exceed 15 meters (50 feet) in length, and shall have an underground shut off valve with an adjustable valve box in each lateral within 3 meters (10 feet) of the hydrant for isolating hydrant. Hydrants shall have their pumper outlet facing the street. Hydrants shall be located a minimum of 1 meter (3 feet) and a maximum of 2 meters (7 feet) from pavement, and shall not be located in sidewalks or where obstructed by parked vehicles, shrubbery, etc. Finish with paint color Beige #37778 (reflective paint).

6.2.2.5 SERVICE STOPS. Provide each housing unit with a separate service stop at uniform distance within the utility corridor or from the street. Water valve box shall be provided for all service stops and shall extend to finish grade.

6.2.2.6 METERING: Provide master meters at both ends of the looped system supplying the new housing site. Metering of individual units is not required.

6.2.2.7 COORDINATION. All work on existing and new water lines is to be coordinated with the CO or his designee prior to construction.

6.2.2.8 CATHODIC PROTECTION. Soils are not corrosive and cathodic protection of water distribution system components is not required. The water storage tank will require cathodic protection (see paragraph 6.2.3.2 Corrosion Protection).

6.2.2.9 HYDROSTATIC LEAKAGE TESTS. Test pressure for the hydrostatic pressure and leakage tests will be the working pressure multiplied by 1.33 continuous for 24 hours.

6.2.2.10 PRESSURE TEST. Piping shall be subjected for 1 hour to a hydrostatic pressure test of 1379 kPa (200 psi). Each valve shall be opened and closed several times during the test. Exposed pipe, joints, fittings, hydrants and valves shall be carefully examined during the partially open trench test.

6.2.2.11 PRESSURE AND LEAKAGE TESTS. Piping shall be tested only after the pipe is laid, the joints completed, fire hydrants permanently installed, and the trench partially backfilled leaving joints and valves exposed for examination, unless otherwise specified. Where any section of a water line is provided with concrete thrust blocking for fittings or hydrants, tests shall not be made until at least 5 days after the installation of the concrete thrust blocking, unless otherwise approved. Joints showing visible leakage shall be replaced or reworked to permanently eliminate leakage. Cracked or defective pipe, joints, fittings, hydrants and valves discovered in consequence of this pressure test shall be removed and replaced with sound material, and the test shall be repeated until the test results are satisfactory.

6.2.2.12 TESTS. All tests shall comply with state and local governments codes and the requirements specified herein.

6.2.2.13 CONCURRENT HYDROSTATIC TESTS. If allowed by code, the Contractor may elect to conduct hydrostatic test using either or both of the following procedures. Regardless of the sequence of tests employed, the results of pressure tests, leakage tests, and disinfection shall be satisfactory as specified. All replacement, repair or retesting required shall be accomplished by the Contractor at no additional cost to the Government.

1) Pressure test and leakage test may be conducted concurrently.

2) Hydrostatic tests and disinfection may be conducted concurrently, using the water treated for disinfection to accomplish the hydrostatic test. This may only be accomplished after the system has been thoroughly flushed with water until all entrained dirt and mud has been removed. If water is lost when treated for disinfection and air is admitted to the unit being tested, or if any repair procedure results in contamination of the unit, disinfection shall be re-accomplished. Testing, correction and retesting shall be accomplished at no additional cost to the Government.

6.2.3 OPTIONAL WATER STORAGE SYSTEM DESIGN CRITERIA

Design and fabrication of the ground-supported storage tank shall be in accordance with the applicable requirements of AWWA, D-100 WELDED STEEL STORAGE TANKS FOR WATER STORAGE (1996)or AWWA, D-103 FACTORY-

COATED BOLTED STEEL TANKS FOR WATER STORAGE (1987). Applicable requirements set forth in the following sections shall govern unless otherwise specified. Design shall provide for earthquake resistance for applicable seismic criteria (see paragraph 10.2 Seismic Design).

6.2.3.1 CAPACITY. Total daily domestic, fire and special demand flow requirements shall be based on both the Phase 2 and Phase 3 Family Housing (110 housing units). See paragraph 1.1 Scope for Phase 3 Housing Unit design assumptions. The fire demand is specified in paragraph 6.2.2.2. A special demand for irrigation of landscaping and lawn shall be included. The irrigation demand shall be determined based on existing domestic usage patterns, but no greater than 3 times the average peak winter domestic demand. Refer to data developed in the attached excerpt from the Water Flow and Pressure Analysis Report prepared under Contract number F44650-94-D-0004. (See Attachment H.) Determine capacity requirements using the equations for the various cases in accordance with AFM 88-10, Volume 4, WATER SUPPLY, WATER STORAGE and MIL HDBK 1008C. After determining applicable governing storage capacity from all required demands the final total storage capacity shall include a 10 percent additional storage requirement to reduce draw-down effects on the existing distribution and storage system. The minimum acceptable tank size will be 1,000,000 gallons unless the calculations indicate a larger tank is required.

NOTE: AFM 88-10, Volume 4 is available on the internet at the following URL: [http://www.usace.army.mil/inet/usace-docs/armytm/tm5-813-4/] and MIL HDBK 1008C is available at [HYPERLINK http://www.hnd.usace.army.mil/techinfo/ti/html http://www.hnd.usace.army.mil/techinfo/milhbk.htm]

6.2.3.2 CORROSION PROTECTION. Tank interior shall be protected by a cathodic protection system in accordance with NACE Standard RP0388, IMPRESSED CURRENT CATHODIC PROTECTION OF INTERNAL SUBMERGED SURFACES OF STEEL WATER STORAGE TANKS (Dated 1995).

6.2.3.3 EXTERIOR LIGHTING. No special hazard warning lighting is required.

6.2.3.4 SITING. Preferred location is adjacent to the existing Well No. 6 and existing elevated storage tank no. 4794. Any other location must be approved by the Contracting Officer and must be supported by the design analysis. Site design shall incorporate a drainage swale for capturing discharge of reservoir drain and overflow.

6.2.3.5 FIELD PAINTING. Exterior body of tank shall be painted KWAL HOWELL, Color “Maison blanche” no. 8181W. Trim shall be painted KWAL HOWELL color “Caribou” no. 8766N.

6.2.3.6. REPLENISHMENT OF STORAGE. Well no. 11 shall be used to supply the primary source of water to replenish storage. (See paragraph 6.2.2.1.1)

6.2.3.7. ASSOCIATED FACILITIES. Provide booster pumping station as required to supply water from the reservoir to the distribution system at required pressure. Pumping station capacity is to be adequate to support both the Phase 2 and Phase 3 Family Housing. Pump motors shall operate on 3-phase power from the new electrical distribution system being installed for the housing project. Backup emergency power is required to maintain system at required pressure (see paragraph 6.2.2.2). The emergency power system shall utilize natural gas as the fuel supply and be furnished with a sound attenuating enclosure.

6.3 SANITARY SEWAGE SYSTEM

6.3.1 GENERAL

The Contractor shall provide connections to the existing sewer system which serves the Mountain Home AFB Hospital. The existing sanitary system serving the adjacent housing area is at capacity. Connection may be made to the existing sewage lift station located to the west of the hospital or to the 8 inch line at any point between the lift station and Aardvark Avenue. A section of the existing lift station is attached to the end of this section. Minimum earth cover over sewer lines is 36 inches.

6.3.2 DESIGN CRITERIA

Sanitary sewage system shall be designed and constructed in accordance with local codes and regulations. All sewage piping to be PVC in accordance with ASTM-D-3034, type PSM, with a maximum SDR of 35, size 15 inches or less in diameter, with flexible elastomeric gasket joint in accordance with ASTM-D-3212.

6.3.3 MINIMUM VELOCITY

A minimum velocity shall be 2.5 feet per second when flowing at the maximum design flow depth. Design pipes with 80 percent full as critical flow depth.

6.3.4 SEWAGE REQUIREMENT

Design shall be based on an average daily per capita flow of sanitary sewage of 100 gallons with a peak hourly factor of 4.

6.3.5 SEWER LATERALS

Sewer lateral lines (connections from interior family housing sewer lines to main) shall be 4 inch minimum for single family units. Each building shall have a separate sewer lateral

line. Only interior house sewer lines may be placed under buildings. All house sewers under buildings shall be as specified in the Paragraph entitled "Plumbing." House sewer lines from any one unit shall not pass under any other unit(s). Cleanouts shall be provided for all branches at points of change in direction before running out to a main. The building drain line (exterior to the unit) shall be provided with a combination test tee and clean out within 5'-0" of the building. The minimum size of the collection line (main) shall be 8 inches.

6.3.6 CALCULATIONS AND DRAWINGS

Details of all sanitary sewage structures shall be shown on the final drawings. The Contractor shall run the necessary topographic and utility surveys. Verification of actual rim and flow line elevations, particularly at the taps, shall be made by the Contractor prior to beginning final design.

6.3.7 COORDINATION

All work on existing and new sewer line to be coordinated by Contractor with the CO or his designee prior to construction.

6.3.8 LEAKAGE TESTS

Lines shall be tested for leakage by low-pressure air testing, infiltration tests or exfiltration tests, as appropriate.. Low-pressure air testing for pipe materials shall use pressures and testing times as described in ASTM C 828 and C 924, after consultation with the pipe manufacturer. Prior to infiltration or exfiltration tests the trench shall be backfilled up to at least the lower half of the pipe. If required, sufficient additional backfill shall be placed to prevent pipe movement during testing, leaving the joints uncovered to permit inspection. Visible leaks encountered shall be corrected regardless of leakage test results. When the water table is 2 feet or more above the top of the pipe at the upper end of the pipeline to be tested, infiltration shall be measured using a suitable weir or other device acceptable to the CO. When the CO determines that infiltration cannot be properly tested, an exfiltration test shall be made by filling the line to be tested with water so that a head of at least 2 feet is provided above both the water table and the top of the pipe at the upper end of the pipeline to be tested. The filled line shall be allowed to stand until the pipe has reached its maximum absorption, but not less than 4 hours. After absorption, the head shall be reestablished. The amount of water required to maintain this water level during a 2-hour test period shall be measured. Leakage as measured by either the infiltration test or the exfiltration test shall not exceed 0.2-gallon per inch diameter per 100 feet of pipeline per hour. When leakage exceeds the maximum amount specified, satisfactory correction shall be made and retesting accomplished. Testing, correction and retesting shall be accomplished at no additional cost to the government

6.4 GAS DISTRIBUTION SYSTEM

6.4.1 GENERAL

Contractor shall provide connections to the existing gas distribution system. Design and installation of system shall comply with the requirements provided in the Air Force Family Housing Guide, paragraph 3.1.6 Gas Distribution System, the utility provider "Intermountain Gas Company," and the requirements stated herein. The distribution system design shall take into account that the Phase 3 Family Housing will also be serviced by this system. Natural gas is available at 50 psig.

6.4.2 METERING

Master metering of the gas system for this project is required. Also, provide and install all taps, valves, and cover plates necessary for the future installation of individual gas meters for each housing unit.

6.4.3 CATHODIC PROTECTION

Cathodic protection shall be provided for all gas distribution system material subject to corrosion in accordance with the requirements of the utility provider.

6.4.4 MATERIALS

Materials and appurtenances shall be of acceptable quality free of defects and suitable to accomplish the stated objectives for gas distribution systems. Intermountain Gas Company supplies natural gas to Mountain Home AFB on a non-interruptible schedule, type 1000 BTU/CF. Existing gas lines are polyethylene at a typical depth of 30". Extensions shall be polyethylene, yellow in color, minimum grade of PE2406.

6.4.5 TESTING

The Contractor shall prove the entire system of gas mains and service lines to be gas tight by air test in accordance with ANSI B31.8. Test shall continue for at least 24 hours between initial and final readings of pressure and temperature.

6.4.6 COORDINATION

All work on existing and new gas line to be coordinated by Contractor with the CO or his designee prior to construction.

6.5 ELECTRICAL DISTRIBUTION SYSTEM

Contractor shall provide a new 12470/7200 volts, 3 phase, 4 wire underground electrical distribution system for this project. The distribution system within the new housing area is to be routed in the utility corridor as specified in paragraph 6.1 General. The primary feeder for this system shall be ~~either~~ an extension of the existing feeder ~~"G"~~ "E" as specified in paragraph 6.5.1 Base Schedule Requirement ~~or it shall be a new feeder "I" in accordance with paragraph 6.5.2 Additional Work as Option. System to be provided will be dependent upon the award schedule~~. The distribution system design shall take into account that the Phase 3 Family Housing will also be serviced by this system (see paragraph 5.1.1 Site Planning). ~~Drawings for existing substation are included in Attachment D.~~

6.5.1 BASE SCHEDULE REQUIREMENT

The 12470/7200 volt, 3 phase, 4 wire distribution line shall be installed underground ~~starting at the substation. Between the substation and Aardvark existing duct bank shall be used. The new duct bank will start where existing ends at Aardvark and will run along the west side of Aardvark up to Well #11 east of Gunfighter. Then existing manholes and ducts shall be used up to Building 6003~~. The new housing area shall be provided with primary distribution by extending the existing feeder "E" starting at the manhole ~~near~~ west of building 6003 and south of building 6002. ~~The underground duct bank along Aardvark shall have four – 6 inch conduits. Crossing of Desert Street and Gunfighter Avenue shall be trenchless underground~~. All the distribution in the housing area shall be underground.. There shall be terminal (sectionalizer) boxes not more than 400 feet apart. No vaults or manholes shall be allowed. ~~Near the intersection of Desert and Aardvark the terminal box shall be a 4 point box and shall connect the existing underground run to the OTH-B building. Other terminal boxes shall be 3 point~~. There shall be a four way switch installed at manhole near building 6003. A fourway switch shall replace existing twoway switch near building 6300, close to where #4790 is shown on the drawings. This switch shall connect portion of existing underground Feeder E that runs along Playground Street, new underground runs to transformers for building 6300 and new underground run to pole near Building 4781 to connect to feeder "F." The fourth tap will hook up the fourway switch near building ~~6300~~ 6003 to this switch. There shall be a ductbank consisting of four, ~~6~~ 4 inch conduits between these two switches with appropriate number of sectionalizers needed to connect the primary feeder that will loop through the Housing Area. Except for the primary loop through the housing area, the primary distribution line shall be rated at ~~600~~ 300A (#4/0 copper). ~~This will require replacement of conductors between substation and Aardvark. The recloser for Feeder G shall be recalibrated to match the new load and disconnects and fuses at substation replaced as needed~~. The connection of feeder "F" will require a underground duct consisting of 2- 4 inch conduits. One conduit with 3 #2/0 copper, 15kv cables and the other a spare. Building 6300 connections will be similar except that conductors will be #2.

6.5.2 ~~ADDITIONAL WORK AS OPTION~~
(The Electrical Option is Deleted)

~~Under this option a new duct bank consisting of four 6 inch ducts will start at the substation. It will run underground, first North to a new manhole near building 1406 and then West to a new manhole near building 1208, on the West side of Aardvark. This duct bank then will connect to the one installed under Base Schedule Requirement, 6.5.1 above. It will be used for a new feeder designated as feeder "I" to be run to Housing Area, instead of Feeder G. A new recloser shall be installed at the substation for Feeder "I." The recloser shall be Cooper Kyle Form 4C Microprocessor-based recloser with digital controls or equivalent. The termination of feeder at the substation,~~

~~including switching and disconnecting features shall be similar to other existing feeder/recloser terminations.~~

6.5.3 DESIGN CRITERIA.

The following documents will be used as design criteria:

ANSI C2-1997 National Electrical Safety Code

Electrical design and installation shall comply with the Mountain Home Air Force Base Electrical Distribution Standards, Architectural Compatibility and Engineering Standards (available at HYPERLINK http://www.nws.usace.army.mil/criteria/criteria.htm) http://www.nws.usace.army.mil/criteria/criteria.htm) , and other applicabl standards. Equipment shall conform to the requirements of the National Electrical Manufacturers Association and Underwriters Laboratories, Inc.

Underground lines/duct shall be installed in accordance with the guidance provided herein and in specification 02316 " Excavation, Trenching, And Backfilling For Utilities Systems
" a copy provided in Attachment A.

6.5.4 DISTRIBUTION SYSTEM REQUIREMENTS

6.5.4.1 GENERAL. Power distribution on the base is 12470 volts, 3 phase, 4 wire. The distribution transformers serving the housing units shall be connected to ensure balancing of loads on all three phases of the feeder. Pad mounted, tamper-proof compartmental transformers shall be placed in the utility corridor (see paragraph 6.1 General), but no closer than 8 meters to a building. The following criteria pertains to the general exterior electrical distribution system design:

(a) All underground ductbanks shall be concrete encased and shall include, unless otherwise stated, one spare with pull cord for each type of service, i.e., power, cable TV, fiber optics, telephone, etc. Provide conduit separation per ANSI C2. Housing Area primary distribution shall use 4 inch conduit and shall include a spare conduit.

(b) Provide a minimum of 2 - 4 inch conduits for communications purposes, one of which is to have four-way interduct. Provide all conduits and interducts with pull cord.

(c) All high voltage (12.47 kV) taps/connections are to be made on above ground sectionalizers (terminal or junction boxes), or loop-fed pad-mount

transformers with appropriate bushings. The equipment shall be rated for 600A where available.

(d) Primary riser and feeders shall be 15kv, copper cable with 133 percent insulation level and shall have full concentric neutral with an insulating jacket over the concentric neutral.

(e) ~~Unless noted otherwise primary conductors shall be 4/0 copper~~.

(f) Deleted.

(g) Primary terminal riser shall include lightning arresters and loadbreak, fused cutouts. Stand off brackets shall be used for attaching conduits to poles.

(h) Dead end poles shall be provided as required. Overhead lines shall not end/terminate on riser poles.

(j) Neutral conductors, cable shields, and all other noncurrent-carrying metallic parts of equipment shall be grounded. Ground resistance of not greater than 25 ohms shall be provided.

(k) Label all cables, where they come from and where they go, with metal embossed tags.

(l) All Primary and HV connections shall be loadbreak type.

(m) Paint all pad mounted equipment in accordance with Base standards. Provide minimum 100 mm thick concrete pad on gravel base. Pad shall extend a minimum of 300 mm beyond the footprint of installed equipment. Provide a ground grid consisting of #1/0 awg CU conductor with a CU ground rod installed at each corner

(n) Unless required for 3 phase loads, pad mounted transformers shall be 1 phase, dead front, loop feed, oil immersed type, loadbreak group operated switch, surge arresters, and dry-well-mounted current limiting fuses. Transformers shall have two 2 1/2% taps above and below rated voltage. Provide low Z% transformers where short circuit currents permit. Unless otherwise required, the transformer secondary voltages shall be 120/240 volts, single phase, three wire.

(p) All cabinets shall be provided with padlock hasps.

(q) Aluminum shall not be used in contact with earth or concrete.

(r) Duct lines shall be concrete encased. Duct line markers shall be provided at the ends of long duct line stubouts or for other ducts whose locations are indeterminate because of duct curvature or terminations at underground locations. In addition to markers a brightly colored plastic tape, not less than 75 mm in width and suitably inscribed with a continuous metallic backing and corrosion resistant metallic foil core to permit easy location of the duct line, shall be placed approximately 300 mm below finished grade.

(s) Primary metering shall be provided for the housing area. The meter shall provide simultaneous measurements for current, voltage, and power parameters. Meter shall be cumulative type kilowatt demand register with 30 minute interval. Meter shall be connected to base EMCS. POC for the EMCS system is Mr. Rick Hill or Mr. Dave Sherman at 208-828-6575.

6.5.5 SERVICE LATERAL AND SERVICE ENTRANCE EQUIPMENT

Each building shall be provided with one underground secondary electrical service, originating from a transformer, to the meter centers of the building. The main circuit breaker located adjacent to the future meter location, and shall be sized to protect the service lateral. Service entrance conductors shall be in PVC conduit buried a minimum of 24 inches below grade. Fault current at the unit service entrance must not exceed 10,000 amps. Provide a main circuit breaker for each housing unit on the exterior of buildings. It is preferred that conduit risers from service lateral to exterior meters/service breakers are concealed between studs of building exterior walls. However, if surface mounted, the location of the surface mounted items is to be screened such that they are not readily visible from the street side of the housing units. (see paragraph 9.3.2 Mechanical Room).. Individual meters are not required but meter boxes with provision for future meter installation shall be provided.

6.5.6 GUIDANCE FOR TRANSFORMER SIZING

To arrive at demand load for each unit use demand loads for each living unit calculated in accordance with National Electric Code, Article 220 except the air conditioning or electric heating loads, whichever is larger, sized for 100 percent demand. In selecting a transformer, the name plate rating shall not be less than 100% of the kilovolt amperes total load calculated for the transformer using the table below. Not more than 8 (eight) living units shall be supplied from one transformer.

DEMAND FACTOR PERCENTAGE

Number of Living Units	% of Total of Demand Load for Units
2	80.0
3	60.0
4 - 8	50.0

6.5.7 RESIDENTIAL SITE LIGHTING

Provide residential street and common area lighting. Poles and lights are to match Trimble House Model No. TX125 MC 100-MH-XXV-RF29-TB. Pole height shall be approximately 4.25 meters for poles placed close to the main roads at either side of the housing area and approximately 3 meters for poles placed within the housing area. Foot candle levels (readings taken at the roadway) to be maximum of 3.65 (approx.) and minimum 0.3 (approx.) with average to minimum ratio 3.6 and maximum to minimum ration of 12. Street light circuits shall be underground in concrete encased PVC conduit. Street lights shall be activated by a photo cell on each circuit. Power shall be obtained from transformer secondaries via breakers mounted inside secondary compartments.

6.5.8 COORDINATION

All work on new, or existing, electric distribution systems shall be coordinated with the CO or his designee prior to construction.

6.5.9 CONSTRUCTION EXPERIENCE

The primary power distribution work and substation modification work shall be performed by personnel with 3 to 5 years of experience in such work. Contractor shall provide appropriate documentation to Contracting Officer when requested.

6.6 TELEPHONE DISTRIBUTION SYSTEM

6.6.1 GENERAL

The telephone distribution system shall be underground in ducts installed as part of duct banks described in paragraph 6.5 Electrical Distribution System. See paragraph 6.1 Site Utilities-General for additional distribution system requirements and paragraph 11.2.9 for additional requirements.

6.6.2 COORDINATION

All work, on new telephone distribution system, to be coordinated by Contractor with the local telephone provider U. S. West, Boise. Contact for U. S. West is George Crawford 208-385-2144. Installation shall comply with the local telephone provider standards. Contractor has the option of having the local telephone provider or other contractors design and install new phone system to the housing units. Any cost or fees associated with the above work are the responsibility of the Contractor.

6.7 CABLE TELEVISION DISTRIBUTION SYSTEM

6.7.1 GENERAL

The cable television distribution system shall be underground in ducts installed as part of duct banks described in paragraph 6.5 Electrical Distribution System. See paragraph 6.1 for additional requirements.

6.7.2 COORDINATION

All work, on new cable television distribution system, to be coordinated by the Contractor with the local cable provider. Installation shall comply with local cable provider standards. The local cable provider is Adelphia Cable. Paragraph 11.2.10 contains information concerning their distribution and in-house requirements as well as a local point of contact for the company. Contractor has the option of having the local cable provider or other contractors design and install new cable television distribution system to the housing units. Any cost or fees associated with the above work are the responsibility of the Contractor. See paragraph 11.2.10 for additional requirements.

6.8 MARKING OF UNDERGROUND UTILITIES

All underground utilities shall be marked with plastic plus wire marking tape of a type specifically manufactured for marking and locating underground utilities. Tape color shall be as specified below and shall bear a continuous printed inscription describing the specific utility.

COLOR MARKINGS FOR UTILITIES

Red	***Electric***
Yellow	***Gas***
Orange	***Telephone, Television***
Blue	***Water Systems***
Green	***Sewer Systems***

Tape shall be acid and alkali-resistant polyethylene film, 6-inches wide with minimum thickness of 0.004 inch. Tape shall have a minimum strength of 1750 psi lengthwise and 1500 psi crosswise. The tape for gas, water and sewer shall be manufactured with integral wires to enable detection by applying an electrical current. The metallic core of the tape shall be encased in a protective jacket or provided with other means to protect it from corrosion.

7.0 GRADING AND DRAINAGE

7.1 GENERAL

The Contractor shall confine all work, except utility upgrades, to the project boundaries indicated on the attached drawings. To the extent possible, the project site shall have a balanced cut and fill. Topsoil may be stripped from building and road sites for reuse in final landscaping if it complies with the requirements of this RFP.

7.2 STORMWATER MANAGEMENT

All storm runoff generated during construction of this facility and all storm water collected on the site on a permanent basis shall be retained on the project site. Local collection systems shall be provided as required to collect and transport storm water to on-site holding and dissipation areas. No storm water shall be diverted to any sanitary waste lines.

7.3 DESIGN CRITERIA

Storm runoff volume shall be determined by the rational formula (Q=CIA) using 25 year storm frequency. Rainfall intensity/duration curves for the Mountain Home area, are available from U.S. Weather Bureau. All runoff onto the site from adjacent properties shall be included in the storm drainage calculations.

7.3.1 STORMWATER MANAGEMENT PLAN

The Contractor shall prepare a plan describing the measures to be used for temporary erosion control and sediment control required during the construction (See also Section 01061 ENVIRONMENTAL PROTECTION for related requirements and permits.) and for permanent control of all storm water after permanent features are constructed. These measures shall include, where applicable, the measures described under the following Idaho publications "A Landowner and Contractors Best Management Practices Guide for the Control and Treatment of Storm water, Erosion and Sedimentation" and the "Catalog of Storm Water Best Management Practices for Idaho Cities and Counties."

7.3.2 MINIMUM GRADES

Surface drainage:

- 0.5% Gutters and small lined swales
- 2.0% Small unlined swales
- 0.5% Area drainage of paved surfaces
- 0.5% Area drainage of unpaved areas

7.3.3 SURFACE STORM DRAINAGE

Provide drainage away from all buildings on all sides with a minimum slope of 2% for 10 feet. Drainage system shall be properly coordinated with surrounding properties to insure that runoff does not cause damage to other properties. Dry wells are acceptable. Temporary ponding on the site will be acceptable. Surface drainage collected from streets shall be collected into shallow swales lined with polyethylene with a rock cover for natural evaporation. Other swales shall be grass-lined not to exceed 3H:1V side slopes. Surface drainage shall flow away from each building and no collection swales shall be closer than 20 feet to any building. Roof drains shall be directed onto splash blocks.

7.3.4 CATCH BASINS AND GRATES

Locate any storm water inlets so that no collection swales flow across a street or sidewalk to reach a storm water ponding or holding area. Catch basin grating shall be of "Bicycle Proof" design.

7.3.5 INLETS

Inlets and grating areas in the sag of vertical street curves that act as sumps shall be oversized 100 percent.

7.3.6 CALCULATIONS AND DRAWINGS

The Contractor shall prepare final drawings for the finish grading at scale of one inch equals 40 feet with a contour interval of one foot. Slopes, two horizontal to one vertical or steeper, may be shown by five foot contour intervals. All drainage swales, and ditches shall be provided with controlling invert elevations at the beginning and at all grade breaks, including drainage swales around all buildings. Details of all storm structures shall be shown on the final contract drawings. All runoff onto the site from adjacent properties shall be included in the storm drainage calculations.

7.3.7 MATERIALS

Storm drainage material shall be PVC, PE, RCP or CMP, or fully coated, paved, aluminum alloy, minimum 12 gage CMP. VCP and asbestos cement piping shall not be used.

8.0 LANDSCAPE

8.1 GENERAL

Landscape design is an essential element in establishing the neighborhood identity for the housing project. Landscape plans shall be developed by a registered landscape architect, familiar with local conditions and plant species, who will provide all of the necessary landscape elements compatible with architectural features and other site improvements. All established tenets of quality landscape architectural practice shall be employed to ensure long-term high standards of aesthetics, maintainability, and function. The overall landscape challenge shall be to provide these high standards while minimizing the irrigation requirement for landscaping. The Contractor shall be responsible for total care of turf, plant materials, site furnishings and play equipment, and irrigation systems for a minimum of 4 months after final construction acceptance phase. All elements of the landscape plan in this project shall be warranted for one year after final acceptance of the entire project. A list of landscape materials acceptable for use at Mountain Home AFB is provided in Attachment G. Additional plant species recommended by the Contractor shall be drought tolerant and hardy to zone 3 as defined by the latest edition of the *Sunset New Western Garden Book*. All plant materials shall have been grown in hardiness zone similar to the locality of the project and shall be readily available from local suppliers.

8.2 LANDSCAPE DESIGN

Landscape design shall follow the guidance provided in the Air Force Family Housing Guide and the guidance provided herein. The landscape plan shall describe all plant material, grading, irrigation, play/recreational equipment and site furnishings to be included in the proposal. The following principles shall also be considered during design of the project:

1. Limit turf areas to functional (back yard areas) or recreational use areas where possible. Providing creative alternatives to traditional lawn areas, especially at the front of the units, is encouraged. Lawn areas should be large and not broken up into small parcels for functionality and ease of maintenance. Grouped plantings with drip irrigation defined by a concrete mow and containment edging is desirable in common areas.
2. Install water efficient irrigation (turf and shrub) systems in common areas only.
3. Edging lawn areas with concrete mow strips is highly desirable. Depth of installed edging if used as mow edging shall be flush with finished grade of lawn.

Finished grade of mulch areas shall be 25mm (1 inch) below top of edging, curbs, and sidewalks.

4. All new grass areas shall receive a minimum of 150mm (6 inches) topsoil bonded with the subsoil by tillage. Improve the backfill soil mix for planting trees, shrubs, and groundcovers with organic amendments as recommended based on soil tests of existing soil for improved plant growth and water holding capacity.
5. Mulch all plant materials installed under this project. A combination of organic and inorganic mulches is acceptable. Washed river rock and volcanic rock areas should include permeable commercial-grade landscape fabric as a weed barrier. Black polyethylene (6 mil) shall be required as a liner under rock mulched areas used as retention for storm water evaporation. Organic (bark) mulch shall be used around the base of all newly installed trees, shrubs, and groundcovers. Large areas of bark mulch shall not be used due to high winds.
6. Specify appropriate maintenance practices for the plant materials provided.
7. Utilize 'Xeriscape' principles of landscape design. Distinguish clearly between higher maintained (improved) areas, lower maintained (semi-improved) areas, and areas where no maintenance is anticipated (unimproved) within the project boundaries.

8.2.1 TOPSOIL

Topsoil shall be a loam soil conforming to the USDA textural class with a pH of 6.5 to 7.0. Maximum particle size shall be 20mm (3/4-inch). Organic matter content shall be between 5-20%.

8.2.2 RECREATION / COMMON AREAS

The common areas of the project include open spaces between housing units and other areas not specifically assigned to individual units. The common areas are typically defined as areas beyond a line 15.2M (50 feet) minimum from the housing units. Within the common areas a tot-lot shall be provided, as well as recreation features. Generally, common areas shall be designed to encourage creative play and learning for children while providing a pleasant gathering place and outdoor experience for adults. Plan these common areas with consideration given to the further development of the site .

The following minimum numbers of recreation features are required:

ITEM	NUMBER OF FEATURES
Tot Lot	2
Playground	2
School Bus Stop Enclosure	4
1/2 basketball courts/multi use court	3
Jogging/bike path	1

8.2.2.1 TOT LOTS AND PLAYGROUNDS. Tot lots, specifically designed for ages 2 through 5 and playgrounds for ages 6 and up, shall be included in the site plan in convenient visible locations within the housing areas with shelter and seating provided for those overseeing the children's' activities. Tot lots and playgrounds shall be accessible by paved walkways. Play area equipment, such as swings and slides, is required, however, integration of natural site features such as logs, rocks, sand and slopes for creative play is desirable. Play features should be designed for low-maintenance. Playgrounds shall be in full accordance with Consumer Products Safety Commission and ASTMs for playground equipment and surfacing. The playground design shall be officially reviewed and approved by a certified National Playground Safety Inspector (NPSI) and the installation of the playground shall have a final inspection by a certified NPSI. The playground equipment shall comply with ASTM F 1487-98 and the playground surfacing with ASTM F 1292. The new handicap accessibility standard is ASTM F 1951 (previously ASTM PS 83). Equipment for the playground shall be certifies by the International Play Equipment Manufacturers Association (IPEMA). Consult the ACC Playground Brochure for further information on design, appropriate equipment and equipment suited to local climate. Wood playground equipment shall not be used. Existing recreation areas, tot lots, etc. will not be considered as meeting the requirements of this contract. Resilient surfaces shall be provided under play equipment. Access for the physically disabled shall also be provided.

8.2.2.1 BUS STOPS The site plan shall include bus stop shelters. Each shelter space shall accommodate 10 adults and shall provide room for a bench to seat 6. Design and location of the bus stops are to be complimentary to the housing style and located conveniently within the new housing area.

8.2.2.1 JOGGING/BIKE PATH The Jogging path shall be paved and when combined with the bike path shall be marked, divided and designed for safe multiple use.

8.2.2.2 BASKETBALL/MULTI-USE COURTS The basketball/multi-use courts shall be sited in accordance with Para 3.4 of the Air Force Family Housing Guide.

8.3 IRRIGATION SYSTEM/ HOSE BIBS

An automatic irrigation system is required in common areas only. Freeze proof hose bibs shall be provided on the exterior of the housing units for manual watering of plants materials/lawns around individual units. See also paragraph 11.3.1 Plumbing – General.

8.3.1 DESIGN CRITERIA

Automatic irrigation systems shall be designed by a certified irrigation designer. The system shall be water efficient drip systems for all plantings except for turf or large areas of ground cover which shall be irrigated with highly durable and easily maintainable pop-up spray heads. Automatic controllers shall be placed in vandal-proof metal cabinets. Selected plantings, turf, and irrigation system shall be compatible. Full coverage of plantings and turf areas shall be provided. Proper backflow prevention shall be provided at all tie-ins to the domestic water supply and shall conform to the Uniform Plumbing Code.

8.4 WIND BREAKS

Windbreaks are to be provided along the north, west, and east sides of the housing project as indicated on the Concept Site Plan. The windbreak design shall consist of a five row planting of Siberian Peashrub, Rocky Mountain Juniper, Hybrid Poplar (or Austrian Pine), Austrian Pine, and Skunkbush Sumac. Austrian Pine shall be used in lieu of the Hybrid Poplar in rocky soil conditions. The spacing between the housing units and the first row of the windbreak shall be 30.4M. Spacing between the individual plants in the rows 1 and 5 (Peashrub and Sumac) shall be 1.5M and between Juniper plants, 1.8M; and spacing between individual trees (Pines and Poplars) shall be 3.0M. Weed barrier fabric and a drip irrigation system shall be placed in the rows of planting to facilitate establishment and maintenance. Maintenance of windbreak shall include mowing/weeding between rows, ensuring weed barrier fabric is intact, ensuring irrigation system is working properly, and straightening plants. Although the windbreaks primarily serve to shield the housing areas from strong north and northwest winter winds, they also provide noise breaks, visual screening, wildlife habitat, and tumbleweed control. Design of the windbreaks should enhance the site in light of all of these uses as much as possible.

The Natural Resources Conservation Service (NRCS) and the Plant Materials Center at Aberdeen have a cooperative agreement with Mountain Home AFB to provide the plant materials and construct windbreak plantings at the base. Contact at the NRCS in Aberdeen, Idaho is Loren St. John, Acting PMC Manager, (208) 397-4133.

9.0 HOUSING UNIT DESIGN / CONSTRUCTION

9.1 GENERAL

Housing unit design shall be within the net areas authorized for the respective type units specified (see paragraph 4.2.1) and conform to good local practices with functional areas arranged and sized for efficient use, circulation and furniture placement. Design shall conform to the requirements and guidance provided in the **Air Force Family Housing Guide** except as noted herein.

9.1.1 ENERGY EFFICIENCY DESIGN

This RFP in conjunction with the **Idaho Residential Energy Standards** sets forth minimum requirements for the efficient use and conservation of energy. Requirements given in this RFP take precedence over like requirements stated in the Idaho Residential Energy Standards. The Idaho Residential Energy Standards document is available on the internet at the following URL:

- http://www.idwr.state.id.us/energy/ECIN/IRES/Default.htm

9.1.2 EXTERIOR FINISHES

For exterior finish materials, emphasis should be placed on use of low maintenance and durable materials with factory applied color finish. Exterior surfaces requiring painting shall receive a minimum of one prime coat and two finish coats of paint. Wood trim, frames, etc., shall be back primed. Exterior semi-transparent stains (two coats) will be acceptable where appropriate. All stain applications shall be in accordance with manufacturers recommendations with the exception that spray application will not be permitted. Paint systems shall conform to the Architectural Specification Manual of Specification Services, Inc. custom quality.

9.1.3 COLOR SELECTION.

Submit a minimum of 3 exterior color schemes for all the dwellings. Each structure in turn should have a minimum of 3 colors, and a maximum of 4. The colors should be selected so that no two adjacent structures are colored alike, yet the selected colors of one should harmonize with its neighbors. Paint and material colors shall be submitted by the Contractor for approval by the CO in accordance with Section 00810.

9.2 FOUNDATION AND BUILDING EXTERIOR

Also see the Air Force Family Housing Guide paragraph 4.6 Foundation and Building Exterior.

9.2.1 FOUNDATIONS

Permanent concrete foundations and footings shall be provided. Foundation design shall assure finish floor elevation in housing units and garages will be higher than the street in front of the housing unit to protect from flooding. Also see Paragraph 10.5 Concrete Design.

9.2.1.1 CRAWL SPACES. Crawl spaces are to be provided. A vapor barrier of minimum 6 mil. polyethylene shall be installed over the earth surface. Ventilation shall be provided in a minimum of two places remote from each other, in each crawl space. Ventilation and access shall be in accordance with UBC.

9.2.1.2 INSULATION. Insulation in the crawl space for floors and piping shall be provided in accordance with the guidance provided in the Idaho Residential Energy Standards document (see Paragraph 9.1.1 Energy Efficiency Design).

9.2.1.3 SOILS TREATMENT. Treatment for termites shall be provided in accordance with specification 02285 Soil Treatment for Subterranean Termite Control provided in Attachment A.

9.2.2 ROOFS

9.2.2.1 SHINGLES. Mineral surfaced fiberglass asphalt shingles, minimum of 240 pounds per square, Class A, conforming to ASTM D 3018. Apply over 15 pound, asphalt saturated roof felt conforming to ASTM D226. Shingles shall be fungal-resistant, Square Tab Butt shingles, 12 or 12-1/4 inches by 36 inches long. Shingles shall have a 5-inch exposure to the weather and shall be self-sealing. Valley roof felt shall be reinforced mineral surfaced 90 pound roll roofing as recommended by the shingle manufacturer. All roofing materials shall be by the same manufacturer or as recommended by the shingle manufacturer. A 25 year warranty shall be provided for all roofing installations.

9.2.2.2 MINIMUM SLOPES. Minimum slopes for roofs shall be 4 in 12.

9.2.2.3 MINIMUM OVERHANG. Minimum roof overhang shall be 2’-8”.

9.2.2.4 FLASHING. Flashing shall be of nonferrous metal.

9.2.2.5 ROOF SHEATHING. The minimum thickness of roof sheathing shall be 1/2 inch (nominal) for plywood or 15/32 inch for OSB.

9.2.2.6 INSULATION. Insulation for ceilings and roofs shall be provided in accordance with the guidance provided in the Idaho Residential Energy Standards document (see Paragraph 9.1.1 Energy Efficiency Design).

9.2.3 EXTERIOR WALLS

Total wall section including framing, sheathing (including rigid insulation sheathing), waterproof barrier, and exterior finish shall satisfy all design requirements for fire protection, and wind resistance. The exterior wall finish selected shall be applied over building wrap (equal to Tyvek Housewrap) applied over sheathing.

9.2.3.1 EXTERIOR WALL FINISH. . For exterior finish materials, emphasis should be placed on use of low maintenance and durable materials. Use of feature materials for architectural variety, is desired. Pay particular attention to existing brick structures on base and the local community for design compatibility and design influence. A brick rowlock cap and flashing shall be provided for all off-set brick veneer. Brick shall conform to ASTM C 216, Grade SW. WATER REPELLENT MORTAR ADMIXTURE: "Dry Block" by Forrer Industries, "Hydratite" by A.C. Horn Co., or comparable product by Euclid Chemical Co., or approved equivalent. Add to mortar mix in accordance with manufacturer's written instructions. WATER REPELLENT BRICK SEALER: High performance, clear, penetrating water repellent sealer. Breathable to allow water vapor to pass. "Hydrozo Brick Enviroseal Double 7" or approved equivalent. Spray apply to brick veneer in accordance with manufacturer's written instructions. . Brick color shall be equal to Mutual Materials Imperial Gray or Teal Brown, Mission type. ***Use of brick as a feature material is considered a desirable feature, using standard brick veneer , or , at the proposer’s option, an exterior insulated thin brick system using 1/2” brick adhered to polystyrene foam insulation, similar to U.S. Brick Systems may be used.***

9.2.3.2 SIDING. Vinyl siding is preferred and shall be factory finished, solid vinyl of extruded polyvinyl chloride (PVC) compound conforming to ASTM D3679-81a. Siding shall be horizontal, with wood grain pattern, minimum gage .040. All materials and accessories needed for a complete installation shall be by the same manufacturer. Install all panels to match adjoining panels. Custom fit and trim where necessary to

provide a neat appearance and securely fasten. Aluminum or plywood siding will not be permitted

9.2.3.3 FACTORY FINISHED SOFFITS, FASCIA COVER, SHUTTERS, AND COVERING FOR BRICK MOLD AROUND DOORS, OTHER SIDING. Covering for brick mold around doors may be vinyl covered aluminum. Fascia covers shall be factory finished aluminum. Shutters shall be preformed as open louvered shutters, 15 inches wide, and extend the full length of each window. Provide closed soffits. Factory finished aluminum soffits or vinyl soffits, perforated for ventilation, ~~may~~ shall be used.

9.2.4 EXTERIOR WINDOWS AND DOORS

9.2.4.1 WINDOWS. All windows shall be horizontal sliding or single hung type, Grade R20 . Double hung type windows throughout are considered a desirable feature and all second story windows shall be of the tilt-in type for ease of cleaning. Performance requirements are those specified in AAMA 101V for type of window unit provided. Window unit air leakage shall comply with ASTM E283, for air infiltration. Water penetration shall comply with ASTM E547. Structural stability shall comply with ASTM E330.

9.2.4.1.1 Frame / Sash shall be solid vinyl as a minimum with vinyl clad wood desirable. Interior exposed wood surfaces shall be paint grade Ponderosa Pine, or other suitable fine-grain lumber, painted to match interior color scheme. Vinyl color shall harmonize with exterior color scheme.

9.2.4.1.2 Glazing shall be double pane low E, argon filled. Glazing shall comply with ANSI Z97.1.

9.2.4.1.3 Screens shall be black vinyl coated 18/16 mesh fiberglass screen cloth complying with Fed Spec L-S-125B, set in aluminum frame fitted to inside of window, complete with all necessary hardware. Frame finish shall be baked enamel to match window frame.

9.2.4.1.4 Hardware/ Weather-Stripping. Provide all hardware necessary to install, operate, tightly close, and securely lock windows. Flexible polyvinyl chloride material compressed between frame and sash on all four sides. Provide secondary weather-strip between frame and sash, stainless steel pivot arm, and copper and nickel alloy operating hardware and locks.

9.2.4.2 EXTERIOR DOORS. All exterior swinging doors to main entrance and secondary entrance and doors between garages and living units shall be 36" wide, 1-3/4 inches thick of metal (foam filled) or metal clad solid wood, flush type and shall meet

NFPA fire rating requirements as needed. Exterior bulk storage doors shall be 36" wide, 1-3/8 inches hollow metal flush type. Wood doors shall conform to NWMA 3 I.S.1.2-80 (solid core) and I.S.1.4-80 (flush). Metal doors shall conform to ASTM E-152, NFPA 252, and UBC 4302. Metal doors shall have edges formed (1" min. thickness) to give maximum rigidity and shall contain top and bottom horizontal stiffeners. Install a wide-angle viewer through door at eye level (5'-5") in all front entrance doors which do not have transparent glazing within 5 feet of the floor or do not have a transparent sidelight adjacent to door opening. ***Sidelights at main entrance doors are considered a desirable feature.*** Main vehicle garage doors shall be metal, sectionalized type and shall be factory insulated. ***Insulated metal raised panel main entry doors and main vehicle garage doors are considered a desirable feature.***

9.2.4.2.1 Patio Doors shall be about 6'-0" wide with two glazed panels. ***Vinyl clad wood construction with one panel fixed and the other a hinged door leaf is considered a desirable feature.*** If sliding patio doors are provided they shall have an anti theft lock and be of either vinyl clad wood construction (preferred) or insulated aluminum construction with thermal break. Glazing shall be double pane low E, argon filled. Glazing shall comply with ANSI Z97.1.

9.2.4.2.2 Weather Stripping / Exterior Thresholds. Weather stripping for heads and jambs of exterior doors shall be spring tension type, cold rolled spring bronze, zinc, or other nonferrous metal. Vinyl magnetic weather stripping is acceptable for metal door. Exterior thresholds shall be nonferrous metal.

9.2.4.2.3 Aluminum Storm Doors shall be provided for all exterior main and secondary entrance doors. Doors shall be one piece solid wood core with seamless aluminum laminate on both sides. Door bottom shall have 2 inch bottom expander with vinyl sweep. Hinges shall be heavy duty self lubricating double leaf type. Doors shall be complete with inside thumb lock, full light 1/8 inch tempered glass with wrap around marine glazing, baked on enamel paint finish, and weather-stripped Z-bar frames. Doors shall have bottom panels of solid material. Doors shall have closures. Latches shall be placed so as not to interfere with exterior door hardware.

9.2.5 BALCONIES/EXTERIOR STAIRS

Exterior balconies and exterior stairs (except steps for access to porch/deck areas) will not be allowed.

9.2.6 MAIN ENTRY/FRONT PORCHES

A covered front porch with room for seating is required for each family housing unit. Also see paragraph 4.1.2.1 “Design Character” concerning the importance of this element to the general overall design character of the family housing units.

9.3 EXTERIOR STRUCTURES.

Also see the Air Force Family Housing Guide paragraph 4.7 Exterior Structures.

9.3.1 GARAGES

Single car garages shall be provided for each dwelling unit. Garages shall have a minimum clear height of 8’-0”. Garage floors shall be concrete in accordance with Paragraph 10.5 and shall have a construction joint installed between the garage and driveway paving. Garage door shall be a minimum of 9 feet wide and in the open position shall give a minimum clear height of 7'-0" (see paragraph Exterior Doors for additional information). Attached garages are preferred.. Sound attenuation is not required for units planned as “Duplex” housing units, where only the garages become the separating elements between the living units. Such garage party walls shall be minimum one-hour fire rated, with 5/8” gypsum wallboard, both sides, full height to bottom of roof sheathing Drywall in garages shall be taped, spackled and sanded, but need not be painted.

9.3.2 MECHANICAL ROOM

Provide each family living unit with a separate room for water heater, furnace, electrical panel (see paragraph 11.2 for acceptable unit service panel locations) and telephone and cable television distribution boxes. Size room with minimum dimensions commensurate with providing adequate space for servicing/replacing the equipment located therein. Direct access from building exterior outside the fenced in back yards is preferred. For duplex units the mechanical rooms may be provided adjacent to each other. However, they shall be separate rooms with individual access. Also see the requirements specified in paragraph 6.5.5 Service Lateral and Service Entrance Equipment.

9.3.3 EXTERIOR BULK STORAGE AREAS

For outside service door minimum requirements see paragraph Exterior Doors.

9.3.4 TRASH ENCLOSURE

Provide paved sight screened trash areas designed for two (33 gallon) containers at each housing unit. Trash screen can be similar to backyard fence design, or extension of the backyard fence if feasible within the site development of each dwelling. Provide paved access for trash handling.

9.3.5 PATIOS/GROUND – LEVEL DECKS

Concrete patios are to be provided as a minimum. ***Decks constructed of recycled plastic lumber are considered desirable features..*** Adaptable housing units (see paragraph 4.2.1 Housing Units) are to be provided with decks. Deck elevations(floor height) are to be set slightly below that of the adjoining living unit floor level to provide protection from moisture and yet allow easy access for all.

9.3.6 PRIVACY FENCE

See Paragraph Backyard Privacy Fences for requirements.

9.4 INTERIOR PLAN REQUIREMENTS

Also see the Air Force Family Housing Guide paragraph 4.8 Interior Plan Requirements. When designing interior spaces consider the aesthetics of the space and how the use of varying ceiling heights and/or the use of decorative moldings can be used to add interest to the space. ***The use of vaulted spaces, 2740 mm (9 foot) or higher ceilings and decorative moldings are considered desirable features. Other design elements that add to the functionality and aesthetics of the living units will also be considered desirable features. Examples are: built in desks, window seats, extra shelving, etc.***

9.4.1 FOYER

This space is to complement the design character of the home and provide the transition between the front porch and the interior of the living unit. Paragraph Design Character states “For further design impact, the units should display a strong sense of entry with side lights at the main entrances to provide a transition between the exterior and the interior. Further emphasis may be provided with the detailing of door ways and windows to produce strong horizontal and vertical elements reminiscent of the prairie style.”

9.4.2 KITCHEN/SECONDARY DINING AREA

Kitchen design shall provide appropriate space for installation, by the Contractor, of Contractor procured appliances. Provide a backsplash behind range extending to underside of range hood. Finished to match countertop or range and range hood.

Sides of this back splash shall have metal trim or other material appropriate to finish edges. A "U" shaped base cabinet layout, or combination “U” shaped and island cabinet layout, is desired. See Paragraph 12.0 - Major Appliances for appliance requirements. Kitchen design should provide visual access to the enclosed backyard area without leaving the work area

9.4.2.1 Kitchen Cabinets and Islands shall be factory manufactured. Countertops shall be a minimum of high pressure laminated plastic with heat resistant adhesive, fully formed with a continuous sheet of plastic combining a no-drip bull nose edge. Base cabinets shall have an integral cove backsplash with a 4 inch minimum height. Cabinets shall conform to the requirements of the Kitchen Cabinet Manufacturers Association or equal, except as noted below. Top mounted center drawer guides will not be acceptable. Hinges shall be Euro style. The finished door and drawer fronts shall feature 3/4 inch solid oak frames. Door panel inserts shall be plain sliced oak veneer plywood. Backs shall be 3/16-inch hardwood plywood or 1/8-inch tempered hardboard. Cabinet ends shall be 5/8 inch medium density overlaid plywood with hardwood veneer where exposed. All interior surfaces shall be finished with melanine plastic finish. All shelves shall be fully adjustable, 5/8 inch thick furniture grade particle board or plywood covered with melanine plastic. Provide resilient bases covering full height of cabinet base recesses at all sheet vinyl flooring.

9.4.2.2 BROOM STORAGE. Broom storage should be adjacent to the kitchen or utility room. Provide upper shelf about 60 inches above finish floor.

9.4.3 COMBINED LIVING/DINING ROOMS

The living /dining area shall be designed so that it can be furnished by the occupant as a single living area only or provide for a separate dining area as an extension of or ell off the living room.

9.4.4 FAMILY ROOM

Family rooms are to be considered as extensions of the kitchen areas for all housing units. While the space is modest in the two bedroom JNCO units it adds functionality/livability to the units.

9.4.5 BEDROOMS

Bedroom closets shall maximize closet space with vinyl covered organizers and shelving, but as a minimum provide 2 rods and 2 shelves in 50 percent of the hanging space with shelves at approximately 3'-8" and 6'- 10" above floor. The remainder of the hanging space shall have one rod and one shelf. Closets 4'-0" or more in width (wardrobe type) shall have full size swing doors, if space provides, or bifold doors with both top and bottom guides, and/or tracks as appropriate. To the maximum extent possible,

closet door jambs shall be located to permit placement of furniture in the corners of the rooms by providing at least 18" return adjacent to a furnishable wall.

9.4.6 BATHROOMS

Minimum door widths for bathrooms shall be 2'-6". Door widths for units designated for potential use by persons with disabilities, shall conform to accessibility standards. All lavatories in bathrooms shall be mounted in countertops with vanity bases. As a minimum, all countertops (minimum 30" wide) shall have plastic laminate tops with either lavatory bowls of vitreous china or porcelain enamel on cast iron. Provide 4" high back splashes against all walls. Vanity base construction shall comply to Kitchen Cabinet criteria. Acrylic or gel-coated , and glass fiber reinforced tub shower units are preferred. Porcelain enamel on steel fixtures are not desired. ***Vanities with integral cultured marble bowl and countertop are considered a desired feature.***

9.4.6.1 Bathroom Accessories shall be of non corroding metal or ceramic tile, and shall consist of a recessed toilet paper holder, recessed combination soap dish and grab bar at tub/shower stall, two bathrobe hooks and two towel bars, totaling not less than 42 inches for a full bath, or one or two towel bars not less than 30 inches for a half bath. A non-corrosive shower curtain rod is required. There shall be a mirror the whole width of the lavatory countertop. A medicine cabinet shall be provided on a side wall in each bathroom. Medicine cabinets shall be the hinged door type, located on side wall adjacent to mirror, and shall be recessed. Do not place in a party wall.

9.4.7 LAUNDRY ROOM/AREA

A separate laundry room with a full width cabinet over washer/dryer is desirable. Coordinate location of laundry room/dryer to assure compliance with dryer vent requirements specified in Paragraph 11.1.7.2 Dryer Vents.

9.5 INTERIOR DESIGN

Also see the Air Force Family Housing Guide paragraph 4.9 Interior Design.

9.5.1 FLOORING TYPE

See the Air Force Family Housing Guide, paragraph 4.9.1 Carpet Policy, for information on carpet selection and guidance. Vinyl composition tile flooring shall be, 12” x 12” x 1/8” thick, conforming to ASTM F 1066, Class 2 (through pattern tile), Composition 1, asbestos-free. For two story schemes, it is preferred that stairs are carpeted. However, stairs may have rubber or vinyl treads with varying thickness from 3/16” to 1/8”, and rubber or vinyl risers and skirts. Provide sheet vinyl flooring in all baths and kitchens. Install to minimize need for seams. Where room size require seams, apply waterproof epoxy adhesive continuously in all seams in accordance with

the manufacturer's instruction. Provide extruded vinyl edge moldings where flooring materials change. Mechanical room flooring may be concrete and garages shall be concrete with steel trowelled finish. Concrete shall be in accordance with paragraph 10.5 Concrete Design.

9.5.2. BASES

Provide flat stock wood bases, 3/8” x 1-1/2” paint grade. Install throughout the living areas, in all closets and where gypsum wallboard terminates on concrete slabs.

9.5.3 GYPSUM WALLBOARD

Interior wall finish material shall be 1/2 inch minimum gypsum wallboard. Ceiling finish material shall be 5/8 inch gypsum wallboard. Where ever framing is spaced over 16” O.C., gypsum wallboard shall be 5/8 inch thick. Finish gypsum wallboard with a light orange peal spray texture as a base under painted surfaces. Do not furnish sprayed-on acoustical ceiling finish in any area for this project. Small amounts of wood paneling or other material for feature walls may be used; however, material should require minimum of maintenance and be capable of withstanding moderate physical impact for its common accepted. Materials used for paneling shall be in conformance with those listed by UL as having a flame spread rating of 25 or less and a smoke development rating of 50 or less when tested in accordance with ASTM E84-77. Gypsum board shall be installed behind all paneling.

9.5.4 BATHROOM WALLS

Bathtub and shower stalls with ceramic tile wainscots, minimum of 6 feet 6 inches high above floor, shall be set in Portland cement mortar or mastic. Substrate for ceramic tile shall be 1/2 inch cementitious backer board complying to ANSI A118.9. Where integral plastic tub / shower units are installed, water resistant gypsum board shall be used behind tub / shower units.

9.5.5 INTERIOR FINISHES

Interior surfaces except factory prefinished material, shall be painted a minimum of one prime coat and one finish coat. All painted surfaces in kitchens, baths, laundry and utility rooms and all painted trim shall have semi-gloss finish. All other interior surfaces shall have satin finish. Natural finished interior doors are acceptable. Simulated acoustic finish or paint finishes with texture coarser than "eggshell/knockdown" are not permitted. Paint systems shall conform to the Architectural Specification Manual of Specification Services, Inc. custom quality. Interior walls shall be an off white (it is desirable for ceilings to be a lighter white than the walls) and interior trim shall be a stark white.

9.5.6 INTERIOR LIGHTING DESIGN

The interior lighting design for the family housing units shall be designed and coordinated by either an interior decorator who is a certified lighting designer or a licensed electrical engineer who is also a certified lighting designer.

9.6 HARDWARE

9.6.1 GENERAL

All hardware shall be bright brass finish.

9.6.1 EXTERIOR LOCKSETS

Exterior locksets with dead-bolt lock shall comply with Federal specification FF-H-106C, Series 4000, Grade 2, Function F81, furnished with removable cores. Trim for locksets shall be wrought construction. Deadbolt locksets on each unit shall be keyed alike. Each exterior doors shall have 1-1/2 pair of butts and a door stop. Garage door to interior of unit shall also have an exterior lockset. See paragraph 9.6.3 for keying.

9.6.2 PRIVACY LATCHSETS

Interior privacy latchsets shall comply with Federal Specification FF-H-106C, Series 4000, Grade 2 or 3, Function F76. Interior passage shall comply with Series 4000, Grade 2 or 3, Function F75. Trim for latchsets shall be wrought construction. All interior doors shall have one pair of butts and a door stop. Only bathrooms and bedrooms shall have privacy latchsets.

9.6.3 KEYING

All exterior locks, including main vehicle garage door, shall be keyed with "Best" locksets, standard figure 8, seven pin. The entire project shall be "Master Keyed" with keying instructions furnished to the Contractor by the CO. Locks for entrance doors to individual family units shall be keyed differently from any other housing unit. All exterior locks (including lock on door from garage to interior of housing unit and all exterior bulk storage areas) on each housing unit, shall be keyed alike, except for the mechanical room. Provide six keys for each dwelling, and four keys for each mechanical room.

9.6.4 DOOR CLOSERS

Self-closing doors are required on all doors in fire rated walls and for all storm doors. Door closers in one hour rated walls shall comply with ANSI/BHMA Standard A156.4.

9.6.5 DOOR STOPS

Hinge pin-type door stops are not acceptable.

9.7 ACCESSORY INSTALLATION

9.7.1 TRAVERSE RODS

Traverse type rods shall be installed over window openings 5'0" or more in width and over exterior patio doors in living and dining areas. Curtain rods shall be provided over all other window openings, and shall provide sufficient stacking room. Provide blocking at all openings to receive rod mounts. Traverse type rods shall be similar or equal to the one inch oval section, Kirsch Model No. 9003 (heavy duty). The model referenced is given for type only and does not preclude the use of any other manufacturer's product of equal or superior quality.

9.7.2 BLINDS

Horizontal slat type mini-blinds or PVC vertical blinds shall be provided for all windows, except bathrooms. Vertical blinds with PVC louver vanes about 3-1/2' wide shall be used where glazed patio doors occur.

9.7.3 HOUSE NUMBERS

Each individual housing unit shall have a permanent address number mounted on the front, visible from the street and located so as to be illuminated by the front entry light. The Contractor is responsible for obtaining the house numbering system from the CO's representative. The size/construction of house numbers shall be 4 inch/brass (4 digits plus letter required). Typeface shall be Clarendon medium as shown in Attachment F. A name plate holder approximately 3" X 18" of extruded metal (finish to match the house numbers) shall be mounted below the house numbers. Furnish samples of House Numbers, Name Plate Holder and proposed mounting locations to the CO for approval.

9.7.4 DOOR BELL

Front & rear entrances of each unit shall be provided with a low voltage door chimes with different sound for easy door recognition. Provide illuminated push button mounted on exterior wall near latch side of entrance door. Locked storm door shall not block access to door bell button.

9.7.5 MAIL BOXES

Per Postal Regulations, mail boxes must be ganged together and installed at central locations--Neighborhood Delivery and Collection Box Units (NDCBU). The NDCBU's currently in use on the base are pedestal mounted, containing 16 mail boxes, 2 parcel boxes, and an outgoing mail box/slot. These units are a product of American Locker Security Systems, Inc., of James Town, NY, and identified by Serial No. III-20086. Contractor is to coordinate the NDCBU requirements, acceptability of any proposed alternates, and siting with the Postmaster, Mountain Home, Idaho. It is preferred that patrons do not have to cross main collector streets to access NDCBU's from the housing area. Provide roofed enclosures designed to complement the housing and provide adequate wind and weather protection to shelter the NDCBU's.

10.0 HOUSING UNIT STRUCTURAL DESIGN

10.1 GENERAL

Structural design and construction shall be in accordance with the requirements stated herein, the Geotechnical Survey Report (Attachment B) and with the applicable requirements of TI 809-04 Seismic Design For Buildings. The overall structural system shall be selected based on durability, maintainability, and cost-effectiveness. The lateral support system shall be selected from conventional industry standard systems and shall be compatible with the vertical load carrying system. The design drawings shall contain in the General Notes a list of the design loading criteria, a list of the strengths of the engineering materials used, the design soil values and any other data that would be pertinent to remodeling and/or future additions. Structural calculations to substantiate the structural design shall be submitted in accordance with Section 00810 requirements.

10.2 SEISMIC DESIGN

Seismic design shall be performed in accordance with the requirements of TI 809-04/AFM 32-1149 V1 (I) dated 31 December 1998 which is available on the internet at the following web address [http:// HYPERLINK http://www.hnd.usace.army.mil/techinfo/ti/html www.hnd.usace.army.mil/techinfo/instruct.htm] and the USGS Ground Motio maps referenced therein are available at [HYPERLINK http://geohazards.cr.usgs.gov/eq/ http://geohazards.cr.usgs.gov/eq/]. The desig criteria is as follows:

- Seismic Use Group: 1
- Short Period Spectral Acceleration, Ss (%G): 30
- One Second Period Spectral Acceleration, S1 (%G): 10
- Site Class: D

10.3 DESIGN LOADS

10.3.1 STATIC OR DEAD LOADS

The structural system shall be designed and constructed to safely support all dead loads, permanent or temporary, including self weight, partitions, insulation, ceiling, floor covering, and all equipment that is fixed in position.

10.3.2 VERTICAL LIVE LOADS

10.3.2.1 Roofs shall be designed to support all live loads, rain, snow, and support wind loads including components and cladding, in accordance with applicable sections of UBC, 1997 edition. Other criteria is as follows:

Basic Wind Speed	40 M/S (90 mph) 3-sec gust per TI 809-91 (1998)
Minimum Roof Live Loads	0.96 kN/m^2 (20 psf)
Ground Snow Load	1.7 kN/m^2 (35 psf)

ROOF LIVE LOADS

10.3.2.2 Floors shall be designed to support live loads as specified below:

Living space	1.9 kN/m^2 (40 psf)
Exterior, Porches, and Corridors	2.8 kN/m^2 (60 psf)
Stairs - concentrated load	136 kg (300 lb.)
Uninhabitable attics without storage	0.5 kN/m^2 (10 psf)

FLOOR LIVE LOADS

10.3.3 HORIZONTAL LOADS (ACTING INWARD OR OUTWARD)

The structural system, including components and cladding, shall be designed to resist wind loads in accordance with the UBC, 1997 edition. Anchoring systems that are exposed to view such as cables, straps, tie-downs, turn buckles, etc., will not be permitted.

10.4 GENERAL DESIGN CRITERIA

10.4.1 MINIMUM FOOTING DEPTH

The minimum footing depth shall be 760 mm (30 inches) in accordance with the Howard Consultants Geotechnical Survey Report provided in Attachment B. Excavations shall be prepared in accordance with the Geotechnical Survey Report.

10.4.2 LATERAL RESISTANCE

Walls, when used or required for lateral resistance to wind or earthquake, shall be considered bearing walls and shall have full foundations. Allowable variations from level, or specified slopes, shall be as follows:

- For overall length, or surface of 3050 mm (10’) or less plus or minus 3 mm (1/8”).
- Up to 6100 mm (20’): plus or minus 6 mm (1/4”).
- Up to 12200 mm (40’): plus or minus 9 mm (3/8”).

10.5 CONCRETE DESIGN

10.5.1 GENERAL

All foundation walls and footings shall be constructed of reinforced cast-in-place concrete. Do not use keys in horizontal and vertical concrete construction joints. Rake construction joints to roughen to 6 mm (1/4") amplitude.

10.5.2 FORMS

Plywood, metal, metal-framed, aluminum, reinforced fiberglass, or plywood-faced, to provide continuous, straight, smooth, exposed surfaces. Limit deflection to 0.0025 of the span.

10.5.3 REINFORCING MATERIALS

Reinforcing Bars: ASTM A615, Grade 60, deformed. Welded Wire Fabric: ASTM A185.

10.5.4 CONCRETE MATERIALS

- Cement: ANSI ASTM C150, type I gray Portland cement.
- Fine Aggregate: ASTM C33 and C40
- Coarse Aggregate: ASTM C33 and C40
- Air-Entraining Admixture: ASTM C260
- Calcium Chloride will not be permitted.
- Fly Ash: ANSI/ASTM C618, Class "C"; fly ash content shall not exceed 20 percent of cement content or 100 pounds of fly ash per cubic yard of concrete, whichever is less.

10.5.5 VAPOR BARRIER

Provide under all garage floor slabs. Vapor barrier shall be polyethylene sheet not less than 6 mils thick. Place vapor barrier in accordance with the Geotechnical Survey Report.

10.5.6 CURING COMPOUND

Liquid type membrane-forming curing compound complying with ANSI/ASTM C309, Type I, Class A. Concrete curing compounds shall be limited to 350 9/1 of volatile organic compounds in accordance with SCAQMD Rule 1113.

10.5.7 PROPORTIONING AND DESIGN OF MIXES

Provide 3,000 psi, 28 day compressive strength minimum, 5-7 percent entrained air, minimum 50 percent mix coarse aggregate by weight, slump per ACI 301.

10.5.8 READY-MIX CONCRETE

Provide in conformance to ASTM C94

10.5.9 GARAGE/PATIO SLABS

Place in accordance with industry standards. Area of sections bounded by crack control joints will not exceed 600 square feet, and distance between crack control joints will not exceed 25 feet. In localities where extreme conditions of heat and/or dryness tend to produce excessive shrinkage, this area and joint spacing shall be decreased. Crack control joints may be construction joints, expansion joints, or sawed joints (cut 1/4 depth of slab thickness). Garage/patio slabs shall contain approximately 0.1 percent

welded wire mesh reinforcement in each direction placed 1-1/2 inches from the top of slab (for example: 6x6-W2.1 x W2.1 in 4-inch slab, 6x6-W2.9 x W2.9 in 5- and 6-inch slabs). In addition garage slabs shall conform to requirements under "Recommendations for Eliminating Uncontrolled Cracking of Concrete Slabs-On-Grade at Mtn. Home AFB, Idaho [http:// HYPERLINK http://www.hnd.usace.army.mil/techinfo/ti/html www.nws.usace.army.mil/criteria/dg_mh.htm]

10.5.10 EXPANSION JOINTS

Stop reinforcing at joint and provide slip dowels across joint. Space sidewalk and curb expansion joints at 30'-0" centers (maximum). Provide a 1/2-inch expansion or isolation joint where all concrete slabs abut a vertical surface (building wall, foundation, curb, etc.). Provide control joints in slabs on ground: Sidewalk joints shall be tooled. Space sidewalk and curb joints at 6'-0" centers (maximum).

10.6 MASONRY DESIGN

Installation of brickwork shall comply with the latest edition of the Brick Institute of America Technical Notes No. 28: Brick Veneer, New Construction and the following:

- Provide solid brick where cores in cored brick might be exposed.
- Joints shall be 3/8-inch, tooled concave, gray type "S" mortar. For water repellent mortar admixture see Section 9.10.1.6.1.
- Ties shall be corrugated galvanized steel, 22 gauge minimum, length to extend to 3/4-inch from brick face. Space ties at 24-inch centers vertically and 16-inch centers horizontally.

10.7 STRUCTURAL STEEL DESIGN

10.7.1 DETAILING

The detailing of structural steel framing, if any, including connections, shall be complete. All weld types, weld, bolting layouts, bolt sizes, connection plates and members sizes and locations and stiffener plates sizes and locations shall be shown.

10.7.2 LIGHT GAUGE STEEL FRAMING

Light Gauge Steel Framing shall be designed in compliance with the American Iron and Steel Institute (AISI), "Specifications for the Design of Cold-Formed Steel Structural Members."

10.8 STRUCTURAL WOOD DESIGN

10.8.1 GENERAL

Structural wood design shall comply with the Uniform Building Code (UBC), 1997 edition except as noted herein. The detailing of structural wood framing, including connections, shall be complete. All metal connectors, bolting layouts, bolt sizes, screwing patterns, screw sizes, nailing patterns and nail sizes shall be shown in details and calculations. All members that are a part of the main vertical and/or lateral force resisting system must be completely detailed.

10.8.2 EXTERIOR WOOD STRUCTURAL MEMBERS

Exterior wood structural members that are exposed to view, such as columns, beams, stair stringers, (minimum 4-inch nominal thickness) and railings shall be of lumber that is graded for appearance and pressure treated for decay resistance. Heel plates and all wood in contact with soil and concrete shall be pressure treated for termites.

10.8.3 PLUMBING WALLS

Plumbing walls shall be minimum 6 inches wide.

10.8.4 SHEATHING

No particleboard or fiber board is to be used in structural applications, including roof sheathing, subfloors, and structural sheathing or exterior concealed panels. The sheathing used shall have adequate and appropriate span ratings per the American Plywood Association (APA) (design specifications and construction guide) for the application and conditions proposed and shown on the contract drawings.

10.8.5 ROOF SHEATHING

APA Rated Sheathing or APA Structural I or II Rated Sheathing, Exposure 1. Roof sheathing must be either tongue and groove or use "H" clips between rafters and top chord of trusses. Plywood, waferboard, oriented-strand board, or comply panels may be used. All roof sheathing laid shall be covered with felt by the end of each day or when a storm is approaching. Roof sheathing damaged due to moisture shall be replaced.

10.8.6 SUB-FLOORS

Sub-floors shall be protected from the elements of weather at all times during construction. Any panels damaged from water or other means shall be replaced.

10.8.7 STRUCTURAL SHEATHING OR EXTERIOR CONCEALED PANELS

APA STRUCTURAL II RATED SHEATHING: Exposure 1 shall be 15/32-inch minimum thickness; if engineered, smaller thickness will be acceptable. Square edges, solid blocking required under all edges.

10.8.8 WOOD TRUSSES

Wood trusses shall be designed for the loads indicated. The design of trusses shall be integrated into the vertical and lateral load carrying systems. Truss connection plates shall be sized for axial loads of members, eccentricity, and net section of metal. A minimum plate size of 15 square inches shall be required. A registered structural engineer must compute loads on the roof trusses and submit them for approval.

10.8.9 JOISTS AND BEAMS

Joists and beams fabricated from laminated veneer lumber may be used. Products must have National Research Board (NER) and HUD approvals.

10.8.10 WOOD FLOORING SYSTEM

Wood flooring system at second floor framing or first floor framing over crawl space shall be glued and nailed. Glue line shall not be considered for stress transfer in diaphragms. Wood flooring system shall be glued and nailed in accordance with the American Plywood Association recommendations and guidelines for the installation of glued floor system.

10.8.11 STRUCTURAL BUILDING PANELS

In lieu of conventional stick-built structures, insulated structural panels may be used. Roof panels shall be 7/16 inch OSB (oriented strand board) laminated to both sides of a core of AFM Certified EPS rigid insulation, R-39. Exterior wall panels are similar, except insulating core is 5-1/2 inch for R-22. Floor panels, built over a crawl space, shall be similar, except that the insulating core shall be 7-1/4 inch for R-30. Provider, may, at his option, use any combination of insulated panels and conventional stick framing for the roof, exterior walls and floor construction.

11.0 MECHANICAL, PLUMBING AND ELECTRICAL

11.1 MECHANICAL (HEATING, VENTILATION AND COOLING)

The lowest life cycle cost of ventilation and cooling equipment, considering all factors, shall be selected. Natural gas shall be used for space and domestic water heating. The use of heat pumps, evaporative coolers, floor furnaces, room A/C units, and room unit heaters is prohibited. All materials and equipment furnished shall be standard cataloged

products of manufacturers regularly engaged in production of such materials and equipment and shall be manufacturers' latest standard design. Installation and equipment shall comply with the requirements of the Idaho Residential Energy Standards, the Air Force Family Housing Guide and the following.

11.1.1 HEATING AND COOLING SYSTEMS

Capacities and distribution systems should conform to recommendations of the American Society of Heating, Refrigerating and Air Conditioning Engineering Standards (ASHRAE). The equipment used will be manufactured stock items, complying with the requirements of Underwriters' Laboratories, Inc., National Electric Manufacturers Association, American National Standards Institute, American Gas Air Conditioning and Refrigeration Institute (ARI 210,230, and 260) or other trade association having nationally recognized standards or codes as applicable.

11.1.2 DESIGN TEMPERATURES

Output of heating and air conditioning units should be adequate to maintain interior design temperature of 26 degrees C (78 degrees F) cooling and 20 degrees C (68 degrees F) heating, at outside design temperatures of 36 degrees C (97 degrees F) summer and – 13 degrees C (8 degrees F) winter.

11.1.3 SYSTEM DESIGN

Systems shall be designed, installed, balanced and adjusted to distribute heat and cooling to all habitable rooms, as well as to bathrooms, in proportion to the calculated heat losses/gains of these spaces. Heat shall also be provided to utility rooms, laundry rooms and other non-habitable areas as needed to prevent pipes from freezing, etc. Provided systems with filters, plenums, and controls in accordance with ASHRAE guidelines.

11.1.4 THERMOSTATS

Energy saving programmable thermostats are to be provided. Thermostats shall provide at least two periods in 24 hours to automatically turn up or turn down the thermostat setting. Thermostats shall not have batteries as their primary power source. However, battery backup is desirable.

11.1.5 CONDENSATE DRAINS

Condensate drains shall be piped directly to floor drains. Piping shall not run under concrete slabs, or over floor slabs where they might be a trip hazard. The runs should be relatively straight to prevent clogging.

11.1.6 DEMAND DEFERMENT FOR AIR CONDITIONERS

A demand deferment switch to inhibit air conditioner cycling when a shed signal is generated from the load management controller at Bldg. 1300 shall be furnished and installed in accordance with the following guidelines. The demand deferment switch must be compatible with the Scientific-Atlanta, Inc. (4300 Northeast Expressway, Atlanta, GA; FAX 404-449-2931), Load Management Controller – Model LMC-1041+ and RTC-1032 Remote Transmitter Controller which are being used by the base to provide the desired control function. The switch is to be a Scientific Atlanta Model DCU-1051B-00-04-S or approved equal.

11.1.6.1 SWITCH INSTALLATION. Install the radio controlled demand deferment switch on outside wall adjacent to each housing unit air conditioner. The switch unit will require either 120 Volt AC or 240 Volt AC power. The Switch is to be mounted approximately 1500 mm (5 feet) above ground level. The housing unit thermostat low voltage control signal is to be routed through the demand deferment "Form C Relay" to provide the required control of the housing unit air conditioner.

11.1.6.2 TESTING REQUIREMENTS. Each switch is to be tested for proper operation using a Scientific Atlanta, or approved equal, hand held tester. After testing is complete the Contractor shall demonstrate system operation to the satisfaction of the Contracting Officer. The hand held tester shall become property of the Government at final acceptance of the work.

11.1.7 MECHANICAL VENTILATION

All baths and kitchens shall be provided with mechanical ventilation with ducts to the building exterior. Venting into vented joist space or attic space is not permitted.

11.1.7.1 EXHAUST FANS. Bathroom and kitchen fans shall be low noise type ducted to the outside through a side wall or soffit. Exhaust fans shall be complete with appropriate switches, wall caps, eave vents, and self-closing back draft dampers. Ducting of fans through the roof will not be allowed. Fans shall be tested and rated in accordance with HVI Standards and shall operate with 120 volt, 60 hertz, single phase power source.

11.1.7.1.1 Bathroom exhaust fans, wall or ceiling mounted, shall be of the centrifugal type, sized to give not less than 10 air changes per hour in the space to be ventilated. Each fan shall have a removable front grille. Control shall be by a separate switch from the bathroom light switch.

11.1.7.1.2 A metal range hood with 2-speed low noise exhaust fan and light is required in each kitchen. The length of hood shall be not less than the width of the range and shall be equipped with removable, washable type filter. The range hood exhaust fan shall have a capacity of not less than 50 cfm per lineal foot of hood. All ductwork shall be sheet metal, rated for residential kitchen exhaust use and installed in accordance with applicable building codes. Plastic or flexible metal ductwork shall not be used. Also, see Paragraph 14.0 Equipment.

11.1.7.2 DRYER VENTS. Dryer vents (4" diameter) discharging to the outside shall be provided for connection to all clothes dryers (one dryer to a vent). The vents shall be rigid, with cap and back draft damper. Directional changes shall be made with right angle elbows having a 6 inch minimum centerline radius. Not more than two elbows shall be used to preclude lint stoppage and to insure adequate drainage of condensed water vapor. Joints shall be riveted. Vent pipes shall take the shortest practical route to an outside wall and shall have a total length of not more than 8 feet horizontally and 8 feet vertically. Vents running vertically shall have a lint clean out panel. Dryer vents shall not exhaust in the immediate vicinity of the air conditioning compressor units, entry doors or through the roof.

11.2 ELECTRICAL (INTERIOR)

The electrical system (living unit) shall conform to latest applicable rules of the National Electrical Code, NFPA 70, the Air Force Family Housing Guide and the following.

11.2.1 SERVICE ENTRANCE

It is preferred that service entrances and exterior meter boxes be recessed (see Paragraph 6.5.5). Service entrance conductors from transformer to meter base shall be copper. Meter bases shall be provided with shorting bars and cover plates.

11.2.2 SERVICE PANEL LOCATION

Unit service panels shall be located in either the mechanical room or laundry room. Service panels located in mechanical rooms may be either surface or recessed type. Service panels located in laundry rooms shall be recessed style with flush one-piece fronts which shall be painted to match the wall color. Service panels in party walls are unacceptable.

11.2. 3 BRANCH CIRCUITS

Branch circuit conductors shall be copper and not smaller than No. 12 AWG. Interior feeders shall be copper. Conductors No. 10 and below shall be solid. Conductors

No. 8 and above shall be stranded. Conductors in housing units shall be installed in rigid conduit, intermediate metal conduit, or electrical metallic tubing and installed above ceilings or in walls. Do not run wiring in concrete slab on grade. Nonmetallic sheathed cables (Type NM) with ground conductor and metallic armored cables may be installed in areas permitted by NFPA 70. All wiring shall be concealed except as required for connection to equipment. Lighting and convenience outlets shall be on separate circuits. Convenience outlets on opposite sides of party walls shall be offset a minimum of 24" horizontally. Convenience outlets, device boxes and switch boxes shall be recessed.

11.2.4 LAUNDRY AREA

One outlet for ironing (on a separate circuit) shall be provided in addition to the washer and dryer requirements. Dryer outlet shall be a 30 ampere 125/250 volt, 3 pole, 3 wire, NEMA 10-30R outlet.

11.2.5 LIGHTING FIXTURES

Fixtures normally designed for incandescent lamps shall be provided with compact fluorescent (CF) lamps where standard CF lamps will fit and pose no danger or damage to light fixtures. Ceiling fixture "box" shall be a metal box anchored directly to wood blocking to hold a ceiling "paddle" fan in the family room, dining room, and all bedrooms.

11.2.6 BATHROOMS

Bathroom exhaust fan shall be switched separately from the light fixture and shall be timer controlled. Also, see paragraph 11.1.7 for additional requirements.

11.2.7 FLUORESCENT FIXTURES

Interior fluorescent light fixtures may be installed in selected locations such as kitchens, bathrooms, utility rooms and work or service areas. Fluorescent fixtures should use electronic ballast and T-8 lamps or otherwise conform to the latest energy conservation guidance.

11.2.8 SMOKE AND CARBON MONOXIDE DETECTORS

Smoke and carbon monoxide detectors shall be wired to a separate unswitched 120-volt AC circuit, in each living unit. Smoke detectors shall be located and connected in accordance with the latest edition of NFPA 72. Carbon monoxide detectors shall be located in the immediate vicinity of the sleeping rooms and on each story/level of the living unit. Smoke detectors shall conform to UL Standard 268 and carbon monoxide detectors shall be listed in accordance with Underwriters Laboratory Standard 2034

Single and Multistation Carbon Monoxide Detectors, October 1998 Edition. Sensitivity for smoke detectors shall range from 3.0 to 3.8. Smoke and carbon monoxide detectors shall be connected so that all of them sound when one is activated. Carbon monoxide detectors shall have a service life/manufacturer's recommended replacement period of not less than five years.

11.2.9 TELEPHONE SYSTEM

Provide the housing unit telephone system in accordance with Paragraph 4.10.1 of the Air Force Family Housing Guide, the requirements of the local telephone provider, and the following. Also see paragraph 6.6 Telephone Distribution System for additional requirements.

- Provide two line capability for each housing unit.
- Service riser to be 25 mm (1 inch) conduit concealed in the exterior wall. (see paragraph 9.3.2 Mechanical Room)
- All telephone system wiring shall be concealed, home run style from telephone distribution box in mechanical room to each telephone jack location.
- Any costs or fees associated with this work are the responsibility of the Contractor.

11.2.10 CABLE TELEVISION SYSTEM

Provide the housing unit cable television system in accordance with Paragraph 4.10.1 of the Air Force Family Housing Guide, the requirements of the local cable television provider (specifications provided in paragraph 11.2.10.1), and the following. Also see paragraph 6.7 Cable Television Distribution System for additional requirements.

- Service riser to be 25 mm (1 inch) conduit on the exterior wall in accordance with the service providers specification which is provided in the following pargaraph. (also see paragraph 9.3.2 Mechanical Room)
- Provide flush-mounted cable television jacks in all bedrooms, the family room/kitchen and the living room.
- All cable television system wiring shall be concealed.
- Any costs or fees associated with this work are the responsibility of the Contractor.

11.2.10.1 The local cable television provider is Adelphia Cable. Contact information is as follows:

Shawn Conlin	Phone:	Work 208-587-5670
Adeplhia		Cell 208-587-5307
345 East 2nd North		Fax 208-590-1858
Mountain Home, ID 83647		

The Adelphia Cable specifications for in-house and distributions system is as follows:

Cable Television Placement Specifications

Housing Specifications

- RG-6 60% shielding cable is required for all in-house wiring placement.
- Each outlet in the dwellings must be home run back to a common location.
- No outlets shall be *LOOPED TOGETHER*. See Drawing A.
- Common location that each outlet shall run to will be located on the outside of the dwelling within 3 feet of the Electrical Service location.
- All outlets shall be connectorized with an approved weather sealed connector. (Crimp type – NO SCREW-ON CONNECTORS).
- Each outlet, at the internal connection point, shall be equipped with a barrel wall plate.
- Residential Control Boxes shall be provided by Adelphia Cable at time of customer hook-up.
- PLEASE assure that, in cable installation, no staples or tacks are placed in or on the cable that cause a puncture or flattening to the cable. (Imperative for future data transmission specifications).

Distribution Specifications

- Adelphia must be provided with two-inch (2”) schedule 40 PVC conduit for placement of trunk and feeder coaxial cable.
- This conduit shall be in a joint trench with power conduit and follow power conduit. See Drawing B.
- Please allow sweeps out of the ground at ever location specified by Adelphia Cable to allow for distribution taps. These sweeps should be at least one foot away from power conduit sweeps to allow for placement of a pedestal. See Drawing C.
- Adelphia must be provided with one-inch (1”) schedule 40 PVC conduit for placement of subscriber coaxial cable.
- This conduit shall be in a joint trench with power conduit and follow power conduit to the dwellings as to allow for a subscriber drop to attach to in-house wiring. Make sure that the conduit stubs out of the ground against the dwelling to allow cable to be attached to the dwelling in a secure manner.

- Prior to construction Adelphia shall be contacted for any situations that may pertain to the actual housing project design.
- If any conduit must riser up a power pole to be connected to any aerial plant, please use Adelphia standards for riser placements. There must be a piece of metal conduit for the first ten feet of the riser. There must also be six-inch stand-offs on the pole for the riser to attach to. The conduit must stop at least eight inches prior to the height of the existing horizontal plant on the pole.

11.2.11 ELECTRICAL EQUIPMENT REQUIREMENTS

Provide separate, dedicated branch circuits in each living unit for the following, except as noted.

11.2.11.1 120 VOLT, 60 HZ EQUIPMENT:

- Refrigerator
- Garbage Disposal: minimum 1/2 horsepower capacity
- Dishwasher
- Smoke and Carbon Monoxide Detectors
- Clothes Washer
- Range Hood and Light (May be connected to the lighting circuit.)
- Freezer (Occupant owned and furnished)
- Gas Dryer (Occupant owned and furnished)
- Gas Cooking Range (Occupant owned and furnished)
- Microwave Oven (Occupant owned and furnished)
- Bath Exhaust Fan (May be connected to the lighting circuit.)
- Gas Furnace

11.2.11.2 220 VOLT, 60 HZ EQUIPMENT

- Clothes Dryer (Occupant owned and furnished)
- Cooking Range
- HVAC Equipment

11.2.12 ELECTRICAL EQUIPMENT CONNECTIONS

The Contractor shall provide appropriate connections, including electric outlets as required, and hook up the equipment. A wall switch above and to the right of kitchen sink and an electrical outlet under the sink shall be provided for the garbage disposal. An under counter outlet shall be provided for dishwasher. Provide an electric cord and plug on each garbage disposal, dishwasher and range.

11.3 PLUMBING

11.3.1 PLUMBING - GENERAL

The plumbing system shall conform with the requirements of the Air Force Family Housing Guide (paragraph 4.10.2), applicable rules of the Uniform Plumbing Code, latest edition, governing backventing of plumbing fixtures, sizing of waste, vents, drains, backflow prevention and water systems and the requirements provided herein. All water supply piping shall be copper. Locate the water service main cutoff valve (ball-valve with a drain) in the mechanical room. Waste water line vents shall be tied together with a single vent extending through the roof.

11.3.2 INTERIOR NATURAL GAS SYSTEM

The interior natural gas system piping installation shall conform in all respects with Uniform Plumbing Code. The interior gas piping, from the low pressure regulator to the equipment, shall be wrought iron or steel, and the fittings shall be malleable iron conforming to ANSI B16.3. Piping connections to all gas burning equipment shall be made with rigid pipe and fittings. The use of semi-rigid tubing and flexible gas connectors to connect appliances to the piping system is prohibited. Space and water heating are required to be natural gas fired systems.

11.3.2.1 SERVICE LINE VALVES. Provide a separate service for each living unit. An easily accessible service line valve and a service regulator shall be installed outside the building on each service line.

11.3.2.2 SHUT OFF VALVES. A gas shut off valve and coupling shall be installed in an easily accessible place in the gas line to each equipment item.

11.3.2.3 METERING. See Paragraph 6.4.2, Metering.

11.3.2.4 STUB OUT REQUIREMENTS While natural gas is required to be used for space heating and domestic water heating, tenants may want to use natural gas for cooking and clothes drying. Provide capped stub outs for possible future connection of tenant provided gas ranges and or gas clothes dryers.

11.3.3 PLUMBING FIXTURES AND FITTINGS

All plumbing fixtures will be the standard catalogued products of a single manufacturer regularly engaged in production of such materials or equipment and shall be the manufacturer's latest standard design. Porcelain enamel on steel type fixtures are not acceptable. All piping in finished areas will be concealed. Fixtures and fixture trim shall be provided complete with fittings, and trim shall be chromium plated or nickel plated brass with a polished bright or satin surface. Trim for plumbing fixtures shall not have alloys exceeding 16 percent zinc. Aluminum trim shall not be permitted. All faucets shall be of metal construction and of the same design in all bathrooms. It is preferable that faucets be single control type with one handle which will regulate volume and hot and cold mixing. Seals and seats of single control faucets shall be combined in one replaceable cartridge designed to be interchangeable with all lavatories, bathtubs and kitchen sinks, or having replaceable seals and seats removable either as a seat insert or as part of a replaceable valve unit

11.3.3.1 LAVATORIES. Lavatory shall be (oval) minimum 19 X 16 inch size and shall have pop-up drains.

11.3.3.2 BATHTUBS WITH SHOWERS. Shower/bath combination shall be controlled by a diverter valve with cartridge type single handle control. Waste fittings shall be pop-up, concealed type with all parts removable and renewable through the overflow and outlet openings in the tub. A non-corrosive shower curtain rod is required. Plastic to metal threaded parts on shower heads are not allowed. Shower control valves shall be thermostatic or pressure balancing type.

11.3.3.3 KITCHEN SINKS. Provide double bowl kitchen sinks of type 302 stainless steel, 20 gauge minimum, seamless drawn, satin finish, and sound deadened. Minimum size of the larger bowl shall be 22 X 33 inches. Sinks shall be self mounting without mounting rings, complete with cup strainer and plug (strainer and plug to be eliminated on the small bowl where garbage disposal is to be provided).

11.3.3.4 CLOTHES WASHER. The piping faucets and electrical outlets for washer and dryer, shall be provided in standard manufactured recessed wall box with single face plate. It shall be placed at a height convenient for the washer hoses connection, but will be covered from view by the height of the clothes washer. Box for electrical outlet shall be separate from box for water pipes. Boxes constructed of sheet steel shall have a corrosion resistant epoxy enamel finish.

11.3.3.5 SHOCK ABSORBERS. Shock absorber units to control water hammer shall be provided on supply lines to the clothes washers. Air Chambers are not acceptable.

11.3.3.6 PIPING INSULATION. All plumbing piping, except for vent piping, running in crawl spaces, attics, or exterior walls and all water lines shall be insulated with wrapped insulation of 1 inch thick fiberglass with vapor barrier jacket or with flexible cellular insulation conforming to ASTM C 534 Type I - 1 inch minimum thickness.

11.3.3.7 MAJOR APPLIANCE PLUMBING CONNECTIONS. The Contractor shall provide appropriate connections for dishwasher, garbage disposal, clothes washers, and gas water heater.

11.3.3.7.1 WATER HEATER. Meet ASHRAE 90A Standard. A pressure/temperature relief valve and drain for the water heater shall be provided. Provide gas water heaters.

11.3.3.7.2 DISHWASHER. A water line and air gap fitting drain shall be provided for electric dishwasher.

11.3.3.7.3 REFRIGERATORS. A water line with cut off valve shall be provided for refrigerator ice maker.

11.3.3.8 CALCULATIONS supporting the plumbing design shall be submitted in accordance with Section 00810 requirements.

12.0 MAJOR APPLIANCES

12.1 GENERAL

The Contractor shall furnish major appliances in accordance with the Air Force Family Housing Guide and the following. Color of major appliances shall be white. Appliance electrical requirements are provided in paragraph 11.2.11 Electrical Equipment Requirements.

12.1.1 REFRIGERATORS

Sizes given in the Air Force Family Housing Guide, Figure 4.23, shall be considered as minimum acceptable sizes. .

12.1.2 GARBAGE DISPOSALS

Shall be continuous feed type, minimum 1/2 HP motor, with stainless steel grinding elements, two 360-degree stainless swivel impellers, manual motor reset, and sound insulation. Provide heavy duty grounding plug and cord type electrical connection.

12.1.3 DISHWASHERS

Provide heavy duty grounding plug and cord type electrical connection.

12.1.4 RANGE HOODS

Provide metal range hood, the same length, finish and color as range, with separately switched light and exhaust fan. Sound level shall not exceed 6 sones. Also, see Paragraph 11.1.7 for additional requirements.

12.1.5 RANGES

Provide electric ranges, 30 inch width, free standing type with controls at the back of the range. Ranges shall have four tubular plug-in surface elements with removable reflector bowls, and ovens shall have both broil and bake function.

13.0 DEMOLITION AND RESTORATION

13.1 GENERAL

The Contractor shall be responsible for the demolition of 30 duplex buildings (60 units of family housing) in the Woodland Groves Housing Area and the restoration of the site in accordance with the requirements stated herein. The housing units being demolished are identified as building numbers 4500, 4501, 4503, 4505, 4507 – 4531, and 4533. Site plans are provided in Attachment D.

13.2 SITE DEMOLITION

13.2.1 BUILDING DEMOLITION

Building demolition shall include the complete housing unit, garage, and foundations and all existing equipment and appliances. No Government salvage of any building components, equipment or appliances is planned. Existing trees and plantings within the housing area are to be preserved in accordance with the approved Tree Preservation Plan (see paragraph 13.5 Tree Preservation Plan). See paragraph 13.4 concerning requirements for disposition of demolished materials.

13.2.1.1 ASBESTOS/LEAD BASED PAINT ABATEMENT. It is the responsibility of the Contractor to perform all removal and disposal operations in accordance with all Federal, State, regional, and local regulations, standards, codes, and specifications governing asbestos and lead based paint abatement, hauling and disposal, as well as any

other work required in conjunction with such abatement work. It shall be the responsibility of the Contractor to visit and investigate the site, review drawings and specifications, assess the amount of asbestos present, and become thoroughly familiar with conditions which would affect an asbestos abatement and disposal operation. Attachment E, contains the Asbestos and Lead Based Paint Survey Reports. These reports identify the extent and location of asbestos-containing materials (ACM) and lead-containing paint (LCP) in the housing units. The Contractor shall submit abatement plans to the CO for approval prior to beginning any removal or demolition. For more requirements see, Specification Section 01061 - ENVIRONMENTAL PROTECTION and Section 13280 – ASBESTOS ABATEMENT.

13.2.2 DEMOLITION OF SITE IMPROVEMENTS

Driveways, sidewalks, fences, signs and other miscellaneous features shall be removed from house to the sidewalk. All associated access roads and sidewalks within the removal area shall be demolished back to the edge of the intersecting roadway at the boundary of the demolition area, namely, to Willow Street, Phantom Avenue and Gunfighter Avenue. Existing sidewalks bisected by removal of pavements at the demolition boundaries of the intersecting roadways at Willow Street, Phantom Avenue and Gunfighter Avenue shall be connected with a new sidewalk to match the existing. See paragraph 13.4 concerning requirements for method of removal of certain materials and disposition of demolished materials.

13.2.3 REMOVAL OF DECOMISSIONED OIL TANKS

Underground oil tanks at the existing housing units were previously decommissioned and filled with sand. These tanks including all contents are to removed and be taken to a staging area on base, which is within three miles of the project site. The tank contents shall be removed and spread on the ground at the “staging” area as directed by the Contracting Officer. The empty tanks and all appurtenances shall be removed from the base and disposed of in accordance with all applicable laws. There are 60 tanks of 500 gallon capacity each in place within the limits of the existing housing area to be removed.

13.3 UTILITIES REMOVAL AND CUT-OFF

The existing utility connections into the family housing units being demolished shall be disconnected from the service mains serving the housing. The water service distribution within the area shall be abandoned in place, and new irrigation service lines installed to provide irrigation for the restored site (see paragraph 13.6). Remove all utility and lighting poles and associated overhead distribution equipment back to the primary feeder circuits at Aardvark and Gunfighter Streets. See Attachment D for locations of existing utilities. Underground capping of existing lines shall occur as close to existing mainlines as possible. Abandoned utility lines may remain in place. Utilities serving remaining existing housing shall be maintained with interruptions in service coordinated

with and approved by the Contracting Officer. Contractor is responsible for coordinating actions prior to work and insuring that water, sewer, and gas lines do not leak after work is completed.

13.4 REMOVAL OF DEMOLITION MATERIAL

The Contractor is responsible for removing all debris created by the demolition process in a lawful manner, complying with state and Federal environmental regulations. Asbestos and non-asbestos landfills are available on base for Contractor use. For more information see Specification Section 01061 - ENVIRONMENTAL PROTECTION.

13.4.1 DISPOSITION OF DEMOLISHED MATERIALS

13.4.1.1 Buildings. Mixed construction debris shall be ground in accordance with Section 01061, paragraph 1.6 prior to disposal in the base landfill.

13.4.1.2 Asphaltic Pavements (Streets). Asphaltic concrete pavements shall be cold milled and stockpiled at an on-base site to be designated by the COR.

13.4.1.3 Portland Cement Concrete. Concrete foundations, pavements, curbs and sidewalks shall be crushed to 6 inches maximum dimensions and stockpiled at an on-base site to be designated by the COR.

13.5 TREE PRESERVATION PLAN

A Tree Preservation Plan shall be developed by the Contractor to address protection, maintenance, and establishment of all existing trees over 2 inch caliper when measured 4.5 feet above the ground. Protection of all other existing vegetation and smaller trees is desirable except vegetation adjacent to foundations and structures being removed. The Tree Preservation Plan shall be developed by a registered landscape architect, licensed forester, or certified arborist. The Tree Preservation Plan shall include all materials, labor, and equipment to be provided by the Contractor for tree protection and preservation prior, during, and following demolition activities. The Tree Preservation Plan shall include plans, details, and specifications, as needed, to identify trees and clearly describe the proposed methods and treatments within the tree protection areas. A sample Tree Preservation Plan is provided in Attachment G. All existing trees that are preserved, protected, and maintained by the Contractor shall be warranted for a minimum of one calendar year following date of final acceptance. Demolition is not to commence until the Government has reviewed and approved the Tree Preservation Plan.

13.6 RESTORATION OF SITE

The demolition footprint of each removed housing unit shall be leveled and back bladed upon removal of the required demolition materials. All earthwork shall be in accordance with Paragraph 5.2 Geotechnical Survey Report. Grading and drainage shall be in accordance with Paragraph 7.0 Grading and Drainage. Roto-till locations of existing sod, and fill excavated areas. All disturbed areas shall be filled and uniformly smooth-graded. If trees are removed the entire stump and roots shall also be removed. Provide top soil and blend into existing subsoil in accordance with paragraph 8.0 Landscape. Install quick-coupler valves in locations sufficient to water trees with a capacity of delivering 15 gallons per minute (50-60 ft. radius) per coupler valve. Design for operation of 10 valves at a time. Design system to be self draining for freeze proof operation. Over seed entire site with dryland grass seed mixture at 24 pounds per acre and top dress with 1 inch of mulch. All seed quantities are based on pure live seed. The dryland mix shall be as specified in Attachment G, Acceptable Landscape Materials for MHAFB.

End of Section 00860

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WAGE AND BENEFIT RATES FOR
DACA67-00-R-0006
PRINTED ON: 02/24/2000

State: IDAHO County: ELMORE Work Site: Mountain Home AFB
Extracted from: General Decision Number ID000006
with modifications through number 0
dated: 02/11/2000

The rates shown below have been extracted from the General Decision indicated, as the rates applicable to the particular location involved in this project. Basic Hourly rates shown reflect the addition of applicable Zone Pay for the zone indicated, where it is possible to make those additions with the information known at the time of solicitation release. Where additional Zone Pay adjustments may be needed (as where, for example, zone pay depends on the residence of the worker), that fact is indicated in the notes accompanying the particular rates affected. Similarly, Fringe Benefit rates shown reflect all calculations that could be made based on the information known at the time of solicitation release. Where additional Fringe Benefit adjustments may be needed (as where, for example, the rate depends on the workers' years of service), that fact is indicated in the notes accompanying the affected rates. Where additional adjustments in hourly rates may be necessary - for such things as handling hazardous materials, projects of certain dollar costs, and so on - that fact is also indicated in the notes accompanying the affected rates.

Rates for classifications not listed must be specially obtained AFTER CONTRACT AWARD by contacting Richard Hynes at (206) 764-3735 or Lynn Forbes at (206) 764-3733. Questions concerning these rates may be addressed to either of these individuals.

CARPENTERS
Basic Hourly: $ 9.070 Fringe Benefits: $ 0.000 SUID4006A 11/01/1983 Zone: 0

CEMENT MASONS
Basic Hourly: $ 7.810 Fringe Benefits: $ 0.000 SUID4006A 11/01/1983 Zone: 0

ELECTRICIANS
Basic Hourly: $ 8.720 Fringe Benefits: $ 0.000 SUID4006A 11/01/1983 Zone: 0

INSULATION INSTALLERS
Basic Hourly: $ 6.500 Fringe Benefits: $ 0.000 SUID4006A 11/01/1983 Zone: 0

IRONWORKERS
Basic Hourly: $ 8.250 Fringe Benefits: $ 0.750 SUID4006A 11/01/1983 Zone: 0

LABORERS
Basic Hourly: $ 5.880 Fringe Benefits: $ 0.000 SUID4006A 11/01/1983 Zone: 0

PAINTERS
Basic Hourly: $ 8.030 Fringe Benefits: $ 0.000 SUID4006A 11/01/1983 Zone: 0

PLASTERERS
Basic Hourly: $ 9.000 Fringe Benefits: $ 0.000 SUID4006A 11/01/1983 Zone: 0

PLUMBERS
Basic Hourly: $ 10.820 Fringe Benefits: $ 0.000 SUID4006A 11/01/1983 Zone: 0

ROOFERS
Basic Hourly: $ 8.000 Fringe Benefits: $ 0.000 SUID4006A 11/01/1983 Zone: 0

SHEET METAL WORKERS
Basic Hourly: $ 8.000 Fringe Benefits: $ 0.340 SUID4006A 11/01/1983 Zone: 0

TRUCK DRIVERS
Basic Hourly: $ 7.180 Fringe Benefits: $ 0.000 SUID4006A 11/01/1983 Zone: 0

Notes:

WELDERS
Basic Hourly: $ 0.000 Fringe Benefits: $ 0.000 / / Zone: 0

Notes:

Receive rate for craft performing operation to which welding is incidental.

In the listing above, the "SU" designation means that rates listed under that identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEAL PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice manual, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to

the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

4.) All decisions by the Administrative Review Board are final.

TECHNICAL SPECIFICATIONS

TABLE OF CONTENTS

DIVISION 1 - GENERAL REQUIREMENTS

NOTE: The following Division 1 Specifications (attached herein) have been prepared by the Government and specify administrative and procedural requirements applicable to this contract.

Section No.	Section Title
01001	Supplementary Requirements
01005	Site Specific Supplementary Requirements
01025	Payment
01035	Modification Procedures
01061	Environmental Protection
01330	Submittal Procedures
. 01451	Contractor Quality Control
01415	Metric Measurements
01501	Construction Facilities and Temporary Controls
01701	Operation and Maintenance Manuals
01702	As Built Records and Drawings
01703	Warranty of Construction
01704	Form 1354 Checklist
01705	Equipment-In-Place List

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SECTION 01001

SUPPLEMENTARY REQUIREMENTS

PART 1 GENERAL

1.1 DEFINITIONS

The references listed below are to be defined as indicated wherever they may be used in the TECHNICAL SPECIFICATIONS.

"SUPPLEMENTARY REQUIREMENTS " shall be read to pertain to any of the sections of the DIVISION 1 as required by the content of the section or paragraph containing the reference.

1.2 CONSTRUCTION SCHEDULING

1.2.1 Construction Progress Charts And Status Reports

1.2.1.1 The instructions and information herein supplement the requirements of Paragraph SCHEDULE FOR CONSTRUCTION CONTRACTS IN THE CONTRACT CLAUSES. The proposed Construction Progress Chart shall be prepared on ENG Form 2454. Additional instructions are obtained in INSTRUCTIONS AND INFORMATION FOR CONTRACTORS, a manual furnished to the Contractor by the Contracting Officer. This manual is available for inspection in the Office of the Seattle District, Corps of Engineers 4735 East Marginal Way South, Seattle, Washington.

1.2.1.2 The Minimum principal contract features (activities) to be included on ENG Form 2454 shall represent the work in each of the following divisions:

(a) Site Work

(b) Concrete

(c) Masonry

(d) Metals

(e) Wood and Plastics

(f) Doors, Windows, and Hardware

(g) Finishes

(h) Miscellaneous Specialties

(i) Equipment

(j) Furnishings

(k) Special Construction

(l) Mechanical

(m) Electrical

1.2.2 The Construction Progress Chart shall show the total bid amount distributed among the features shown on the chart. The schedule shall show the percentage of completion at the close of each weekly period. This percentage shall be based on percentage of physical completion of the work. (NOTE: Mobilization and demobilization shall not be listed as a separate payment item unless so noted in the schedule.)

1.2.3 The Construction Progress Chart shall be submitted within 10 calendar days after the date of receipt of notice to proceed.

1.2.4 The Contractor shall prepare and submit a monthly project status report. The report shall tell whether the project as a whole is on, ahead of, or behind schedule. If the project is behind schedule, the Contractor shall explain what actions he will take to regain his schedule. The report shall include a description of problem areas, delaying factors and their impact, and an explanation of corrective actions taken or proposed. Any delays caused by the Government shall be identified. Any significant items or events that occurred during the report month shall also be detailed.

1.3 CORRESPONDENCE

1.3.1 All correspondence shall be addressed to the Contracting Officer, shall be serially numbered commencing with Number 1, with no numbers missing or duplicated and shall be forwarded in quintuplicate, as directed by the authorized representative of the Contracting Officer, and shall include an additional copy forwarded to a separate designated location. All copies provided shall be legible. Enclosures attached or transmitted with the correspondence shall also be furnished with the original and each copy. Each serial letter shall make reference to the contract name, contract number and shall have only one subject.

1.3.2 For submission of Contractor payment requests, See Section 01025.

1.4 ADVANCED NOTICE OF CONTRACTOR PERFORMED ACCEPTANCE TESTING

The Contractor shall notify the Contracting Officer a minimum of 20 days prior to performing any acceptance or "buy off" testing of the following systems: (1) Fire Detection/Protection, and (2) HVAC. Advance notification is not required for testing performed as part of fabrication or installation.

1.5 CONTRACTOR'S FILES

Contractor shall maintain "Approved (Action Code "A") and "Approved Except as Noted (Action Code "B") shop drawing files in fabrication shops and at project sites for Government use.

1.6 AUDIO-VIDEO RECORDINGS

1.6.1 General

The Contractor shall provide all equipment, materials, and trained personnel to visually and audibly record (video tape) all on site operations and maintenance (O&M) training sessions for this contract. The video technician shall be employed by a video production company that has been in business for a minimum of 2 years. The Contractor shall submit the resume of the technician and video production company. Also the Contractor shall submit for approval an agenda or an outline breakdown of the proposed presentation. Video tapes shall be produced in the VHS format. Audio shall be adjusted, filtered or otherwise controlled to insure that the trainer can be understood at all times. Each system or piece of equipment shall be covered in a single tape or set of tapes which shall be correlated with the O&M manuals provided. Video tapes and their individual storage cases shall be identified with a typewritten label showing the project, equipment or system, and contract number; this same information shall be provided as an introduction on each video tape. When two or more tapes are provided, they shall be submitted as a set in an appropriate storage container.

1.6.2 Submittals

Prior to conducting the training sessions the following shall be submitted for approval:

1) A training plan consisting of the agenda or an outline breakdown of the proposed presentation

2) The qualifications of the trainer and the video recording technician

Two copies of the video taped material shall be submitted to the Contracting Officer within 10 days after completion of video taping the training sessions.

1.7 MECHANICAL AND ELECTRICAL LAYOUT DRAWINGS

The Contractor shall submit, for Contracting Officer's approval, scaled layout drawings, including appropriate elevations and sections, as required, showing the room arrangement the Contractor proposes for all pieces of mechanical and electrical equipment and appurtenances thereto, such as but not limited to: hot water tanks, pumps, electrical control panels, ducts and piping, that are to be located in the room. Mechanical and electrical layouts shall be coordinated to eliminate any conflicts of installed equipment. No payments will be made to the Contractor for furnishing or installing equipment until the layout drawings have been approved by the Contracting Officer. Mechanical and electrical equipment layout drawings shall be identified and submitted as specified herein. Equipment rooms shall be designed to accommodate equipment of required capacities as available from several manufacturers with sufficient space left for access, servicing, and removal. The use of equipment items with dimensions such as "to crowd the space" will not be permitted.

1.8 IDENTIFICATION OF EMPLOYEES AND MILITARY REGULATIONS

(a) The Contractor shall be responsible for compliance with all regulations and orders of the Commanding Officer of the Military Installation, respecting identification of employees, movements on installation, parking, truck entry, and all other military regulations which may affect the work.

(b) The work under this Contract is to be performed at an operating Military Installation with consequent restrictions on entry and movement of nonmilitary personnel and equipment.

(c) Temporary ID's issued by Base Security will be required for construction personnel working on base. Contractor shall provide a list of employees with driver's license and social security numbers prior to construction.

1.9 COLOR BOARDS

Two sets of color boards shall be submitted. The board shall include samples of colors and finishes of every finish such as on walls, floors, and ceilings. This would include, but not be limited to, paint, floor and wall tile, acoustical panels, carpet, wall base, plastic laminate, etc. Where special finishes such as architectural concrete or prefinished metal panels are required, samples of not less than 305 mm (12 inches) square shall be submitted with the board. Boards shall include, where applicable, color samples of integrally colored block, brick, and prefinished metal roofing and siding. The board shall be 610 mm by 610 mm (24 inches by 24 inches). If more space is needed, more than one board per set may be submitted. This is not meant to replace the samples called for in other portions of the specifications. The Contractor shall certify that he has reviewed the color boards in detail and that they are in strict accordance with the contract drawings and specifications, except as may be otherwise explicitly stated.

1.10 PRESERVATION OF HISTORICAL, ARCHEOLOGICAL AND CULTURAL RESOURCES

If an unexpected archaeological find occurs during construction, the requirements for work around such occurrence is specified under Section 01061, ENVIRONMENTAL PROTECTION.

1.11 SPECIAL SAFETY REQUIREMENTS:

In addition to Safety and Health Requirements Manual EM 385-1-1, dated September 1996, the Contractor shall comply with the requirements listed below. Paragraph numbers refer to EM 385-1-1 or are added thereto.

(a) Paragraph 01.A.12: Add new paragraph: Safety Personnel. The Contractor shall designate a person on his staff to manage the Contractor's safety and accident prevention program. This person will provide a point of contact for the Contracting Officer on matters of job safety, and shall be responsible for ensuring the health and safety of on site personnel.

(b) Paragraph 01.D.02, revise as follows:

(1) Replace paragraph 01.D.02c with the following:
"c. Property damage in excess of $2,000.00

(2) Add new paragraph d as follows:
"An injury resulting in a lost workday, not including the day of injury."

1.12 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER (ER 415-1-15 31 OCT 89)

This Paragraph specifies the procedure for the determination of time extensions for unusually severe weather in accordance with the CONTRACT CLAUSE entitled "Default (Fixed Price Construction)". In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:

1.12.1 The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.

1.12.2 The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the contractor.

1.12.3 The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

MONTHLY ANTICIPATED ADVERSE WEATHER DELAY
WORK DAYS BASED ON (5) DAY WORK WEEK

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
16	11	8	3	3	2	0	1	1	3	9	14

1.12.4 Upon acknowledgment of the notice to proceed (NTP) and continuing throughout the contract, the contractor will record on the daily QCQ report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delays must prevent work on critical activities for 50 percent or more of the contractor's scheduled work day.

1.12.5 The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph 1.12.3, above, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the contract clause entitled " Default (Fixed Price Construction)".

PARTS 2 AND 3 NOT USED

END OF SECTION

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SECTION 01005

SITE SPECIFIC SUPPLEMENTARY REQUIREMENTS

1. CONDUCT OF WORK:

1.1 Coordination And Access To Site

1.1.1 Coordination with using agencies shall be made through the Contracting Officer to assist the Contractor in completing the work with a minimum of interference and inconvenience.

1.1.2 All vehicles and drivers entering Mountain Home Air Force Base shall have valid current licenses. All Contractor owned and privately owned vehicles shall obtain an access pass/vehicle decal.

1.1.3 When keys are required for access to facilities on this contract, they shall be obtained through the Contracting Officer.

1.1.3.1 The Contractor shall be responsible for Government-owned keys issued for access to facilities or areas pertinent to this contract.

1.1.3.2 Upon completion of the work in an area, or upon request of the Contracting Officer, the key or keys relevant to the completed areas shall be returned.

1.1.3.3 Should the Contractor lose a key:

a. the Contracting Officer shall be notified, in writing, within three (3) working days after the loss is discovered and

b. should the key not be found before final acceptance, the final contract payment shall be reduced by $100 for each key not returned.

1.1.4 Work hours in the construction area will be restricted to 7:30 a.m. to 4 p.m. daily, Monday through Friday, excluding holidays. Work hours other than as specified above shall be coordinated with and approved by the Contracting Officer.

1.2 SCHEDULING AND SEQUENCE OF WORK

Refer to requirements under Section 00860 DESIGN DEVELOPMENT TECHNICAL CRITERIA, paragraph “Sequencing of Construction and Demolition.”

1.3 UTILITY OUTAGES

Contractor shall coordinate all utility outages with the Contracting Officer at least 14 days in advance. Outages shall be kept to a minimum, any one outage shall not last more than 2 hours and schedule shall be at the convenience of the Government. For outages exceeding 2 hours, the Contracting Officer may require work to be performed on weekends at no additional cost to the Government.

1.4 PROTECTION OF GOVERNMENT PROPERTY

In addition to requirements of the CONTRACT CLAUSES, Contractor shall protect all Government property within the buildings in which he is working, except for such property as is required to be demolished. Property which is to be demolished shall be protected until its scheduled demolition time. Protection shall include, but not be limited to, protection from construction generated dust, debris, water, and vibration.

1.5 USE OF SITE

1.5.1 Permits

1.5.1.1 Prior to use of a nuclear density gauge on base the Contractor shall complete a NRC 241 Form and submit the license to the Base Bioenvironmental Engineer (Building 6000).

1.5.1.2 Additional requirements for permits are specified under Section 01501 CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS.

1.5.2 On-Site Disposal and Recycling

Refer to requirements under Section 01061 ENVIRONMENTAL PROTECTION for availability and restrictions for on-site disposal and recycling of waste construction materials.

1.5.3 Blasting

Blasting is prohibited on air base property.

END OF SECTION

SECTION 01025

PAYMENT

PART 1 GENERAL

1.1 GENERAL

The contract price for each item shall constitute full compensation for furnishing all plant, labor, materials, appurtenances, and incidentals and performing all operations necessary to construct and complete the items in accordance with these specifications and the applicable drawings, including surveying performed by the Contractor. Payment for each item shall be considered as full compensation, notwithstanding that minor features may not be mentioned herein. Work paid for under one item will not be paid for under any other item. No separate payment will be made for the work, services, or operations required by the Contractor, as specified in DIVISION 1, GENERAL REQUIREMENTS, to complete the project in accordance with these specifications; all costs thereof shall be considered as incidental to the work.

1.2 PROGRESS PAYMENT INVOICE

Requests for payment shall be submitted in accordance with Federal Acquisition Regulations (FAR) Subpart 32.9, entitled "PROMPT PAYMENT", and Paragraphs 52.232-5 and 52.232-27, entitled "Payments Under Fixed-Price Construction Contracts", and "Prompt Payment for Construction Contracts", respectively. In addition each request shall be submitted in the number of copies and to the designated billing office as shown in the Contract.

1.2.1 When submitting payment requests, the Contractor shall complete Blocks 1 through 12 of the "PROGRESS PAYMENT INVOICE" Form as directed by the Contracting Officer. (A sample form is attached at the end of this Technical Specification Section.) The completed form shall then become the cover document to which all other support data shall be attached.

1.2.2 One additional copy of the entire request for payment, to include the "PROGRESS PAYMENT INVOICE" cover document, shall be forwarded to a separate address as designated by the Contracting Officer.

1.2.3 The Contractor shall submit with each pay request, a list of subcontractors that have worked during that pay period. The listing shall be broken down into weeks, identifying each subcontractor that has worked during a particular week, and indicate the total number of employees that have worked on site for each subcontractor for each week. The prime Contractor shall also indicate the total number of employees for its on site staff for each week.

PARTS 2 and 3 NOT USED

PROGRESS PAYMENT INVOICE
See Federal Acquisition Regulations (FAR) 32.900, 52.232-5, & 52.232-27

1. PROJECT AND LOCATION	2. DATE
3. CONTRACTOR NAME AND ADDRESS (Must be the same as in the Contract)	4. CONTRACT NO. _____ 5. INVOICE NO.
6. DESCRIPTION OF WORK	7. PERIOD OF PERFORMANCE From: To:
8. DISCOUNT TERMS	
9. OFFICIAL TO WHOM PAYMENT IS TO BE FORWARDED Name: Title: Phone: ( ) -	10. OFFICIAL TO BE NOTIFIED OF DEFECTIVE INVOICE Name: Title: Phone ( ) -

11. CERTIFICATION: I hereby certify, to the best of my knowledge and belief, that
(1) The amounts requested are only for the performance in accordance with the specifications, terms, and conditions of this contract;
(2) Payments to subcontractors and suppliers have been made from previous payments received under the contract, and timely payments will be made from the proceeds of the payment covered by this certification, in accordance with subcontract agreements and the requirements of Chapter 39 of Title 31, United States Code; and
(3) This request for progress payment does not include any amounts which the prime contractor intends to withhold or retain from a subcontractor or supplier in accordance with the terms and conditions of the subcontract.

_____ _____ _____
(Signature) (Title) (Date)

12. OTHER INFORMATION OR DOCUMENTATION required by Contract. Provide two (2) copies of each (check and attach if applicable): _____ Updated Progress Chart/Schedule _____ Progress Narrative _____ Certified Payrolls (submitted weekly) _____ Safety Exposure Report _____ Updated Submittal \register _____ Progress Photos _____ Subcontractor/Employee Listings	(FOR GOVERNMENT USE ONLY) Retainage: _____% Amt: $_____ Withholdings: $ _____ Reason: _____ _____ Following items are current: As-Builts _____ Yes _____ No O & M Manuals _____ Yes _____ No 1354 Data _____ Yes _____ No Submittal Register _____Yes _____No

END OF SECTION

SECTION 01035

MODIFICATION PROCEDURES

PART 1 GENERAL

1.1 PROPOSED PROJECT MODIFICATIONS:

Price proposals for proposed modifications shall be submitted in accordance with the requirements of the Contract Clause MODIFICATION PROPOSALS - PRICE BREAKDOWNS. If change order work impacts or delays other unchanged contract work, the costs of such impacts or delays shall be included in the proposals and separately identified. Additional instructions for submitting price proposals can be found in NPSP-415-1-1, INSTRUCTION AND INFORMATION FOR CONTRACTORS, a copy of which will be furnished to the Contractor at the Preconstruction Conference. For information applicable to equipment rates used in contract modifications, refer to 00800 - SPECIAL CLAUSES, clause “EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE”.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01061

ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.1 SCOPE

This Section covers prevention of environmental pollution and damage as the result of construction operations under this contract. For the purpose of this specification, environmental pollution, and damage is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for esthetic, cultural, and/or historical purposes. The control of environment pollution and damage requires consideration of air, water, and land, and includes management of visual esthetics, noise, and solid waste, as well as other pollutants.

1.1.1 ENVIRONMENTAL SYNOPSIS

The site chosen for this project raises no major existing environmental concerns. The site contains no known contamination or waste products other than the materials identified in the Asbestos Survey Report (see Attachment E1) and Lead Based Paint Survey Report (see Attachment E2). The new construction will have no known effect on existing natural or historic resources. This project will conform with all environmental compliance concerns. No lead or asbestos-containing materials are to be used in the construction required under this contract.

1.2 QUALITY CONTROL

The Contractor shall establish and maintain quality control for environmental protection of all items set forth herein. The Contractor shall record any problems in complying with laws, regulations, and ordinances, and corrective action taken.

1.2.1 Subcontractors

Assurance of compliance with this Section by subcontractors will be the responsibility of the Contractor.

1.3 NOTIFICATION

When the Contracting Officer notifies the Contractor in writing of any observed noncompliance with Federal, state, or local laws, regulations, or permits, the Contractor shall, after receipt of such notice, inform the Contracting Officer of proposed corrective action and take such action as may be approved. If the Contractor fails to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions will be granted or costs or damage allowed to the Contractor for any such suspension.

1.4 PERMITS

The Contractor shall obtain all needed permits or licenses. The Government will not obtain any permits for this project; see Contract Clause PERMITS AND RESPONSIBILITIES. The Contractor shall be responsible for implementing the terms and requirements of the appropriate permits as needed and for payment of all fees. The Contractor shall file the following environmental permits and notices (but not necessarily only these permits):

1.4.1 Stormwater Discharge Permit Associated With a Construction Site

The State department of natural resources, through the national pollutant discharge elimination system (NPDES), requires general permits, a notice of intent, and a notice of discontinuation.

1.4.1.1 Notice of Intent

Both the Corps of Engineers and the Contractor shall sign the Notice of Intent (NOI) to obtain coverage under a stormwater general permit to control stormwater discharges from the construction site as required under section 402 of the Clean Water Act (Public Law 92-500, as amended).

1.4.1.2 Pollution Prevention Plan

The Contractor shall prepare a Pollution Prevention Plan as required by the permit. This plan shall include a Soil Erosion and Stabilization Plan (SES) (see paragraph 1.5.8). The Contractor shall comply with all terms and conditions to obtain and maintain this stormwater discharge permit. This plan shall satisfy the Idaho Department of Environmental Quality Checklist and shall be signed by a Professional Engineer registered with the State of Idaho.

1.4.1.3 Monitoring and Water Treatment

The Contractor shall provide all monitoring and water treatment, if necessary, to achieve compliance with applicable Water Quality Standards, and perform the recordkeeping required by the stormwater discharge permit associated with construction activity.

1.4.2 Air Quality

Permit to construct with Idaho Department of Environmental Quality, through Mountain Home AFB Environmental Flight. Point of contact at Mt. Home is Mr. William Spoerer, telephone (208) 828-4247. The permit must be approved prior to start of construction.

1.4.3 Asbestos

Permit to do abatement work with EPA or local air quality authority 10 days prior to beginning of abatement work. See the specification CEGS 13280 Asbestos Abatement for required submittals.

1.5 PROTECTION OF ENVIRONMENTAL RESOURCES

The environmental resources within the project boundaries and those affected outside the limits of permanent work under this contract shall be protected during the entire period of this contract. The

Contractor shall confine its activities to areas defined by the drawings and specifications. Environmental protection shall be as stated in the following subparagraphs:

1.5.1 Protection of Land Resources

The Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without special permission from the Contracting Officer except as otherwise specified or indicated. See Paragraph 1.7 for additional requirements relating to protection of trees during excavation in the vicinity of a tree.

1.5.2 Disposal of Garbage

Garbage shall be placed in containers which are emptied on a regular schedule. All handling and disposal shall be conducted to prevent contamination.

1.5.3 Refuse Disposal and Cleanup

Refuse shall be defined as debris other than such organic materials as brush or tree stumps.

1.5.3.1 Refuse Disposal

The cost of refuse disposal, such as transportation, handling, dumping fees as applicable, and similar cost, shall be included in the contract price. Refuse may be disposed of off site at the Contractor's expense, in accordance with all local, state, and Federal rules and regulations, or at the base landfill (see paragraph 1.6.1 for details).

1.5.3.2 Fire Hazard

Cloths, cotton waste, and other combustible materials that might constitute a fire hazard shall be placed in closed metal containers and placed outside or destroyed at the end of each day.

1.5.4 Restrictions

The Contractor will not be permitted to deposit refuse in existing garbage cans or refuse dumpsters. Cleaners shall not be poured, drained, or washed into plumbing fixtures or sanitary or storm sewers. Debris, dirt, dust, and stains attributable to or resulting from the work effort shall be removed, cleaned, or effaced by the Contractor to the satisfaction of the Contracting Officer prior to acceptance of the job. Refuse shall not be burned. Burning of vegetation or tree stumps will not be allowed unless the worksite is in an area approved for burning.

1.5.5 Disposal of Chemical or Hazardous Waste

Hazardous waste generated by construction operations remains the property of the Contractor and shall be removed from Mountain Home AFB. Contractor operations shall be, at all times, in compliance with the Resource Conservation and Recovery act (RCRA), 40 CFR, and Idaho Rules, Regulations and Standards for Hazardous Waste, (Idaho Code 16.01). No more than 142 liters, total, of hazardous waste shall be accumulated by the Contractor on site. Once the 142 liters limit is reached, the Contractor has 72 hours to remove the waste from Mountain Home AFB. If any materials will be used that are corrosive, flammable, toxic, or reactive, the Contractor shall submit a Hazardous Materials/Hazardous Waste Control Plan to the

CO for approval and coordination with 366 CES/CEV. Contractor shall submit Material Safety Data Sheets (MSDS) to the CO for approval and coordination with 366 CES/ CEV for all paints and protective coatings, solvents, adhesives, and all other chemical products.

1.5.6 Disposal of Discarded Materials

Discarded materials, other than those which can be included in the solid waste category, shall be handled as directed.

1.5.7 Disposal of Asbestos Containing Materials (ACM)

Asbestos containing materials shall be disposed of as specified in specification Section 02080 Asbestos Abatement which is included in Appendix D.

1.5.8 Protection of Water Resources

1.5.8.1 The Contractor shall keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters.

1.5.8.2 The Contractor shall submit a Soil Erosion and Stabilization Plan (SES) for the Contracting Officer's approval. The plan shall include detailed information on how the surface runoff will be controlled during construction to minimize soil erosion in the construction area and adjacent areas on the base. These measures shall include, where applicable, the measures described under the following Idaho publications "A Landowner and Contractors Best Management Practices Guide for the Control and Treatment of Stormwater, Erosion and Sedimentation" and the "Catalog of Storm Water Best Management Practices for Idaho Cities and Counties." The Contractor shall control all construction operations in strict compliance with the approved SES Plan.

1.5.9 Particulates

Dust particles, aerosols, and gaseous byproducts from construction activities, processing, and preparation of materials shall be controlled at all times, including weekends, holidays, and hours when work is not in progress. Hydrocarbons and carbon monoxide emissions from equipment shall be controlled to Federal and state allowable limits at all times.

1.6 RECYCLING OF CONSTRUCTION MATERIALS

1.6.1 Base Landfill: The Contractor may use the base landfill or may, at his option, dispose of construction materials off-base at a properly licensed and approved landfill. If the Contractor wishes to use the base landfill, recycling is required to the maximum extent practicable for all waste generated by the Contractor. Contractors shall grind mixed construction debris, into a 6 inch minus bulk, for all projects expected to generate greater than 10 cubic yards of waste for landfill disposal. Do not dispose of any batteries, tires, appliances, recyclable materials, hazardous materials, hazardous wastes, etc. Comply with all Federal, State, and local environmental rules and requirements.

1.6.1.1 Recycling shall consist of sorting and delivering recyclable items to the appropriate recycle processors. Recyclable items include: wood, glass, metals, cardboard, and paper. Any Contractor loads containing any of these recyclable materials will be turned away from the base landfill (or removed from the landfill, by the Contractor, if already dumped) and shall be sorted for recycling or removed from the

base and disposed of off the base, all at the Contractor's expense. Appropriate recycling processors are private or government entities currently accepting material for the purpose of recycling.
1.6.1.2 The Contractor shall submit a Waste Disposal and Recycling Plan for the Government's approval prior to any disposal or recycling operations on base. (See sample "Waste Disposal and Recycling Plan" below). When preparing the plan, the Contractor may contact the base Recycle Center at 828-4212 for advice and suggestions on how to best satisfy the recycling requirement. The plan shall be submitted to the Contracting Officer for coordination with 366 CES/CEV. The plan shall include, at a minimum:

- Brief description of work done under the contract,
- Identification of the major waste stream (categories of waste, e.g. wood, fixtures, cardboard, etc) to be generated,
- Intended method and location of disposal or recycling for each waste system

1.6.1.3 The Contractor may choose to dispose of any or all of the waste streams off-base. The Contractor may choose to recover any or all of the waste streams by sending them to an off-base recycling company. The Contractor may choose to turn in some waste streams to the base recycling program with the Government's approval. The acceptance of these waste streams depends on the Government's ability to process the waste stream and the Contractor's ability to adequately prepare the waste stream to meet the Government's condition requirements. The Government is currently encouraging the recycling of:

- Wood
- Scrap Metal
- Corrugated Cardboard
- Glass
- Paper

1.6.1.4 SAMPLE Waste Disposal and Recycling Plan

CONTRACT # _____

Brief description of Work done under the contract:

Renovate 6000 sq. ft. in building XYZ. Plumbing, electrical, and mechanical systems to be replaced. Floor plan to be changed with new floors, walls, and ceilings. Asbestos abatement planned on existing floor tile mastic and insulation.

Identification of the major waste stream (categories of waste, e.g., wood, fixtures, cardboard, etc.) to be generated:

1. Scrap Metal
2. ACM
3. Wood Waste
4. Fixtures
5. Mixed Demo Debris
6. Inert Debris

Intended method and location of disposal or recycling for each waste stream:

1. Scrap Metal: Existing water pipe (copper), ductwork (steel), and electrical wiring (copper) will be turned in to the Base Recycling Center.

2. Asbestos Containing Material: ACM removed prior to renovation will be deposited in the base Asbestos landfill IAW all federal, state, and local regulations.

3. Wood Waste: Contractor will keep re-usable wood scraps and turn in smaller scraps to the Base Recycling Center free of other bulk building material.

4. Plumbing and Electrical Fixtures: Contractor will salvage existing fixtures to be removed for re-use in later projects or sale to others. Fixtures will be removed from Mt Home AFB prior to the end of the contract.

5. Mixed Demo Debris: If less than 10 cy, mixed demo debris will be disposed of in base landfill. If greater than 10 cy, mixed demo debris will be ground into a 6 inch minus bulk and disposed of in base landfill.

6. Inert Debris: Disposed of at the MHAFB inert debris site as directed by the Chief of Heavy Repair, 366 CES/CEOH.

1.6.2 Dumping of asphalt, concrete and rock rubble materials at the Base Hard Fill Area shall be approved in advance on a case by case basis. No dumping shall take place at the base rubble area without specific approval of the exact location, composition and quantity of material. This approval must be received in advance by the Contractor from the Base Civil Engineering (BCE) Pavement and Equipment Foreman through the Contracting Officer. No dumping shall take place without approval. All materials dumped at the base rubble area shall be spread, graded and covered daily (unless specified otherwise) as directed by the BCE Pavements and Equipment Foreman.

1.7 PROTECTION OF TREES DURING EXCAVATION

Care shall be exercised by the Contractor when excavating trenches in the vicinity of trees. Where roots are 50 mm in diameter or greater, the trench shall be excavated by hand and tunneled. When large roots are exposed, they shall be wrapped with a heavy burlap for protection and to prevent drying. Trenches dug by machines adjacent to trees having roots less than 50 mm in diameter shall have the sides hand trimmed making a clean cut of the roots. Trenches having exposed tree roots shall be backfilled within 24 hours unless adequately protected by moist burlap or canvas.

1.8 MAINTENANCE OF POLLUTION CONTROL FACILITIES

The Contractor shall maintain all constructed facilities and portable pollution control devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

1.9 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Existing historical, archaeological, and cultural resources within the Contractor's work area will be so designated by the Contracting Officer if any has been identified. The Contractor shall take precautions to preserve all such resources as they existed at the time they were first pointed out. The Contractor shall provide and install protection for these resources and be responsible for their preservation during the life of the contract. If during excavation or other construction activities any previously unidentified or unanticipated resources are discovered or found, all activities that may damage or alter such resources shall be temporarily suspended. Resources covered by this paragraph include but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rocks or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, the Contractor shall immediately notify the Contracting Officer.

1.10 RESTORATION OF LANDSCAPE (VEGETATION - SUCH AS TREES, PLANTS, AND GRASS) DAMAGE

All landscape features (vegetation - such as trees, plants, and grass) damaged or destroyed during Contractor operations outside and within the work areas shall be restored to a condition similar to that which existed prior to construction activities unless otherwise indicated on the drawings or in the specifications. This restoration shall be done at no additional cost to the Government. If the Contractor fails or refuses to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

Trees shall be replaced in kind with a minimum 100 mm caliper nursery stock. Shrubs, vines, and ground cover shall be replaced in kind; size to be approved by the Contracting Officer.

All plant material shall meet specifications outlined in ANSI Z60.1 - current publication, "American Standard for Nursery Stock."

Grass areas shall be replaced in kind by sodding. Sod shall be required in all regularly maintained lawn areas and shall be installed according to American Sod Producers Association Guideline Specifications for Sodding.

END OF SECTION

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SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.0 INTRODUCTION Design submittal activities shall follow the guide lines presented in Section 00810 Special Contract Requirements - New Family Housing. All correspondence shall follow the guidance of Section 01001 Supplementary Requirements, paragraph 1.3 Correspondence. The following guidance is to be followed for all construction related submittals, all submittals required in Division 1 specifications and all submittals identified in Section 00860 Design Development Technical Criteria - New Family Housing as requiring Contracting Officer approval.

1.1 CONTROL AND SCHEDULING OF SUBMITTALS

1.1.1 Submittal Coordination Meeting

After the preconstruction conference and before any submittals are sent to the Contracting Officer's Representative (COR), with the exception of Division 1 submittals, the Contractor shall meet with the COR to develop an approved preliminary submittal register, ENG Form 4288. During the meeting all required items will be identified and grouped into three categories:

- Government Approved (GA)

Government approval is required for extensions of design, critical materials, variations/deviations, an "or equal" decision, equipment whose compatibility with the entire system must be checked, architectural items such as Color Charts/Patterns/Textures, and other items as designated by the COR. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," these submittals will be acted on as "shop drawings."

- For Information Only (FIO)

Submittals not requiring Government approval will be for information only. These are items such as Installation Procedures, Certificates of compliance, Samples, Qualifications, etc. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," these submittals will not be acted on as "shop drawings."

- Those items that can be visually inspected by the Contractor's Quality Control Representative (CQC) on site or are provided to the Government other than with an ENG Form 4025: The items that fall into this category shall remain on the register but shall not be submitted to the COR. For these items, the "Classification" column on the submittal register shall remain blank.

1.1.2 Final Submittal Register

The final submittal register shall be coordinated with the approved project schedule and submitted within 20 days of Notice to Proceed. In preparing the final document, adequate time (minimum of 30 days) shall be allowed for review and approval, and possible resubmittal of each item on the register.

1.1.3 Submittal Register Updates

The Contractor's quality control representative shall review the listing at least every 30 days and take appropriate action to maintain an effective system. Copies of updated or corrected listings shall be submitted to the COR at least every 30 days in the quantity specified.

1.2 SUBMITTAL TYPES

Throughout these specifications submittals may be identified with the prefix "SD" (submittal data) followed by a number (category, i.e., data, drawings, reports, etc.). This is for bookkeeping and record sorting in the system:

SD-01 Data

Submittals which provide calculations, descriptions, or documentation regarding the work.

SD-04 Drawings

Submittals which graphically show relationship of various components of the work, schematic diagrams of systems, details of fabrication, layouts of particular elements, connections, and other relational aspects of the work.

SD-06 Instructions

Preprinted material describing installation of a product, system or material, including special notices and material safety data sheets, if any, concerning impedances, hazards, and safety precautions.

SD-07 Schedules

Tabular lists showing location, features, or other pertinent information regarding products, materials, equipment, or components to be used n the work.

SD-08 Statements

A document, required of the Contractor, or through the Contractor from a subcontractor, supplier, installer, or manufacturer to confirm the quality or orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel, qualifications, or other quality verifications.

SD-09 Reports

Reports of inspections or tests, including analyses and interpretation of test results. Each report shall be properly identified. Test methods used shall be identified and test results shall be recorded.

SD-13 Certificates

Statement signed by an official authorized to certify on behalf of the manufacturer that a product, system or material meets specified requirements. The statement must be dated after the award of this contract and state the Contractor's name and address, project and location, and list specific requirements which are being certified.

SD-14 Samples

Fabricated and/or unfabricated physical examples of materials, products, and/or units of work as complete units or as portions of units.

SD-18 Records

Documentation to record compliance with technical or administrative requirements.

SD-19 Operation and Maintenance Manuals

Data which forms a part of an operation and maintenance manual.

Submittals required by the Contract Clauses and other non-technical parts of the contract are not necessarily included in this section. These type of submittals can be added to the register before or during the submittal coordination meeting.

1.3 APPROVED SUBMITTALS

The approval of submittals by the COR shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist. The Contractor, under the CQC requirements of this contract, is responsible for the dimensions and design of adequate connections, details, and satisfactory construction of all work. After submittals have been approved by the COR, no resubmittal for the purpose of substituting materials or equipment will be given consideration.

1.4 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the COR and promptly furnish a corrected submittal in the format and number of copies specified for the initial submittal. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, written notice, as required under the Contract Clause entitled "Changes," shall be given to the COR.

1.5 PAYMENT

Separate payment will not be made for submittals, and all costs associated therein shall be included in the applicable unit prices or lump sum prices contained in the schedule. Payment will not be made for any material or equipment which does not comply with contract requirements.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

Prior to submittal, all items shall be checked and approved by the Contractor's CQC and each item of the submittal shall be stamped, signed, and dated. Each respective transmittal form (ENG Form 4025) shall be signed and dated by the CQC certifying that the accompanying submittal complies with the contract requirements. This procedure applies to all submittals. Submittals shall include items such as:

Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including, but not limited to, catalog cuts, diagrams; operating charts or curves; test reports; test cylinders; samples; O&M manuals including parts lists; certifications; warranties and other such required items. Units of weights and measures used on all submittals shall be the same as the contract drawings. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. GA submittals shall be scheduled and made prior to the acquisition of the material or equipment covered thereby. The COR may request submittals in addition to those listed when deemed necessary to adequately describe the work covered in the respective sections. The Contractor shall maintain a complete and up-to-date file of all submittals/items on site for use by both the Contractor and the Government.

3.2 SUBMITTAL REGISTER (ENG Form 4288)

In APPENDIX A at the end of this specification Section is a copy of the ENG Form 4288. The Contractor shall list each item of equipment and material for which submittals are required by the Special Clauses (SC's), Technical Specifications Division 1 and the Design Development Technical Criteria - Section 00860. The Contractor shall approve all items listed on the submittal register. During the submittal coordination meeting, a preliminary submittal register will be created by annotating this Form 4288. When the final submittal register is submitted for approval, the Contractor shall complete the column entitled "Item No." and all data under "Contractor Schedule Dates" and return five completed copies to the COR for approval. The Contractor shall review the list to ensure its completeness and may expand general category listings to show individual entries for each item. The numbers in column "Item No." are to be assigned sequentially starting with "1" for each specification section. DO NOT preassign transmittal numbers when preparing the submittal register. When a conflict exists between the submittal register and a submittal requirement in the technical sections, other than those submittals referenced in Paragraph 3.9: Field Test Reports, the approved submittal register shall govern. The preliminary, and then the final approved submittal register, will become the scheduling documents and will be updated monthly and used to control submittals throughout the life of the contract. Names and titles of individuals authorized by the Contractor to approve shop drawings shall be submitted to COR with the final 4288 form. Supplier or subcontractors certifications are not acceptable as meeting this requirement.

3.3 SCHEDULING

Submittals covering component items forming a system, or items that are interrelated, shall be coordinated and submitted concurrently. Certifications shall be submitted together with other pertinent information and/or drawings. Additional processing time beyond 30 days, or number of copies, may be shown by the COR on the submittal register attached in the "Remarks" column, or may be added by the COR during the coordination meeting. No delays damages or time extensions will be allowed for time lost due to the Contractor not properly scheduling and providing submittals.

3.4 TRANSMITTAL FORM (ENG Form 4025)

Transmittal Form 4025 (sample at the end of this section) shall be used for submitting both GA and FIO submittals in accordance with the instructions on the reverse side of the form. Transmittal numbers shall be assigned sequentially. Original 4025 forms shall be used (do not photo copy) and will be furnished by the COR upon request. These forms shall be filled in completely prior to submittal. Special care shall be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item. Each submittal item shall be listed separately on the form, naming subcontractor, supplier, or manufacturer, applicable specification paragraph number(s), drawing/sheet number, pay item number, and any other information needed to identify the item, define its

use, and locate it in the work. One or more 4025 forms may be used per specification section, however, DO NOT include more than one specification section per transmittal. Each submittal shall be complete, containing all information needed to determine contract compliance.

3.5 CROSS-REFERENCE (ENG FORM 4288/ENG FORM 4025)

To provide a cross-reference between the approved submittal register and transmittal forms, the Contractor shall record the "transmittal numbers" assigned when submitting items in column “Transmittal No.” of the ENG FORM 4288. DO NOT preassign transmittal numbers when preparing the submittal register. Transmittal numbers shall be assigned sequentially in accordance with the instructions on the reverse side of the transmittal form (ENG FORM 4025).The item numbers in column “Item No.” of submittal register shall correspond to the item numbers on ENG Form 4025.

3.6 SUBMITTAL PROCEDURE

3.6.1 General

Shop drawings with ENG Form 4025 shall be submitted in the number of copies specified in subparagraphs "Government Approved Submittals" and "Information Only Submittals," or as indicated on the submittal register in the “Remarks” column. Submit a complete collated “reviewers copy” with one 4025 form and attachments (not originals). The remaining copies (4 for GA, 2 for FIO) of 4025 forms and attachments shall not be collated. This would not apply to a series of drawings.

3.6.2 Approval of Submittals by the Contractor

Before submittal to the COR, the Contractor shall review and correct shop drawings prepared by subcontractors, suppliers, and itself, for completeness and compliance with plans and specifications. The Contractor shall not use red markings for correcting material to be submitted. Red markings are reserved for COR’s use. Approval by the Contractor shall be indicated on each shop drawing by an approval stamp containing information as shown in this section. Submittals not conforming to the requirements of this section will be returned to the Contractor for correction and resubmittal.

3.6.3 Variations

For submittals which include proposed variations requested by the Contractor, column “h” of ENG Form 4025 shall be checked and the submittal shall be classified as GA, and submitted accordingly. The Contractor shall set forth in writing the justification for any variations and annotate such variations on the transmittal form in the REMARKS block. Variations are not approved unless there is an advantage to the Government. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted variations.

3.6.4 Drawings

Each drawing shall be not larger than A1 size (841 mm wide by 594 mm high), with a title block in lower right hand corner and a 75 mm by 100 mm clear area adjacent. The title block shall contain the subcontractor's or fabricator's name, contract number, description of item(s), bid item number, and a revision block. Provide a blank margin of 20 mm at bottom, 50 mm at left, and 10 mm at top and right. Where drawings are submitted for assemblies of more than one piece of equipment or systems of components dependent on each other for compatible characteristics, complete information shall be submitted on all such related components at the same time. The Contractor shall ensure that information is

complete and that sequence of drawing submittal is such that all information is available for reviewing each drawing. Drawings for all items and equipment, of special manufacture or fabrication, shall consist of complete assembly and detail drawings. All revisions after initial submittal shall be shown by number, date, and subject in revision block.

3.6.4.1 Submittals Containing Drawings Larger than A3 size, (297 mm high by 420 mm wide)

For GA submittals containing drawings larger than A3 size, one reproducible and one blue line copy will be required to be submitted with five copies of the ENG Form 4025. The marked-up reproducible (and/or any review comments contained on the page-size comment sheet(s) at the Government's option) will be returned to the Contractor upon review. Three copies of blue line drawings (generated from the reviewed reproducible) will be provided to the Government within 10 days of Contractor's receipt of the reviewed reproducible. The Contractor shall not incorporate approved work into the project until the Government has received the three blue line copies. The Contractor shall use the marked-up reproducible to make any additional copies as needed. For FIO submittals, one reproducible and two blue line copies will be required to be submitted with the appropriate number of copies of ENG Form 4025.

3.6.5 Printed Material

All requirements for shop drawings shall apply to catalog cuts, illustrations, printed specifications, or other data submitted, except that the 75 mm by 100 mm clear area adjacent to the title block is not mandatory. Inapplicable portions shall be marked out and applicable items such as model numbers, sizes, and accessories shall be indicated by arrow or highlighted.

3.7 SAMPLES REQUIRING LABORATORY ANALYSIS

See Section 01451 CONTRACTOR QUALITY CONTROL for procedures and address for samples requiring Government testing.

3.8 SAMPLES REQUIRING VISUAL INSPECTION

Samples requiring only physical inspection for appearance and suitability shall be coordinated with the on-site Government quality assurance representative (QAR).

3.9 FIELD TEST REPORTS

Routine tests such as soil density, concrete deliveries, repetitive pressure testing shall be delivered to the QAR with the daily Quality Control reports. See SECTION: 01451 CONTRACTOR QUALITY CONTROL.

3.10 CONTROL OF SUBMITTALS

The Contractor shall carefully control his procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

3.11 GOVERNMENT APPROVED SUBMITTALS (GA)

The Contractor shall submit 5 copies of GA submittals with 5 corresponding 4025 forms. Upon completion of GA submittal review, copies as specified below will be marked with an action code, dated, and returned to the Contractor. See “Drawings” above for special instructions if drawings larger than size A3 (297 mm by 420 mm) are used.

3.11.1 Processing of GA Submittals

Submittals will be reviewed and processed as follows:

a. Approved as Submitted (Action Code "A"): Shop drawings which can be approved without correction will be stamped "Approved" and two copies will be returned to the Contractor. No resubmittal required.

b. Approved Except as Noted (Action Code "B"): Shop drawings which have only minor discrepancies will be annotated in red to indicate necessary corrections. Marked material will be stamped "Approved Except as Noted" and two copies returned to the Contractor for correction. No resubmittal required.

c. Approved Except as Noted (Action Code "C"): Shop drawings which are incomplete or require more than minor corrections will be annotated in red to indicate necessary corrections. Marked material will be stamped "Approved Except as Noted - Resubmission Required" and two copies returned to the Contractor for correction. Resubmittal of only those items needing correction required.

d. Disapproved (Action Code "E"): Shop drawings which are fundamentally in error, cover wrong equipment or construction, or require extensive corrections, will be returned to the Contractor stamped "Disapproved." An explanation will be furnished on the submitted material or on ENG Form 4025 indicating reason for disapproval. Complete resubmittal required.

e. Resubmittal will not be required for shop drawings stamped "A" or "B" unless subsequent changes are made by Contractor or a contract modification. For shop drawings stamped "C" or "E," Contractor shall make corrections required, note any changes by dating the revisions to correspond with the change request date, and promptly resubmit the corrected material. Resubmittals shall be associated with the “parent” by use of sequential alpha characters (for example, resubmittal of transmittal 8 will be 8A, 8B, etc). Government costs incurred after the first resubmittal may be charged to the Contractor.

3.12 INFORMATION ONLY SUBMITTALS (FIO)

The Contractor shall submit three copies of data and four copies of ENG Form 4025. FIO submittals will not be returned. Government approval is not required on FIO submittals. These submittals will be used for information purposes. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the Contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications and will not prevent the COR from requiring removal and replacement if nonconforming material is incorporated in the work. This does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or check testing by the Government in those instances where the technical specifications so prescribe.

3.12.1 Processing of FIO Submittals

FIO submittals shall be submitted prior to delivery of the material or equipment to the job site. ENG Form 4025 shall be marked with the words "Contractor approved - information copy only" in the REMARKS block of the form. Submittals will be monitored and spot checks made. When such checks indicate noncompliance, the Contractor will be notified by the same method used for GA submittals. Resubmittal of nonconforming FIO submittals shall be reclassified GA and shall be in five copies.

3.13 CONTRACTOR APPROVAL STAMP

The stamp used by the Contractor on the submittal data to certify that the submittal meets contract requirements shall be similar to the following:

CONTRACTOR:
_____

CONTRACT NO:_____
TRANSMITTAL NO_____
ITEM N NO _____
SPECIFICATION SECTION _____
PARAGRAPH NO _____
APPROVED AS SUBMITTED_____
APPROVED WITH CORRECTIONS AS NOTED
ON SUBMITTAL DATA_____
ON ATTACHED COMMENT SHEET_____
SIGNATURE
_____
TITLE
_____
DATE
_____

CONTRACTORS REVIEW STAMP

MAXIMUM SIZE 75 MM BY 75 MM

(Attachments follow)

END OF SECTION

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE *(Read instructions on the reverse side prior to initiating this form)*	DATE	TRANSMITTAL NO.

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS *(This section will be initiated by the contractor)*

TO:	FROM:	CONTRACT NO.	CHECK ONE: ☐ THIS IS A NEW TRANSMITTAL ☐ THIS IS A RESUBMITTAL OF TRANSMITT/_____
SPECIFICATION SEC. NO. *(Cover only one section with each transmittal)*	PROJECT TITLE AND LOCATION		CHECK ONE: THIS TRANSMITTAL IS FOR ☐ FIO ☐ GOV'T. APPROVAL

ITEM NO. *a.*	DESCRIPTION OF ITEM SUBMITTED *(Type size, model number/etc.)* *b.*	MFG OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO. *(See instruction no. 8)* *c.*	NO. OF COPIES *d.*	CONTRACT REFERENCE DOCUMENT: SPEC. PARA. NO. *e.*	CONTRACT REFERENCE DOCUMENT: DRAWING SHEET NO. *f.*	FOR CONTRACTOR USE CODE *g.*	VARIATION *(See instruction No. 8)* *h.*	FOR CE USE CODE *i.*

REMARKS

I certify that the above submitted items have been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as otherwise stated.

_____
NAME AND SIGNATURE OF CONTRACTOR

SECTION II - APPROVAL ACTION

ENCLOSURES RETURNED *(List by Item No.)*	NAME, TITLE AND SIGNATURE OF APPROVING AUTHORITY	DATE

ENG FORM 4025-R, MAR 95 *(ER 415-1-10)* EDITION OF SEP 93 IS OBSOLETE. SHEET ___ OF ___ (Reverse) CEMPCD

INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required number of copies.

2. Each transmittal shall be numbered consecutively in the space provided for "Transmittal No.". This number, in addition to the contract number, will form a serial number for identifying each submittal. For new submittals or resubmittals mark the appropriate box; on resubmittals, insert transmittal number of last submission as well as the new submittal number.

3. The "Item No." will be the same "Item No." as indicated on ENG FORM 4288-R for each entry on this form.

4. Submittals requiring expeditious handling will be submitted on a separate form.

5. Separate transmittal form will be used for submittals under separate sections of the specifications.

6. A check shall be placed in the "Variation" column when a submittal is not in accordance with the plans and specifications--also, a written statement to that effect shall be included in the space provided for "Remarks".

7. Form is self-transmittal, letter of transmittal is not required.

8. When a sample of material or Manufacturer's Certificate of Compliance is transmitted, indicate "Sample" or "Certificate" in column c, Section I.

9. U.S. Army Corps of Engineers approving authority will assign action codes as indicated below in space provided in Section I, column i to each item submitted. In addition they will ensure enclosures are indicated and attached to the form prior to return to the contractor. The Contractor will assign action codes as indicated below in Section I, column g, to each item submitted.

THE FOLLOWING ACTION CODES ARE GIVEN TO ITEMS SUBMITTED

A	--	Approved as submitted.	E	--	Disapproved (See attached).
B	--	Approved, except as noted on drawings.	F	--	Receipt acknowledged.
C	--	Approved, except as noted on drawings. Refer to attached sheet resubmission required.	FX	--	Receipt acknowledged, does not comply as noted with contract requirements.
D	--	Will be returned by separate correspondence.	G	--	Other *(Specify)*

10. Approval of items does not relieve the contractor from complying with all the requirements of the contract plans and specifications.

(Reverse of ENG Form 4025-R)

SUBMITTAL REGISTER

(ER 415-1-10)

CONTRACT NUMBER

TITLE AND LOCATION

CONTRACTOR

SPECIFICATION SECTION

				TYPE OF SUBMITTAL										CLASSIFICATION			CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		
TRANSMITTAL NO	ITEM NO	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	OPERATION AND MAINTENANCE	INFORMATION ONLY	GOVERNMENT APPROVED	REVIEWER	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	REMARKS

ENG FORM 4288, MAY 91

EDITION OF AUG 89 IS OBSOLETE

PAGE__ OF __ PAGES

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SECTION 01415

METRIC MEASUREMENTS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 380	(1993) Practice for Use of the International System of Units (SI)
ASTM E 621	(1994) Practice for Use of Metric (SI) Units in Building Design and Construction

1.2 GENERAL

This project includes metric units of measurements. The metric units used are the International System of Units (SI) developed and maintained by the General Conference on Weights and Measures (CGPM); the name International System of Units and the international abbreviation SI were adopted by the 11th CGPM in 1960. A number of circumstances require that both metric SI units and English inch-pound (I-P) units be included in a section of the specifications. When both metric and I-P measurements are included, the section may contain measurements for products that are manufactured to I-P dimensions and then expressed in mathematically converted metric value (soft metric) or, it may contain measurements for products that are manufactured to an industry recognized rounded metric (hard metric) dimensions but are allowed to be substituted by I-P products to comply with the law. Dual measurements are also included to indicate industry and/or Government standards, test values or other controlling factors, such as the code requirements where I-P values are needed for clarity or to trace back to the referenced standards, test values or codes. For American Society for Testing and Materials (ASTM) references in the technical specifications, the Contractor shall use the metric publication, if one is available (For example: ASTM A 36, use ASTM A 36M). An acceptable substitute to hard Metric SI Concrete Masonry Units (CMU) and Recessed Lighting Fixtures (RLF) is English in-pound (soft metric) CMU and RLF. The Contractor shall be responsible for any adjustments required to accommodate these alternative English in-pound units at no additional cost to the Government.

1.3 USE OF MEASUREMENTS

Measurements shall be either in SI or I-P units as indicated, except for soft metric measurements or as otherwise authorized. The Contractor shall be responsible for all associated labor and materials when authorized to substitute one system of units for another and for the final assembly and performance of the specified work and/or products.

1.3.1 Hard Metric

A hard metric measurement is indicated by an SI value with no expressed correlation to an I-P value, i.e., where an SI value is not an exact mathematical conversion of an I-P value, such as the use of 100 mm in

lieu of 4 inches. Hard metric products are required when only metric dimensions are indicated, except for Contractor's options as outlined in paragraph GENERAL above. Hard metric measurements are often used for field data such as distance from one point to another or distance above the floor. Products are considered to be hard metric when they are manufactured to metric dimensions or have an industry recognized metric designation.

1.3.2 Soft Metric

a. A soft metric measurement is indicated by an SI value which is a mathematical conversion of the I-P value shown in parentheses e.g. 38.1 mm (1-1/2 inches). Soft metric measurements are used for measurements pertaining to products, test values, and other situations where the I-P units are the standard for manufacture, verification, or other controlling factor. The I-P value shall govern while the metric measurement is provided for information.

b. A soft metric measurement is also indicated for products that are manufactured in industry designated metric dimensions but are required by law to allow substitute I-P products. These measurements are indicated by a manufacturing hard metric product dimension followed by the substitute I-P equivalent value in parentheses e.g., 190 x 190 x 390 mm (7-5/8 x 7-5/8 x 15-5/8 inches).

1.3.3 Neutral

A neutral measurement is indicated by an identifier which has no expressed relation to either an SI or an I-P value (e.g., American Wire Gage (AWG) which indicates thickness but in itself is neither SI nor I-P).

1.4 COORDINATION

Discrepancies, such as mismatches or product unavailability, arising from use of both metric and non-metric measurements and discrepancies between the measurements in the specifications and the measurements in the drawings shall be brought to the attention of the Contracting Officer for resolution.

1.5 RELATIONSHIP TO SUBMITTALS

Submittals for Government approval or for information only shall cover the SI or I-P products actually being furnished for the project. The Contractor shall submit the required drawings and calculations in the same units used in the contract documents describing the product or requirement unless otherwise instructed or approved. The Contractor shall use ASTM E 380 and ASTM E 621 as the basis for establishing metric measurements required to be used in submittals. For quick reference the :METRIC REFERENCE CHARTS" and "METRIC CONVERSION CHARTS" attached herein may be used.

PART 2 PRODUCTS & PART 3 EXECUTION

(NOT APPLICABLE)

END OF SECTION

SECTION 01451

CONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3740	(1988) Evaluation of Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E 329	(1990) Use in the Evaluation of Testing and Inspection Agencies as Used in Construction

1.2 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices or lump-sum prices contained in the Bidding Schedule.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Clause entitled "Inspection of Construction", in SECTION 00700 of this document.

The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both on-site and off-site, and shall be keyed to the proposed construction sequence.

3.2 QUALITY CONTROL PLAN

3.2.1 General

The Contractor shall furnish for review by the Government, not later than 30 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause entitled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used. The Government will consider an interim plan for

the first 30 days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

3.2.2 Content of the CQC Plan

The CQC plan shall include, as a minimum, the following to cover all construction operations, both on-site and off-site, including work by subcontractors, fabricators, suppliers and purchasing agents:

a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC system manager who shall report to the project manager or someone higher in the Contractor's organization. Project manager in this context shall mean the individual with responsibility for the overall management of the project including quality and production.

b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a QC function.

c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities and responsibilities. Copies of these letters will also be furnished to the Government.

d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, off-site fabricators, suppliers and purchasing agents. These procedures shall be in accordance with Section 01330 SUBMITTAL PROCEDURES.

e. Control, verification and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities will be approved by the Contracting Officer.)

f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.

h. Reporting procedures, including proposed reporting formats. This shall include a copy of the Daily CQC report form.

i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks and has separate control requirements. It could be identified by different trades or disciplines, or it could be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable feature under a particular section. This list will be agreed upon during the coordination meeting.

3.2.3 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in his CQC plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.4 Notification of Changes

After acceptance of the QC plan, the Contractor shall notify the Contracting Officer in writing a minimum of seven calendar days prior to any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and prior to acceptance by the Government of the Quality Control Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both on-site and off-site work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 CQC System Manager

The Contractor shall identify an individual within his organization at the site of the work who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. This CQC System Manager shall be on the site at all times during construction and will be employed by the Contractor, except as noted in the following. An alternate for the CQC System Manager will be identified in the plan to serve in the event of the system manager's absence. Period of absence may not exceed 2 weeks at any one time. The requirements for the alternate will be the same as for the designated CQC manager. The CQC system manager shall be an experienced person with a minimum of 3 years experience in related work. The CQC system manager shall be assigned no other duties. In addition to the above requirements the CQC System Manager shall have completed the course entitled “Construction Quality Management for Contractors” prior to start of field work. This one-day course is periodically offered in Spokane, Boise, Portland and Seattle. For further information contact the Construction Division Office in your area.

3.4.2 CQC Organizational Staffing

The Contractor shall provide a CQC staff which shall be at the site of work at all times during progress, with complete authority to take any action necessary to ensure compliance with the contract.

3.4.3 Organizational Changes

The Contractor shall obtain Contracting Officer's acceptance before replacing any member of the CQC staff. Requests shall include the names, qualifications, duties, and responsibilities of each proposed replacement.

3.5 SUBMITTALS

Submittals shall be as specified in Section 01330 SUBMITTAL PROCEDURES. The CQC organization shall be responsible for certifying that all submittals are in compliance with the contract requirements. All Contractor forms for submitting test results are subject to Contracting Officer approval.

3.6 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. The controls shall be adequate to cover all construction operations, including both on-site and off-site fabrication, and will be keyed to the proposed construction sequence. The controls shall include at least three phases of control to be conducted by the CQC system manager for all definable features of work, as follows:

3.6.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work and shall include:

a. A review of each paragraph of applicable specifications.

b. A review of the contract plans.

c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.

d. A check to assure that provisions have been made to provide required control inspection and testing.

e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.

f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawing or submitted data, and are properly stored.

g. A review of the appropriate activity hazard analysis to assure safety requirements are met.

h. Discussion of procedures for constructing the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that phase of work.

i. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.

j. The Government shall be notified at least 48 hours in advance of beginning any of the required action of the preparatory phase. This phase shall include a meeting conducted by the CQC system manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC system manager and attached to the daily QC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

a. A check of preliminary work to ensure that it is in compliance with contract requirements. Review minutes of the preparatory meeting.

b. Verification of full contract compliance. Verify required control inspection and testing.

c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with sample panels is appropriate.

d. Resolve all differences.

e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.

f. The Government shall be notified at least 48 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC system manager and attached to the daily QC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.

g. The initial phase should be repeated for each new crew to work on-site, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase

Daily checks shall be performed to assure continuing compliance with contract requirements, including control testing, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation and shall document specific results of inspections for all features of work for the day or shift. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon or conceal non-conforming work.

3.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases may be conducted on the same definable features of work as determined by the Government if the quality of on-going work is unacceptable; or if there are changes in the applicable QC staff or in the on-site production supervision or work crew; or if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.

3.7 TESTS

3.7.1 Testing Procedure

The Contractor shall perform tests specified or required to verify that control measures are adequate to provide a product which conforms to contract requirements, see Table 1-Minimum Testing. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site. A list of tests to be performed shall be furnished as a part of the CQC plan. The list shall give the test name, frequency, specification paragraph containing the test requirements, the personnel and laboratory responsible for each type of test, and an estimate of the number of tests required. The Contractor shall perform the following activities and record and provide the following data:

a. Verify that testing procedures comply with contract requirements.

b. Verify that facilities and testing equipment are available and comply with testing standards.

c. Check test instrument calibration data against certified standards.

d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

e. Results of all tests taken, both passing and failing tests, will be recorded on the Quality Control report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test will be given. Actual test reports may be submitted later, if approved by the Contracting Officer, with a reference to the test number and date taken. An information copy of tests performed by an off-site or commercial test facility will be provided directly to the Contracting Officer. Failure to submit timely test reports, as stated, may result in nonpayment for related work performed and disapproval of the test facility for this contract. Test results shall be signed by an Engineer Registered in the state where the tests are performed.

3.7.2 Testing Laboratories

3.7.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Costs of testing the Contractor Laboratory facilities for Government acceptance shall be borne by the Contractor. Laboratory facilities, including personnel and equipment, utilized for testing soils, concrete, asphalt and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329, and be accredited by the American Association of Laboratory Accreditation (AALA), National Institute of Standards and Technology (NIST), National Voluntary Laboratory

Accreditation Program (NVLAP), the American Association of State Highway and Transportation Officials (AASHTO), or other approved national accreditation authority. All personnel performing concrete testing shall be certified by the American Concrete Institute (ACI). The contractor shall submit documentation showing the AALA, or other approved testing facility, certification, personnel ACI certifications, and the name and work experience of the Registered Professional Engineer on the staff.

3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of $500.00 plus travel costs to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3 On-Site Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials will be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the Corps of Engineers Division Laboratory, f.o.b., at the following address:

U.S. Army Corps of Engineers
Materials Testing Center
Waterways Experiment Station
3909 Hall Ferry Road
Vicksburg, MS 39180-6199

ATTN: Project _____, Contract Number _____

Coordination for each specific test, exact delivery location and dates will be made through the Area Office.

If samples are scheduled to arrive at the laboratory on a weekend (after 1700 Friday through Sunday) notify the laboratory at least 24 hours in advance at (402) 444-4317 to arrange for delivery.

3.8 COMPLETION INSPECTION

At the completion of all work or any increment thereof established by a completion time stated in the Special Clause entitled "Commencement, Prosecution, and Completion of Work," or stated elsewhere in the specifications, the CQC system manager shall conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved plans and specifications. Such a list of deficiencies shall be included in the CQC documentation, as required by paragraph DOCUMENTATION below, and shall include the estimated date by which the deficiencies will be corrected. The CQC system manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected and so notify the Government. These inspections and any deficiency corrections required by this paragraph will be

accomplished within the time stated for completion of the entire work or any particular increment thereof if the project is divided into increments by separate completion dates.

3.9 DOCUMENTATION

The Contractor shall maintain current records of quality control operations, activities, and tests performed, including the work of subcontractors and suppliers. These records shall be on an acceptable form and shall be a complete description of inspections, the results of inspections, daily activities, tests, and other items, including but not limited to the following:

a. Contractor/subcontractor and their area of responsibility.

b. Operating plant/equipment with hours worked, idle, or down for repair.

c. Work performed today, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.

d. Test and/or control activities performed with results and references to specifications/plan requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.

e. Material received with statement as to its acceptability and storage.

f. Identify submittals reviewed, with contract reference, by whom, and action taken.

g. Off-site surveillance activities, including actions taken.

h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

i. List instructions given/received and conflicts in plans and/or specifications.

j. Contractor's verification statement.

k. These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within 24 hours after the date(s) covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every seven days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC system manager. The report from the CQC system manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.10 SAMPLE FORMS

Sample Contractor Quality Control Report forms are enclosed at the end of this section.

3.11 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor at the site of the work, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

TABLE 1

MINIMUM SAMPLING AND TESTING FREQUENCY

Materials	Test	Minimum Sampling and Testing Frequency
Fills, Embankments, Backfills, Subgrade, Subbase, and Base Course Material		
Fill and Embankment	Field Density[2/12/]	Two tests per lift for each increment or fraction of 1,672 square meters (2000 sy) and any time material type changes.
	Lab Density[3/]	One test initially per each type of materials or blended material and any time material type changes, and one every 10 field density tests.
	Gradation[1/]	One test every 153 cubic meters (200 cubic yards) of fill for each type of materials or blended material and any time material type changes.
Subgrade	Field Density[2/12/]	One test per each increment or fraction of 1,672 square meters (2000 sy)
	Lab Density[3/]	One test every 10 field density tests.
Backfill for Culverts, Trenches, Buildings and Walls, Pavements, and Other Structures	Field Density[2/12/]	Culverts: One test per each lift. Trenches: One test per lift for each increment or fraction of 152 lineal meters (500 linear feet) for backfill. Under pavements, one test every lift and at every crossing. Walls and Buildings Perimeters, Including Footings: One test per lift for each increment or fraction of 61 lineal meters (200 linear feet) of backfill. Buildings Slabs on Grade: One test per lift for each increment or fraction of 93 square meters (1000 s.f.)

TABLE 1 (Con.)

MINIMUM SAMPLING AND TESTING FREQUENCY

Materials	Test	Minimum Sampling and Testing Frequency
Backfill for Culverts, Trenches, Buildings and Walls, Pavements, and Other Structures		Areas enclosed by grade beams, compacted with power driven hand operated compactors: One test per lift for each increment or fraction of 46 square meters (500 s.f.) Pavements: Two tests per lift for each increment or fraction of 1,672 square meters (2000 s.y.) Other Structures: One test per lift for each increment or fraction of 61 lineal meters (200 linear feet) of backfill.
	Lab Density3/	One test initially per each type of material or blended material and one every 10 field density tests.
	Gradation1/	One test per each type of material or blended material and one every 10 field density tests.
Subbase and Base	Gradation1/(including .02 mm particles size limits.	1 sample for every 3,345 square meters (4,000 sy.)
	In-Place Density2/ 12/	1 sample every 1,672 square meters (2,000 sy.)
	Moisture-Density Relationship3/	1 initially and every 20 density tests.
	Asphaltic Concrete and Pavements	(Non airfield)
Asphaltic concrete	Marshall method Test	1 test per day minimum and 1 per 907,200 kilograms (1,000 tons) thereafter.
	Specific Gravity	per each Marshall Test.
	Extraction	1 test for each Marshall Method.

TABLE 1 (Con.)

MINIMUM SAMPLING AND TESTING FREQUENCY

Materials	Test	Minimum Sampling and Testing Frequency
Asphaltic concrete	Gradation[5/]	1 per each extraction test.
	Fracture faces[5/]	1 per each extraction test.
Cored or sawed specimens	Perform complete test (thickness, in-place density and bulk specific gravity) on each cored or sawed sample.[12/]	Take 1 set of 3 cored sawed specimens for each 836 square meters (1,000 square yards) or fraction thereof. One specimen shall be taken from longitudinal joint or from transverse joint.
	Portland Cement Concrete (Non airfield)	
Coarse and Fine Aggregate[7/]	Moisture, specific gravity and absorption[8/]	1 initially.
	Gradation and fineness modules	1 every 191 cubic meters (250 cy) of concrete.
	Moisture, specific gravity and absorption[8/]	(same as coarse aggregate).
Concrete	Slump	Conduct test every day of placement and for every 19 cubic meters (25 cy) and more frequently if batching appears inconsistent. Conduct with strength tests.
	Entrained Air	Conduct with slump test.
	Ambient and concrete temperatures	Conduct with slump tests.
	Unit weight, yield, and water cement ratio	Conduct with strength tests. Check unit weight and adjust aggregate weights to insure proper yield.

TABLE 1 (Con.)

MINIMUM SAMPLING AND TESTING FREQUENCY

Materials	Test	Minimum Sampling and Testing Frequency
Concrete	Flexural strength and evaluation	When specified for slabs on grade or for concrete pavements, take one set of 6 beams every 76 cubic meters (100 cy) of concrete with a minimum of 1 set per day. Two beams shall be tested at 7 days, two at 28 days, and two at 90 days.
	Compressive strength	One set of 3 cylinders per day and every 76 cubic meters (100 cy) for each class of structural concrete. Test one cylinder at 7 days and two at 28 days. Additional field cure cylinders shall be made when insitu strengths are required to be known.
Vibrators	Frequency and amplitude	Check frequency and amplitude initially and any time vibration is questionable.
	Masonry	
Concrete Masonry Units[9/]	Dry shrinkage[10/]	1 set of 3 per 10,000 units and manufacturers certification and test report.
	Airdry condition[11/]	Same as dry shrinkage.
	Absorption	" " " "
	Compressive strength	" " " "
	Unit Weight	" " " "
Mortar and grout	Compressive Strength	1 set of 3, every 2,000 units (1 test at 7 days and 2 tests at 28 days).

TABLE 1 (Con.)

NOTES:

1/ All acceptance tests shall be conducted from in-place samples.
2/ Additional tests shall be conducted when variations occur due to the contractors operations, weather conditions, site conditions, etc.
3/ Classification (ASTM D-2487), moisture contents, Atterberg limits and specific gravity tests shall be conducted for each compaction test if applicable.
4/ (Not used.)
5/ Tests can substitute for same tests required under "Aggregates" (from bins or source), although gradations will be required when blending aggregates.
6/ Increase quantities by 50 percent for Paving mixes and by 100 percent for Government testing of admixtures. Include standard deviation for similar mixes from the intended batch plant and data from a minimum of 30 tests, if available. Refer to ACI 214.
7/ A petrographic report for aggregate is required with the sample for source approval. If the total amount of all types of concrete is less than 153 cubic meters (200 c.y.) service records from three separate structures in similar environments which used the aggregates may substitute for the petrographic report.
8/ Aggregate moisture tests are to be conducted in conjunction with concrete strength tests for w/c calculations.
9/ For less than 1,000 units, the above test may be waived at the discretion of the Contracting Officer and acceptance based on manufacturers certification and test report.
10/ Additional tests shall be performed when changes are made either in the manufacturing processes or in materials used in the production of the masonry units.
11/ If adequate storage protection is not provided at the jobsite, additional tests shall be made to determine that the allowable moisture condition has not been exceeded before the blocks can be placed in the structure.
12/ The nuclear densometer, if properly calibrated, may be used but only in addition to the required testing frequency and procedures using sandcones. The densometer shall be calibrated and is recommended for use when the time for complete results becomes critical.

(sample of Contractor's typical daily report)
DAILY CONSTRUCTION QUALITY CONTROL REPORT

Contract Number: _____ Date: _____ Rpt No._____

Contract Title: _____ Location: _____

Weather: Clear __ P. Cloudy __ Cloudy __ Rainfall __ (__% of workday)

Temperature during workday: High ____ degrees F. Low ___ degrees F.

1. WORK PERFORMED BY CONTRACTOR/SUBCONTRACTOR(S):

Contractor Name	No. of Workers	Crafts/Hours	Work performed

2. EQUIPMENT DATA:

Type, Size, Etc.	Owned/Rented	Hours Used	Hours Standby

3. QUALITY CONTROL INSPECTIONS AND RESULTS: (Include a description of preparatory, initial, and/or follow up inspections or meetings; check of subcontractors work and materials delivered to the site compared to submittals and/or specifications; comments on the proper storage of materials; include comments on corrective actions to be taken):

_____

_____

_____

_____

4. QUALITY CONTROL TESTING AND RESULTS (comment on tests and attach test reports):

_____

_____

_____

5. DAILY SAFETY INSPECTIONS (Include comments on new hazards to be added to the Hazard Analysis and corrective action of any safety issues):

_____

_____

6. REMARKS (Include conversations with or instructions from the Government representatives; delays of any kind that are impacting the job; conflicts in the contract documents; comments on change orders; environmental considerations; etc.):

_____

_____

_____

_____

_____

CONTRACTOR'S VERIFICATION: The above report is complete and correct. All material, equipment used, and work performed during this reporting period are in compliance with the contract documents except as noted above.

_____
CONTRACTOR QC REPRESENTATIVE

(Sample of Contractor's Typical Test Report)

TEST REPORT

STRUCTURE OR BUILDING _____

CONTRACT NO. _____

DESCRIPTION OF ITEM, SYSTEM, OR PART OF SYSTEM TESTED: _____
_____

_____

DESCRIPTION OF TEST: _____

_____

_____
NAME AND TITLE OF PERSON IN CHARGE OF PERFORMING TESTS FOR THE CONTRACTOR:

NAME_____

TITLE_____

SIGNATURE_____

I HEREBY CERTIFY THAT THE ABOVE DESCRIBED ITEM, SYSTEM, OR PART OF SYSTEM HAS BEEN TESTED AS INDICATED ABOVE AND FOUND TO BE ENTIRELY SATISFACTORY AS REQUIRED IN THE CONTRACT SPECIFICATIONS.

SIGNATURE OF CONTRACTOR
QUALITY CONTROL INSPECTOR_____

DATE_____

REMARKS
_____

_____

_____

END OF SECTION

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SECTION 01501

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.1.1 Water

The Government will make available to Contractor, from existing outlets and supplies, reasonable amounts of potable water without charge. Contractor shall reasonably conserve potable water furnished. Contractor, at its own expense, shall install and maintain necessary temporary connections and distribution lines and shall remove the connections and lines prior to final acceptance of construction.

1.1.2 Electricity

Electric power will be made available by the Government, without charge, to the Contractor for performing work at the work area. The Contractor shall carefully conserve electricity furnished. The Contractor, at its own expense and in a workmanlike manner satisfactory to the Contracting Officer, shall extend the existing electrical distribution system (overhead and underground) for temporary electrical service to the worksite, shall install and maintain necessary temporary connections, and shall remove the same prior to final acceptance of the construction. These connections shall be coordinated with the Air Force Exterior Electrical Shop, through the Contracting Officer.

1.2 SANITARY PROVISIONS

Contractor shall provide sanitary accommodations for the use of employees as may be necessary and shall maintain accommodations approved by the Contracting Officer and shall comply with the requirements and regulations of the State Health Department, County Sanitarian, or other authorities having jurisdiction.

1.3 TEMPORARY ELECTRIC WIRING

1.3.1 Temporary Power and Lighting

The Contractor shall provide construction power facilities in accordance with the safety requirements of the National Electric Code NFPA No. 70 and the SAFETY AND HEALTH REQUIREMENTS MANUAL EM 385-1-1. The Contractor, or its delegated subcontractor, shall enforce the safety requirements of electrical extensions for the work of subcontractors. Work shall be accomplished by journeyman electricians.

1.3.2 Construction Equipment

In addition to the requirements of SAFETY AND HEALTH REQUIREMENTS MANUAL, EM 385-1-1, temporary wiring conductors installed for operation of construction tools and equipment shall be either Type TW or THW contained in metal raceways, or shall be hard usage or extra hard usage multiconductor cord. Temporary wiring shall be secured above the ground or floor in a workmanlike manner and shall not present an obstacle to persons or equipment. Open wiring may only be used outside of buildings, and then only in accordance with the provisions of the National Electric Code.

1.3.3 Submittals

Submit detailed drawings of temporary power connections. Drawings shall include, but not be limited to, main disconnect, grounding, service drops, service entrance conductors, feeders, GFCI'S, and all site trailer connections.

1.4 FIRE PROTECTION

1.4.1 Fire Extinguishers

During the construction period, the Contractor shall provide fire extinguishers in accordance with the safety requirements of the SAFETY AND HEALTH REQUIREMENTS MANUAL, EM 385-1-1. The fire extinguishers shall remain the property of the Contractor and shall be removed at the completion of construction. These requirements include providing fire extinguishers on construction equipment, storage facilities and work areas.

1.4.2 Welding Permits

Welding permits are required prior to any welding work. The Contractor shall contact the Base Fire Department for required permits.

1.5 STAGING AREA

Contractor will be provided adequate open staging area as directed by the Contracting Officer. Area is unsecured, and Contractor shall make provisions for its own security.

Contractor shall be responsible for keeping staging area, and office area clean and free of weeds and uncontrolled vegetation growth. Weeds shall be removed by pulling or cutting to within 1-inch of ground level. Lawn areas shall be mown to keep growth to less than 2-inches. All loose debris and material subject to being moved by prevailing winds in the area shall be picked up or secured at all times.

If the area is not maintained in a safe and clean condition as defined above the Contracting Officer may have the area cleaned by others with the costs being deducted from the Contractor's payment.

1.6 VEHICULAR ACCESS

Pavements, drives or turf areas utilized by the Contractor for access roads or storage areas shall be maintained and restored by the Contractor to match the original condition, to the satisfaction of the Contracting Officer. Costs associated with the above work shall be incidental to the contract.

1.7 HOUSEKEEPING AND CLEANUP

Pursuant to the requirements of Clause CLEANING UP and Clause ACCIDENT PREVENTION, of the CONTRACT CLAUSES, the Contractor shall assign sufficient personnel to insure compliance. The Contractor shall submit a detailed written plan for implementation of this requirement. The plan will be presented as part of the preconstruction safety plan and will provide for keeping the total construction site, structures, and accessways free of debris and obstructions at all times. Work will not be allowed in those areas that, in the opinion of the Contracting Officer, have unsatisfactory cleanup and housekeeping at the

end of the preceding day's normal work shift. At least once each day all areas shall be checked by the Quality Control person of the Contractor and the findings recorded on the Quality Control Daily Report. In addition, the Quality Control person shall take immediate action to insure compliance with this requirement. Housekeeping and cleanup shall be assigned by the Contractor to specific personnel. The name(s) of the personnel shall be available at the project site.

1.8 DIGGING PERMIT

Before performing any onsite excavation, Contractor shall obtain a digging permit. The digging permit may be obtained through coordination with Corps of Engineers office and it may take up to 14 days. Digging permit(s) expires 30 days after date issued and must be renewed.

1.9 CONSTRUCTION NEAR COMMUNICATIONS CABLES

1.9.1 Excavation Near Communication Cables

Digging within 3 feet of communication cables (including fiber optic cables) shall be performed by hand digging until the cable is exposed. The Contracting Officer shall be notified a minimum 3 days prior to digging within a . 3-foot area near cable. The cable route will be marked by the Government prior to excavation in the area. A digging permit shall be obtained by the Contractor before performing any excavation. The Contractor shall be held responsible for any damage to the cable by excavation procedures. Once the cable is exposed, mechanical excavation may be used if there is no chance of damage occurring to the cable.

1.9.2 Reburial of Exposed Utilities

When existing utility lines are reburied a tape, detectable by pipe detector systems, shall be installed above the uncovered length of the utility at a depth of 305 mm (12 inches) below grade. Tape shall be a minimum .127 mm (5 mil) plastic tape with metallic tracer, minimum 76 mm (3 inches) wide, lettering on tape to show buried utility, and brightly colored.

1.9.3 Access to Communications Manhole or Handhole

No communications manhole or handhole shall be entered without first obtaining a fiber optic cable briefing. Coordinate through the Contracting Officer with the Base Communications Officer.

1.9.4 Cable Cuts or Damage

If a communications cable is cut or damaged the Contractor shall immediately notify the Contracting Officer (CO) and begin gathering personnel and equipment necessary to repair the cut, or damage. Contractor shall begin repairs within one hour of the cut or damage, unless notified otherwise, and continue repairs without interruption until full service is restored.

1.10 PROJECT SIGN

Contractor shall furnish and install one project sign in accordance with conditions hereinafter specified and layout shown on drawing No. 49s-40-05-15, Sheets 1 and 2, except Corps of Engineers' castle and Department of Air Force seal will be Government furnished. All letters shall be block type, upper case. Letters shall be painted as indicated using exterior-type paint. Sign shall be maintained in excellent

condition throughout the life of job. Project sign shall be located as directed. Upon completion of project, sign shall be removed and shall remain the property of Contractor.

1.11 ELEVATED WORK AREAS

Workers in elevated work areas in excess of 2 meters (6 feet) above an adjoining surface require special safety attention. In addition to the provisions of SAFETY AND HEALTH REQUIREMENTS MANUAL, EM 385-1-1, the following safety measures are required to be submitted to the Contracting Officer's Representative. Prior to commencement of work in elevated work areas, the Contractor shall submit drawings depicting all provisions of his positive fall protection system including, but not limited to, all details of guardrails. Positive protection for workmen engaged in the installation of structural steel and steel joist shall be provided by safety nets, tie-offs, hydraulic man lifts, scaffolds, or other required means. Decking crews must be tied-off or work over nets or platforms not over 2 meters (6 feet) below the work area. Walking on beams and/or girders and the climbing of columns is prohibited without positive protection. Perimeter guardrails shall be installed at floor, roof, or wall openings more than 2 meters (6 feet) above an adjoining surface and on roof perimeters. Rails shall be designed to protect all phases of elevated work including, but not limited to, roofing operations and installation of gutters and flashing. Rails around roofs may not be removed until all work on the roof is complete and all traffic on or across the roof ceases. Rails shall be designed by a licensed engineer to provide adequate stability under any anticipated impact loading. As a minimum, the rails shall consist of a top rail at a height of 1067 mm (42 inches), a mid-rail, and a toe board. Use of tie-offs, hydraulic man lifts, scaffolds, or other means of roof edge protection methods may be utilized on small structures such as family housing, prefabricated metal buildings, etc. If safety belts and harnesses are used, the positive fall protection plan will address fall restraint versus fall arrest. Body belts will ONLY be used for fall restraint, they will not be used for fall arrest.

1.12 TRAFFIC CONTROL

The Contractor shall provide for movement of traffic through and around the construction zone in a manner that is conducive to the safety of motorists, pedestrians, and workers. This shall include placement and maintenance of traffic control devices in accordance with the U.S. Department of Transportation, Federal Highway Administration publication, Manual on Uniform Traffic Control Devices. Streets (except dead end) may be closed to traffic temporarily by approved written request to the Contracting Officer at least 14 working days prior to street closure. One way traffic (directed by Contractor personnel) shall be maintained at all times during road lane closures. Excavations shall not remain open for more than 1 working day without approval.

1.12.1 Utility Crossings at Roadways

Jacking or boring are the preferred method for utility installation under roads.

1.13 UTILITIES

1.13.1 Utility Locator

Before construction commences, the Contractor shall coordinate with the Contracting Officer to locate utilities. A permit is required for locating base utilities. Contractor shall allow a minimum of 14 days to obtain permit and shall be responsible for marking limits of construction areas with white paint or white flagging so utilities may be located.

1.13.2 Utilities Not Shown

The Contractor can expect to encounter, within the construction limits of the entire project, utilities not shown on the drawings and not visible as to the date of this contract If such utilities will interfere with construction operations, he shall immediately notify the Contracting Officer verbally and then in writing to enable a determination by the Contracting Officer as to the necessity for removal or relocation. If such utilities are removed or relocated as directed, the Contractor shall be entitled to equitable adjustment for any additional work or delay. The types of utilities the Contractor may encounter are waterlines, sewer lines (storm and sanitary), gas lines, fueling lines, steam lines, buried fuel tanks, septic tanks, other buried tanks, communication lines, and power lines. These utilities may be active or abandoned utilities.

1.14 GOVERNMENT WITNESSING AND SCHEDULING OF TESTING

The Contractor shall notify the Contracting Officer, by serial letter, of dates and agenda of all performance testing of the following systems: mechanical (including fire protection), electrical (including fire protection) not later than 10 calendar days prior to start of such testing. In this notification, the Contractor shall certify that all equipment, materials, and personnel necessary to conduct such testing will be available on the scheduled date and that the systems have been prechecked by him and are ready for performance and/or acceptance testing. Contractor shall also confirm that all operations and maintenance manuals have been submitted and approved. NO PERFORMANCE AND/OR ACCEPTANCE TESTING WILL BE PERMITTED UNTIL THE OPERATIONS AND MAINTENANCE MANUALS HAVE BEEN APPROVED.

Government personnel, at the option of the Government, will travel to the site to witness testing. If the testing must be postponed or canceled for whatever reason not the fault of the government, the Contractor shall provide the Government not less than 3 working days advance notice (notice may be faxed) of this postponement or cancellation. Should this 3 working day notice not be given, the Contractor shall reimburse the Government for any and all out of pocket expenses incurred for making arrangements to witness such testing including, but not limited to airline, rental car, meal, and lodging expenses. Should testing be conducted, but fail and have to be rescheduled for any reason not the fault of the Government, the Contractor shall similarly reimburse the Government for all expenses incurred.

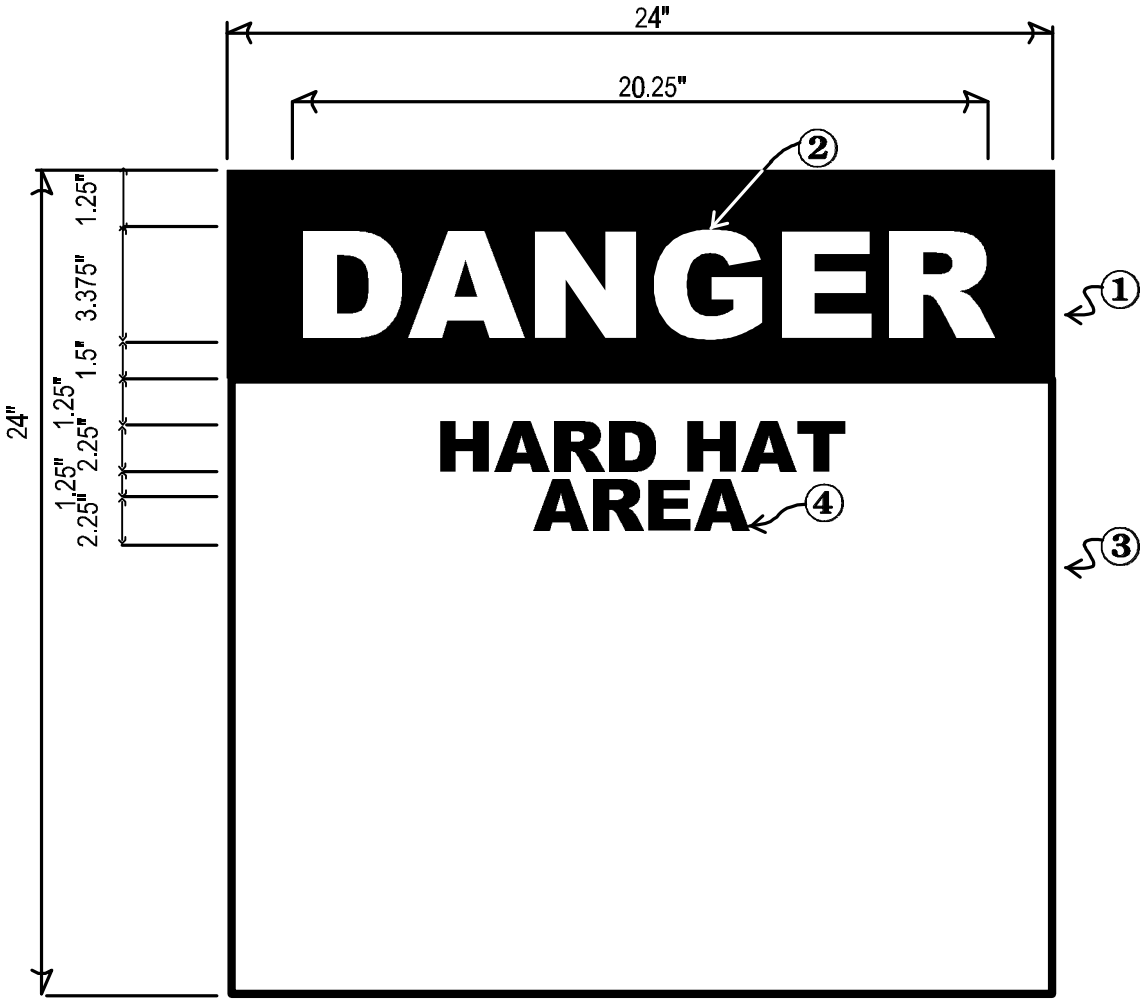
1.15 HARD HAT SIGNS

The Contractor shall provide 610 mm by 610 mm (24 by 24 inch) square Hard Hat Area signs at each entry to the project or work area as directed by the Contracting Officer. A minimum of two signs will be required. Signs shall be in accordance with the sketch at the end of this section.

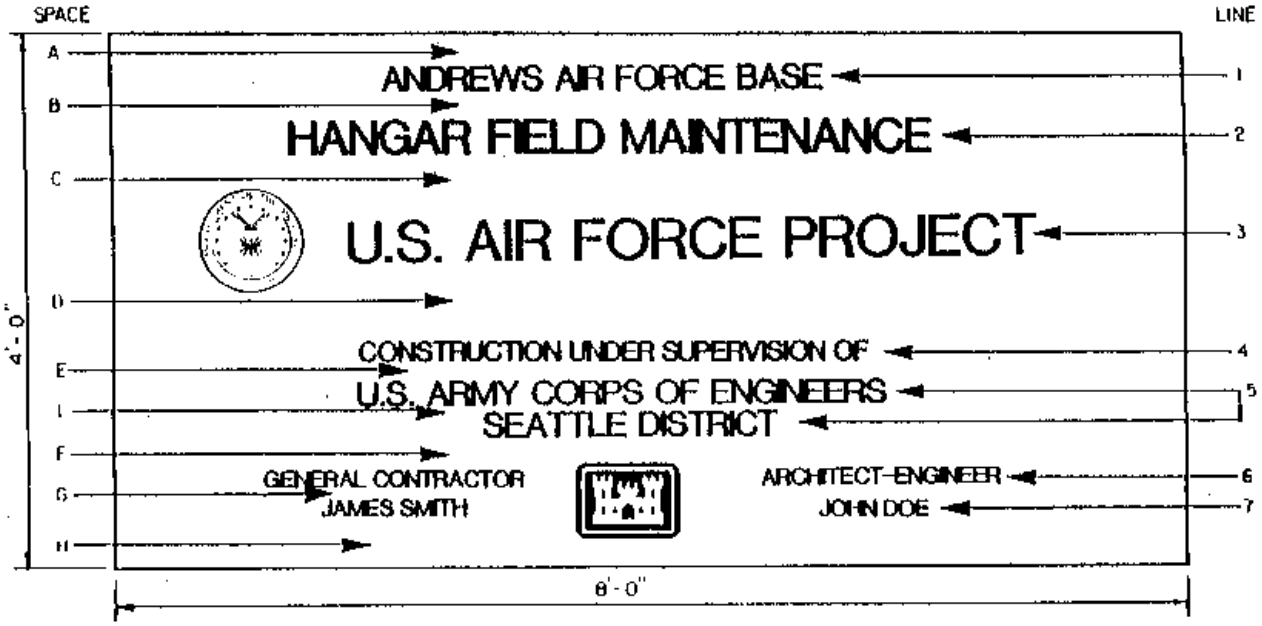
PART 2 PRODUCTS AND PART 3 EXECUTION (NOT APPLICABLE)

(Attachments follow.)

END OF SECTION



- SIGN SHALL BE FABRICATED FROM .125 THICK 6061-T6 ALUMINUM PANEL
- <u>COLOR</u>
    1. SAFETY RED (SR)
    2. WHITE
    3. WHITE
    4. BLACK
- LETTERING SHALL BE HELVETICA BOLD TYPOGRAPHY.
- LETTERS AND BACKGROUND SHALL BE REFLECTIVE SHEETING MATERIAL.
- SIGNS SHALL BE POSTED AT 6’-6” (BOTTOM SIGN TO GRADE) OR AS DIRECTED BY THE CONTRACTING OFFICER.
- LETTERING TO BE CENTERED ON PANEL.



SAMPLE CONSTRUCTION SIGN FOR MCP PROJECTS

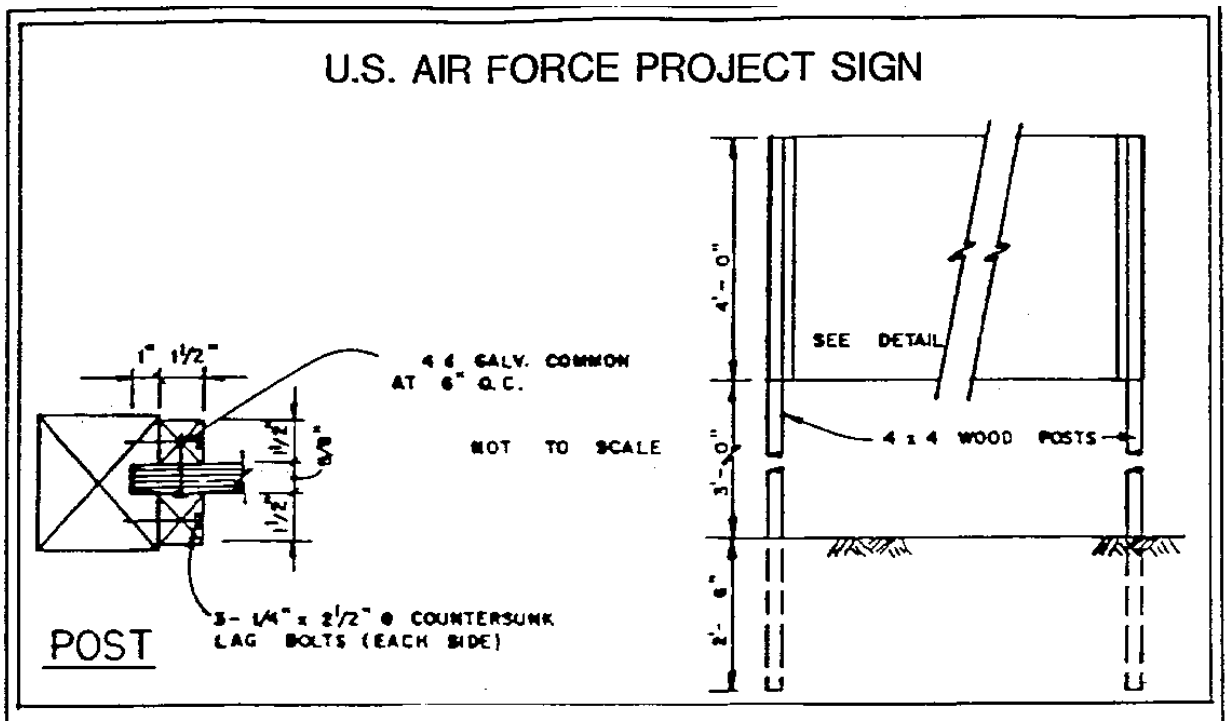
SCHEDULE

SPACE	HT.	LINE	DESCRIPTION	LETTER HT.	STROKE
A	2"	1	LOCATION	2 3/8"	1/4"
B	2 5/8	2	PROJECT NOMENCLATURE *	2 3/4"	3/8"
C	5 3/4"	3	U.S. AIR FORCE PROJECT	4"	1/2"
D	8"	4	CONSTRUCTION UNDER SUPERVISION OF	1 1/2"	1/8"
E	4"	5	CONSTRUCTION AGENCY *	2 3/8"	1/4"
F	4"	6	GENERAL CONTRACTOR *	1 3/8"	3/16"
G	1"	7	GENERAL CONTRACTOR *	1 3/8"	3/16"
H	2 7/8"		* WILL VARY TO SUIT PROJECT REQUIREMENTS		
I	2"		SEATTLE DISTRICT		

U.S. AIR FORCE

PROJECT CONSTRUCTION SIGN

Sheet 1 OF 2 Scale: As shown
U.S. Army Engr. Dist. Seattle, WA.
Drl R.L.M. Transmitted with report
Trl R.L.M. DATE: 20 JUNE 84
Chl R.L.M. File No. 49: / 40-05-15



NOTES:

1. Signboard 4' x 8' x 5/8" grade A-C exterior type plywood with medium density overlay on both sides.

2. Paint both sides and edges with one prime coat and two coats of paint, color white exterior type enamel. Lettering shall be as shown on drawing and shall be black gloss exterior type enamel.

3. Lettering shall be Helvetica medium.

4. Acceptable abbreviations may be used for Contractor's name.

5. Department of Air Force Seal and Corps of Engineers' Castle to be Government furnished.

6. No company logo shall be used.

7. Sign posts and 1-½" wood trim shall be painted white.

8. Upon completion of work under this contract, the project sign shall be removed from the job site and shall remain the property of the Contractor.

END OF SECTION

SHEET 2 OF 2

SECTION 01701

OPERATION AND MAINTENANCE MANUALS

PART 1 GENERAL

1.1 SUBMITTALS

Submittals shall be in accordance with Section 01330: SUBMITTAL PROCEDURES.

1.1.1 Preliminary O&M Manual And Data Submittal

To establish and assure uniform O&M manual format, the Contractor shall submit and receive Contracting Officer approval on one (1) complete set of the O&M data package without the binders prior to submission of the final bound manuals for each data package. Initial O & M Manual data submittal shall be a minimum of 30 days prior to 90 percent completion of the first housing unit or other facility to be constructed.

The Contractor shall also provide two typewritten pages representing the proposed binder marking format as required under Paragraph: Marking and Binding. One page will represent the front cover/spine and the other page will represent the inside of the front cover.

1.1.1.1 Data submitted for the manual are to be for the specific equipment furnished, and are in addition to that furnished as shop drawings.

1.1.1.2 The Contracting Officer will require thirty (30) days for review of submitted O&M manual(s) or data. The Contracting Officer will retain one copy of unacceptable O&M manual submittal and return remainder of copies to the Contractor marked "Returned for Correction." If "Returned for Correction." the Contractor shall resubmit the required number of copies of the manual(s) incorporating all comments, prior to substantial completion and/or use and possession. The Contractor may, at its option, update the copy retained by the Government in lieu of providing the added copy.

1.1.2 Final O&M Manual And Data Submittal

1.1.2.1 Number of Manuals

a. Base Housing Office Data Packages: Three copies of the final manuals are required for the complete project. The requirement for three copies of the O&M manual shall supersede and replace any requirements for the number of manuals which may be indicated in other specifications.

b. Occupants Maintenance Manual Data Package: Five copies of the final manual are required for the first completed single family housing unit and one additional copy for each additional completed single family housing unit.

1.1.2.2 For equipment or systems requiring personnel training and/or acceptance testing, the final O&M data shall be approved by the Contracting Officer prior to the scheduling of the training and/or testing. O&M data on equipment or systems not requiring training or testing shall be submitted so all data will be approved and bound in the O&M manuals in the required quantity by the time the facility reaches

90 percent completion. Failure to furnish approved, bound manuals in the required quantity by the time the facility is 90 percent complete, will be cause for the Contracting Officer to hold or adjust the retained percentage in accordance with CONTRACT CLAUSE, PAYMENTS UNDER FIXED PRICE CONSTRUCTION CONTRACTS.

1.1.2.3 One of the three completed copies of the final O&M Base Housing Office manuals shall contain original manufacturer's data. Data in the remaining manuals may be duplicated copies of original data. All data furnished must be of such quality to reproduce clear, legible copies.

1.1.3 Binders

All final submittals for O&M Data Packages shall be bound as follows:

1.1.3.1 Base Engineering/Housing Office Manuals

1.1.3.1.1 Construction and Assembly

Manuals shall be sliding posts or screw-type aluminum binding posts (three screws) with spine, but only one type shall be used for all manuals. The manuals shall be hardback plastic-covered, cleanable, not over three (3) inches thick and designed for 8-1/2 x 11 inch paper. The hard cover shall be of minimum stiffness equal to 0.080 inch display board or double weight illustration board.

1.1.3.1.2 Marking and Binding

As appropriate, systems shall be grouped into four separate categories as follows: Mechanical, Electrical, Fire Protection/Security, and Architectural/General.

Each binder shall have the following information, as a minimum, inscribed on both the spine and cover using an offset or silk screen printing process; "EQUIPMENT OPERATION, MAINTENANCE, AND REPAIR MANUAL;" BUILDING NAME, IDENTIFICATION NUMBER (Building No.), LOCATION, AND DISCIPLINE (MECHANICAL, ELECTRICAL, FIRE PROTECTION/SECURITY, ARCHITECTURAL/GENERAL). Contractor's name and address as well as the contract title and contract number shall be printed on the inside of the front cover.

1.1.3.1.3 Color

Color of binder and printing shall be the option of the Contractor except that; (a) printing color shall contrast with binder color, and (b) colors shall be the same for all manuals.

1.1.3.2 Occupants Maintenance Manual Data Package

1.1.3.2.1 Construction and Assembly

The manuals shall be plastic-covered, designed for 8-1/2 x 11 inch paper. Each binder shall have the following information, as a minimum, visible without opening the manual: "OCCUPANTS MAINTENANCE MANUAL; MOUNTAIN HOME AFB.”

1.1.3.2.2 Color

Color of binder, interior separator pages and printing shall be subject to the approval of the Base Housing Office.

1.1.4 Changes to Submittals

Manufacturer-originated changes or revisions to submitted data shall be furnished by the Contractor if a component of an item is so affected subsequent to acceptance of the O&M data. Changes, additions, or revision required by the Contracting Officer for final acceptance of submitted data, shall be submitted by the Contractor within 30 calendar days of the notification of this change requirement.

1.2 OPERATION AND MAINTENANCE DATA

Operation and maintenance (O&M) data/manuals shall be specifically applicable to this contract and provide a complete and concise description all provided equipment, products and systems. Data containing extraneous information to be sorted through to find applicable instructions will not be accepted. Present information in sufficient detail to clearly explain O&M requirements at the system, equipment, component, and subassembly level. Include an index preceding each submittal. Submit in accordance with this section and Section 01330, "Submittal Procedures." Additional O&M data requirements are specified in individual sections of the technical specifications. O&M manual requirements shall be coordinated with the requirements specified in the other technical sections of the specifications.

1.2.1 Manual Content

For each product, system, or piece of equipment requiring submission of O&M data, the individual manual content shall, as a minimum, include the items required in the data packages described in the paragraph entitled "Schedule of Operations and Maintenance Data Manual" except irrelevant or inapplicable items need not be included.

1.3 TYPES OF INFORMATION REQUIRED IN O&M DATA PACKAGES

1.3.1 Operating Instructions

Include specific instructions, procedures, and illustrations for the following phases of operation:

1.3.1.1 Safety Precautions

List personnel hazards and equipment or product safety precautions for all conditions.

1.3.1.2 Normal Operations

Provide narrative description of normal operating procedures. Include control diagrams with data to explain operation and control of systems and specific equipment.

1.3.1.3 Emergency Operations

Include emergency procedures for equipment malfunctions to permit a short period of continued operation or to shut down the equipment to prevent further damage to systems and equipment. Include emergency

shutdown instructions for fire, explosion, spills, or other foreseeable contingencies. Provide guidance on emergency operations of all utility systems including valve locations and portions of systems controlled.

1.3.1.4 Operator Service Requirements

Include instructions for services to be performed by the operator for all equipment provided, including lubrication, adjustment, inspection, and gage reading recording.

1.3.1.5 Environmental Conditions

Include a list of environmental conditions (temperature, humidity, and other relevant data) which are best suited for each product or piece of equipment and describe conditions under which equipment should not be allowed to run.

1.3.2 Preventive Maintenance

Include the following information for preventive and scheduled maintenance to minimize corrective maintenance and repair.

1.3.2.1 Lubrication Data

Include lubrication data, other than instructions for lubrication in accordance with paragraph entitled "Operator Service Requirements":

a. A table showing recommended lubricants for specific temperature ranges and applications;

b. Charts with a schematic diagram of the equipment showing lubrication points, recommended types and grades of lubricants, and capacities; and

c. A lubrication schedule showing service interval frequency.

1.3.2.2 Preventive Maintenance Plan and Schedule

Include manufacturer's schedule for routine preventive maintenance, inspections, tests and adjustments required to ensure proper and economical operation and to minimize corrective maintenance and repair. Provide manufacturer's projection of preventive maintenance work-hours on a daily weekly, monthly, and annual basis including craft requirements by type of craft. For periodic calibrations, provide manufacturer's specified frequency and procedures for each separate operation.

1.3.3 Corrective Maintenance

1.3.3.1 Troubleshooting Guides and Diagnostic Techniques

Include step-by-step procedures to promptly isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or require replacement.

1.3.3.2 Wiring Diagrams and Control Diagrams

Wiring diagrams and control diagrams shall be point-to-point drawings of wiring and control circuits including factory-field interfaces. Provide a complete and accurate depiction of the actual job specific wiring and control work. On diagrams, number electrical and electronic wiring and pneumatic control tubing and the terminals for each type, identically to actual installation numbering.

1.3.3.3 Maintenance and Repair Procedures

Include instructions and list tools required to restore product or equipment to proper condition or operating standards.

1.3.3.4 Removal and Replacement Instructions

Include step-by-step procedures and list required tools and supplies for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings and adjustments required. Instructions shall include a combination of text and illustrations.

1.3.3.5 Spare Parts and Supply Lists

Include lists of spare parts and supplies required for maintenance and repair to ensure continued service or operation without unreasonable delays. List spare parts and supplies that have a long lead time to obtain.

1.3.4 Architectural/General O&M

1.3.4.1 Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Provide information for re-ordering custom manufactured products. Data shall include, but not be limited to, information on carpet, floor tile, vinyl wall finishes, builder's hardware, etc.

1.3.4.2 Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

1.3.4.3 Moisture-protection and Weather-exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

1.3.4.4 Additional Requirements: As specified in individual specifications sections.

1.3.5 Appendices

1.3.5.1 Parts Identification

Provide identification and coverage for all parts of each component, assembly, subassembly, and accessory of the end items subject to replacement. Include special hardware requirements, such as requirement to use high-strength bolts and nuts. Identify parts by make, model, serial number, and source of supply to allow reordering without further identification. Provide clear and legible illustrations, drawings, and exploded

views to enable easy identification of the items. When illustrations omit the part numbers and description, both the illustrations and separate listing shall show the index, reference, or key number which will cross-reference the illustrated part to the listed part. Parts shown in the listings shall be grouped by components, assemblies, and subassemblies. Parts data may cover more than one model or series of equipment. components, assemblies, subassemblies, attachments, or accessories, such as a master parts catalog, in accordance with the manufacturer's standard commercial practice. Provide a copy of the nameplate data as shown on each item of equipment furnished.

1.3.5.2 Warranty Information

List and explain the various warranties and include the servicing and technical precautions prescribed by the manufacturers or contract documents to keep warranties in force. Include warranty information for primary components such as the compressor of air conditioning system.

1.3.5.3 Personnel Training Requirements

Provide information available from the manufacturers to use in training designated personnel to operate and maintain the equipment and systems properly.

1.3.5.4 Testing Equipment and Special Tool Information

Include information on test equipment required to perform specified tests and on special tools needed for the operation, maintenance, and repair of components.

1.3.5.5 Contractor Information

Provide a list that includes the name, address, and telephone number of the General Contractor and each subcontractor installing the product or equipment. Include local representatives and service organizations most convenient to the project site. Provide the name, address, and telephone number of the product or equipment manufacturers.

1.3.6 Occupants Maintenance Manual

This manual is intended as a guide for the use of the occupants of the family housing unit and shall provide general information for use of the housing unit features, including basic operating instructions, care and cleaning instructions, safety precautions, and simple troubleshooting. It is not intended for performing repair or maintenance requiring trained or experienced personnel.

1.4 SCHEDULE OF OPERATION AND MAINTENANCE DATA MANUAL

Provide O&M data packages with the required information as follows for each item of equipment and systems furnished in accordance with the following schedule:

1.4.1 Data Package 1 – Family Housing Unit (Base Engineering/Housing Office Manual)

As applicable for the equipment or building feature having a motor and some sequence of operation the following data items are required (except data for appliances may be the manufacturer’s standard information package provided to retail purchasers) Coordinate with individual technical sections:

a. Safety precautions

b. Normal operations

c. Environmental conditions

d. Operator service requirements (include general lubrication instructions)

e. Lubrication data

f. Troubleshooting guides and diagnostic techniques

g. Maintenance and repair procedures

h. Removal and replacement instructions

i. Spare parts and supply list

j Parts identification and nameplate data

k. Warranty information

l. Contractor information

1.4.2 Data Package 2 – Family Housing Unit (Base Engineering/Housing Office Manual)

As applicable for architectural/general building features the following data items are required (coordinate with individual technical sections):

a. Safety precautions

b. Maintenance and repair procedures

c. Removal and replacement instructions

d. Warranty information

e. Contractor information

1.4.3 Data Package 3 – Site Facilities Other than Family Housing Units (Base Engineering/Housing Office Manual)

As applicable for equipment or systems with motors and specialized controls the following data items are required (coordinate with individual technical sections):

a. Safety precautions

b. Normal operations

c. Emergency operations

d. Environmental conditions

e. Operator service requirements (include general lubrication instructions)

f. Lubrication data

g. Troubleshooting guides and diagnostic techniques

h. Preventive maintenance plan and schedule

i. Wiring Diagrams and Control Diagrams

j. Maintenance and repair procedures

k. Removal and replacement instructions

l. Spare parts and supply list

m Parts identification and nameplate data

n. Warranty information

o. Contractor information

1.4.4 Data Package 4 – Site Facilities Other than Family Housing Units (Base Engineering/Housing Office Manual)

As applicable for any specialized electrical equipment the following data items are required (coordinate with individual technical sections):

a. Safety precautions

b. Operator prestart

c. Start-up, shutdown, and post shutdown procedures

d. Normal operations

e. Environmental conditions

f. Preventive maintenance plan and schedule

g. Troubleshooting guides and diagnostic techniques

h. Wiring and control diagrams

i. Maintenance and repair procedures

j. Spare parts and supply list

k. Testing Equipment and Special Tool

l. Warranty information

m. Contractor information

1.4.5 Data Package 5 – Family Housing Unit (Occupants Maintenance Manual)

Suggested format:

Table of Contents

a. Introduction

b. Emergency Phone Numbers

c. Cabinets

d. Counter Tops

e. Vinyl Siding

f. Stain Removal Chart for Vinyl Siding

g. Overhead Doors

h. Patio Doors

i. Slate Tile

j. Sheet Vinyl Floor

k. Carpet

l. Paint

m. Fireplaces

n. Water Heater

o. Marble

p. Programmable Thermostat

q. Gas Furnace

r. Air Conditioner

s. Range Hood

t. Smoke & CO2 Alarms

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

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SECTION 01702

AS BUILT RECORDS AND DRAWINGS

PART 1 GENERAL

1.1 SUBMITTALS

Data listed in PART 3 of this section shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES. Due dates shall be as indicated in applicable paragraphs and all submittals shall be completed before final payment will be made.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 AS-BUILT FIELD DATA

3.1.1 General

The Contractor shall keep at the construction site two complete sets of full size blueline prints of the contract drawings, reproduced at Contractor expense, one for the Contractor's use, one for the Government. During construction, both sets of prints shall be marked to show all deviations in actual construction from the contract drawings. The color red shall be used to indicate all additions and green to indicate all deletions. The drawings shall show the following information but not be limited thereto:

a. The locations and description of any utility lines and other installations of any kind or description known to exist within the construction area. The location includes dimensions and/or survey coordinates to permanent features.

b. The locations and dimension of any changes within the building or structure, and the accurate location and dimension of all underground utilities and facilities.

c. Correct grade or alignment of roads, structures, and utilities if any changes were made from contract plans.

d. Correct elevations if changes were made in site grading from the contract plans.

e. Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor including, but not limited to, fabrication erection, installation, and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.

f. The topography and grades of all drainage installed or affected as part of the project construction.

g. All changes or modifications from the original design and from the final inspection.

h. Where contract drawings or specifications allow options, only the option actually used in the construction shall be shown on the as-built drawings. The option not used shall be deleted.

These deviations shall be shown in the same general detail utilized in the contract drawings. Marking of the prints shall be pursued continuously during construction to keep them up to date. In addition, the Contractor shall maintain full size marked-up drawings, survey notes, sketches, nameplate data, pricing information, description, and serial numbers of all installed equipment. This information shall be maintained in a current condition at all times until the completion of the work. The resulting field-marked prints and data shall be referred to and marked as "As-Built Field Data," and shall be used for no other purpose. They shall be made available for inspection by the Contracting Officer's representative whenever requested during construction and shall be jointly inspected for accuracy and completeness by the Contracting Officer's representative and a responsible representative of the Contractor prior to submission of each monthly pay estimate. Failure to keep the As-Built Field Data (including Equipment-in-Place lists) current shall be sufficient justification to withhold a retained percentage from the monthly pay estimate.

3.1.2 Submittal of the As-Built Field Data

Two sets of the As-Built Field Data shall be submitted to the Contracting Officer for review and approval a minimum of 20 calendar days prior to the date of final inspection. If review of the preliminary as-built drawings reveals errors and/or omissions, the drawings will be returned to the Contractor for corrections. The Contractor shall make all corrections and return the drawings for backcheck to the Contracting Officer within 10 calendar days of receipt. When submitted drawings are accepted, one set of marked drawings will be returned to the Contractor for the completion of the as-built drawings.

3.2 AS-BUILT ELECTRONIC FILE DRAWINGS

3.2.1 No later than 30 days after final acceptance a complete set of as-built drawings shall be submitted in AutoCAD electronic file format. The electronic file format, layering standards and submittal requirements are specified in paragraphs below. The Contractor shall incorporate all the written modifications to the contract drawings which were issued by amendment or contract modification. All revisions and changes shall be incorporated, i.e. items marked "deleted" shall be deleted, clouds around new items shall be removed, etc. The as-built drawings shall be done in a quality equal to that of the originals. Line work, line weights, lettering, and use of symbols shall be the same as the original line work, line weights, lettering, and symbols. If additional drawings are required they shall be prepared in electronic file format under the same guidance. When final revisions have been completed, each drawings shall be identified with the words "AS-BUILT" in block letters at least 10 mm high placed above the title block if space permits, or if not, below the title block between the border and the trim line. The date of completion and the words "REVISED AS-BUILT" shall be placed in the revision block above the latest revision notation.

3.2.2 Electronic File Submittal Requirements

3.2.2.1 The AutoCAD electronic file(s) deliverable shall be in AutoCAD release 14 'DWG' binary format. All support files required to display or plot the file(s) in the same manner as they were developed shall be delivered along with the files. These files include but are not limited to Font files, Menu files, Plotter Setup, and Referenced files.

3.2.2.2 Layering shall conform to the guidelines defined by the "MHAFB Civil Engineering CAD Layering Standards", attached at the end of this specification section. An explanatory list of which layer is used at which drawing and an explanatory list of all layers which do not conform to MHAFB Civil Engineering CAD Layering Standards, including any user definable fields permitted by the guidelines, shall be provided with each submittal.

3.2.2.3 Electronic File Deliverable Media: All electronic files shall be submitted in ISO 9660 format CD-ROM (CD). Zip drive disks shall not be provided. Two complete sets of CD(s) shall be submitted along with one complete set of prints and one complete set of full size mylars taken from the CD(s). The mylars are to be submitted only after corrections are made, if any. See paragraph 3.2.3 below. Each CD shall have a clearly marked label stating the Contractor's firm name, project name and location, submittal type (AS-BUILT), and date the CD was made. Each submittal shall be accompanied by a hard copy transmittal sheet that contains the above information along with tabulated information about all files submitted, as shown below:

Electronic File Name	Plate Number	Drawing Title

Electronic version of the table shall be included with each submittal set of disks.

3.2.3 Submittal of the Final As-Built Drawings

The final as-built record drawings shall be completed and returned together with the approved preliminary as-built drawings to the COE, Seattle District Office, Technical Branch, Records and Information Section, within 30 calendar days of final acceptance. All drawings from the original contract drawings set shall be included, including the drawings where no changes were made. The Government will review all final as-built record drawings for accuracy and conformance to the drafting standards and other requirements contained in DIVISION 1 GENERAL REQUIREMENTS. The drawings will be returned to the Contractor if corrections are necessary. The Contractor shall make all corrections and shall return the drawings to the same office within 7 calendar days of receipt.

3.3 No partial or total payment will be made for as-built drawings (See Price Schedule) until the complete set of as-built drawings, both marked up blue prints and electronic files are fully approved by the Government (A or B action) and all copies of approved drawings and electronic media received by the Government.

3.4 One set of marked-up as-built blueline prints shall be furnished at the time of system acceptance testing. These as-built blueline prints shall be in addition to the submittals of marked-up as-built blueline prints specified elsewhere in the contract.

MHAFB CIVIL ENGINEERING CAD LAYERING STANDARDS

GENERAL GUIDELINES

1. There will be no numerical layer names. All layers will be in an abbreviated format; example: utilities = util, text = txt.

2. All New buildings will be located by their Geodetic Coordinates.

3. All blocks will be created on layer O.

4. The Contractor shall provide all projects in .DWG file format compatible with AutoCAD Release 14 on either 5-1/4" ISO 9660 format CD-ROM or 3-1/2" 1.44 MB floppy disks as directed by the Contracting Officer.

5. The Contractor shall provide a typed copy of layer names, limits, Lt scale, pen configurations, etc., and contents submitted as part of the Design Analysis and the final submittal of the disks.

6. All information shall be drawn at full scale. (1:1)

7. All text shall be in mono.

MANDATORY LAYER NAMES (CIVIL SITE PLANS ONLY)

LAYER NAME	TO INCLUDE	COLOR
BORDER	Border, Title Block, N Arrow, Scale	8 (Dark Grey)
TXT	Title Block, Text, Notes, Dims	11 (Dark Green)
STRUCT	Bldg. Outlines	4 (Cyan)
STRUCT T	Bldg. Numbers	(Red)
CONTOURS	Index & Intermediate Index/ Intermediate/	4 (Cyan) 1 (Red)
UTILS	All	7 (White)
PAVED	Paved Roads	2 (Yellow)
PAVED T	Street Names	1 (Red)
UNPAVED	Unpaved Roads	1 (Red)

Any specific questions regarding layering standards may be referred to the project engineer.

RECOMMENDED LAYER TITLES

Proposed Layers for a CIVIL/SITE Drawing:

Layer List: O (Not Used), BORDER, KEYMAP, SITEPLAN, FTPRINT, SOILBOR, CONTOURS, GRADING, LANDSCP, LAWNSPR, PAVING, WATER, SEWER, STDRAIN, ELECT, COMM, PHONE, NATGAS, SECTIONS, DETAILS, DEMOL, NEW, DIMS, TXT, MISC

Proposed Layers for a FOUNDATION Drawing:

Layer List: O (Not Used), BORDER, DEMOL, EXISTING, NEW, DIMS, TXT, MISC, KEYMAP, FDPLAN, SECTIONS, DETAILS, MISC

Proposed Layers for an ARCHITECTURAL Drawing:

Layer List: O (Not Used), BORDER, KEYMAP, FLPLAN, DOORS (SWINGS), WDWS, DIMS, TXT,DEMOL, NEW, SECT, DETAILS, SCHED, INTELV, MISC

Proposed Layers for a STRUCTURAL Drawing:

Layer List: O (Not Used), BORDER, KEYMAP, FLPLAN, DEMOL, NEW, BLDGSECT, STRDET, DIMS, TXT, MISC

Proposed Layers for a Roof Drawing:

Layer List: O (Not Used). BORDER, KEYMAP, FLPLAN, ROOFPLAN, ROOFFRMG, DEMOL, NEW, DIMS, TXT, MISC

Proposed Layers for an EXTERIOR ELEVATIONS Drawing:

Layer List: O (Not Used), BORDER, KEYMAP, NELEV, SELEV, EELEV, WELEV, DIMS, TXT, MISC

Proposed Layers for a MECHANICAL DRAWING:

Layer List: O (Not Used), BORDER, KEYMAP, FLPLAN, DIMS, TXT, WATER, SEWER, HVAC, SPRINKLER, SCHED, MISC

Proposed Layers for a HVAC Drawing:

Layer List: O (Not Used), BORDER, KEYMAP, FLPLAN, DIMS, TXT, HVAC, CONTROLS, SCHED, MISC

Proposed Layers for a LIGHTING Drawing:

Layer List: O (Not Used), BORDER, KEYMAP, FLPLAN, ELEDT, DIMS, TXT, DIAG/SCHEM (DIAGRAMS/SCHEMATICS), SCHED, MISC

Proposed Layers for an ELECTRICAL Drawing:

Layer List: O (Not Used), BORDER, KEYMAP, FLPLAN, ELECT, DIMS, TXT, DETAILS, DIAGRAMS, SCHED, MISC

Proposed Layers for a COMMUNICATIONS / TELEPHONE Drawing:

Layer List: O (not Used), BORDER, KEYMAP, FLPLAN, PHONEJCK, COMMDEV, CIRCUITS, PANELS, DIMS, TXT, DETAILS,DIAGRAMS, SCHED, MISC

END OF SECTION

SECTION 01703

WARRANTY OF CONSTRUCTION

PART 1 GENERAL

1.1 SUBMITTALS

Submittals shall be made in accordance with SECTION 01330: SUBMITTAL PROCEDURES. Submittal dates shall be as defined in PART 3 of this section.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 WARRANTY OF CONSTRUCTION (APR 1984) (FAR52.246-21)

3.1.1 In addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph 3.1.9 of this Clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or design furnished, or workmanship performed by the Contractor or any subcontractor or supplier at any tier.

3.1.2 This warranty shall continue for a period of 1 year from the date of final acceptance of the work. If the Government takes possession of any part of the work before final acceptance, this warranty shall continue for a period of 1 year from the date the Government takes possession.

3.1.3 The Contractor shall remedy at the Contractor's expense, any failure to conform, or any defect. In addition, the Contractor shall remedy, at the Contractor's expense, any damage to Government-owned or controlled real or personal property, when that damage is the result of:

a. the Contractor's failure to conform to contract requirements or

b. any defect of equipment, material, workmanship, or design furnished.

3.1.4 The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for 1 year from the date of repair or replacement.

3.1.5 The Government will notify the Contractor, in writing or by telephone, after the discovery of any failure, defect, or damage and the Contractor shall respond and be on-site to correct the problem in accordance with the procedures of paragraph 3.2 SERVICE CALLS.

3.1.6 If the Contractor fails to remedy any failure, defect, or damage within a reasonable time as determined by the Government, after receipt of notice, the Government will have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

3.1.7 With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall:

a. obtain all warranties that would be given in normal commercial practice;

b. require all warranties to be executed, in writing, for the benefit of the Government, if directed by the Contracting Officer; and

c. enforce all warranties for the benefit of the Government, if directed by the Contracting Officer.

3.1.8 In the event the Contractor's warranty under paragraph 3.1.2 of this clause has expired, the Government may bring suit at its expense to enforce a subcontractor's, manufacturer's, or supplier's warranty.

3.1.9 Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material or design furnished by the Government nor for the repair of any damage that results from any defect in Government-furnished material or design.

3.1.10 This warranty shall not limit the Government's rights under the Inspection and Acceptance clause of this contract with respect to latent defects, gross mistakes, or fraud.

3.1.11 After final acceptance of the work, the Contractor shall furnish and install an Equipment Warranty Sticker on Contractor-installed equipment. (Same equipment as listed on the Equipment-In-Place List required under Section 01705 EQUIPMENT-IN-PLACE LIST.) Lettering shall be block-type upper case and easily readable. Sticker shall be of a durable type material and of a type that can be written on. Sticker shall state the following:

a. The title "Equipment Warranty."

b. Contractor's name and Contract Number.

c. Date warranty expires.

d. Point of contact, including name and telephone number.

e. Manufacturer.

3.2 SERVICE CALLS

Service calls required under this Section are defined as maintenance and repair requirements for warranty items which are called into the Contractor by authorized Government Representatives. This category includes services requiring either routine, urgent or emergency response. The Government will indicate the classification of the call and the required response time for the service call when reporting the warranty work item to the Contractor.

3.2.1 Service Call Reception

The Contractor shall have adequate procedures for picking up service call warranty work during normal working hours, and for receiving and responding to emergency warranty service calls 24 hours per day,

including weekends and during holidays. A single local telephone number shall be provided by the Contractor for receiving emergency calls.

3.2.2 Service Call Classification

3.2.2.1 Emergency calls.

Service calls will be classified as an emergency call when the work consists of correcting failures which constitute an immediate safety issue or health hazard, threaten to damage property, threaten the environment or are required to restore essential services. The Contractor shall respond immediately and must be on the job site and working within 60 minutes after receipt of an emergency service call unless otherwise allowed by the Government's notification of a service call. The Contractor shall work continuously without interruption and shall arrest the emergency condition before departing the job site. See service call time limits specified in Appendix 01703-A for some representative items of possible warranty work requiring an emergency call.

3.2.2.2 Urgent calls.

Urgent services, for purposes of this specification, include those services which do not immediately endanger personnel or threaten damage to property, but would soon inconvenience and affect the health or well-being of personnel. Urgent service calls shall be responded to within 24 hours, and shall be completed or arrested within two working days after receipt unless otherwise allowed by the Government's notification of a service call. See Appendix 01703-A for some representative items of possible warranty work requiring an urgent call.

3.2.2.3 Routine calls.

Service calls will be classified as routine when the work does not qualify as an emergency or urgent response. See Appendix 01703-A for some representative items of possible warranty work requiring a routine call. All routine calls must be completed within 5 calendar days after receipt, unless otherwise allowed by the Government's notification of a service call and once begun, the work shall be prosecuted to completion. Routine calls shall normally be accomplished during normal work hours, Monday through Friday.

APPENDIX 01703-A

SERVICE CALL TIME LIMITS

Description	Classification	Response Time*	Completion Time*
Plumbing			
Broken line	Emergency	I hour	24 hours
Inoperable faucet	Urgent	24 hours	48 hours
Leaking supply line	Emergency	I hour	24 hours
Dripping/leaking faucet	Routine	5 days	5 days
No hot water	Urgent	4 hours	24 hours
Not enough hot water	Urgent	24 hours	48 hours
Leaking garbage disposal	Urgent	24 hours	48 hours
Heating System			
Loss of heat when outside temperature is below 55 degrees	Emergency	1 hour	12 hours
Loss of heat (other than above)	Urgent	24 hours	48 hours
Cooling System			
No cooling when outside temperature is above 85 degrees	Emergency	3 hours	24 hours
No cooling (other than above)	Urgent	24 hours	48 hours
Utility Systems			
No power to light or outlet	Routine	5 days	5 days
Recurring breaker/fuse problems	Emergency	4 hours	24 hours
Arching or exposed energized circuit	Emergency	1 hour	24 hours
Smoke/carbon monoxide detector inoperative	Emergency	4 hours	24 hours
Gas leaks	Emergency	1 hour	6 hours

APPENDIX 01703-A (Con.)

SERVICE CALL RESPONSE LIMITS

Description	Classification	Response Time*	Completion Time*
Appliances			
Malfunctioning refrigerator that will result in food spoilage	Emergency	2 hours	24 hours
Malfunctioning refrigerator that will not result in food spoilage	Routine	5 days	5 days
Kitchen range inoperative	Urgent	24 hours	48 hours
Other range problems (burner, oven, or broiler)	Routine	5 days	5 days
Dishwasher malfunctioning	Routine	5 days	5 days
Garbage disposal inoperative	Routine	5 days	5 . days
Miscellaneous			
Roof leak	Emergency	I hour	Stop leak within 4 hours, repair within 5 days
Fence/gate repair	Routine	5 days	5 days
Concrete repair	Routine	5 days	30 days
Exhaust fan inoperative	Routine	5 days	5 days
Exterior door lock malfunctioning	Emergency	2 hours	8 hours
Repair cabinet hardware	Routine	5 days	5 days

*Number of hours or calendar days after receipt of service call, unless otherwise directed by the Contracting Officer.

NOTE: This list is not intended to be all-inclusive, but those categories and times shown will be representative for performance of like tasks and in measuring timeliness.

END OF SECTION

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SECTION 01704

FORM 1354 CHECKLIST

PART 1 GENERAL

1.1 Procedures

The form which is a part of this specification section shall be completed for any project having revisions to real property. The following page contains the basic instructions applicable to the form.

1.2 Submittal

This form shall be submitted for approval, and be approved a minimum of 30 days before final inspection of the project. Failure to have this form completed and approved in time for the final inspection will result in delay of the inspection until the checklist is completed.

PARTS 2 AND 3 NOT USED

INSTRUCTIONS FOR DD FORM 1354 CHECKLIST

The following checklist is only a guide to describe various parts of new and modified construction. Alter this form as necessary or create your own document to give complete accounting of the real property added or deleted for this contract. All items added, deleted, replaced, or relocated within the building 5 foot line, or on site 5 feet beyond the building perimeter must be accounted for completely. Only a few of the most common items beyond the 5 foot line are included on the checklist under UTILITIES/SURFACE CONSTRUCTION, add additional items as required by the construction accomplished.. Attach a continuation sheet and use the checklist format to describe other work related to this particular project. Listed on the last page are additional items with units of measure and descriptive terms.

Costs for each item must include material, tax, installation, overhead and profit, bond and insurance costs. This form should be filled out as each item is installed or each phase of work is completed.

TOTAL FOR ALL ITEMS INCLUDING CONTRACT MODIFICATION COSTS ADDED TOGETHER SHOULD EQUAL THE TOTAL CONTRACT PRICE.

KEY TO ABBREVIATIONS

AC - Acres
BL - Barrels, Capacity
BTU - British Thermal Unit
CY - Cubic Yards
EA - Each
GA - Gallons, Capacity
HD - Head
KV - Kilovolt-Amperes, Capacity (KVA)
KW - Kilowatts, Capacity
SE - Seats
SF - Square Feet
SY - Square Yard
MB - Million British Thermal Units
MI - Miles
LF - Linear Feet
KG - Thousand Gallons Per Day, Capacity
TN - Ton
- Number; How Many

DD FORM 1354 CHECKLIST
Transfer of Real Property

CONTRACT NUMBER:_____

CONTRACT TITLE:_____

LOCATION:_____

1. **DEMOLITION** (Describe each item removed and the cost of removal.)*

2. **RELOCATION** (Describe each item relocated and the cost of relocation.)*

3. **REPLACEMENTS** (Describe each item replaced and replacement cost.)*

*Use a continuation sheet if more space is required. Items should be described by quantity and the correct unit of measure.

4. **NEW CONSTRUCTION OVERVIEW: BUILDING(S)/ADDITION(S) TO A BUILDING** - Use a separate checklist for each building and/or addition.

(1) **Outside Dimensions: Length x Width**

(a) Main Building_____
(b) Offsets_____
(c) Wings_____
(d) Basement_____
(e) Attic_____

(2) **Number of Usable Floors**: _____

(3) **Construction: Exterior Materials Used**

(a) Foundation (such as concrete)_____
(b) Floors (such as wood, concrete)_____
(c) Walls (such as wood siding, metal, CMU)_____
(d) Roof (such as metal, comp., built-up)_____

(4) **Utilities ENTERING Building**: Measure LF from Bldg entry to next larger size of pipe

(a) Water (size & type of pipe; number of LF)_____
(b) Gas (size & type of pipe; number of LF)_____
(c) Sewer (size & type of pipe; number of LF)_____
(d) Electric (phase, voltage, size & type of wire, connected load in amps_____

(5) **Air Conditioning**:

(a) Type_____
(b) Capacity (TONS)_____
(c) SQ YDS covered by system_____

(6) **Heating**:

(a) Source_____
(b) Fuel_____

(7) **Hot Water Facilities**:

(a) Capacity (GAL)_____
(b) Temperature Rise_____

BUILDING COST:_____

5. **BUILDING SYSTEMS (INTERIOR)**

A. **FIRE PROTECTION**:
Property Code
(1) (880 50/880-211) CLOSED HEAD AUTO SPRINKLERS - SF & HD (wet or dry pipe; # of LF of service pipe; type of pipe & # of heads; # of SF covered by system)
DESCRIPTION:
_____
_____
_____
COST: _____

(2) (880 50/880-212) OPEN HEAD DELUGE SYSTEM - SF & HD (# of LF of service pipe; type of pipe; # of heads; # of SF covered)
DESCRIPTION:
_____
_____
_____
COST: _____

(3) (880 10/880-221) AUTO FIRE DETECTION SYSTEM - SF & EA (# of alarms-horns, bells, etc.; # of smoke detectors; # of heat detectors; # of fire alarm panels; # of radio transmitters/antennae)
DESCRIPTION:
_____
_____
_____
COST: _____

(4) (880 20/880-222) MANUAL FIRE ALARM SYSTEM - EA (# of pull stations; # of alarm horns; # of fire extinguisher cabinets)
DESCRIPTION:
_____
_____
_____
COST: _____

(5) (880 60/880-231) CO2 FIRE SYSTEM (# of bottles & size of bottles in lbs)
DESCRIPTION:

_____
_____
_____

COST: _____

(6) (880 60/880-232) FOAM FIRE SYSTEM - EA (# of tanks - capacity in lbs)
DESCRIPTION:

_____
_____
_____

COST: _____

(7) (880 60/880-233) OTHER FIRE SYSTEM - EA
DESCRIPTION:

_____
_____
_____

COST: _____

(8) (880 60/880-234) HALON 1301 FIRE SYSTEM - EA (# of bottles & size of bottles in lbs)
DESCRIPTION:

_____
_____
_____

COST: _____

B. **SECURITY**:

(1) (880 40/872-841) SECURITY ALARM SYSTEM - EA (name of system installed)
DESCRIPTION:

_____
_____
_____

COST: _____

C. **HEATING/COOLING SYSTEMS**

(1) (826 10/890-126) A/C WINDOW UNITS - TN & SF-(# of units installed; amount of SF covered per unit; size & capacity of each unit)
DESCRIPTION:

_____
_____
_____

COST: _____

(2) (826 14/890-125) A/C PLT LESS THAN 5 TN - TN & SF-(# of TN; # of SF covered)
DESCRIPTION:
_____
_____
COST: _____

(3) (826 13/890-121) A/C PLT 5 TO 25 TN - TN-(# of TN; # of SF covered)
DESCRIPTION:
_____
_____
_____
COST: _____

(4) (826 12/826-122) A/C PLT 25 TO 100 TN - TN-(# of TN; # of SF covered)
DESCRIPTION:
_____
_____
_____
COST: _____

(5) (826 11/826-123) A/C PLT OVER 100 TN - TN-(# of TN; # of SF covered)
DESCRIPTION:
_____
_____
_____
COST: _____

(6) (821 33/821-115) HEATING PLT 750/3500 MB - MB-(# of MBH; type of heating system - Ex: Warm air furnace, central)
DESCRIPTION:
_____
_____
_____
COST: _____

(7) (821 32/821-116) HEATING PLT OVER 3500 MB - MB-(# of MBH; type of heating system)
DESCRIPTION:
_____
_____
COST: _____

(8) (811 60/811-147) ELEC EMERGENCY POWER GENERATOR-KW-(size of engine; rating of generator in kilowatts & voltage)
DESCRIPTION:
_____
_____
_____
COST: _____

(9) (81190 or 82320-gas) STORAGE TANK FOR HEATING or GENERATOR FUEL-GA; TYPE; FUEL-(Size, type of tank, kind of fuel & # of gallons)
DESCRIPTION:
_____
_____
_____
COST: _____

SITE WORK

6. **UTILITIES/SURFACE CONSTRUCTION**:

(1) (812 41/812-223) PRIM DISTR LINE OH-LF-(# LF of wire; size & type of wire; # of poles; voltage)
DESCRIPTION:
_____
_____
_____
COST: _____

(2) (812/81360) TRANSFORMERS-KVA
POWER POLES-LF
(# poles; # transformers - pad or pole mounted; KVA of wire; # LF of wire)
DESCRIPTION:
_____
_____
_____
COST: _____

(3) (812 40/812-224) SEC DISTR LINE OH-LF-(voltage; size & type of wire; # transformers; KVA; # LF of wire; # of service drops; # poles)
DESCRIPTION:
_____
_____
_____
COST: _____

(4) (812 42/812-225) PRIM DISTR LINE UG-LF-(KVA; voltage; type of conduit & size(encased or direct burial); size & kind of wire inside conduit; LF of wire & conduit)
DESCRIPTION:
_____
_____
_____
COST: _____

(5) (812 42/812-226) SEC DISTR LINE UG-LF-(type of conduit & size; type & size of wires in conduit; LF of conduit & wire inside conduit; voltage)
DESCRIPTION:

_____
_____
_____
COST: _____

(6) (812 30/812-926) EXTERIOR LIGHTING-EA-(streets or parking area lights) (# & type of lights; whether pole mounted or not; # LF of connecting wire if pole mounted)
DESCRIPTION:

_____
_____
_____
COST: _____

(7) (824 10/824-464) GAS MAINS-LF(size, type, & # of LF of pipe)
DESCRIPTION:

_____
_____
_____
COST: _____

(8) (831 90/831-169) SEWAGE SEPTIC TANK-KG-(size, kind of material, & capacity)
DESCRIPTION:

_____
_____
_____
COST: _____

(9) (832 10/832-266) SANITARY SEWER-LF-(sizes & types of pipes - # of LF of each; # of cleanouts; # & size of manholes)
DESCRIPTION:

_____
_____
_____
COST: _____

(10) (842 10/842-245) WATER DISTR MAINS (POTABLE)-LF-(# LF & size, type of pipe)
DESCRIPTION:

_____
_____
_____
COST: _____

(11) (843 11/843-315) FIRE HYDRANTS-EA-(#; size & type)
DESCRIPTION:
_____
_____
_____
COST: _____

(12) (851 90/851-143) CURBS & GUTTERS-LF-(# LF; material; width & height)
DESCRIPTION: (Is curb extruded or standard?)_
_____
_____
_____
COST: _____

(13) (851 90/851-145) DRIVEWAY-SY-(SY; material used; thickness)
DESCRIPTION:
_____
_____
_____
COST: _____

(14) (851 10/12/851-147) ROAD-SY & LF-(SY; material used; thickness; LF)
DESCRIPTION:
_____
_____
_____
COST: _____

(14) (85210/11 /852-262) VEHICLE PARKING-SY-(SY; material used; thickness; # of bollards; # of wheel stops; # of regular parking spaces; # of handicap spaces)
DESCRIPTION:
_____
_____
_____
COST: _____

(15) (852 20/852-289) SIDEWALKS-SY & LF-(# SF & LF; dimensions of each section & location; thickness; material used)
DESCRIPTION:
_____
_____
_____
COST: _____

(16) (871 10/871-183) STORM DRAIN DISPOSAL-LF-(# LF of pipe; sizes & types of pipe; # of catch basins & manholes & sizes of each)
DESCRIPTION:
_____
_____
_____
COST: _____

(17) (872 15/872-247) FENCE, SECURITY (ARMS)-LF-(# of LF; fence material; # & type of gate(s); # strands of barbed wire on top)
DESCRIPTION:
_____
_____
_____
COST: _____

(18) (87210/12/872-248) FENCE, INTERIOR-LF-(# of LF; fence material; # & kind of gate(s)
DESCRIPTION:
_____
_____
_____
COST: _____

(19) (890 70/890-187) UTILITY VAULT(4 or more transformers)- SF(# SF; dimensions of vault; # of xfmers)
DESCRIPTION:
_____
_____
_____
COST: _____

(20) (135 10/135-583) TEL DUCT FACILITY-LF-(# of LF; size & type of conduit; type of wire)
DESCRIPTION:
_____
_____
_____
COST: _____

(21) (135 10/135-586) TEL POLE FACILITY-LF-(# LF & type of wire; # of poles)
DESCRIPTION:
_____
_____
_____
COST: _____

7. **INSTALLED EQUIPMENT**: Furnish an Equipment-In-Place List. Any price related to equipment should already be included in this checklist.

8. **SYSTEMS NOT PREVIOUSLY LISTED**: Attach a separate sheet and use the same format to describe the system(s). Example: CATV system, intercom system, or other utilities and surface construction not described on this checklist.

9. **ASBESTOS REMOVAL**: Furnish a description by building of the number of LF of asbestos removed, number of LF of reinsulation, number of SF of soil encapsulation, and number and size of tanks, etc., where asbestos was removed. Also, identify buildings by their numbers and use.

10. **MAINTENANCE/RENOVATIONS**: List by building number and describe all additions and deletions by quantity and the correct unit of measure. Furnish a cost per building.

UTILITIES/SURFACE CONSTRUCTION - Listed below are some additional items which may or may not apply to your contract. EACH item installed on site should be listed and priced separately even if not included on this checklist.

(1) IRRIGATION SYSTEM-(LF of pipe; size & type of pipe; number and type of heads)
(2) UNDERGROUND/ABOVEGROUND STORAGE TANKS-(GA, type of tank; material stored)
(3) (833-354) DUMPSTER ENCLOSURE-(SF & dimensions)
(4) (890-152) UNLOADING PAD-(SY; material)
(5) SIGNAGE-(Dimensions; material)
(6) (12580) CATHODIC PROTECTION-(MI; LF)
(7) (87270 LIGHTNING PROTECTION-(LF)
(8) (81290) POLE DUCT RISER-(LF, type of material)
(9) RAMPS-(SF, material; CY if concrete-use code for sidewalk if concrete)
(10) (89080/890-158) LOAD AND UNLOAD PLATFORM-(SF)
(11) (83240/832-255) INDUSTRIAL WASTE MAIN-(LF)
(12) WHEEL STOPS-(EA; size & material)
(13) (81350) OUTDOOR INTEGRAL DISTR CTR-(KVA)
(14) (45110) OUTDOOR STORAGE AREA-(SF)
(15) (73055/730-275) BUS/WAIT SHELTER-(SF)
(16) (690-432) FLAGPOLE-(EA; dimensions)
(17) (93210) SITE IMPROVEMENT-(JOB)
(18) (93220) LANDSCAPE PLANTING (Acre; EA; SF)
(19) (93230) LANDSCAPE BERMS/MOUNDS-(SY)
(20) (93410) CUT AND FILL-(CY)
(21) (843-315) FIRE HYDRANTS-(EA; Type)
(22) (14970) LOADING AND UNLOADING DOCKS AND RAMPS (not connected to a Bldg)-(SF) (23) BICYCLE RACK-(EA)
(24) (85140/812-928) TRAFFIC SIGNALS-(EA)
(25) (87210) FENCING OR WALLS-(LF)
(26) (15432) RIPRAP-(LF & SY)
(27) (75061) GRANDSTAND OR BLEACHERS-(EA; SE)
(28) 87150/871-187) RETAINING WALLS-(LF; SY; material)

NOTE: 5 Digit Codes-Army; 6 Digit Codes-Air Force

END OF SECTION

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SECTION 01705

EQUIPMENT-IN-PLACE LIST

PART 1 GENERAL

1.1 SUBMITTALS

Data listed in PART 3 of this section shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES. Due dates shall be as indicated in applicable paragraphs and all submittals shall be completed before final payment will be made.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 Submittal:

The final equipment-in-place list shall be completed and returned to the Contracting Officer within 30 calendar days of the final inspection. The Contracting Officer will review all final Equipment-In-Place Lists for accuracy and conformance to the requirements contained in DIVISION 1 GENERAL REQUIREMENTS. The lists shall be returned to the Contractor if corrections are necessary. The Contractor shall make all corrections and shall return the lists to the Contracting Officer within 7 calendar days of receipt.

3.2 EQUIPMENT-IN-PLACE LIST:

Contractor shall submit for approval, at the completion of construction, a list of equipment-in-place. This list shall be updated and kept current throughout construction, and shall be jointly inspected for accuracy and completeness by the Contracting Officer's representative and a responsible representative of the Contractor prior to submission of each monthly pay estimate. A sample form showing minimum data required is provided at the end of this section. The EQUIPMENT-IN-PLACE LIST shall be comprised of all equipment falling under one or more of the following classifications:

a. Each piece of equipment listed on the mechanical equipment schedules.

b. Each electrical panel, switchboard, and MCC panel.

c. Each transformer.

d. Each piece of equipment or furniture designed to be movable.

e. Each piece of equipment that contains a manufacturer's serial number on the name plate.

f. All Government furnished, Contractor installed equipment per a. through e. (price data excluded)

3.3 PAYMENT:

All costs incurred by the Contractor in the preparation and furnishing of Equipment-In-Place Lists shall be included in the contract price and no separate payment will be made for this work. Approval and acceptance of the final Equipment-In Place Lists shall be accomplished before final payment is made to the Contractor.

EQUIPMENT-IN-PLACE LIST

CONTRACT NO.: _____

Specification Section: _____ Paragraph No. _____

ITEM DESCRIPTION: _____

Item Name: _____

Serial Number: _____

Model Number: _____

Capacity: _____Replacement Cost _____

ITEM LOCATION:

Building Number: _____ Room Number: _____

or Column Location: _____

MANUFACTURER INFORMATION:

Manufacturer Name: _____

Trade Name (if different from item name): _____

Manufacturer's Address: _____

_____

Telephone Number: _____

WARRANTY PERIOD: _____

CHECKED BY: _____

END OF SECTION

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SECTION 13280

ASBESTOS ABATEMENT

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z9.2	(1979; R 1991) Fundamentals Governing the Design and Operation of Local Exhaust Systems
ANSI Z87.1	(1989; Errata; Z87.1a) Occupational and Educational Eye and Face Protection
ANSI Z88.2	(1992) Respiratory Protection

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 732	(1995) Aging Effects of Artificial Weathering on Latex Sealants
ASTM D 522	(1993a) Mandrel Bend Test of Attached Organic Coatings
ASTM D 1331	(1989; R 1995) Surface and Interfacial Tension of Solutions of Surface-Active Agents
ASTM D 2794	(1993) Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
ASTM D 4397	(1996) Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications
ASTM E 84	(1996a) Surface Burning Characteristics of Building Materials
ASTM E 96	(1995) Water Vapor Transmission of Materials
ASTM E 119	(1995a) Fire Tests of Building Construction and Materials
ASTM E 736	(1992) Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members
ASTM E 1368	(1997) Visual Inspection of Asbestos Abatement Projects

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1926	Safety and Health Regulations for Construction
40 CFR 61	National Emissions Standards for Hazardous Air Pollutants
40 CFR 763	Asbestos
42 CFR 84	Approval of Respiratory Protective Devices
49 CFR 107	Hazardous Materials Program Procedures
49 CFR 171	General Information, Regulations and Definitions
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 173	Shippers - General Requirements for Shipments and Packaging

COMPRESSED GAS ASSOCIATION (CGA)

CGA G-7	(1990) Compressed Air for Human Respiration
CGA G-7.1	(1989) Commodity Specification for Air

ENGINEERING MANUALS (EM)

EM 385-1-1	(1996) Safety and Health Requirements Manual

ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 340/1-90-018	(1990) Asbestos/NESHAP Regulated Asbestos Containing Materials Guidance
EPA 340/1-90-019	(1990) Asbestos/NESHAP Adequately Wet Guidance
EPA 560/5-85-024	(1985) Guidance for Controlling Asbestos-Containing Materials in Buildings

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 701	(1996) Methods of Fire Test for Flame-Resistant Textiles and Films

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH Pub No. 84-100	(1984; Supple 1985, 1987, 1988 & 1990) NIOSH Manual of Analytical Methods

UNDERWRITERS LABORATORIES (UL)

UL 586	(1996) High-Efficiency, Particulate, Air Filter Units

1.2 DEFINITIONS

a. Adequately Wet: A term defined in 40 CFR 61, Subpart M, and EPA 340/1-90-019 meaning to sufficiently mix or penetrate with liquid to prevent the release of particulate. If visible emissions are observed coming from asbestos-containing material (ACM), then that material has not been adequately wetted. However, the absence of visible emissions is not sufficient evidence of being adequately wetted.

b. Aggressive Method: Removal or disturbance of building material by sanding, abrading, grinding, or other method that breaks, crumbles, or disintegrates intact asbestos-containing material (ACM).

c. Amended Water: Water containing a wetting agent or surfactant with a surface tension of at least 29 dynes per square centimeter when tested in accordance with ASTM D 1331.

d. Asbestos: Asbestos includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophylite asbestos, actinolite asbestos, and any of these minerals that have been chemically treated and/or altered.

e. Asbestos-Containing Material (ACM): Any materials containing more than one percent asbestos.

f. Asbestos Fiber: A particulate form of asbestos, 5 micrometers or longer, with a length-to-width ratio of at least 3 to 1.

g. Authorized Person: Any person authorized by the Contractor and required by work duties to be present in the regulated areas.

h. Building Inspector: Individual who inspects buildings for asbestos and has EPA Model Accreditation Plan (MAP) "Building Inspector" training; accreditation required by 40 CFR 763, Subpart E, Appendix C.

i. Certified Industrial Hygienist (CIH): An Industrial Hygienist certified in the practice of industrial hygiene by the American Board of Industrial Hygiene.

j. Class I Asbestos Work: Activities defined by OSHA involving the removal of thermal system insulation (TSI) and surfacing ACM.

k. Class II Asbestos Work: Activities defined by OSHA involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos- containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastic. Certain "incidental" roofing materials such as mastic, flashing and cements when they

are still intact are excluded from Class II asbestos work. Removal of small amounts of these materials which would fit into a glovebag may be classified as a Class III job.

l. Class III Asbestos Work: Activities defined by OSHA that involve repair and maintenance operations, where ACM, including TSI and surfacing ACM, is likely to be disturbed. Operations may include drilling, abrading, cutting a hole, cable pulling, crawling through tunnels or attics and spaces above the ceiling, where asbestos is actively disturbed or asbestos-containing debris is actively disturbed.

m. Class IV Asbestos Work: Maintenance and custodial construction activities during which employees contact but do not disturb ACM and activities to clean-up dust, waste and debris resulting from Class I, II, and III activities. This may include dusting surfaces where ACM waste and debris and accompanying dust exists and cleaning up loose ACM debris from TSI or surfacing ACM following construction.

n. Clean room: An uncontaminated room having facilities for the storage of employees' street clothing and uncontaminated materials and equipment.

o. Competent Person: In addition to the definition in 29 CFR 1926, Section .32(f), a person who is capable of identifying existing asbestos hazards as defined in 29 CFR 1926, Section .1101, selecting the appropriate control strategy, has the authority to take prompt corrective measures to eliminate them and has EPA Model Accreditation Plan (MAP) "Contractor/Supervisor" training; accreditation required by 40 CFR 763, Subpart E, Appendix C.

p. Contractor/Supervisor: Individual who supervises asbestos abatement work and has EPA Model Accreditation Plan "Contractor/Supervisor" training; accreditation required by 40 CFR 763, Subpart E, Appendix C.

q. Critical Barrier: One or more layers of plastic sealed over all openings into a regulated area or any other similarly placed physical barrier sufficient to prevent airborne asbestos in a regulated area from migrating to an adjacent area.

r. Decontamination Area: An enclosed area adjacent and connected to the regulated area and consisting of an equipment room, shower area, and clean room, which is used for the decontamination of workers, materials, and equipment that are contaminated with asbestos.

s. Demolition: The wrecking or taking out of any load-supporting structural member and any related razing, removing, or stripping of asbestos products.

t. Disposal Bag: A 6 mil thick, leak-tight plastic bag, pre-labeled in accordance with 29 CFR 1926, Section .1101, used for transporting asbestos waste from containment to disposal site.

u. Disturbance: Activities that disrupt the matrix of ACM, crumble or pulverize ACM, or generate visible debris from ACM. Disturbance includes cutting away small amounts of ACM, no greater than the amount which can be contained in 1 standard sized glovebag or waste bag, not larger than 60 inches in length and width in order to access a building component.

v. Equipment Room or Area: An area adjacent to the regulated area used for the decontamination of employees and their equipment.

w. Employee Exposure: That exposure to airborne asbestos that would occur if the employee were not using respiratory protective equipment.

x. Fiber: A fibrous particulate, 5 micrometers or longer, with a length to width ratio of at least 3 to 1.

y. Friable ACM: A term defined in 40 CFR 61, Subpart M and EPA 340/1-90-018 meaning any material which contains more than 1 percent asbestos, as determined using the method specified in 40 CFR 763, Subpart E, Appendix A, Section 1, Polarized Light Microscopy (PLM), that when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. If the asbestos content is less than 10 percent, as determined by a method other than point counting by PLM, the asbestos content is verified by point counting using PLM.

z. Glovebag: Not more than a 60 by 60 inch impervious plastic bag-like enclosure affixed around an asbestos-containing material, with glove-like appendages through which material and tools may be handled.

aa. High-Efficiency Particulate Air (HEPA) Filter: A filter capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter.

bb. Homogeneous Area: An area of surfacing material or thermal system insulation that is uniform in color and texture.

cc. Industrial Hygienist: A professional qualified by education, training, and experience to anticipate, recognize, evaluate, and develop controls for occupational health hazards.

dd. Intact: ACM which has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix. Removal of "intact" asphaltic, resinous, cementitious products does not render the ACM non-intact simply by being separated into smaller pieces.

ee. Model Accreditation Plan (MAP): USEPA training accreditation requirements for persons who work with asbestos as specified in 40 CFR 763, Subpart E, Appendix C.

ff. Modification: A changed or altered procedure, material or component of a control system, which replaces a procedure, material or component of a required system.

gg. Negative Exposure Assessment: A demonstration by the Contractor to show that employee exposure during an operation is expected to be consistently below the OSHA Permissible Exposure Limits (PELs).

hh. NESHAP: National Emission Standards for Hazardous Air Pollutants. The USEPA NESHAP regulation for asbestos is at 40 CFR 61, Subpart M.

ii. Nonfriable ACM: A NESHAP term defined in 40 CFR 61, Subpart M and EPA 340/1-90-018 meaning any material containing more than 1 percent asbestos, as determined using the method specified in 40 CFR 763, Subpart E, Appendix A, Section 1, Polarized Light Microscopy, that, when dry, cannot be crumbled, pulverized or reduced to powder by hand pressure.

jj. Nonfriable ACM (Category I): A NESHAP term defined in 40 CFR 61, Subpart E and EPA 340/1-90-018 meaning asbestos-containing packings, gaskets, resilient floor covering, and asphalt roofing products containing more than 1 percent asbestos as determined using the method specified in 40 CFR 763, Subpart F, Appendix A, Section 1, Polarized Light Microscopy.

kk. Nonfriable ACM (Category II): A NESHAP term defined in 40 CFR 61, Subpart E and EPA 340/1-90-018 meaning any material, excluding Category I nonfriable ACM, containing more than 1 percent asbestos, as determined using the methods specified in 40 CFR 763, Subpart F, Appendix A, Section 1, Polarized Light Microscopy, that when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

ll. Permissible Exposure Limits (PELs):

(1) PEL-Time weighted average(TWA): Concentration of asbestos not in excess of 0.1 fibers per cubic centimeter of air (f/cc) as an 8 hour time weighted average (TWA), as determined by the method prescribed in 29 CFR 1926, Section .1101, Appendix A, or the current version of NIOSH Pub No. 84-100 analytical method 7400.

(2) PEL-Excursion Limit: An airborne concentration of asbestos not in excess of 1.0 f/cc of air as averaged over a sampling period of 30 minutes as determined by the method prescribed in 29 CFR 1926, Section .1101, Appendix A, or the current version of NIOSH Pub No. 84-100 analytical method 7400.

mm. Regulated Area: An OSHA term defined in 29 CFR 1926, Section .1101 meaning an area established by the Contractor to demarcate areas where Class I, II, and III asbestos work is conducted; also any adjoining area where debris and waste from such asbestos work accumulate; and an area within which airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed, the permissible exposure limit.

nn. Removal: All operations where ACM is taken out or stripped from structures or substrates, and includes demolition operations.

oo. Repair: Overhauling, rebuilding, reconstructing, or reconditioning of structures or substrates, including encapsulation

or other repair of ACM attached to structures or substrates. If the amount of asbestos so "disturbed" cannot be contained in 1 standard glovebag or waste bag, Class I precautions are required.

pp. Spills/Emergency Cleanups: Cleanup of sizable amounts of asbestos waste and debris which has occurred, for example, when water damage occurs in a building, and sizable amounts of ACM are dislodged. A Competent Person evaluates the site and ACM to be handled, and based on the type, condition and extent of the dislodged material, classifies the cleanup as Class I, II, or III. Only if the material was intact and the cleanup involves mere contact of ACM, rather than disturbance, could there be a Class IV classification.

qq. Surfacing ACM: Asbestos-containing material which contains more than 1% asbestos and is sprayed-on, troweled-on, or otherwise applied to surfaces, such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, or other purposes.

rr. Thermal system insulation (TSI) ACM: ACM which contains more than 1% asbestos and is applied to pipes, fittings, boilers, breeching, tanks, ducts, or other interior structural components to prevent heat loss or gain or water condensation.

ss. Transite: A generic name for asbestos cement wallboard and pipe.

tt. Worker: Individual (not designated as the Competent Person or a supervisor) who performs asbestos work and has completed asbestos worker training required by 29 CFR 1926, Section .1101, to include EPA Model Accreditation Plan (MAP) "Worker" training; accreditation required by 40 CFR 763, Subpart E, Appendix C, if required by the OSHA Class of work to be performed or by the state where the work is to be performed.

1.3 DESCRIPTION OF WORK

The work covered by this section includes the removal of asbestos-containing materials (ACM) which are encountered during renovation activities associated with this project and describes procedures and equipment required to protect workers and occupants of the regulated area from contact with airborne asbestos fibers and ACM dust and debris. Activities include OSHA Class II work operations involving ACM. The work also includes containment, storage, transportation and disposal of the generated ACM wastes. More specific operational procedures shall be detailed in the required Accident Prevention Plan and its subcomponents, the Asbestos Hazard Abatement Plan and Activity Hazard Analyses required in paragraph SAFETY AND HEALTH PROGRAM AND PLANS.

1.3.1 Abatement Work Tasks

The specific ACM to be abated is identified on the attached drawings. Abatement will consist of removal of vinyl flooring tile matrix adhesive and roofing materials. 30 duplex housing units are to be abated. The housing units are numbered 4500-4533. Approximately 96,800 sq. ft of asphalt roofing materials and 10,300 sq. ft of vinyl linoleum with mastic adhesive are to be abated. A summary of work task data elements for each individual ACM abatement work task to include the appropriate RESPONSE ACTION DETAIL SHEET

(item to be abated and methods to be used) is included in Table 1, "Individual Work Task Data Elements" at the end of this section. **RESPONSE ACTION DETAIL SHEETS and SET-UP SHEETS Nos. 9A, 9B, 9C, 10, 12, 14, 19, 45, 56, and 75 are attached at the end of this specification section**

1.3.2 Unexpected Discovery of Asbestos

For any previously untested building components suspected to contain asbestos and located in areas impacted by the work, the Contractor shall notify the Contracting Officer (CO) who will have the option of ordering up to 2 bulk samples to be obtained at the Contractor's expense and delivered to a laboratory accredited under the National Institute of Standards and Technology (NIST) "National Voluntary Laboratory Accreditation Program (NVLAP)" and analyzed by PLM at no additional cost to the Government.

1.4 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Materials and Equipment; FIO.

Material Safety Data Sheets for all chemicals to be used onsite in the same format as implemented in the Contractor's HAZARD COMMUNICATION PROGRAM. Data shall include, but shall not be limited to, the following items:

a. High Efficiency Filtered Air (HEPA) local exhaust equipment

b. Vacuum cleaning equipment

c. Pressure differential monitor for HEPA local exhaust equipment

d. Air monitoring equipment

e. Respirators

f. Personal protective clothing and equipment

g. Duct Tape

h. Disposal Containers

i. Sheet Plastic

j. Wetting Agent

k. Strippable Coating

l. Prefabricated Decontamination Unit

m. Other items

n. Material Safety Data Sheets (for all chemicals proposed)

SD-04 Drawings

Site Layout; GA.

Descriptions, detail project drawings, and site layout to include worksite containment area techniques as prescribed on applicable SET-UP DETAIL SHEETS, local exhaust ventilation system locations, decontamination and load-out units, other temporary waste storage facility, location of temporary utilities (electrical, water, sewer) and boundaries of each regulated area.

SD-08 Statements

Qualifications; GA.

A written report providing evidence of qualifications for personnel, facilities and equipment assigned to the work.

Training Program; FIO.

A copy of the written project site-specific training material as indicated in 29 CFR 1926, Section .1101 that will be used to train onsite employees. The training document shall be signed by the Contractor's Designated IH and Competent Person.

Medical Requirements; FIO.

Physician's written opinion.

Encapsulants; GA.

Certificates stating that encapsulants meet the applicable specified performance requirements.

SD-09 Reports

Exposure Assessment and Air Monitoring; GA.

Initial exposure assessments, negative exposure assessments, air-monitoring results and documentation.

Local Exhaust Ventilation; FIO.

Pressure differential recordings.

Licenses, Permits and Notifications; GA.

Licenses, permits, and notifications.

SD-13 Certificates

Vacuum, Filtration and Ventilation Equipment; FIO.

Manufacturer's certifications showing compliance with ANSI Z9.2 for:

a. Vacuums.

b. Water filtration equipment.

c. Ventilation equipment.

d. Other equipment required to contain airborne asbestos fibers.

SD-18 Records

Respiratory Protection Program; GA.

Records of the respirator program.

Cleanup and Disposal; GA.

Waste shipment records. Weigh bills and delivery tickets shall be furnished for information only.

1.5 QUALIFICATIONS

1.5.1 Written Qualifications and Organization Report

The Contractor shall furnish a written qualifications and organization report providing evidence of qualifications of the Contractor, Contractor's Project Supervisor, Designated Competent Person, supervisors and workers; Designated IH (person assigned to project and firm name); independent testing laboratory (including name of firm, principal, and analysts who will perform analyses); all subcontractors to be used including disposal transportation and disposal facility firms, subcontractor supervisors, subcontractor workers; and any others assigned to perform asbestos abatement and support activities. The Contractor shall include the following statement in the report: "By signing this report I certify that the personnel I am responsible for during the course of this project fully understand the contents of 29 CFR 1926, Section .1101, 40 CFR 61, Subpart M, and the federal, state and local requirements specified in paragraph SAFETY AND HEALTH PROGRAM AND PLANS for those asbestos abatement activities that they will be involved in."

1.5.2 Specific Requirements

The Contractor shall designate in writing, personnel meeting the following qualifications:

a. Designated Competent Person: The name, address, telephone number, and resume of the Contractor's Designated Competent Person shall be provided. Evidence that the full-time Designated Competent Person is qualified in accordance with 29 CFR 1926, Sections .32 and .1101, has EPA Model Accreditation Plan (MAP) "Contractor/Supervisor" training accreditation required by 40 CFR 763, Subpart E, Appendix C, and is experienced in the administration and supervision of asbestos abatement projects, including exposure assessment and monitoring, work practices, abatement methods, protective measures for personnel, setting up and inspecting asbestos abatement work areas, evaluating the integrity of containment barriers, placement and operation of local exhaust systems, ACM generated waste containment and disposal

procedures, decontamination units installation and maintenance requirements, site safety and health requirements, notification of other employees onsite, etc. The Designated Competent Person shall be responsible for compliance with applicable federal, state and local requirements, the Contractor's Accident Prevention Plan and Asbestos Hazard Abatement Plan. The Designated Competent Person shall provide, and the Contractor shall submit, the "Contractor/Supervisor" course completion certificate and the most recent certificate for required refresher training with the employee "Certificate of Worker Acknowledgment" required by this paragraph. The Contractor shall submit evidence that this person has a minimum of 2 years of on-the-job asbestos abatement experience relevant to OSHA competent person requirements. The Designated Competent Person shall be onsite at all times during the conduct of this project.

b. Project and Other Supervisors: The Contractor shall provide the name, address, telephone number, and resume of the Project Supervisor and other supervisors who have responsibility to implement the Accident Prevention Plan, including the Asbestos Hazard Abatement Plan and Activity Hazard Analyses, the authority to direct work performed under this contract and verify compliance, and have EPA Model Accreditation Plan (MAP) "Contractor/Supervisor" training accreditation required by 40 CFR 763, Subpart E, Appendix C. The Project Supervisor and other supervisors shall provide, and the Contractor shall submit, the "Contractor/Supervisor" course completion certificate and the most recent certificate for required refresher training with the employee "Certificate of Worker Acknowledgment" required by this paragraph. The Contractor shall submit evidence that the Project Supervisor has a minimum of 2 years of on-the-job asbestos abatement experience.

c. Designated Industrial Hygienist: The Contractor shall provide the name, address, telephone number, resume and other information specified below for the Industrial Hygienist (IH) selected to prepare the Contractor's Asbestos Hazard Abatement Plan, prepare and perform training, direct air monitoring and assist the Contractor's Competent Person in implementing and ensuring that safety and health requirements are complied with during the performance of all required work. The Designated IH shall be a person who is board certified in the practice of industrial hygiene as determined and documented by the American Board of Industrial Hygiene (ABIH), has EPA Model Accreditation Plan (MAP) "Contractor/Supervisor" training accreditation required by 40 CFR 763, Subpart E, Appendix C, and has a minimum of 2 years of comprehensive experience in planning and overseeing asbestos abatement activities.

d. Asbestos Abatement Workers: Asbestos abatement workers shall meet the requirements contained in 29 CFR 1926, Section .1101, 40 CFR 61, Subpart M, and other applicable federal, state and local requirements. Worker training documentation shall be provided as required on the "Certificate of Workers Acknowledgment" in this paragraph.

e. Worker Training and Certification of Worker Acknowledgment: Training documentation will be required for each employee who will

perform OSHA Class II or Class IV asbestos abatement operations. Such documentation shall be submitted on a Contractor generated form titled "Certificate of Workers Acknowledgment", to be completed for each employee in the same format and containing the same information as the example certificate at the end of this section. Training course completion certificates (initial and most recent update refresher) required by the information checked on the form shall be attached.

f. First Aid and CPR Trained Persons: The names of at least 2 persons who are currently trained in first aid and CPR by the American Red Cross or other approved agency shall be designated and shall be onsite at all times during site operations. They shall be trained in universal precautions and the use of PPE as described in the Bloodborne Pathogens Standard of 29 CFR 1910, Section .1030 and shall be included in the Contractor's Bloodborne Pathogen Program. These persons may perform other duties but shall be immediately available to render first aid when needed.

g. Independent Testing Laboratory: The Contractor shall provide the name, address and telephone number of the independent testing laboratory selected to perform the sample analyses and report the results.

i. Disposal Facility, Transporter: The Contractor shall provide written evidence that the landfill to be used is approved for asbestos disposal by the Idaho State regulatory agencies. Copies of signed agreements between the Contractor (including subcontractors and transporters) and the asbestos waste disposal facility to accept and dispose of all asbestos containing waste generated during the performance of this contract shall be provided. Qualifications shall be provided for each subcontractor or transporter to be used, indicating previous experience in transport and disposal of asbestos waste to include all required state and local waste hauler requirements for asbestos. The Contractor and transporters shall meet the DOT requirements of 49 CFR 171, 49 CFR 172, and 49 CFR 173 as well as registration requirements of 49 CFR 107 and other applicable state or local requirements. The disposal facility shall meet the requirements of 40 CFR 61, Sections .154 or .155, as required in 40 CFR 61, Section .150(b), and other applicable state or local requirements.

1.5.3 Federal, State or Local Citations on Previous Projects

The Contractor and all subcontractors shall submit a statement, signed by an officer of the company, containing a record of any citations issued by Federal, State or local regulatory agencies relating to asbestos activities (including projects, dates, and resolutions); a list of penalties incurred through non-compliance with asbestos project specifications, including liquidated damages, overruns in scheduled time limitations and resolutions; and situations in which an asbestos-related contract has been terminated (including projects, dates, and reasons for terminations). If there are none, a negative declaration signed by an officer of the company shall be provided.

1.6 REGULATORY REQUIREMENTS

In addition to detailed requirements of this specification, work performed under this contract shall comply with EM 385-1-1, applicable federal, state, and local laws, ordinances, criteria, rules and regulations regarding handling, storing, transporting, and disposing of asbestos waste materials. This includes, but is not limited to, OSHA standards, 29 CFR 1926, especially Section .1101, 40 CFR 61, Subpart M and 40 CFR 763. Matters of interpretation of standards shall be submitted to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements shall apply.

1.7 SAFETY AND HEALTH PROGRAM AND PLANS

The Contractor shall develop and submit a written comprehensive site-specific Accident Prevention Plan at least 21 days prior to the preconstruction conference. The Accident Prevention Plan shall address requirements of EM 385-1-1, Appendix A, covering onsite work to be performed by the Contractor and subcontractors. The Accident Prevention Plan shall incorporate an Asbestos Hazard Abatement Plan, and Activity Hazard Analyses as separate appendices into 1 site specific Accident Prevention Plan document. Any portions of the Contractor's overall Safety and Health Program that are referenced in the Accident Prevention Plan, e.g., respirator program, hazard communication program, confined space entry program, etc., shall be included as appendices to the Accident Prevention Plan. The plan shall take into consideration all the individual asbestos abatement work tasks identified in Table 1. The plan shall be prepared, signed (and sealed, including certification number if required), and dated by the Contractor's Designated IH, Competent Person, and Project Supervisor.

1.7.1 Asbestos Hazard Abatement Plan Appendix

The Asbestos Hazard Abatement Plan appendix to the Accident Prevention Plan shall include, but not be limited to, the following:

a. The personal protective equipment to be used;

b. The location and description of regulated areas including clean and dirty areas, access tunnels, and decontamination unit (clean room, shower room, equipment room, storage areas such as load-out unit);

c. Initial exposure assessment in accordance with 29 CFR 1926, Section .1101;

d. Level of supervision;

e. Method of notification of other employers at the worksite;

f. Abatement method to include containment and control procedures;

g. Interface of trades involved in the construction;

h. Sequencing of asbestos related work;

i. Storage and disposal procedures and plan;

j. Type of wetting agent and asbestos encapsulant to be used;

k. Location of local exhaust equipment;

l. Air monitoring methods (personal, environmental and clearance);

m. Bulk sampling and analytical methods (if required);

n. A detailed description of the method to be employed in order to control the spread of ACM wastes and airborne fiber concentrations;

o. Fire and medical emergency response procedures;

p. The security procedures to be used for all regulated areas.

1.7.2 Activity Hazard Analyses Appendix

Activity Hazard Analyses, for each major phase of work, shall be submitted and updated during the project. The Activity Hazard Analyses format shall be in accordance with EM 385-1-1.

1.8 PRECONSTRUCTION CONFERENCE AND ONSITE SAFETY

The Contractor and the Contractor's Designated Competent Person, Project Supervisor, and Designated IH shall meet with the Contracting Officer prior to beginning work at a safety preconstruction conference to discuss the details of the Contractor's submitted Accident Prevention Plan to include the Asbestos Hazard Abatement Plan and Activity Hazard Analyses appendices. Onsite work shall not begin until the Accident Prevention Plan has been accepted. A copy of the written Accident Prevention Plan shall be maintained onsite. Changes and modifications to the accepted Accident Prevention Plan shall be made with the knowledge and concurrence of the Designated IH, the Project Supervisor, Designated Competent Person, and the Contracting Officer.

1.9 SECURITY

Entry into regulated areas shall only be by personnel authorized by the Contractor and the Contracting Officer. Personnel authorized to enter regulated areas shall be trained, be medically evaluated, and wear the required personal protective equipment, for the specific regulated area to be entered.

1.10 MEDICAL REQUIREMENTS

Medical requirements shall conform to 29 CFR 1926, Section .1101.

1.11 TRAINING PROGRAM

1.11.2 Project Specific Training

Prior to commencement of work, each worker shall be instructed by the Contractor's Designated IH and Competent Person in the following project specific training:

a. The hazards and health effects of the specific types of ACM to be abated;

b. The content and requirements of the Contractor's Accident Prevention Plan to include the Asbestos Hazard Abatement Plan and Activity Hazard Analyses and site-specific safety and health precautions;

c. Hazard Communication Program;

d. Hands-on training for each asbestos abatement technique to be employed;

e. Heat and/or cold stress monitoring specific to this project;

f. Air monitoring program and procedures;

g. Medical surveillance to include medical and exposure record-keeping procedures;

h. The association of cigarette smoke and asbestos-related disease;

i. Security procedures;

j. Specific work practice controls and engineering controls required for each Class of work in accordance with 29 CFR 1926, Section .1101.

1.12 RESPIRATORY PROTECTION PROGRAM

The Contractor's Designated IH shall establish in writing, and implement a respiratory protection program in accordance with 29 CFR 1926, Section .1101, 29 CFR 1910, Section .134, ANSI Z88.2, CGA G-7, CGA G-7.1. The Contractor's Designated IH shall establish minimum respiratory protection requirements based on measured or anticipated levels of airborne asbestos fiber concentrations encountered during the performance of the asbestos abatement work.

1.12.1 Respiratory Fit Testing

A qualitative or quantitative fit test conforming to 29 CFR 1926, Section 1101, Appendix C shall be conducted by the Contractor's Designated IH for each Contractor worker required to wear a respirator,

1.12.2 Respirator Selection and Use Requirements

The Contractor shall provide respirators, and ensure that they are used as required by 29 CFR 1926, Section .1101 and in accordance with the manufacturer's recommendations. Respirators shall be jointly approved by the Mine Safety and Health Administration and the National Institute for Occupational Safety and Health (MSHA/NIOSH), or by NIOSH, under the provisions of 42 CFR 84, for use in environments containing airborne asbestos fibers.

1.12.4 Class II Work

The Contractor shall provide an air purifying respirator, other than a disposable respirator, equipped with high-efficiency filters whenever the employee performs Class II asbestos jobs where the Contractor does not produce a negative exposure assessment.

1.12.5 Sanitation

Employees who wear respirators shall be permitted to leave work areas to wash their faces and respirator facepieces whenever necessary to prevent skin irritation associated with respirator use.

1.13 HAZARD COMMUNICATION PROGRAM

A hazard communication program shall be established and implemented in accordance with 29 CFR 1926, Section .59. Material safety data sheets (MSDSs) shall be provided for all hazardous materials brought onto the worksite. One copy shall be provided to the Contracting Officer and 1 copy shall be included in the Contractor's Hazard Communication Program.

1.14 LICENSES, PERMITS AND NOTIFICATIONS

1.14.1 General Legal Requirements

Necessary licenses, permits and notifications shall be obtained in conjunction with the project's asbestos abatement, transportation and disposal actions and timely notification furnished of such actions as required by federal, state, regional, and local authorities. The Contractor shall notify the Regional Office of the USEPA, Idaho’s environmental protection agency responsible for asbestos air emissions, and the local air pollution control district/agency and the Contracting Officer in writing, at least 10 days prior to the commencement of work, in accordance with 40 CFR 61, Subpart M, and state and local requirements to include the mandatory "Notification of Demolition and Renovation Record" form and other required notification documents. Notification shall be by Certified Mail, Return Receipt Requested. The Contractor shall furnish copies of the receipts to the Contracting Officer, in writing, prior to the commencement of work. A copy of the rental company's written acknowledgment and agreement shall be provided as required by paragraph RENTAL EQUIPMENT. For licenses, permits, and notifications that the Contractor is responsible for obtaining, the Contractor shall pay any associated fees or other costs incurred.

1.14.2 Litigation and Notification

The Contractor shall notify the Contracting Officer if any of the following occur:

a. The Contractor or any of the subcontractors are served with notice of violation of any law, regulation, permit or license which relates to this contract;

b. Proceedings are commenced which could lead to revocation of related permits or licenses; permits, licenses or other Government authorizations relating to this contract are revoked;

c. Litigation is commenced which would affect this contract;

d. The Contractor or any of the subcontractors become aware that their equipment or facilities are not in compliance or may fail to comply in the future with applicable laws or regulations.

1.15 PERSONAL PROTECTIVE EQUIPMENT

Contractor workers shall be provided with personal protective clothing and equipment and the Contractor shall ensure that it is worn properly. The Contractor's Designated IH and Designated Competent Person shall select and approve all the required personal protective clothing and equipment to be used.

1.15.1 Respirators

Respirators shall be in accordance with paragraph RESPIRATORY PROTECTION PROGRAM.

1.16 HYGIENE FACILITIES AND PRACTICES

The Contractor shall establish a decontamination area for the decontamination of employees, material and equipment. The Contractor shall ensure that employees enter and exit the regulated area through the decontamination area.

1.16.1 Shower Facilities

Shower facilities, when provided, shall comply with 29 CFR 1910, Section .141(d)(3).

1.16.2 Single Stage Decontamination Area

A decontamination area (equipment room/area) shall be provided for Class II asbestos work operations where exposures exceed the PELs or where there is no negative exposure assessment produced before the operation. The equipment room or area shall be adjacent to the regulated area for the decontamination of employees, material, and their equipment which is contaminated with asbestos. The equipment room or area shall consist of an area covered by an impermeable drop cloth on the floor or horizontal working surface. The area must be of sufficient size to accommodate cleaning of equipment and removing personal protective equipment without spreading contamination beyond the area. Surfaces of the equipment room shall be wet wiped 2 times after each shift. Materials used for wet wiping shall be disposed of as asbestos contaminated waste.

1.16.3 Decontamination Requirements for Class IV Work

The Contractor shall ensure that employees performing Class IV work within a regulated area comply with the hygiene practice required of employees performing work which has a higher classification within that regulated area, or the Contractor shall provide alternate decontamination area facilities for employees cleaning up debris and material which is TSI or surfacing ACM.

1.16.4 Lunch Areas

The Contractor shall provide lunch areas in which the airborne concentrations of asbestos are below 0.01 f/cc.

1.16.5 Smoking

Smoking, if allowed by the Contractor, shall only be permitted in designated areas approved by the Contracting Officer.

1.17 REGULATED AREAS

All Class II asbestos work shall be conducted within regulated areas. The regulated area shall be demarcated to minimize the number of persons within the area and to protect persons outside the area from exposure to airborne asbestos. Where critical barriers or negative pressure enclosures are used, they shall demarcate the regulated area. Access to regulated areas shall be limited to authorized persons. The Contractor shall control access to regulated areas, ensure that only authorized personnel enter, and verify that Contractor required medical surveillance, training and respiratory protection program requirements are met prior to allowing entrance.

1.18 WARNING SIGNS AND TAPE

Warning signs and tape printed in English shall be provided at the regulated boundaries and entrances to regulated areas. The Contractor shall ensure that all personnel working in areas contiguous to regulated areas comprehend the warning signs. Signs shall be located to allow personnel to read the signs and take the necessary protective steps required before entering the area. Warning signs, as shown and described in DETAIL SHEET 11, shall be in vertical format conforming to 29 CFR 1910 and 29 CFR 1926, Section .1101, a minimum of 20 by 14 inches, and displaying the following legend in the lower panel:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY

Spacing between lines shall be at least equal to the height of the upper of any two lines. Warning tape shall be provided as shown and described on DETAIL SHEET 11.

1.19 WARNING LABELS

Warning labels shall be affixed to all asbestos disposal containers used to contain asbestos materials, scrap, waste debris, and other products contaminated with asbestos. Containers with preprinted warning labels conforming to requirements are acceptable. Warning labels shall be as described in DETAIL SHEET 14, shall conform to 29 CFR 1926, Section .1101 and shall be of sufficient size to be clearly legible displaying the following legend:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

1.20 LOCAL EXHAUST VENTILATION

Local exhaust ventilation units shall conform to ANSI Z9.2 and 29 CFR 1926, Section .1101. Filters on local exhaust system equipment shall conform to ANSI Z9.2 and UL 586. Filter shall be UL labeled.

1.21 TOOLS

Vacuums shall be leak proof to the filter, equipped with HEPA filters, of sufficient capacity and necessary capture velocity at the nozzle or nozzle attachment to efficiently collect, transport and retain the ACM waste material. Power tools shall not be used to remove ACM unless the tool is equipped with effective, integral HEPA filtered exhaust ventilation capture and collection system, or has otherwise been approved for use by the Contracting Officer. Residual asbestos shall be removed from reusable tools prior to storage and reuse. Reusable tools shall be thoroughly decontaminated prior to being removed from regulated areas.

1.22 RENTAL EQUIPMENT

If rental equipment is to be used, written notification shall be provided to the rental agency, concerning the intended use of the equipment, the possibility of asbestos contamination of the equipment and the steps that will be taken to decontaminate such equipment. A written acceptance of the terms of the Contractor's notification shall be obtained from the rental agency.

1.23 AIR MONITORING EQUIPMENT

The Contractor's Designated IH shall approve air monitoring equipment to be used to collect samples.

1.24 EXPENDABLE SUPPLIES

1.24.1 Duct Tape

Industrial grade duct tape of appropriate widths suitable for bonding sheet plastic and disposal container shall be provided.

1.24.2 Disposal Containers

Leak-tight (defined as solids, liquids, or dust that cannot escape or spill out) disposal containers shall be provided for ACM wastes as required by 29 CFR 1926 Section .1101 and DETAIL SHEETS 9A, 9B, 9C and 14.

1.24.3 Disposal Bags

Leak-tight bags, 6 mil thick, shall be provided for placement of asbestos generated waste as described in DETAIL SHEET 9A.

1.24.4 Cardboard Boxes

Heavy-duty corrugated cardboard boxes, coated with plastic or wax to retard deterioration from moisture, shall be provided as described in DETAIL SHEET 9C, if required by state and local requirements. Boxes shall fit into

selected ACM disposal bags. Filled boxes shall be sealed leak-tight with duct tape.

1.24.5 Sheet Plastic

Sheet plastic shall be polyethylene of 6 mil minimum thickness and shall be provided in the largest sheet size necessary to minimize seams, as indicated on the project drawings. Film shall be clear and conform to ASTM D 4397, except as specified below:

1.24.6 Amended Water

Amended water shall meet the requirements of ASTM D 1331.

1.24.7 Mastic Removing Solvent

Mastic removing solvent shall be nonflammable and shall not contain methylene chloride, glycol ether, or halogenated hydrocarbons. Solvents used onsite shall have a flash point greater than 140 degrees F.

1.24.8 Wetting Agents

Removal encapsulant (a penetrating encapsulant) shall be provided when conducting removal abatement activities that require a longer removal time or are subject to rapid evaporation of amended water.

1.24.9 Strippable Coating

Strippable coating in aerosol cans shall be used to adhere to surfaces and to be removed cleanly by stripping, at the completion of work. This work shall only be done in well ventilated areas.

1.25 MISCELLANEOUS ITEMS

A sufficient quantity of other items, such as, but not limited to: scrapers, brushes, brooms, staple guns, tarpaulins, shovels, rubber squeegees, dust pans, other tools, scaffolding, staging, enclosed chutes, wooden ladders, lumber necessary for the construction of containments, UL approved temporary electrical equipment, material and cords, ground fault circuit interrupters, water hoses of sufficient length, fire extinguishers, first aid kits, portable toilets, logbooks, log forms, markers with indelible ink, spray paint in bright color to mark areas, project boundary fencing, etc., shall be provided.

PART 2 PRODUCTS

2.1 ENCAPSULANTS

Encapsulants shall conform to USEPA requirements, shall contain no toxic or hazardous substances and no solvent and shall meet the following requirements:

Requirements for Penetrating Encapsulant

Requirement	Test Standard
Cohesion/Adhesion Test, 50 pounds of force/foot	ASTM E 736
Fire Resistance, Negligible affect on fire resistance rating over 3 hour test(Classified by UL for use over fibrous and cementitious sprayed fireproofing)	ASTM E 119
Impact Resistance, Minimum 43 in-lb (Gardner Impact Test)	ASTM D 2794
Flexibility, no rupture or cracking (Mandrel Bend Test)	ASTM D 522

Additional Requirements for Lockdown Encapsulant

Requirement	Test Standard
Fire Resistance, Negligible affect on fire resistance rating over 3 hour test(Tested with fireproofing over encapsulant applied directly to steel member)	ASTM E 119
Bond Strength, 100 pounds of force/foot (Tests compatibility with cementitious and fibrous fireproofing)	ASTM E 736

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Asbestos abatement work tasks shall be performed as shown on the detailed plans and drawings, as summarized in paragraph DESCRIPTION OF WORK and including Table 1 and the Contractor's Accident Prevention Plan, Asbestos Hazard Abatement Plan, and the Activity Hazard Analyses. The Contractor shall use the engineering controls and work practices required in 29 CFR 1926, Section .1101(g) in all operations regardless of the levels of exposure. Personnel shall wear and utilize protective clothing and equipment as specified. The Contractor shall not permit eating, smoking, drinking, chewing or applying cosmetics in the regulated area. All hot work (burning, cutting, welding, etc.) shall be conducted under controlled conditions in conformance with 29 CFR 1926, Section .352, Fire Prevention. Personnel of other trades, not engaged in asbestos abatement activities, shall not be exposed at any time to airborne concentrations of asbestos unless all the administrative and personal protective provisions of the Contractor's Accident Prevention Plan are complied with. Power to the regulated area shall be locked-out and tagged in accordance with 29 CFR 1910, and temporary electrical service with ground fault circuit interrupters shall be provided as needed. Temporary electrical service shall be disconnected when necessary for wet removal. The Contractor shall stop abatement work in the regulated area immediately when the airborne total fiber concentration: (1) equals or exceeds 0.01 f/cc, or the pre-abatement concentration, whichever is greater, outside the regulated area; or (2) equals or exceeds 1.0 f/cc inside the regulated area. The Contractor

shall correct the condition to the satisfaction of the Contracting Officer, including visual inspection and air sampling. Work shall resume only upon notification by the Contracting Officer. Corrective actions shall be documented.

3.2 PROTECTION OF ADJACENT WORK OR AREAS TO REMAIN

Asbestos abatement shall be performed without damage to or contamination of adjacent work or area. Where such work or area is damaged or contaminated, as verified by the Contracting Officer using visual inspection or sample analysis, it shall be restored to its original condition or decontaminated by the Contractor at no expense to the Government, as deemed appropriate by the Contracting Officer. This includes inadvertent spill of dirt, dust or debris in which it is reasonable to conclude that asbestos may exist. When these spills occur, work shall stop in all effected areas immediately and the spill shall be cleaned. When satisfactory visual inspection and air sampling analysis results are obtained and have been evaluated by the Contractor's Designated IH and the Contracting Officer, work shall proceed.

3.3 METHODS OF COMPLIANCE

3.3.1 Mandated Practices

The Contractor shall employ proper handling procedures in accordance with 29 CFR 1926 and 40 CFR 61, Subpart M, and the specified requirements. The specific abatement techniques and items identified shall be detailed in the Contractor's Asbestos Hazard Abatement Plan including, but not limited to, details of construction materials, equipment, and handling procedures. The Contractor shall use the following engineering controls and work practices in all operations, regardless of the levels of exposure:

a. Vacuum cleaners equipped with HEPA filters to collect debris and dust containing ACM.

b. Wet methods or wetting agents to control employee exposures during asbestos handling, mixing, removal, cutting, application, and cleanup; except where it can be demonstrated that the use of wet methods is unfeasible due to, for example, the creation of electrical hazards, equipment malfunction, and in roofing.

c. Prompt clean-up and disposal in leak-tight containers of wastes and debris contaminated with asbestos.

d. Inspection and repair of polyethylene in work and high traffic areas.

e. Cleaning of equipment and surfaces of containers filled with ACM prior to removing them from the equipment room or area.

3.3.2 Control Methods

The Contractor shall use the following control methods to comply with the PELs:

a. Local exhaust ventilation equipped with HEPA filter dust collection systems;

b. Enclosure or isolation of processes producing asbestos dust;

c. Ventilation of the regulated area to move contaminated air away from the breathing zone of employees and toward a filtration or collection device equipped with a HEPA filter;

d. Use of other work practices and engineering controls;

e. Where the feasible engineering and work practice controls described above are not sufficient to reduce employee exposure to or below the PELs, the Contractor shall use them to reduce employee exposure to the lowest levels attainable by these controls and shall supplement them by the use of respiratory protection that complies with paragraph, RESPIRATORY PROTECTION PROGRAM.

3.3.3 Unacceptable Practices

The following work practices and engineering controls shall not be used for work related to asbestos or for work which disturbs ACM, regardless of measured levels of asbestos exposure or the results of initial exposure assessments:

a. High-speed abrasive disc saws that are not equipped with point of cut ventilator or enclosures with HEPA filtered exhaust air.

b. Compressed air used to remove asbestos, or materials containing asbestos, unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud created by the compressed air.

c. Dry sweeping, shoveling, or other dry clean-up of dust and debris containing ACM.

d. Employee rotation as a means of reducing employee exposure to asbestos.

3.3.3.1 Negative Pressure Enclosure (NPE) System

The NPE system shall provide at least 4 air changes per hour inside the containment. The local exhaust unit equipment shall be operated 24 hours per day until the containment is removed, and shall be leak-proof to the filter and equipped with HEPA filters. Air movement shall be directed away from the employees and toward a HEPA filtration device. The NPE shall be smoke tested for leaks at the beginning of each shift. Local exhaust equipment shall be sufficient to maintain a minimum pressure differential of minus 0.02 inch of water column relative to adjacent, unsealed areas. Pressure differential shall be monitored continuously, 24 hours per day, with an automatic manometric recording instrument. Pressure differential recordings shall be provided daily on the same day collected. Readings shall be reviewed by the Contractor's Designated Competent Person and IH prior to submittal. The Contracting Officer shall be notified immediately if the pressure differential falls below the prescribed minimum. The building ventilation system shall not be used as the local exhaust system for the regulated area. The local exhaust system shall terminate outdoors unless an alternate arrangement is allowed by the Contract Officer. All filters used shall be new at the beginning of the project and shall be periodically changed as necessary and disposed of as ACM waste.

3.3.3.2 Mini-Enclosures

Single bulkhead containment or Mini-containment (small walk-in enclosure) to accommodate no more than 2 persons, may be used if the disturbance or removal can be completely contained by the enclosure with the following specifications and work practices. The mini-enclosure shall be inspected for leaks and smoke tested before each use. Air movement shall be directed away from the employee's breathing zone within the mini-enclosure.

3.3.4 Class II Work

In addition to the requirements of paragraphs Mandated Practices and Control Methods, the following engineering controls and work practices shall be used:

a. A Competent Person shall supervise the work.

b. For indoor work, critical barriers shall be placed over all openings to the regulated area.

c. Impermeable dropcloths shall be placed on surfaces beneath all removal activity.

3.3.5 Specific Control Methods for Class II Work

In addition to requirements of paragraph Class II Work, Class II work shall be performed using the following methods:

3.3.5.1 Vinyl and Asphalt Flooring Materials

When removing vinyl and asphalt flooring materials which contain, the Contractor shall use the following practices as shown in RESPONSE ACTION DETAIL SHEET 56. Resilient sheeting shall be removed by adequately wet methods. Tiles shall be removed intact (if possible); wetting is not required when tiles are heated and removed intact. Flooring or its backing shall not be sanded. Scraping of residual adhesive and/or backing shall be performed using wet methods. Mechanical chipping is prohibited unless performed in a negative pressure enclosure. Dry sweeping is prohibited. The Contractor shall use vacuums equipped with HEPA filter, disposable dust bag, and metal floor tool (no brush) to clean floors.

3.3.5.2 Roofing Material

When removing roofing materials which contain ACM as described in 29 CFR 1926, Section .1101(g)(8)(ii), the Contractor shall use the following practices as shown in RESPONSE ACTION DETAIL SHEET 74. Roofing material shall be removed in an intact state. Wet methods shall be used to remove roofing materials that are not intact, or that will be rendered not intact during removal, unless such wet methods are not feasible or will create safety hazards. When removing built-up roofs, with asbestos-containing roofing felts and an aggregate surface, using a power roof cutter, all dust resulting from the cutting operations shall be collected by a HEPA dust collector, or shall be HEPA vacuumed by vacuuming along the cut line. Asbestos-containing roofing material shall not be dropped or thrown to the ground, but shall be lowered to the ground via covered, dust-tight chute, crane, hoist or other method approved by the Contracting Officer. Any ACM

that is not intact shall be lowered to the ground as soon as practicable, but not later than the end of the work shift. While the material remains on the roof it shall be kept wet or placed in an impermeable waste bag or wrapped in plastic sheeting. Intact ACM shall be lowered to the ground as soon as practicable, but not later than the end of the work shift. Unwrapped material shall be transferred to a closed receptacle precluding the dispersion of dust. Critical barriers shall be placed over roof level heating and ventilation air intakes.

3.3.6 Specific Control Methods for Class IV Work

Class IV jobs shall be conducted using wet methods, HEPA vacuums, and prompt clean-up of debris containing ACM. Employees cleaning up debris and waste in a regulated area where respirators are required shall wear the selected respirators.

3.3.7 Alternative Methods for Roofing Materials

The Contractor shall use the following engineering controls and work practices when removing, repairing, or maintaining intact roof cements, mastics, coatings, or flashings which contain asbestos fibers encapsulated or coated by bituminous or resinous compounds. If during the course of the job the material does not remain intact, the Contractor shall use the procedures described in paragraph Roofing Material. Before work begins, and as needed during the job, the Designated Competent Person shall conduct an inspection and determine that the roofing material is intact and will likely remain intact. The material shall not be sanded, abraded, or ground. Manual methods which would render the material non-intact shall not be used. Roofing material shall not be dropped or thrown to the ground but shall be lowered via covered, dust-tight chute, crane, hoist or other method approved by the Contracting Officer. All such material shall be removed from the roof as soon as practicable, but not later than the end of the work shift.

3.3.8 Cleaning After Asbestos Removal

After completion of all asbestos removal work, surfaces from which ACM has been removed shall be wet wiped or sponged clean, or cleaned by some equivalent method to remove all visible residue. Run-off water shall be collected and filtered through a dual filtration system. A first filter shall be provided to remove fibers 20 micrometers and larger, and a final filter provided that removes fibers 5 micrometers and larger. After the gross amounts of asbestos have been removed from every surface, remaining visible accumulations of asbestos on floors shall be collected using plastic shovels, rubber squeegees, rubber dustpans, and HEPA vacuum cleaners as appropriate to maintain the integrity of the regulated area.

3.3.9 Class II Asbestos Work Response Action Detail Sheets

The following Class II Asbestos Work Response Action Detail Sheet is specified on Table 1 for each individual work task to be performed:

a. Vinyl or Vinyl Asbestos Tile Adhered to Concrete Floor System by Asbestos-Containing Adhesive: See Sheet 56

b. Roof, Shingles and Underlayment: See Sheet 75

Prior to applying any encapsulant, the entire surface area shall be inspected for loose, or damaged asbestos material:

3.4 FINAL CLEANING AND VISUAL INSPECTION

Upon completion of abatement, the regulated area shall be cleaned by collecting, packing, and storing all gross contamination. A final cleaning shall be performed using HEPA vacuum and wet cleaning of all interior exposed surfaces and objects in the regulated area. Upon completion of the cleaning, the Contractor shall conduct a visual pre-inspection of the cleaned area in preparation for a final inspection and recleaning, as necessary. Upon completion of the final cleaning, the Contractor and the Contracting Officer shall conduct a final visual inspection of the cleaned regulated area in accordance with ASTM E 1368 and document the results on the Final Cleaning and Visual Inspection as specified on the SET-UP DETAIL SHEET 19. If the Contracting Officer rejects the clean regulated area as not meeting final cleaning requirements, the Contractor shall reclean as necessary and have a follow-on inspection conducted with the Contracting Officer. Recleaning and follow-up reinspection shall be at the Contractor's expense.

3.5 LOCKDOWN

Prior to removal of plastic barriers and after clean-up of gross contamination and final visual inspection, a post removal (lockdown) encapsulant shall be spray applied to ceiling, walls, floors, and other surfaces in the regulated area.

3.6 EXPOSURE ASSESSMENT AND AIR MONITORING

3.6.1 General Requirements For Exposure

Exposure assessment, air monitoring and analysis of airborne concentration of asbestos fibers shall be performed in accordance with 29 CFR 1926, Section .1101, the Contractor's air monitoring plan, and as specified. Personal exposure air monitoring (collected at the breathing zone) that is representative of the exposure of each employee who is assigned to work within a regulated area shall be performed by the Contractor's Designated IH. Breathing zone samples shall be taken for at least 25 percent of the workers in each shift, or a minimum of 2, whichever is greater at the Contractor's expense. Monitoring may be duplicated by the Government at the discretion of the Contracting Officer. Results of breathing zone samples shall be posted at the job site and made available to the Contracting Officer. The Contractor shall maintain a fiber concentration inside a regulated area less than or equal to 0.1 f/cc expressed as an 8 hour, time-weighted average (TWA) during the conduct of the asbestos abatement. If fiber concentration rises above 0.1 f/cc, work procedures shall be investigated with the Contracting Officer to determine the cause. At the discretion of the Contracting Officer, fiber concentration may exceed 0.1 f/cc but shall not exceed 1.0 f/cc expressed as an 8-hour TWA. The Contractor's workers shall not be exposed to an airborne fiber concentration in excess of 1.0 f/cc, as averaged over a sampling period of 30 minutes. Should either an environmental concentration of 1.0 f/cc expressed as an 8-hour TWA or a personal excursion concentration of 1.0 f/cc expressed as a 30-minute sample occur inside a regulated work area, the Contractor shall stop work immediately, notify the Contracting Officer, and implement additional engineering controls and work practice controls to reduce

airborne fiber levels below prescribed limits in the work area. Work shall not restart until authorized by the Contracting Officer.

3.6.2 Initial Exposure Assessment

The Contractor's Designated IH shall conduct an exposure assessment immediately before or at the initiation of an asbestos abatement operation to ascertain expected exposures during that operation.

3.6.3 Negative Exposure Assessment

The Contractor shall provide a negative exposure assessment for the specific asbestos job which will be performed. The negative exposure assessment shall be provided within 2 days of the initiation of the project and conform to the following criteria:

a. Objective Data: Objective data demonstrating that the product or material containing asbestos minerals or the activity involving such product or material cannot release airborne fibers in concentrations exceeding the PEL-TWA and PEL-Excursion Limit under those work conditions having the greatest potential for releasing asbestos.

b. Prior Asbestos Jobs: Where the Contractor has monitored prior asbestos jobs for the PEL and the PEL-Excursion Limit within 12 months of the current job, the monitoring and analysis were performed in compliance with asbestos standard in effect; the data were obtained during work operations conducted under workplace conditions closely resembling the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in the Contractor's current operations; the operations were conducted by employees whose training and experience are no more extensive than that of employees performing the current job; and these data show that under the conditions prevailing and which will prevail in the current workplace, there is a high degree of certainty that the monitoring covered exposure from employee exposures will not exceed the PEL-TWA and PEL-Excursion Limit.

c. Initial Exposure Monitoring: The results of initial exposure monitoring of the current job, made from breathing zone air samples that are representative of the 8-hour PEL-TWA and 30-minute short-term exposures of each employee. The monitoring covered exposure from operations which are most likely during the performance of the entire asbestos job to result in exposures over the PELs.

3.6.4 Preabatement Environmental Air Monitoring

Preabatement environmental air monitoring shall be established 1 day prior to the masking and sealing operations for each regulated area to determine background concentrations before abatement work begins.

3.6.5 Environmental Air Monitoring During Abatement

Until an exposure assessment is provided to the Contracting Officer, environmental air monitoring shall be conducted at locations and frequencies that will accurately characterize any evolving airborne asbestos fiber

concentrations. The assessment shall demonstrate that the product or material containing asbestos minerals, or the abatement involving such product or material, cannot release airborne asbestos fibers in concentrations exceeding 0.01 f/cc as a TWA under those work conditions having the greatest potential for releasing asbestos. The monitoring shall be at least once per shift at locations including, but not limited to, close to the work inside a regulated area; preabatement sampling locations; outside entrances to a regulated area; representative locations outside of the perimeter of a regulated area; and at the exhaust discharge point of local exhaust system ducted to the outside of a containment (if used). If the sampling outside regulated area shows airborne fiber levels have exceeded background or 0.01 f/cc, whichever is greater, work shall be stopped immediately, and the Contracting Officer notified. The condition causing the increase shall be corrected. Work shall not restart until authorized by the Contracting Officer.

3.6.6 Final Clearance Air Monitoring

Final air clearance monitoring is only required within the housing units. Prior to conducting final clearance air monitoring , the Contractor and the Contracting Officer shall conduct a final visual inspection of the regulated area where asbestos abatement has been completed. The final visual inspection shall be as specified in SET-UP DETAIL SHEET 19. Final clearance air monitoring shall not begin until acceptance of the Contractor's final cleaning by the Contracting Officer. The Contractor's Designated IH shall conduct final clearance air monitoring using aggressive air sampling techniques as defined in EPA 560/5-85-024 or as otherwise required by federal or state requirements.

3.6.6.1 Air Clearance Failure

If clearance sampling results fail to meet the final clearance requirements, the Contractor shall pay all costs associated with the required recleaning, resampling, and analysis, until final clearance requirements are met.

3.6.7 Air-Monitoring Results and Documentation

Air sample fiber counting shall be completed and results provided within 24 hours (breathing zone samples), and 48 hours (environmental/clearance monitoring) after completion of a sampling period. The Contracting Officer shall be notified immediately of any airborne levels of asbestos fibers in excess of established requirements. Written sampling results shall be provided within 5 working days of the date of collection. The air sampling results shall be documented on a Contractor's daily air monitoring log. The daily air monitoring log shall contain the following information for each sample:

a. Sampling and analytical method used;

b. Date sample collected;

c. Sample number;

d. Sample type: BZ = Breathing Zone (Personal), P = Preabatement, E = Environmental, C = Abatement Clearance;

e. Location/activity/name where sample collected;

f. Sampling pump manufacturer, model and serial number, beginning flow rate, end flow rate, average flow rate (L/min);

g. Calibration date, time, method, location, name of calibrator, signature;

h. Sample period (start time, stop time, elapsed time (minutes);

i. Total air volume sampled (liters);

j. Sample results (f/cc and S/mm square) if EPA methods are required for final clearance;

k. Laboratory name, location, analytical method, analyst, confidence level. In addition, the printed name and a signature and date block for the Industrial Hygienist who conducted the sampling and for the Industrial Hygienist who reviewed the daily air monitoring log verifying the accuracy of the information.

3.7 CLEARANCE CERTIFICATION

When asbestos abatement is complete, ACM waste is removed from the regulated areas, and final clean-up is completed, the Contracting Officer will certify the areas as safe before allowing the warning signs and boundary warning tape to be removed. The Contractor and the Contracting Officer shall visually inspect all surfaces within the containment for residual material or accumulated debris. The Contractor shall reclean all areas showing dust or residual materials. The Contracting Officer will certify in writing that the area is safe before unrestricted entry is permitted. The Government will have the option to perform monitoring to certify the areas are safe before entry is permitted.

3.8 CLEANUP AND DISPOSAL

3.8.1 Title to ACM Materials

ACM material resulting from abatement work, except as specified otherwise, shall become the property of the Contractor and shall be disposed of as specified and in accordance with applicable federal, state and local regulations. **The Contractor shall contact MT Home AFB Environmental Flight Office, Mr. Earl Claiborne, and coordinate disposal at the MT Home AFB asbestos landfill.**

3.8.2 Collection and Disposal of Asbestos

All ACM waste including contaminated wastewater filters, scrap, debris, bags, containers, equipment, and asbestos contaminated clothing, shall be collected and placed in leak-tight containers such as double plastic bags (see DETAIL SHEET 9A); sealed double wrapped polyethylene sheet (see DETAIL 9B); sealed fiberboard boxes (see DETAIL SHEET 9C); or other approved containers. Waste within the containers shall be wetted in case the container is breached. For temporary storage, sealed impermeable containers shall be stored in an asbestos waste load-out unit or in a storage/transportation conveyance (i.e., dumpster, roll-off waste boxes, etc.) in a manner acceptable to and in an area assigned by the Contracting

Officer. Procedure for hauling and disposal shall comply with 40 CFR 61, Subpart M, state, regional, and local standards.

3.8.3 Scale Weight Measurement

Scales used for measurement shall be public scales.

3.8.4 Weigh Bill and Delivery Tickets

Copies of weigh bills and delivery tickets shall be submitted to the Contracting Officer during the progress of the work.

3.8.5 Asbestos Waste Shipment Record

The Contractor shall complete and provide the Contracting Officer final completed copies of the Waste Shipment Record for all shipments of waste material as specified in 40 CFR 61, Subpart M and other required state waste manifest shipment records, within 3 days of delivery to the landfill. Each Waste Shipment Record shall be signed and dated by the Contracting Officer, the waste transporter, and disposal facility operator.

TABLE 1

INDIVIDUAL WORK TASK DATA ELEMENTS

Sheet 1 of 2

There is a separate data sheet for each individual work task.

1. WORK TASK DESIGNATION NUMBER ***1***
2. LOCATION OF WORK TASK: ***2, 3 and 4 bedroom Unit***

3. BRIEF DESCRIPTION OF MATERIAL TO BE ABATED: **Vinyl linoleum and adhesive mastic or vinyl floor tile and adhesive mastic**

   a. Type of Asbestos: **Chrysotile**
   b. Percent asbestos content: ***Mastic adhesive* 2-12%**

5. OSHA ASBESTOS CLASS DESIGNATION FOR WORK TASK: ***Class II***
6. EPA NESHAP FRIABILITY DESIGNATION FOR WORK TASK
   Friable _____ Non-friable ***X***
7. QUANTITY:
   2 bedroom duplex Unit: **350 sq. ft** of kitchen floor vinyl linoleum and vinyl linoleum from garage entrance to kitchen. An estimated 3,500 sq. ft total.

   3 bedroom duplex Unit: 330 sq. ft of kitchen floor vinyl tile. An estimated 3,300 sq. ft total.

   4 bedroom duplex Unit: 360 sq. ft of kitchen floor vinyl tile. An estimated 3,500 sq. ft total.

8. RESPONSE ACTION DETAIL SHEET NUMBER FOR WORK TASK: **56**

TABLE 1

INDIVIDUAL WORK TASK DATA ELEMENTS

Sheet 2 of 2

There is a separate data sheet for each individual work task.

1. WORK TASK DESIGNATION NUMBER ***2***
2. LOCATION OF WORK TASK: ***2, 3 and 4 bedroom Unit***

3. BRIEF DESCRIPTION OF MATERIAL TO BE ABATED: **Asphalt and gravel roof**

   a. Type of Asbestos: **Chrysotile**
   b. Percent asbestos content: **2-12%**

5. OSHA ASBESTOS CLASS DESIGNATION FOR WORK TASK: ***Class II***
6. EPA NESHAP FRIABILITY DESIGNATION FOR WORK TASK
   Friable _____ Non-friable ***X***
7. QUANTITY:
   2 bedroom duplex Unit: **3,080 sq. ft** of asphalt roofing materials. An estimated 30,800 sq. ft total.

   3 bedroom duplex Unit: 3,300 sq. ft of asphalt roofing materials. An estimated 33,000 sq. ft total.

   4 bedroom duplex Unit: 3,300 sq. ft of asphalt roofing materials. An estimated 33,000 sq. ft total.

8. RESPONSE ACTION DETAIL SHEET NUMBER FOR WORK TASK: **75**

CERTIFICATE OF WORKER'S ACKNOWLEDGMENT

PROJECT NAME _____ CONTRACT NO. _____
PROJECT ADDRESS _____
CONTRACTOR FIRM NAME _____
EMPLOYEE'S NAME _____,_____,_____,
(Print) (Last) (First) (MI)

Social Security Number: _____-_____-_____,

WORKING WITH ASBESTOS CAN BE DANGEROUS. INHALING ASBESTOS FIBERS HAS BEEN LINKED WITH TYPES OF LUNG DISEASE AND CANCER. IF YOU SMOKE AND INHALE ASBESTOS FIBERS, THE CHANCE THAT YOU WILL DEVELOP LUNG CANCER IS GREATER THAN THAT OF THE NONSMOKING PUBLIC.

Your employer's contract for the above project requires that you be provided and you complete formal asbestos training specific to the type of work you will perform and project specific training; that you be supplied with proper personal protective equipment including a respirator, that you be trained in its use; and that you receive a medical examination to evaluate your physical capacity to perform your assigned work tasks, under the environmental conditions expected, while wearing the required personal protective equipment. These things are to be done at no cost to you. By signing this certification, you are acknowledging that your employer has met these obligations to you. The Contractor's Designated Industrial Hygienist will check the block(s) for the type of formal training you have completed. Review the checked blocks prior to signing this certification.

FORMAL TRAINING:
_____ a. For Competent Persons and Supervisors: I have completed EPA's Model Accreditation Program (MAP) training course, "Contractor/Supervisor", that meets this State's requirements.

b. For Workers:
_____ (1) For OSHA Class I work: I have completed EPA's MAP training course, "Worker", that meets this State's requirements.
_____ (2) For OSHA Class II work (where there will be abatement of more than one type of Class II materials, i.e., roofing, siding, floor tile, etc.): I have completed EPA's MAP training course, "Worker", that meets this State's requirements.
(3) For OSHA Class II work (there will only be abatement of one type of Class II material):
_____ (a) I have completed an 8-hour training class on the elements of 29 CFR 1926, Section .1101(k)(9)(viii), in addition to the specific work practices and engineering controls of 29 CFR 1926, Section .1101(g) and hands-on training.
_____ (b) I have completed EPA's MAP training course, "Worker", that meets this State's requirements.
_____ (4) For OSHA Class III work: I have completed at least a 16-hour course consistent with EPA requirements for training of local education agency maintenance and custodial staff at 40 CFR 763, Section .92(a)(2) and the elements of 29 CFR 1926, Section .1101(k)(9)(viii), in addition to the specific work practices and engineering controls at 29 CFR 1926, Section .1101, and hands-on training.

_____ (5) For OSHA Class IV work: I have completed at least a 2-hr course consistent with EPA requirements for training of local education agency maintenance and custodial staff at 40 CFR 763, (a)(1), and the elements of 29 CFR 1926, Section .1101(k)(9)(viii), in addition to the specific work practices and engineering controls at 29 CFR 1926, Section .1101(g) and hands-on training.

_____ c. Workers, Supervisors and the Designated Competent Person: I have completed annual refresher training as required by EPA's MAP that meets this State's requirements.

PROJECT SPECIFIC TRAINING:
_____ I have been provided and have completed the project specific training required by this Contract. My employer's Designated Industrial Hygienist and Designated Competent Person conducted the training.

RESPIRATORY PROTECTION:
_____ I have been trained in accordance with the criteria in the Contractor's Respiratory Protection program. I have been trained in the dangers of handling and breathing asbestos dust and in the proper work procedures and use and limitations of the respirator(s) I will wear. I have been trained in and will abide by the facial hair and contact lens use policy of my employer.

RESPIRATOR FIT-TEST TRAINING:
_____ I have been trained in the proper selection, fit, use, care, cleaning, maintenance, and storage of the respirator(s) that I will wear. I have been fit-tested in accordance with the criteria in the Contractor's Respiratory Program and have received a satisfactory fit. I have been assigned my individual respirator. I have been taught how to properly perform positive and negative pressure fit-check upon donning negative pressure respirators each time.

MEDICAL EXAMINATION:
_____ I have had a medical examination within the last twelve months which was paid for by my employer. The examination included: health history, pulmonary function tests, and may have included an evaluation of a chest x-ray. A physician made a determination regarding my physical capacity to perform work tasks on the project while wearing personal protective equipment including a respirator. I was personally provided a copy and informed of the results of that examination. My employer's Industrial Hygienist evaluated the medical certification provided by the physician and checked the appropriate blank below. The physician determined that there:

_____ were no limitations to performing the required work tasks.
_____ were identified physical limitations to performing the required work tasks.

Date of the medical examination _____

Employee Signature _____ date _____
Contractor's Industrial
Hygienist Signature _____ date _____

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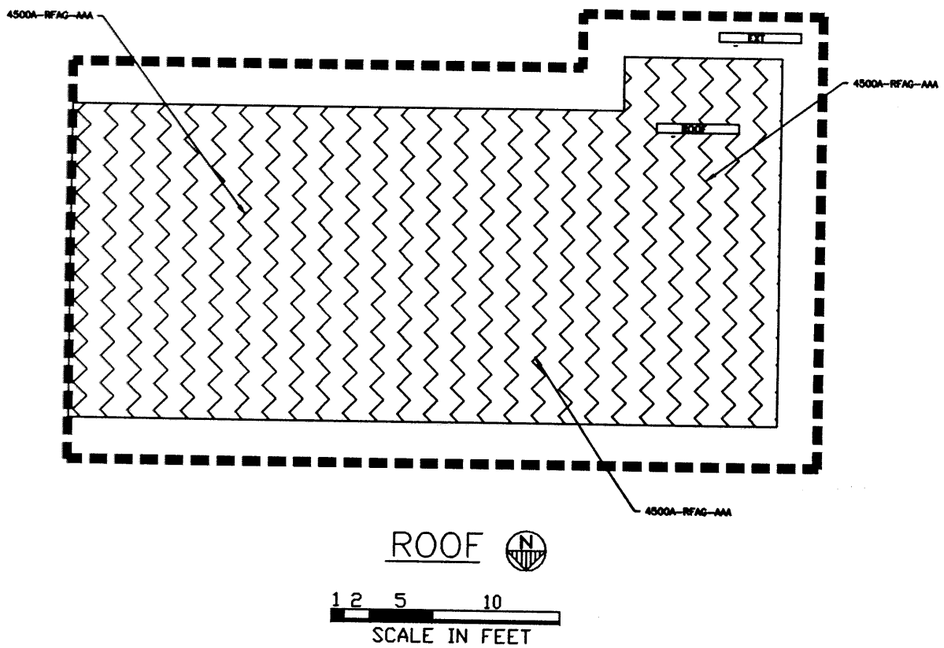
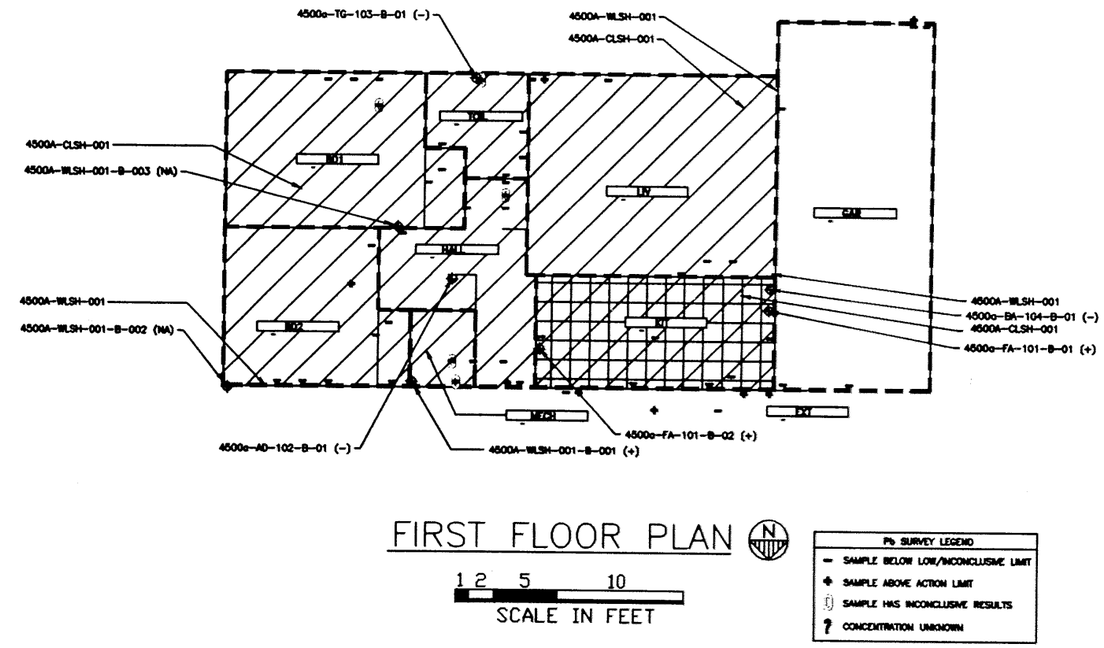


2 Bedroom Unit Representing
1/2 of duplex unit



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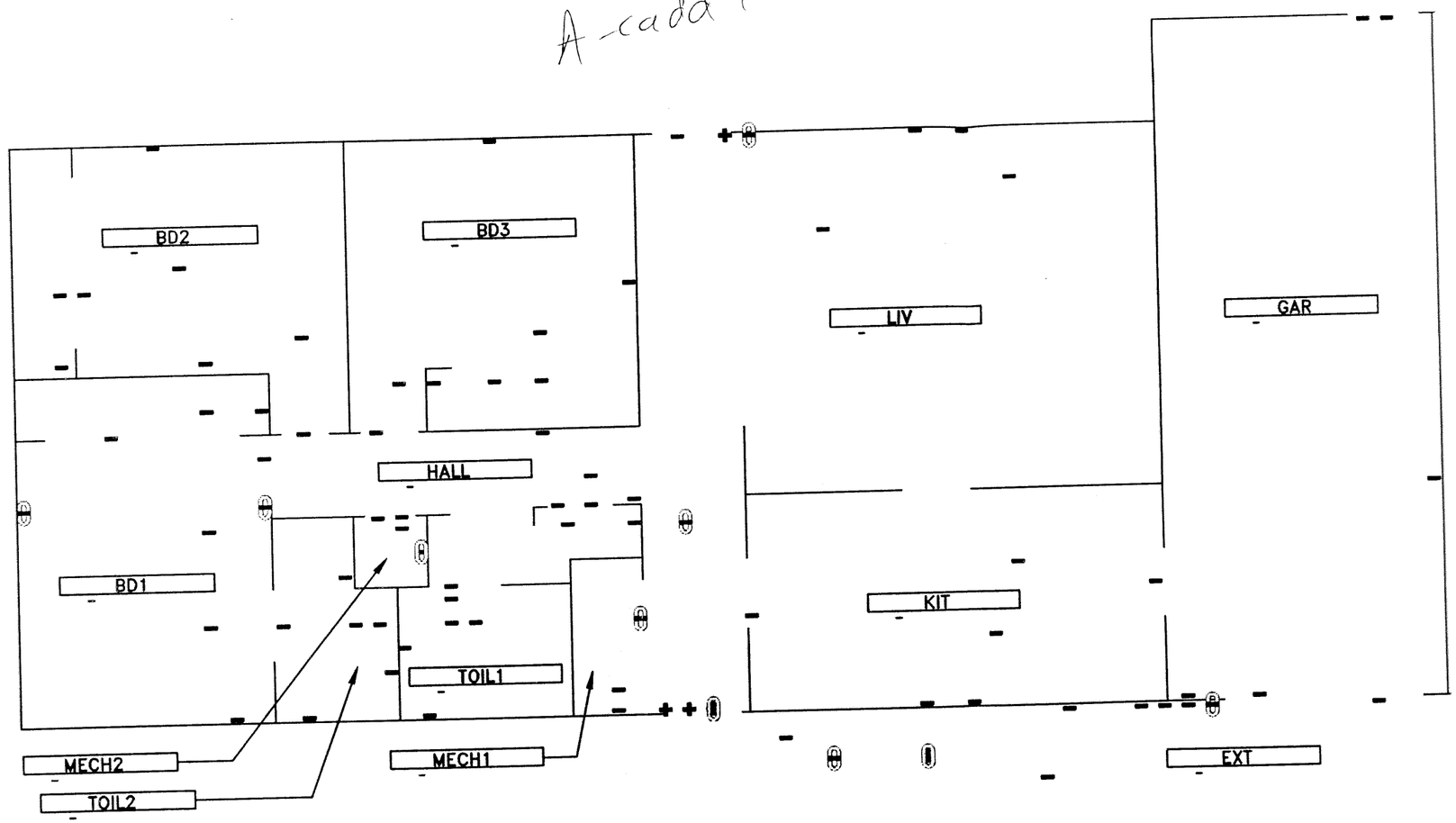

3 Bedroom Unit Representing
1/2 of duplex unit

FIRST FLOOR PLAN

N

1 2 5 10

SCALE IN FEET

Pb SURVEY LEGEND	
–	SAMPLE BELOW LOW/INCONCLUSIVE LIMIT
+	SAMPLE ABOVE ACTION LIMIT
0	SAMPLE HAS INCONCLUSIVE RESULTS
?	CONCENTRATION UNKNOWN

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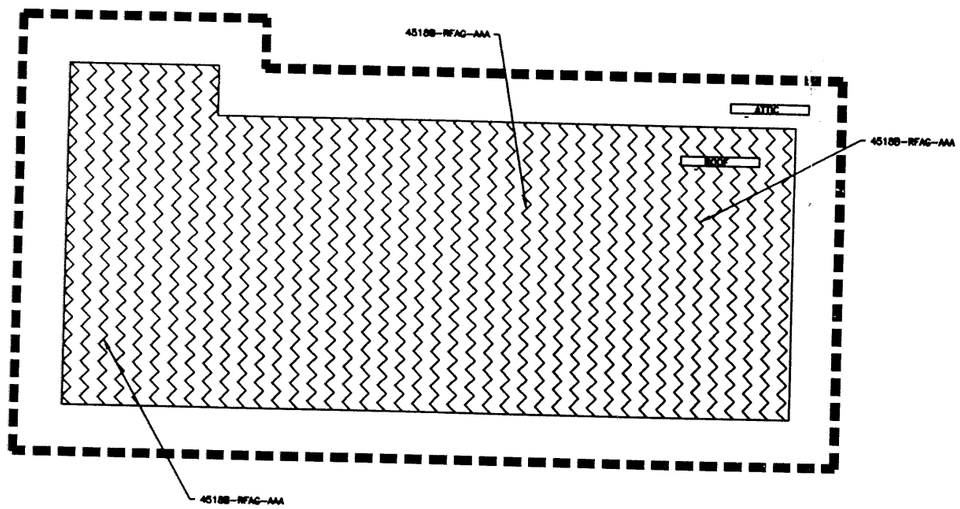
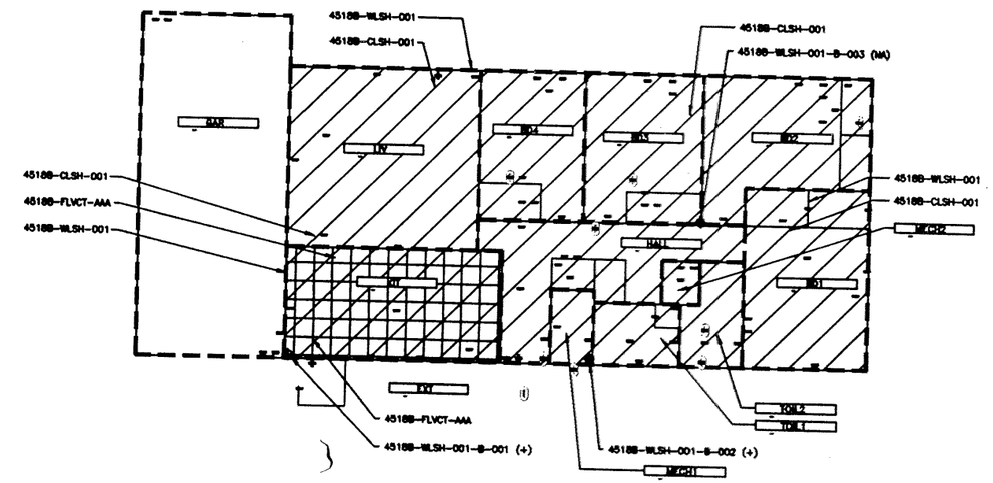


ROOF

1 2 5 10

SCALE IN FEET



FIRST FLOOR PLAN

1 2 5 10

SCALE IN FEET

Pb SURVEY LEGEND

- SAMPLE BELOW LOW/INCONCLUSIVE LIMIT
- SAMPLE ABOVE ACTION LIMIT
- SAMPLE HAS INCONCLUSIVE RESULTS
- CONCENTRATION UNKNOWN

4 Bedroom Unit Representing
1/2 of duplex unit

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LIST OF ATTACHMENTS

ATTACHMENT ITEM		TITLE
A		Miscellaneous Technical Specifications
B		Geotechnical Survey Report
C		Reserved
D		List of Project Site and Utility Drawings
E		Reports
	E1	Asbestos Survey Report
	E2	Lead Based Paint Survey Report For Grouped Housing Buildings
F		Standard Typography
G		Landscaping Criteria
	G1	Acceptable Landscape Materials for MHAFB
	G2	Sample Tree Preservation Plan
H		Water Distribution System Data
I		Air Force Family Housing Guide

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ATTACHMENT A - MISCELLANEOUS TECHNICAL SPECIFICATIONS

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Attachment A

TECHNICAL SPECIFICATIONS

TABLE OF CONTENTS

The following final technical specifications sections, attached in their entirety, shall be included in the contract specifications for the type of work represented therein.

Section No.	Section Title
02285	Soil Treatment for Subterranean Termite Control
02316	Excavation, Trenching, And Backfilling For Utilities Systems

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SECTION 02285

SOIL TREATMENT FOR SUBTERRANEAN TERMITE CONTROL

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

This specification covers application of pesticides for the prevention of subterranean termites at Mountain Home Air Force Base, Idaho. All new construction of structures which contain cellulose materials (i.e. sheetrock, wood paneling, cellulose insulation, cabinetry, etc.) should be treated for the prevention of subterranean termites during the construction phase.

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

Data

Qualifications; GA.

Qualifications of the pesticide applicator.

Instructions.

Soil Treatment Agent; GA.

Certifications, material safety data sheets (MSDS) and manufacturers instructions, shall be submitted not less than working 15 days before application of the soil treatment agent. A copy of the pesticide label , Contractor’s certification, and application plan including rates of application shall be submitted not less than working 15 days before application of the soil treatment agent. All soil treatment submittals shall be approved by Mountain Home Air Force Base, Base Civil Engineering/Entomology Section and the Contracting Officer.

All contracts which specify pesticide use must be reviewed and approved by the MAJCOM Entomologist IAW DOD Directive 4150.7. Information shall be forwarded thru the Contracting Officer and Mountain Home AFB Entomology Section to:

HQ/ACC/CEOO Attn. Mr. Teig
129 Andrews St., Suite 102
Langley AFB, Va. 23665-2769

Samples

Pesticides; GA.

Samples of the pesticides used in this work, upon request by the Base Pest Management Section.

1.3 QUALIFICATIONS OF PESTICIDE APPLICATORS

The pesticide applicator's principal business shall be pest control and the pesticide applicator shall be State certified in the U. S. Environmental Protection Agency (EPA) pesticide applicator category which includes structural pest control, and certified in the State.

1.4 DELIVERY, STORAGE, AND HANDLING.

Pesticides shall be delivered to the project is sealed and labeled containers in good condition as supplied by the manufacturer or formulator. Pesticides shall be stored, handled, and used in accordance with manufacturer's labels. Labels shall bear evidence of registration under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as amended.

1.5 SAFETY REQUIREMENTS.

The Contractor shall formulate, treat, and dispose of termiticides and their containers in accordance with label directions. Water for formulating shall only come from sites designated by the Contracting Officer, and the filling hose shall be fitted with a backflow preventer meeting local plumbing codes or standards. Overflow shall be prevented during the filling operation. Pesticides and related materials shall be kept under lock and key when unattended. Proper protective clothing and equipment shall be worn and used during all phases of termiticide application.

PART 2 PRODUCTS.

2.1 SOIL TREATMENT AGENT

Soil treatment agent shall be isofenphos, fenvalerate, cypermethrin, permethrin, chlorphyrifos or other EPA registered agents approved by Mountain Home Air Force Base, Entomology Section. Labels shall bear evidence of registration under the FIFRA and shall provide the manufactureres recommended rates of application. When the soil treatment agent label indicates a range in rate of application, the maximum rate shall be used for application. Soil treatment agent used for the preconstruction treatment of subterranean termites must be EPA registered, approved for use in the State of Idaho, and must state on the label that it is approved for the prevention/treatment of subterranean termites.

PART 3 EXECUTION.

3.1 APPLICATION

3.1.1 The Contractor shall establish complete and unbroken vertical and/or horizontal soil poison barriers between the soil and all portions of the intended structure which may allow termite access

to wood and wood related products. Application shall not be made to areas intended for use as a plenum air space. Surface treatments shall not be made for areas to serve as crawl spaces. Termiticide shall be applied as a coarse spray and provide uniform distribution unto the soil surface. Treatment shall be applied prior to placement of a vapor barrier or waterproof membrane and at least 12 hours prior to concrete placement. Where treated soil or fill material is not to be covered with a vapor barrier or waterproof membrane, adequate precautions shall be taken to prevent its disturbance. Soil or fill material disturbed after treatment shall be re-treated as specified above before placement of slabs or other covering structures. Treatment of the soil on the exterior sides of foundation wall, grade beams, and similar structures shall be coordinated with final grading and planting operations so as to avoid disturbance of the treated barriers. At the time of application, the soil moisture content shall be sufficiently low to allow uniform distribution of the treatment solution throughout the soil. Applications shall not be made during or immediately following heavy rains or when conditions may cause runoff and create an environmental hazard. Manufacturer's warnings and precautions shall be observed in the handling and use of such materials. Care shall be taken to prevent these chemicals from entering water supply systems, potable water supplies, or aquifers; and that they do not endanger plants or animals.

3.1.2 The Contractor shall furnish plans of the structures to the pesticide applicators so they can determine the square footage of slabs, linear feet of foundation and load bearing walls, and critical treatment areas such as expansion joints and control joints. Critical treatment areas are where the slab is penetrated by pipes, conduit, bath traps, drains, clean outs, etc and these areas require different rates of treatment than other horizontal barrier areas.

3.1.3 Preconstruction treatments for subterranean termites must be made in strict compliance to the labeled directions and any additional requirements set forth in the standards. The dilution rate will be the maximum concentration of termiticide and volume of water listed on the label for subterranean termites. Samples of tank mixtures may be taken for verification of accuracy.

3.1.4 Contractors and/or pesticide applicators must submit in writing the following information to the MOUNTAIN HOME AIR FORCE BASE, PEST MANAGEMENT SECTION before any pesticide is applied: (1) The names of individuals who will be applying any pesticides; (2) Copies of Idaho Pesticided Applicators licenses for each individual; (3) A label and MSDS of the product which will be utilized.

3.1.5 Mountain Home Air Force Base pest management personnel certified and trained in termite treatments will provide Quality Assurance during all phases of the pesticide application. The Mountain Home AFB Pest Management facility is located in Building No. 1337. This facility is the only area authorized on the base for mixing of pesticides and filling of pesticide dispersal equipment. Pest Management personnel will supervise all mixing and filling procedures to ensure pesticide formulations are within contract specifications.

3.1.6 Contractors will transport termiticides to the mixing site (Building No. 1337) and return any excess back to their place of business at the end of each day. Termiticides must be in the original labeled containers. No pesticides may be stored at any site on Mountain Home AFB without prior written approval. All packaging , containers, residues, and rinsates must be

disposed of by the Contractor. No pesticides and their residue will be disposed of on Mountain Home AFB. The Contractor shall dispose of residual pesticides and containers off Government property in accordance with label instructions and EPA criteria.

3.1.7 Periodic inspections will be made by Mountain Home AFB Pest Management personnel to ensure standards are being met by all applicators. Soil samples may be drawn. One hundred parts per million shall be the minimum acceptable termiticide residue for a soil sample taken within one year of the treatment.

3.1.8 A “Record of Termiticide Use” form (see attached sample) will be given to the Contract Applicator each day treatments are being made. This form will be available at the Pest Management Shop (Building 1337) and must be completed and returned at the end of each day of application. Pesticide application will only be made during normal duty hours, 0700-1630 hours (Monday-Friday) unless other arrangements are made with Pest Management personnel in advance.

RECORD OF TERMITICIDE USE ON MOUNTAIN HOME AFB

(To be filled out daily) Application Site _____

Date of Application _____Wind Speed _____ Direction _____

Time of Application _____Time Application Stopped _____

Name of Company_____

Names and Certification Numbers of all Applicators/Technicians Treating Structure_____

Type of Treatment (Circle One) Pre-treatment Post-treatment

Brand Name of Termiticide used _____ EPA Reg. # _____

Percentage Dilution Rate (ex. 1%, 0.5%) _____

Gallons of Dilution Used _____

Gallons of Concentrate Used _____

Square Footage of Slab Area Treated _____

Linear Footage of Foundation Wall Treated Outer _____ Inner_____

Linear Footage of Expansion Joints/Control Joints Treated _____

Number of Critical Areas (pipes, drains, cleanouts, bath traps)_____

Application Technique Used to Treat Foundation Wall:

(Circle One) Rodding Trenching Rodding/Trenching

END OF SECTION

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****

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS

CEGS-02316 (November 1997)

Superseding
CEGS-02222 (July 1989)

GUIDE SPECIFICATION FOR CONSTRUCTION

Includes changes through Notice 2 (June 1999)
Includes Special Change (Tailoring Options) (July 1998)
Includes Text Adjustment Change (Section References) (November 1998)

Latest change indicated by CHG tags
****

SECTION 02316

EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS
11/97

****
NOTE: This guide specification covers the requirements for excavation, trenching, and backfilling for utilities systems to the points of connection within 1.5 m (5 feet) of the buildings. This guide specification is to be used in the preparation of project specifications in accordance with ER 1110-1-8155.

Comments and suggestions on this guide specification are welcome and should be directed to the proponent of the specification. A listing of proponents, including their organization designation and telephone number, is at URL http://www.hnd.usace.army.mil/techinfo/index.htm, and an electronic feedback page for submission of recommended changes is available at the same address. Use of electronic communication is encouraged.

This guide specification includes tailoring options for rock excavation, and sheeting and bracing. Selection or deselection of a tailoring option will include or exclude that option in the section, but editing the resulting section to fit the project is still required.
****

PART 1 GENERAL

1.1 REFERENCES

****
NOTE: Issue (date) of references included in project specifications need not be more current than provided

by the latest change (Notice) to this guide specification.
****

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 1556	(1990; R 1996) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(1991) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu. m.))
ASTM D 2167	(1994) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2487	(1993) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1996) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

1.2 MEASUREMENT AND PAYMENT

****
NOTE: These paragraphs are written for bids on a unit-price basis. When it is determined that a lump-sum contract may be more advisable, these paragraphs will be deleted.
****

Measurement and payment shall be based on completed work performed in accordance with the drawings and specifications.

1.2.1 Trench Excavation

****
NOTE: This paragraph will be coordinated with the payment paragraphs of appropriate contract sections to ensure that there are no dual payments or omission of payment for trench excavation. There should be separate payment items established for trench excavation for each different size of pipe in the contract. Payment for trench excavation for heat-distribution system and for underground electrical-distribution system may be excluded for payment from this paragraph, and included in payment under the appropriate utility section, when the work is of such

a nature and extent and so clearly indicated that the excavation quantities involved can be estimated with reasonable accuracy.
****

Trench excavation shall be the number of linear meters feet measured along the centerline of the trench and excavated to the depths and widths specified for the particular size of pipe. No increase shall be made for the extra width required at manholes and similar structures. Payment for trench excavation, as so measured, shall constitute full payment for excavation and backfilling, [including specified overdepth] except in rock or unstable trench bottoms. Unstable trench bottoms shall be replaced by select granular material and paid for as specified below. Trench excavation shall also include the additional width at manholes and similar structures, the furnishing, <TAI OPT=SHEETING AND BRACING>placing and removal of sheeting and bracing</TAI>, pumping and bailing, and all incidentals necessary to complete the work required by this section.

<TAI OPT=ROCK EXCAVATION>1.2.2 Rock Excavation

Rock excavation shall be measured and paid for by the number of cubic meters yards of acceptably excavated rock material. The material shall be measured in place, but volume shall be based on a maximum 750 mm 30 inch width for pipes 300 mm (12 inches) 12 inches in diameter or less, and a maximum width of 400 mm 16 inches greater than the outside diameter of the pipe for pipes over 300 mm (12 inches) 12 inches in diameter. The measurement shall include all authorized overdepth rock excavation as determined by the Contracting Officer. For manholes and other appurtenances, volumes of rock excavation shall be computed on the basis of 300 mm 1 foot outside of the wall lines of the structures. Payment for rock excavation will be made in addition to the price bid for the trench excavation, and will include all necessary drilling and blasting and all incidentals necessary to excavate and dispose of the rock. Backfill replacing rock excavation will not be paid for separately, but will be included in the unit price for rock excavation.

</TAI><TAI OPT=SHEETING AND BRACING>1.2.3 Sheeting and Bracing

Sheeting and bracing, when shown or authorized by the Contracting Officer to be left in place, will be paid for as follows: [_____].

1.2.3.1 Timber Sheeting

Timber sheeting will be paid for as the number of board feet of lumber below finish grade measured in place prior to backfilling. Sheeting wasted when cut off between the finished grade and 300 mm 1 foot below the finished grade also shall be included in the measurement.

1.2.3.2 Steel Sheeting and Soldier Piles

****
NOTE: The blank will be filled with an appropriate number not greater than 1 meter (3 feet). However, if the quantities of sheeting involved are anticipated to be substantial, and since the cut off steel can be sold by the Contractor as scrap, the

whole part in brackets can be deleted and no payment provided for wasted cut off ends.
****

Steel sheeting, soldier piles, and steel bracing will be paid for according to the number of pounds of steel calculated. This calculation shall be made by multiplying the measured in-place length in meters feet below finish grade by the unit weight of the section in kg per meter. pounds per foot. Unit weight of rolled steel sections shall be obtained from recognized steel manuals. [Sheeting wasted when cut off between the finished grade and a distance of up to [_____] meters feet below the finished grade shall be included in the measurement.]

</TAI>1.2.4 Select Granular Material

Select granular material shall be measured in place as the actual cubic meters yards replacing wet or unstable material in trench bottoms [within the limits shown] [in authorized overdepth areas]. The unit price shall include furnishing and placing the granular material, excavation and disposal of unsatisfactory material, and additional requirements for sheeting and bracing, pumping, bailing, cleaning, and other incidentals necessary to complete the work. Payment for select granular material will be made in addition to the bid price for trench excavation.

1.3 DEGREE OF COMPACTION

Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557.

1.4 SUBMITTALS

****
NOTE: Submittals must be limited to those necessary for adequate quality control. The importance of an item in the project should be one of the primary factors in determining if a submittal for the item should be required.

Indicate submittal classification in the blank space using "GA" when the submittal requires Government approval or "FIO" when the submittal is for information only.
****

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-09 Reports

Field Density Tests; [_____]. Testing of Backfill Materials; [_____].

Copies of all laboratory and field test reports within 24 hours of the completion of the test.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Satisfactory Materials

****
NOTE: Satisfactory material will be defined in accordance with locally available materials, type of installation, etc., and suitable classes, based on the geotechnical report, will be listed in the contract specification in accordance with the Unified Soil Classification System (ASTM D 2487).
****

Satisfactory materials shall comprise any materials classified by ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, [SM,] [SW-SM,] [SC,] [SW-SC,] [SP-SM,] [SP-SC,] [CL,] [ML,] [CL-ML,] [CH,] [MH].

2.1.2 Unsatisfactory Materials

****
NOTE: Unsatisfactory material will be defined in accordance with locally available materials, type of installation, etc., and unsuitable classes will be listed in the project specification in accordance with ASTM D 2487. Normally, stones larger than 75 mm (3 inches) are considered unsatisfactory. This paragraph should be edited to delete inapplicable materials.
****

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials also include man-made fills, trash, refuse, or backfills from previous construction. Unsatisfactory material also includes material classified as satisfactory which contains root and other organic matter, frozen material, and stones larger than [_____] mm inches. The Contracting Officer shall be notified of any contaminated materials.

2.1.3 Cohesionless and Cohesive Materials

Cohesionless materials shall include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials shall include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM shall be identified as cohesionless only when the fines are nonplastic.

<TAI OPT=ROCK EXCAVATION>2.1.4 Rock

Rock shall consist of boulders measuring 1/2 cubic meter 1/2 cubic yard or more and materials that cannot be removed without systematic drilling and blasting such as rock material in ledges, bedded deposits, unstratified masses and conglomerate deposits, and below ground concrete or masonry structures, exceeding 1/2 cubic meter 1/2 cubic yard in volume, except that pavements shall not be considered as rock.

</TAI>2.1.5 Unyielding Material

****
NOTE: Stones should generally not exceed 75 mm (3 inches) in diameter. However, pipe manufacturer's criteria, if any, should be used.
****

Unyielding material shall consist of rock and gravelly soils with stones greater than [_____] millimeters inches in any dimension or as defined by the pipe manufacturer, whichever is smaller.

2.1.6 Unstable Material

Unstable material shall consist of materials too wet to properly support the utility pipe, conduit, or appurtenant structure.

2.1.7 Select Granular Material

****
NOTE: Maximum size of aggregate should be not more than 8 mm per 100 mm (1 inch per foot) of pipe diameter, or 75 mm (3 inches) maximum. Refer to pipe manufacturer's criteria for more stringent requirements, if any, on aggregate size and gradation.
****

Select granular material shall consist of well-graded sand, gravel, crushed gravel, crushed stone or crushed slag composed of hard, tough and durable particles, and shall contain not more than 10 percent by weight of material passing a 0.075 mm No. 200 mesh sieve and no less than 95 percent by weight passing the 25 mm l inch sieve. The maximum allowable aggregate size shall be [_____] millimeters, inches, or the maximum size recommended by the pipe manufacturer, whichever is smaller.

2.1.8 Initial Backfill Material

Initial backfill shall consist of select granular material or satisfactory materials free from rocks [_____] millimeters inches or larger in any dimension or free from rocks of such size as recommended by the pipe manufacturer, whichever is smaller. When the pipe is coated or wrapped for corrosion protection, the initial backfill material shall be free of stones larger than [_____] millimeters inches in any dimension or as recommended by the pipe manufacturer, whichever is smaller.

2.2 PLASTIC MARKING TAPE

Plastic marking tape shall be acid and alkali-resistant polyethylene film, 152 mm (6 inches) 6 inches wide with minimum thickness of 0.102 mm (0.004 inch). 0.004 inch. Tape shall have a minimum strength of 12.1 MPa (1750 psi) 1750 psi lengthwise and 10.3 MPa (1500 psi) 1500 psi crosswise. The tape shall be manufactured with integral wires, foil backing or other means to enable detection by a metal detector when the tape is buried up to 1 meter 3 feet deep. The tape shall be of a type specifically manufactured for marking and locating underground utilities. The metallic core of the

tape shall be encased in a protective jacket or provided with other means to protect it from corrosion. Tape color shall be as specified in TABLE 1 and shall bear a continuous printed inscription describing the specific utility.

TABLE 1. Tape Color

Red:	Electric
Yellow:	Gas, Oil, Dangerous Materials
Orange:	Telephone, Telegraph, Television, Police, and Fire Communications
Blue:	Water Systems
Green:	Sewer Systems

PART 3 EXECUTION

3.1 EXCAVATION

****
NOTE: The details for disposal of excavated materials should be specified here. If dewatering is required due to ground water conditions, a paragraph on dewatering procedures and requirements should be developed.
****

Excavation shall be performed to the lines and grades indicated. Rock excavation shall include removal and disposition of material defined as rock in paragraph MATERIALS. Earth excavation shall include removal and disposal of material not classified as rock excavation. During excavation, material satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench equal to 1/2 the depth of the excavation, but in no instance closer than 600 mm. 2 feet. Excavated material not required or not satisfactory for backfill shall be removed from the site [or shall be disposed of by [_____]]. Grading shall be done as may be necessary to prevent surface water from flowing into the excavation, and any water accumulating shall be removed to maintain the stability of the bottom and sides of the excavation. Unauthorized overexcavation shall be backfilled in accordance with paragraph BACKFILLING AND COMPACTION at no additional cost to the Government.

3.1.1 Trench Excavation Requirements

****
NOTE: The width of the trench below the top of the pipe will depend on the type of pipe used and soil conditions. The pipe manufacturer's installation manual should provide this information, and if so, it will be followed. In general, the width of trench will be 300 mm (12 inches) to 600 mm (24 inches), plus pipe O.D. for smaller pipe sizes, and 600 mm (24 inches) to 900 mm (36 inches) plus pipe O.D. for larger pipe sizes. Sloping walls below the top of the pipe are allowed for certain types of pipe in special ground conditions.
****

The trench shall be excavated as recommended by the manufacturer of the pipe to be installed. Trench walls below the top of the pipe shall be sloped, or made vertical, and of such width as recommended in the manufacturer's installation manual. Where no manufacturer's installation manual is available, trench walls shall be made vertical. Trench walls more than [_____] meters feet high shall be shored, cut back to a stable slope, or provided with equivalent means of protection for employees who may be exposed to moving ground or cave in. Vertical trench walls more than [_____] meters feet high shall be shored. Trench walls which are cut back shall be excavated to at least the angle of repose of the soil. Special attention shall be given to slopes which may be adversely affected by weather or moisture content. The trench width below the top of pipe shall not exceed 600 mm (24 inches) 24 inches plus pipe outside diameter (O.D.) for pipes of less than 600 mm (24 inches) 24 inches inside diameter and shall not exceed 900 mm (36 inches) 36 inches plus pipe outside diameter for sizes larger than 600 mm (24 inches) 24 inches inside diameter. Where recommended trench widths are exceeded, redesign, stronger pipe, or special installation procedures shall be utilized by the Contractor. The cost of redesign, stronger pipe, or special installation procedures shall be borne by the Contractor without any additional cost to the Government.

3.1.1.1 Bottom Preparation

****
NOTE: Stones 75 mm (3 inches) or greater should be removed. However, pipe manufacturer's criteria, if any, should be used.
****

The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing. Stones of [_____] millimeters inches or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing.

3.1.1.2 Removal of Unyielding Material

****
NOTE: Minimum of 100 mm (4 inches) should be removed to produce a suitable cushion for the pipe.
****

Where [overdepth is not indicated and] unyielding material is encountered in the bottom of the trench, such material shall be removed [_____] millimeters inches below the required grade and replaced with suitable materials as provided in paragraph BACKFILLING AND COMPACTION.

3.1.1.3 Removal of Unstable Material

Where unstable material is encountered in the bottom of the trench, such material shall be removed to the depth directed and replaced to the proper grade with select granular material as provided in paragraph BACKFILLING AND COMPACTION. When removal of unstable material is required due to the Contractor's fault or neglect in performing the work, the resulting material

shall be excavated and replaced by the Contractor without additional cost to the Government.

3.1.1.4 Excavation for Appurtenances

Excavation for manholes, catch-basins, inlets, or similar structures shall be [sufficient to leave at least 300 mm 12 inches clear between the outer structure surfaces and the face of the excavation or support members] [of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown.] Rock shall be cleaned of loose debris and cut to a firm surface either level, stepped, or serrated, as shown or as directed. Loose disintegrated rock and thin strata shall be removed. Removal of unstable material shall be as specified above. When concrete or masonry is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation. Excavation to the final grade level shall not be made until just before the concrete or masonry is to be placed.

3.1.1.5 Jacking, Boring, and Tunneling

****

NOTE: In situations where utility lines must be installed more than 5 to 7 meters (15 to 20 feet) below ground surface, through embankments, under minor roads or parking areas, or where surface conditions make it difficult or impractical to excavate open trenches, utility lines may be installed by jacking, boring, or tunneling as a contractor option. Where operational requirements preclude installation by trenching, the use of jacking, boring, or tunneling should be specified as mandatory alternatives. This requirement will normally exist where utilities must cross railroads, highways, primary access roads and airfield pavements. Pipe and conduit smaller than 900 mm (36 inches) in diameter will normally be installed in smooth steel pipe casing. Designing engineers must coordinate with installation facility engineers to identify and validate utility crossings where jacking, boring, or tunneling will be specified as mandatory.

****

Unless otherwise indicated, excavation shall be by open cut except that sections of a trench may be jacked, bored, or tunneled if, in the opinion of the Contracting Officer, the pipe, cable, or duct can be safely and properly installed and backfill can be properly compacted in such sections.

3.1.2 Stockpiles

Stockpiles of satisfactory [and unsatisfactory] [and wasted materials] shall be placed and graded as specified. Stockpiles shall be kept in a neat and well drained condition, giving due consideration to drainage at all times. The ground surface at stockpile locations shall be cleared, grubbed, and sealed by rubber-tired equipment, excavated satisfactory and unsatisfactory materials shall be separately stockpiled. Stockpiles of satisfactory

materials shall be protected from contamination which may destroy the quality and fitness of the stockpiled material. If the Contractor fails to protect the stockpiles, and any material becomes unsatisfactory, such material shall be removed and replaced with satisfactory material from approved sources at no additional cost to the Government. [Locations of stockpiles of satisfactory materials shall be [as shown] [subject to prior approval of the Contracting Officer].]

3.2 BACKFILLING AND COMPACTION

Backfill material shall consist of satisfactory material, select granular material, or initial backfill material as required. Backfill shall be placed in layers not exceeding 150 mm 6 inches loose thickness for compaction by hand operated machine compactors, and 200 mm 8 inches loose thickness for other than hand operated machines, unless otherwise specified. Each layer shall be compacted to at least 95 percent maximum density for cohesionless soils and 90 percent maximum density for cohesive soils, unless otherwise specified.

3.2.1 Trench Backfill

****

NOTE: Most pressure tests require backfilling to at least 600 mm (2 feet) over the pipe with the joints and couplings left open for inspection.

****

Trenches shall be backfilled to the grade shown. [The trench shall be backfilled to [_____] meters feet above the top of pipe prior to performing the required pressure tests. The joints and couplings shall be left uncovered during the pressure test.] [The trench shall not be backfilled until all specified tests are performed.]

3.2.1.1 Replacement of Unyielding Material

Unyielding material removed from the bottom of the trench shall be replaced with select granular material or initial backfill material.

3.2.1.2 Replacement of Unstable Material

Unstable material removed from the bottom of the trench or excavation shall be replaced with select granular material placed in layers not exceeding 150 mm 6 inches loose thickness.

3.2.1.3 Bedding and Initial Backfill

****

NOTE: Bedding is provided to level out any irregularities in the foundation and to assure uniform support along the barrel of each pipe section. Bedding is also constructed to distribute the load bearing reaction, due to the weight of the backfill material, around the lower portion of the pipe. If the pipe or conduit is placed directly on a flat or shaped foundation, delete "bedding" from the title and from any reference in the paragraph. If

bedding will be specified, determine type and thickness and show on the plans. Specify compaction to 95 percent maximum density for cohesionless soils, and 90 percent maximum density for cohesive soils.
****

[Bedding shall be of the type and thickness shown.] Initial backfill material shall be placed and compacted with approved tampers to a height of at least one foot above the utility pipe or conduit. The backfill shall be brought up evenly on both sides of the pipe for the full length of the pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe.

3.2.1.4 Final Backfill

The remainder of the trench, except for special materials for roadways, railroads and airfields, shall be filled with satisfactory material. Backfill material shall be placed and compacted as follows:

a. Roadways, Railroads, and Airfields: Backfill shall be placed up to the elevation at which the requirements in Section 02300 EARTHWORK control. Water flooding or jetting methods of compaction will not be permitted.

b. Sidewalks, Turfed or Seeded Areas and Miscellaneous Areas: Backfill shall be deposited in layers of a maximum of 300 mm 12 inch loose thickness, and compacted to 85 percent maximum density for cohesive soils and 90 percent maximum density for cohesionless soils. [Water flooding or jetting methods of compaction will be permitted for granular noncohesive backfill material. Water jetting shall not be allowed to penetrate the initial backfill.] [Compaction by water flooding or jetting will not be permitted.] This requirement shall also apply to all other areas not specifically designated above.

3.2.2 Backfill for Appurtenances

****
NOTE: The number of days the concrete is allowed to cure before backfilling the structure will depend on the type of mix and the concrete strength requirements specified. Three days would be considered as a minimum.
****

After the manhole, catchbasin, inlet, or similar structure has been constructed [and the concrete has been allowed to cure for [_____] days], backfill shall be placed in such a manner that the structure will not be damaged by the shock of falling earth. The backfill material shall be deposited and compacted as specified for final backfill, and shall be brought up evenly on all sides of the structure to prevent eccentric loading and excessive stress.

3.3 SPECIAL REQUIREMENTS

Special requirements for both excavation and backfill relating to the specific utilities are as follows:

3.3.1 Gas Distribution

Trenches shall be excavated to a depth that will provide not less than 450 mm 18 inches of cover in rock excavation and not less than 600 mm 24 inches of cover in other excavation. Trenches shall be graded as specified for pipe-laying requirements in Section 02256 GAS DISTRIBUTION SYSTEM.

3.3.2 Water Lines

****

NOTE: Minimum depth of cover will be that required for frost penetration in the region and for safe operation of the utility. For fire protection yard mains, reference is made to NFPA 24 for recommended depth of cover.

****

Trenches shall be of a depth to provide a minimum cover of [_____] meters feet from the existing ground surface, or from the indicated finished grade, whichever is lower, to the top of the pipe. [For fire protection yard mains or piping, an additional [_____] millimeters inches of cover is required.]

3.3.3 Heat Distribution System

Initial backfill material shall be free of stones larger than 6.3 mm 1/4 inch in any dimension.

3.3.4 Electrical Distribution System

Direct burial cable and conduit or duct line shall have a minimum cover of 600 mm 24 inches from the finished grade, unless otherwise indicated. [Special trenching requirements for direct-burial electrical cables and conduits are specified in Section 16375 ELECTRICAL DISTRIBUTION SYSTEM, UNDERGROUND.]

3.3.5 Plastic Marking Tape

****

NOTE: The use of plastic marking tape for identification purpose will be mandatory for buried hazardous utilities such as electrical conduit, gas line, high pressure nitrogen, high pressure water line, domestic sewage force mains, industrial waste force mains, and industrial sewers carrying hazardous, explosive or toxic waste. Tape should be used for all plastic or other nonferrous pipes and for ferrous pipes buried to depths such that the top of the pipe is more than 1 meter (3 feet) deep. Tape will be optional for nonhazardous utility lines such as domestic wastewater sewers (gravity) or storm drains.

****

Warning tapes shall be installed directly above the pipe, at a depth of [450] [18] [_____] millimeters inches below finished grade unless otherwise shown.

3.4 TESTING

Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Government.

3.4.1 Testing Facilities

Tests shall be performed by an approved commercial testing laboratory or may be tested by facilities furnished by the Contractor. No work requiring testing will be permitted until the facilities have been inspected and approved by the Contracting Officer. The first inspection shall be at the expense of the Government. Cost incurred for any subsequent inspection required because of failure of the first inspection will be charged to the Contractor.

3.4.2 Testing of Backfill Materials

Classification of backfill materials shall be determined in accordance with ASTM D 2487 and the moisture-density relations of soils shall be determined in accordance with ASTM D 1557. A minimum of one soil classification and one moisture-density relation test shall be performed on each different type of material used for bedding and backfill.

3.4.3 Field Density Tests

Tests shall be performed in sufficient numbers to ensure that the specified density is being obtained. A minimum of one field density test per lift of backfill for every [_____] meters feet of installation shall be performed. One moisture density relationship shall be determined for every 1500 cubic meters 1500 cubic yards of material used. Field in-place density shall be determined in accordance with [ASTM D 1556] [ASTM D 2167] [ASTM D 2922]. When ASTM D 2922 is used, the calibration curves shall be checked and adjusted using the sand cone method as described in paragraph Calibration of the ASTM publication. ASTM D 2922 results in a wet unit weight of soil and when using this method, ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with density calibration checks as described in ASTM D 3017. The calibration checks of both the density and moisture gauges shall be made at the beginning of a job, on each different type of material encountered, at intervals as directed by the Contracting Officer. Copies of calibration curves, results of calibration tests, and field and laboratory density tests shall be furnished to the Contracting Officer. Trenches improperly compacted shall be reopened to the depth directed, then refilled and compacted to the density specified at no additional cost to the Government.

3.4.4 Displacement of Sewers

****

NOTE: The trench should be backfilled to at least 600 mm (2 feet).

****

After other required tests have been performed and the trench backfill compacted to [[_____] meters feet above the top of the pipe] [the finished grade surface], the pipe shall be inspected to determine whether significant displacement has occurred. This inspection shall be conducted in the presence of the Contracting Officer. Pipe sizes larger than 900 mm (36 inches) 36 inches shall be entered and examined, while smaller diameter pipe shall be inspected by shining a light or laser between manholes or manhole locations, or by the use of television cameras passed through the pipe. If, in the judgement of the Contracting Officer, the interior of the pipe shows poor alignment or any other defects that would cause improper functioning of the system, the defects shall be remedied as directed at no additional cost to the Government.

ATTACHMENT B - GEOTECHNICAL SURVEY REPORT

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REPORT
Soil and Foundation Evaluation
FY95 Military Family Housing
Delivery Order No. 9
Mountain Home Air Force Base
Mountain Home, Idaho

PREPARED FOR:
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September 2, 1994

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REPORT
Soil and Foundation Evaluation
FY95 Military Family Housing
Delivery Order No. 9
Mountain Home Air Force Base
Mountain Home, Idaho

INTRODUCTION

This report presents the results of our soil and foundation evaluation for the proposed Military Family Housing project at Mountain Home Air Force Base in Mountain Home, Idaho. The approximate location of the proposed project is shown on Plate 1, Vicinity Map.

The purpose of this evaluation was to assess the subsurface soil conditions and to prepare engineering opinions and recommendations for the design and construction of temporary excavation support, dewatering, utility trench backfill, earthwork, wet weather construction, building foundations, floor slabs, sidewalks, pavement areas, grading, and drainage. To accomplish this evaluation, we performed the following scope of work:

1. Obtained pertinent geotechnical data for geologic interpretation of the area, which included the site of the proposed Family Housing Project.
2. Performed a subsurface evaluation by excavating nine test pits using a rubber-tire-mounted backhoe. The soils encountered in the test pits were visually identified and logged by a geotechnical engineer according to the Unified Soil Classification System (USCS). Soil samples were obtained for further identification and laboratory testing, which included in situ moisture/density, moisture content, and percentage passing the No. 200 sieve.

3. Performed analyses based on the data from Items 1 and 2 above, and prepared geotechnical opinions and recommendations.

4. Prepared this report.

PROPOSED CONSTRUCTION

We understand that the proposed housing development will include the construction of 1 to 2-story, wood-frame, slab-on-grade structures. We understand basements are not planned for the proposed residential structures. The proposed 30-acre housing development is planned for a vacant site on Chestnut street near the north end of the Air Force Base. The site is nearly flat and will require minimal regrading. Roadways and utilities are planned to service the development.

SITE DESCRIPTION

At the time of our subsurface evaluation, the topography of the project site was nearly flat. The project area was approximately 30 acres, which was bounded on the west by Chestnut Street, by residential development on the south, and by undeveloped land on the east and north. The project site was undeveloped at the time of our exploration. Vegetation consisted of sage brush and various annual vegetation. Piles of fill material were observed near the east end of the site. These piles were approximately 2 to 3 feet in height. Basalt rocks were observed scattered on the ground surface throughout the project area.

FIELD EXPLORATION AND LABORATORY TESTING

Nine test pits were excavated at the site using a case 580 SK rubber-tire-mounted backhoe, on August 10, 1994. The approximate locations of the test pits are shown on the Site Plan, Plate 2. The test pit logs are presented in Appendix A. Plate 3, Unified Soil

Classification System (USCS), should be used to interpret the terms on the test pit logs and in this report.

The soils encountered in each test pit were visually evaluated, and the soil profiles were logged in the field by a geotechnical engineer in accordance with the USCS. Representative samples of the soils encountered were obtained for further laboratory evaluation, which included in situ moisture density, moisture content, and percentage passing the No. 200 sieve. The results of the laboratory testing are presented on the corrersponding Test Pit logs. Relatively undisturbed samples of uncemented silt were obtained using a 2.5-inch-inside-diameter ring sampler for in situ moisture density testing.

SUBSURFACE CONDITIONS

The general subsurface conditions consisted of 6.0 to 12.0 inches of native topsoil with roots, overlying uncemented silt, overlying cemented silt/sand or basalt rock. The uncemented silt was generally medium dense and contained varying amounts of fine sand. However, very loose to loose, uncemented silt was observed in Test Pits 1, 4, 5 and 7. The loose silt extended to a depth of 6.0 feet in Test Pit 7. The thickness of the calcium carbonate cemented silt was up to 4.5 feet. The depth to refusal on cemented silt and/or rock with the Case 580 SK backhoe is shown on the Site Plan, Plate 2. The depth to backhoe refusal varied from 2.5 to 7.0 feet below the existing ground suface. The shallowest depth to refusal was 2.5 feet, as measured in Test Pit 2.

Groundwater was not encountered in the test pits. We anticipate that groundwater is located more than 100 feet below the existing ground surface within the basalt rock layers.

OPINIONS AND RECOMMENDATIONS

General

It is our opinion that the site is suitable for the proposed family housing project. The recommendations contained in this report reflect our understanding of the nature of the proposed construction, and the topography and subsurface soil profile. However, no site plans showing the buildings or road configuration were available for our review. If design plans change, with respect to the size or type of buildings, we should be notified to review the report recommendations and make any necessary revisions. Since refusal with the Case 580 SK backhoe occurred as shallow as 2.5 to 3.5 feet below the existing ground surface, ripper teeth, large trackhoes or drill-and-blast techniques may be required to excavate utility trenches in the cemented soil/rock. The report recommendations reflect a straight-line interpolation of the subsurface conditions between test pit locations. However, the soil/rock conditions may vary at the proposed site. The variation in soil/rock conditions will not be known until construction, and may cause changes to construction plans and/or costs.

Bearing Soil

We recommend that building foundations bear on either the native, tan to brown, medium dense, uncemented silt, or the medium dense to hard, moderately to highly cemented silt located below the topsoil layer, or structural fill placed over these soils according to the Earthwork section of this report. However, specific site preparation procedures, as presented in the following sections, will need to be accomplished to maintain a stable subgrade. We recommend that all footing excavations be observed by HCI to verify

that the excavations have been accomplished to the recommended bearing soil, and that footing excavation bottoms are prepared according to the Earthwork section of this report.

Temporary Excavation Support

Temporary excavation support in the form of steel or timber shoring or flattened side slopes with a maximum slope of 1.5:1 (horizontal to vertical) should be provided for all excavations exceeding a depth of 5 feet. Excavations in soil with a depth of less than 5 feet can be constructed with vertical sides. Sloughing of granular soils could occur during the excavation, when the soils are dry, or if wetted during rain or snow periods. Appropriate precautions should be taken to protect workers from being injured by loose material falling into the excavation. All excavation and temporary support should be performed according to applicable OSHA standards.

Dewatering

Grading of areas adjacent to excavations should be performed such that surface run-off is prevented from entering the excavation. Any water which does accumulate in excavations should be removed with conventional gravel sumps and pumps, prior to placing structural fill, foundations or utilities.

Utility Trench Backfill

All saturated, loose or disturbed soil should be removed from the bottom of utility trenches prior to placing pipe bedding. Bedding of pipes in utility trenches should be accomplished according to the latest edition of the Idaho Standards for Public Works Construction (ISPWC). Backfill should be placed and compacted in utility trenches according to the Earthwork section of this report.

Earthwork

We recommend that the small piles of loose fill and the upper 6 to 12 inches of the surficial, native silt containing roots and vegetation be stripped from all building, pavement and sidewalk areas. The exposed soil surface should be brought to optimum moisture content for compaction and proof-rolled with a minimum of five passes of a 5-ton, sheepsfoot roller. Footing excavation bottoms should be moisture-conditioned and proof-compacted with either a hoe pack or a 1-ton, vibratory, walk-behind roller. If weaving (pumping) or unstable areas are observed, these areas should be removed to firm soil and replaced with structural fill. We recommend that HCI be retained to observe the proof-rolling and proof-compacting operations.

After stripping and proof-rolling the site, structural fill will be required beneath pavement, sidewalk and floor slab areas. Structural fill may also be required beneath the building footings, particularly interior footings. Structural fill should consist of soil classified as sand and/or gravel (GW, GP, GM, SW, SP, SM) as described by the USCS on Plate 3. Structural fill should contain cobbles less than 6 inches in size.

Structural fill should be placed in the floor slab and pavement areas in no greater than 12-inch-thick, loose lifts and compacted to a minimum of 95% of the maximum dry density of the soil as determined by ASTM Test D 698 (Standard Proctor). The maximum loose lift thickness for structural fill placed beneath footings should be reduced to 8 inches, if smaller and lighter compaction equipment, such as hoe packs and/or 1-ton, walk-behind, vibratory rollers, is used. We recommend that the structural fill placed beneath footings be

compacted to a minimum of 95% of the maximum dry density of the soil, as determined by ASTM Test D 698 (Standard Proctor).

Wet Weather Construction

We recommend that site construction be undertaken during dry weather conditions. If the site construction, particularly grading of the uncemented silt is undertaken during wet periods of the year, the uncemented silt will be susceptible to pumping or rutting when subjected to heavy loads from rubber-tire equipment or vehicles which exert a point load. Wet weather earthwork should be performed by low pressure, track-mounted equipment which spread and reduce the vehicle load. Work should not be performed immediately after rainfall. All soft and disturbed areas should be excavated to undisturbed soil and backfilled with structural fill as recommended in the Earthwork section of this report. Areas adjacent to open excavations should be graded so that surface water cannot enter the excavation and saturate the soil at the bottom.

In summary, careful construction procedures are paramount to the successful grading operation if the uncemented silt is wet and soft. Consulting us prior to initiating this type of construction is recommended to maximize earthwork efficiency and achieve a well-performing, stable subgrade.

Foundations

We recommend that conventional shallow foundations be used to support the proposed residential buildings. The following recommendations should be accomplished for all foundations:

1. All footing excavations should be observed by HCI to verify that the excavations have been accomplished to the recommended bearing soil, and that the footing trench bottoms have been prepared according to the Earthwork section of this report.
2. Exterior footings should be located at least 30 inches below final, exterior grade to protect against frost penetration.
3. Minimum strip footing widths should be consistent with the Uniform Building Code (UBC).
4. All loose soil or water in the bottom of footing excavations should be removed, and the trench bottom over-excavated to firm soil, prior to forming and pouring strip footings.
5. Structural fill placed beneath building footings should extend a minimum of 1 foot horizontally for each 2 feet of thickness placed beneath the footings. The horizontal dimension is measured from the edge of the footing.
6. A maximum allowable bearing value of 1,500 pounds per square foot (psf) should be used for the design of shallow strip or spread footings bearing directly on the recommended bearing soil. However, the allowable bearing value could be increased to 2,500 psf where strip footings bear directly on the moderately to highly to highly cemented silt or a minimum of 1.5 feet of structural fill that is placed over the uncemented silt bearing soil according to the Earthwork section of this report. We recommend that 1.5 feet of

structural fill be placed beneath footings where very loose to loose soil (e.g. Test Pits 1, 4, 5 and 7) is encountered at footing subgrade in footing trenches.

7. If the above bearing soil, earthwork and foundation recommendations are accomplished, we anticipate the total and differential settlement will be less than 1 inch and 1/2 inch, respectively.

Floor Slab, Sidewalk and Pavement Areas

We recommend that the following preparation and construction procedures be used for all floor slab, sidewalk and pavement areas:

1. After completion of stripping of the topsoil with roots and cutting to the required subgrade, moisture-condition and proof-roll the exposed soil surface according to the Earthwork section of this report.
2. Grade and compact structural fill to the required subgrade elevation, according to the Earthwork section of this report.
3. Place and compact 3/4-inch-minus, crushed sand and gravel with no more than 5% passing the No. 200 sieve to a minimum compacted thickness of 4 inches in all floor slab and sidewalk areas. The sand and gravel will act as a leveling course and help distribute point loads. Compact the base course to a minimum of 95% of the maximum dry density of the soil according to ASTM Test D 698 (Standard Proctor).
4. If additional moisture protection is required beneath slabs-on-grade, a 6-mil, polyethylene vapor barrier could be used beneath the floor slab to reduce the

migration of moisture through the slab. The vapor barrier should be placed between layers of sand to protect the barrier from puncture.

5. Provided the site preparation procedures, as presented above, are accomplished, the following pavement section for automobiles and light trucks is recommended for the streets and parking areas:

- 2.5" - Type 3 asphalt concrete top course
- 4.0" - 3/4-inch-minus, crushed sand and gravel base course
- 6.0" - pit run sand and gravel structural fill subbase course

The subbase should consist of 6-inch-minus, well-graded sand and gravel with less than 10% passing the No. 200 sieve. The subbase should be compacted as outlined for structural fill in the Earthwork section of this report.

The base course should consist of 3/4-inch-minus, well-graded, crushed sand and gravel with less than 5% passing the No. 200 sieve. The base course should be compacted to at least 95% of the maximum dry density of the soil per ASTM Test D 698 (Standard Proctor).

The asphalt concrete should have material properties as specified in ASTM Test D 3515 and have a mix design with a maximum aggregate size between 3/4 and 3/8 inch. The asphalt concrete should be compacted to at least 95% of the maximum density for the mix design.

Surface Grading and Drainage

Site grading, including grading of all pavements, sidewalks and landscaped areas, should slope at a minimum of 2% away from the proposed buildings to prevent ponding and

to direct surface run-off away from the area. All run-off from downspouts, roof areas, paved areas, landscaped areas and other large volumes of stormwater should be directed away from the proposed construction, and not be allowed to infiltrate the soil beneath sidewalks, paved areas or building footings. All surface run-off should be directed to an approved discharge and/or collection facility.

REVIEW OF PLANS AND SPECIFICATIONS

We recommend that we be retained to review the earthwork, foundation and paving aspects of the final plans and specifications for the proposed project prior to issuance of the construction documents for bidding. It has been our experience that having the consultants from the design team review the construction documents prior to bidding minimizes the potential for errors, and also reduces costly changes to the contract during construction. We will provide review of the construction documents on a time and expense basis.

CONSTRUCTION OBSERVATION AND MONITORING

It is our opinion that the success of the proposed construction will be dependent on following the report recommendations, good construction practices and providing the necessary construction monitoring and consultation to verify that the work has been completed as recommended. We recommend that HCI be retained to provide monitoring and consultation services to verify that the report recommendations are being followed. If we are not retained to perform the recommended services, we cannot be responsible for soil engineering-related construction errors or omissions. The recommended services are not included in this evaluation and would be incurred on a time and expense basis.

EVALUATION LIMITATIONS

This report has been prepared to evaluate the subsurface conditions at the site of the proposed FY95 Military Family Housing project (Delivery Order No. 9) at the Mountain Home Air Force Base in Mountain Home, Idaho. Our services consist of professional opinions and recommendations made in accordance with generally accepted geotechnical engineering principles and practices. This acknowledgement is in lieu of all warranties either expressed or implied.

The following plates accompany and complete this report:

Plate 1:	Vicinity Map
Plate 2:	Site Plan
Plate 3:	Unified Soil Classification System
Appendix A:	Exploratory Test Pit Logs

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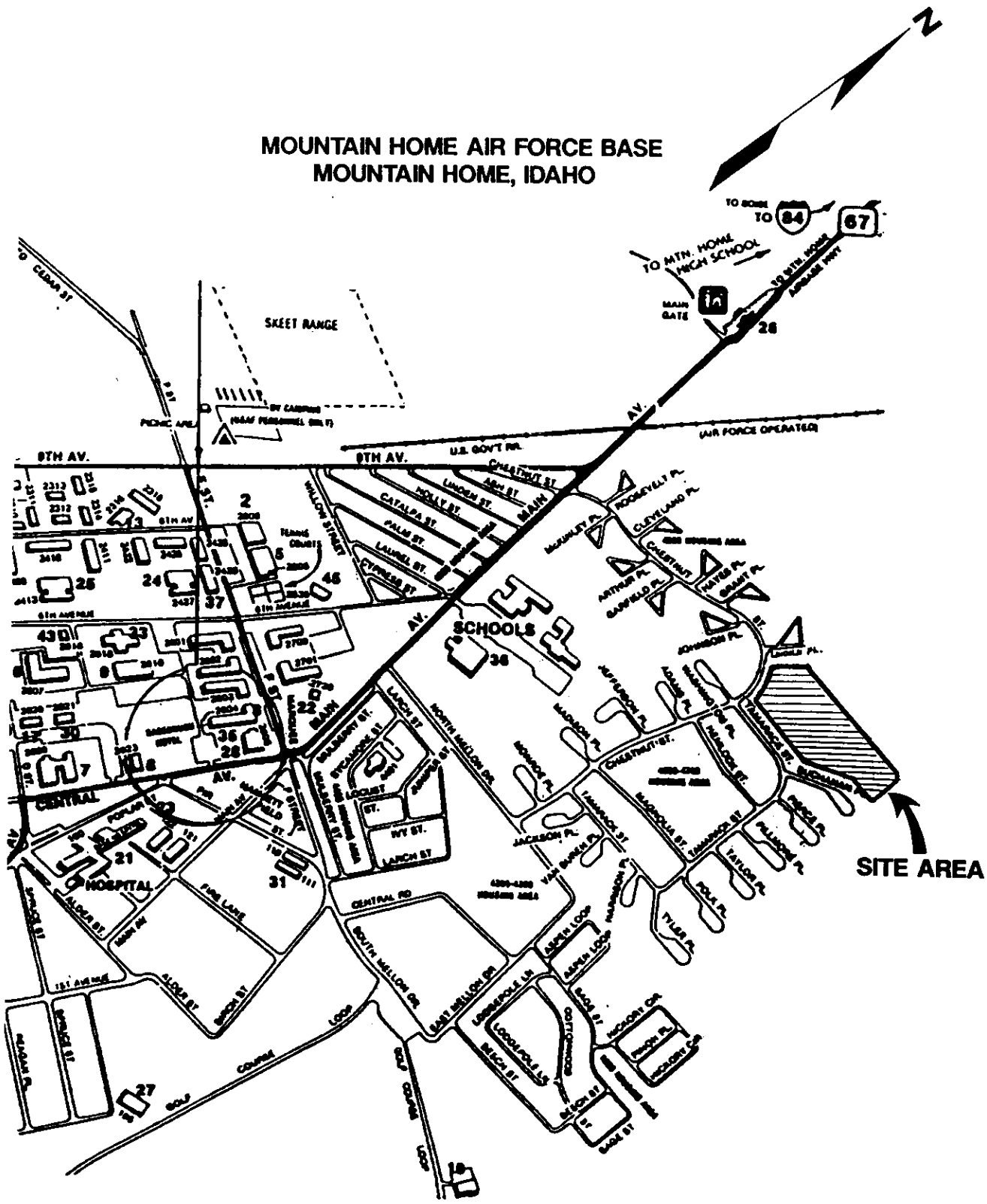
MOUNTAIN HOME AIR FORCE BASE
MOUNTAIN HOME, IDAHO



ATTACHMENT B

VICINITY MAP

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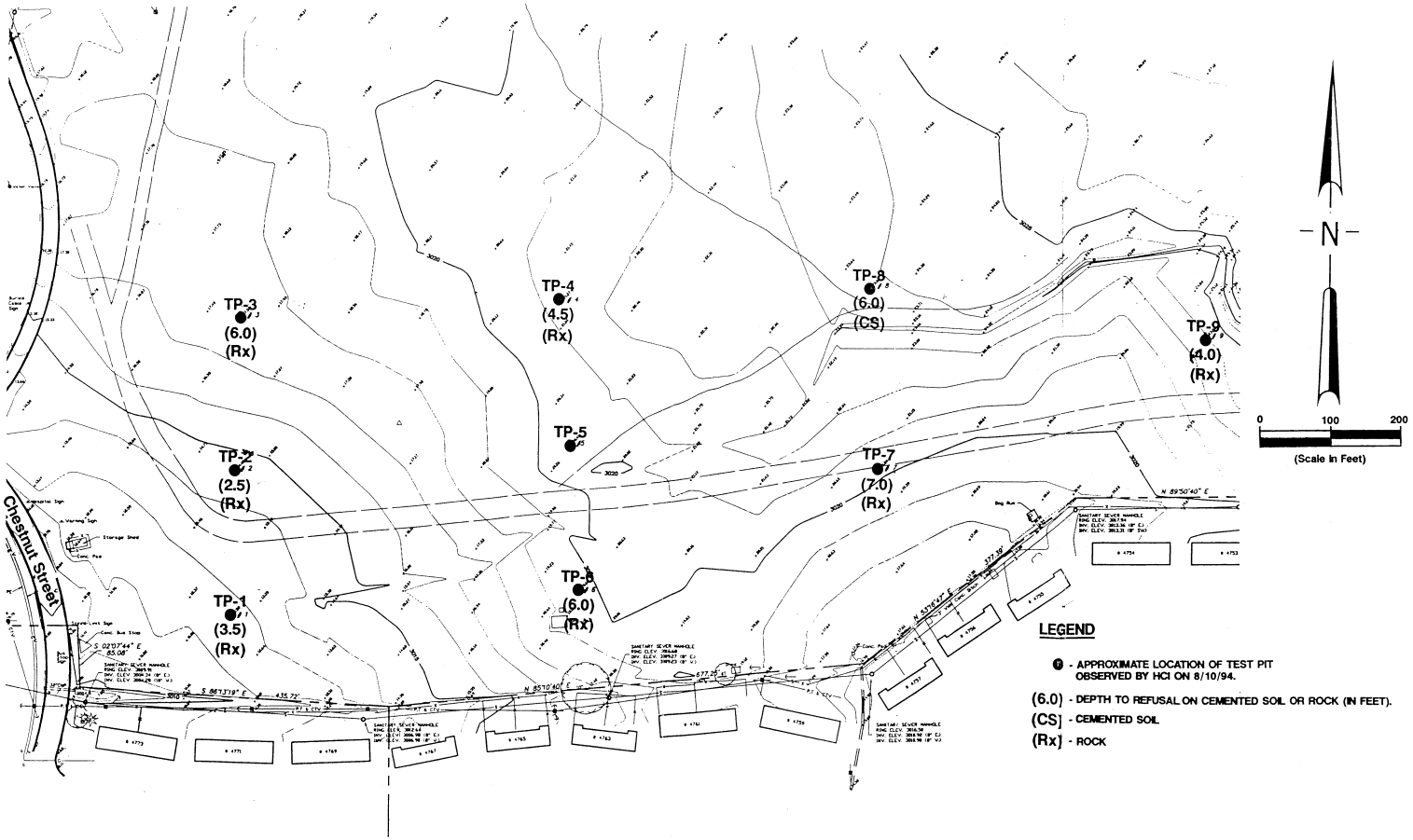
Project No. B1439-151

Reference: Page 11 of 14 F41624-94-D,0005.

PLATE 1



Ref: J-U-B- Engineers, Site Plan, 8/94.

SITE PLAN

HOWARD CONSULTANTS, INC.
CONSULTING GEOTECHNICAL ENGINEERS
Project No. B1439-151

PLATE 2

MAJOR DIVISIONS			SYMBOL	TYPICAL NAMES
COARSE GRAINED SOILS	GRAVELS	CLEAN GRAVELS	GW	Well-Graded Gravel, Gravel-Sand Mixtures.
			GP	Poorly-Graded Gravel, Gravel-Sand Mixtures.
		GRAVELS WITH FINES	GM	Silty Gravel, Gravel-Sand-Silt Mixtures.
			GC	Clayey Gravel, Gravel-Sand-Clay Mixtures.
	SANDS	CLEAN SANDS	SW	Well-Graded Sand, Gravelly Sand.
			SP	Poorly-Graded Sand, Gravelly Sand.
		SANDS WITH FINES	SM	Silty Sand, Sand-Silt Mixtures.
			SC	Clayey Sand, Sand-Clay Mixtures.
FINE GRAINED SOILS	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50%		ML	Inorganic Silt, Silty or Clayey Fine Sand.
			CL	Inorganic Clay of Low to Medium Plasticity, Sandy or Silty Clay.
			OL	Organic Silt and Clay of Low Plasticity.
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH	Inorganic Silt, Micaceous Silt, Fine Sand or Silt, Elastic Silt.
			CH	Inorganic Clay of High Plasticity, Fat Clay.
			OH	Organic Clay of Medium to High Plasticity.
Highly Organic Soils			PT	Peat, Muck and Other Highly Organic Soils.

UNIFIED SOIL CLASSIFICATION SYSTEM

ASTM D-2487, Standard Classification of Soils
For Engineering Purposes

ATTACHMENT B

PLATE 3

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Project No. B1439-151

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APPENDIX A

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EXPLORATORY TEST PIT LOG #1

Mountain Home Air Force Base Family Housing - Order No. 9

Project No. B1439-151

DEPTH (feet)	SOIL CLASS	SOIL DESCRIPTION
0.0 - 0.5	ML	SILT (native) - tan to light brown, medium dense, dry, trace fine sand, some small pieces of moderately cemented soil, roots and vegetation, pocket penetrometer = 3.0 tsf.
0.5 - 1.5	ML	SILT - tan to light brown, hard, dry, moderately to highly cemented, trace fine sand, some small roots.
1.5 - 2.25	ML	SILT - light brown to tan, loose to medium dense, dry, some small pieces of weakly to moderately cemented soil, some fine sand, some very small rootlettes, pocket penetrometer 1.5 to 2.0 tsf, 71.9% passed the No. 200 sieve.
2.25 - 3.0	ML	Sandy SILT - brown, loose to medium dense, dry to humid, pieces of moderately cemented soil.
3.0 - 3.5	ML	SILT - tan to white, hard, dry, highly cemented, some fine sand, some small pieces fractured basalt.
3.5	Rx	BASALT - black, hard, dry, interbedded with highly cemented silt, backhoe refusal.

Excavated on August 10, 1994
No ground water encountered.
Test pit terminated at backhoe refusal at 3.5 feet below existing ground surface.

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EXPLORATORY TEST PIT LOG #2

Mountain Home Air Force Base Family Housing - Order No. 9

Project No. B1439-151

DEPTH (feet)	SOIL CLASS	SOIL DESCRIPTION
0.0 - 1.0	ML	SILT (native) - tan to light brown, medium dense, dry, trace fine sand, some small pieces of moderately cemented soil, roots and vegetation.
1.0 - 2.5	ML	SILT - tan to white, hard, dry, highly cemented, some fine sand, some small pieces fractured basalt.
2.5	Rx	BASALT - black, hard, dry, interbedded with highly cemented silt, backhoe refusal.

Excavated on August 10, 1994
No ground water encountered.
Test pit terminated at backhoe refusal at 2.5 feet below existing ground surface.
Bulk sample taken at 2.0 feet.

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EXPLORATORY TEST PIT LOG #3

Mountain Home Air Force Base Family Housing - Order No. 9

Project No. B1439-151

DEPTH (feet)	SOIL CLASS	SOIL DESCRIPTION
0.0 - 1.0	ML	SILT (native) - tan to light brown, medium dense, dry, trace fine sand, some small pieces of moderately cemented soil, roots and vegetation.
1.0 - 2.0	ML	SILT - tan to light brown, hard, dry, moderately to highly cemented, trace fine sand, some small roots.
2.0 - 4.5	ML	SILT - tan, hard, dry, moderately to highly cemented, trace fine sand, some roots (1/4-inch thick).
4.5 - 6.0	Rx	Fractured BASALT - black, hard, dry, interlayered with highly cemented silt, some fine sand.
6.0	Rx	BASALT - black, hard, dry, interbedded with highly cemented silt, backhoe refusal.

Excavated on August 10, 1994
No ground water encountered.
Test pit terminated at backhoe refusal at 6.0 feet below existing ground surface.

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PLATE

EXPLORATORY TEST PIT LOG #4

Mountain Home Air Force Base Family Housing - Order No. 9

Project No. B1439-151

DEPTH (feet)	SOIL CLASS	SOIL DESCRIPTION
0.0 - 1.0	ML	SILT (native) - tan to light brown, medium dense, dry, trace fine sand, some small pieces of moderately cemented soil, many roots.
1.0 - 1.5	ML	SILT - tan, medium dense, dry, trace fine sand, moderately to highly cemented, many roots.
1.5 - 3.5	ML	Fine, sandy SILT - tan, very loose, dry, many roots, dry density = 84.5 pcf, moisture content = 7.0%, 70.7% passed the No. 200 sieve.
3.5 - 4.5	ML	SILT - tan to white, hard, dry, highly cemented, some fine sand, some small pieces fractured basalt.
4.5	Rx	Fractured BASALT - black, hard, dry, interlayered with highly cemented silt, backhoe refusal.

Excavated on August 10, 1994
No ground water encountered.
Test pit terminated at backhoe refusal at 4.5 feet below existing ground surface.
Sample taken at 2.5 to 3.0 feet.

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EXPLORATORY TEST PIT LOG #5

Mountain Home Air Force Base Family Housing - Order No. 9

Project No. B1439-151

DEPTH (feet)	SOIL CLASS	SOIL DESCRIPTION
0.0 - 1.0	ML	SILT (native) - tan to light brown, medium dense, dry, trace fine sand, some small pieces of moderately cemented soil, roots and vegetation.
1.0 - 3.0	ML	SILT - tan, medium dense, dry, trace fine sand, moderately to highly cemented, many roots.
3.0 - 4.5	ML	Sandy SILT - brown, loose to medium dense, dry to humid, pieces of moderately cemented soil.
4.5 - 7.0	ML	SILT - tan to white, hard, dry, highly cemented, some fine sand, some small pieces fractured basalt.

Excavated on August 10, 1994
No ground water encountered.
Test pit terminated at 7.0 feet below existing ground surface.

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EXPLORATORY TEST PIT LOG #6

Mountain Home Air Force Base Family Housing - Order No. 9

Project No. B1439-151

DEPTH (feet)	SOIL CLASS	SOIL DESCRIPTION
0.0 - 0.5	ML	SILT (native) - tan to light brown, medium dense, dry, trace fine sand, some small pieces of moderately cemented soil, roots and vegetation.
0.5 - 2.5	ML	SILT - tan to light brown, hard, dry, moderately to highly cemented, trace fine sand, some small roots.
2.5 - 6.0	ML	Sandy SILT - tan to white, hard, dry, highly cemented, some fractured basalt.
6.0	Rx	BASALT - black, hard, dry, backhoe refusal.

Excavated on August 10, 1994
No ground water encountered.
Test pit terminated at backhoe refusal at 6.0 feet below existing ground surface.

ATTACHMENT B

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EXPLORATORY TEST PIT LOG #7

Mountain Home Air Force Base Family Housing - Order No. 9

Project No. B1439-151

DEPTH (feet)	SOIL CLASS	SOIL DESCRIPTION
0.0 - 1.0	ML	SILT (native) - tan to light brown, loose to medium dense, dry, trace fine sand, some small pieces of moderately cemented soil, roots and vegetation.
1.0 - 3.0	ML	SILT - tan, very loose, dry, trace fine sand, pieces of highly cemented soil.
3.0 - 6.0	SM	Silty, fine SAND - tan to light brown, loose, humid to damp, small pieces of moderately to highly cemented soil, some small pieces of fractured basalt, pocket penetrometer = 2.0 to 2.25 tsf, dry density = 69.4 pcf, moisture content = 16.7%, 44.4% passed the No. 200 sieve.
6.0 - 7.0	ML	SILT - tan to white, hard, dry, highly cemented, some fine sand, some small pieces fractured basalt.
7.0	Rx	BASALT - black, hard, dry, backhoe refusal.

Excavated on August 10, 1994
No ground water encountered.
Test pit terminated at backhoe refusal at 7.0 feet below existing ground surface.
Bulk sample taken at 2.5 to 3.0 feet.

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PLATE

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EXPLORATORY TEST PIT LOG #8

Mountain Home Air Force Base Family Housing - Order No. 9

Project No. B1439-151

DEPTH (feet)	SOIL CLASS	SOIL DESCRIPTION
0.0 - 1.5	ML	SILT (native) - tan to light brown, medium dense, dry, trace fine sand, some small pieces of moderately cemented soil, roots and vegetation.
1.5 - 6.0	ML	SILT - tan, hard, dry, highly cemented with large chunks of fractured basalt increasing in size and quantity with depth.

Excavated on August 10, 1994
No ground water encountered.
Test pit terminated at backhoe refusal at 6.0 feet below existing ground surface.

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EXPLORATORY TEST PIT LOG #9

Mountain Home Air Force Base Family Housing - Order No. 9

Project No. B1439-151

DEPTH (feet)	SOIL CLASS	SOIL DESCRIPTION
0.0 - 1.0	ML	SILT (native) - tan to light brown, medium dense, dry, trace fine sand, some small pieces of moderately cemented soil, roots and vegetation.
1.0 - 1.5	ML	SILT - tan, medium dense, dry, trace sand, moderately to highly cemented.
1.5 - 2.5	ML	SILT - light brown to brown, hard, damp, some fine sand, highly cemented, moisture content = 16.9%.
2.5 - 4.0	Rx	Fractured BASALT - black, hard, dry, interbedded with highly cemented silt.
4.0	Rx	BASALT - black, hard, dry, backhoe refusal.

Excavated on August 10, 1994
No ground water encountered.
Test pit terminated at backhoe refusal at 4.0 feet below existing ground surface.

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ATTACHMENT B2

SUPPLEMENTAL GEOTECHNICAL REPORT

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REPLACE MILITARY FAMILY HOUSING, PHASE 2
MOUNTAIN HOME AIR FORCE BASE, IDAHO

PROJECT NO. DACA67-00-R-006

GEOTECHNICAL REPORT

9 NOVEMBER 1999

PREPARED BY

CIVIL/SOILS SECTION, DESIGN BRANCH
SEATTLE DISTRICT, U.S. ARMY CORPS OF ENGINEERS

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Replace Military Family Housing, Phase 2
Mountain Home Air Force Base, Idaho
PN DACA67-00-R-006

1. General. This project consists of constructing a new, 30 unit family housing complex on the base. This report covers the following project features: new communication/power alinements; new water supply alinement; and a new above ground water storage tank.

2. Foundation Exploration. Subsurface exploration was conducted by Seattle District, U.S. Army Corps of Engineers, on 26-27 October 1999. Thirty-two exploration test holes (99-PA-302 through 333) were completed to depths ranging from 457 millimeters (mm) to 3000 mm at the proposed site. A truck-mounted power auger, Mobile(Model BK-81) was used to perform the exploration. Exploration logs and locations are attached. Standard penetration tests where conducted used a 50.8 millimeter(mm) diameter split spoon sampler driven by a 63.49 kilogram hammer dropped 762 mm. Soil brought to the surface by the auger and split spoon sampler was visually classified according to the "Unified Soil Classification System."

3. Site Conditions.

a. Regional Geology. The site lies near the center of the Snake River Plain about 3 kilometers north of the Snake River. The Snake River Plain is a structural depression underlain by several hundred feet of relatively flat lying Quaternary basaltic lavas locally interbedded with thin sedimentary units of ash, tuff, silt, and clay. The surface of the lava field is somewhat irregular due to normal flow-top irregularities and the presence of cinder cones. The lava surface is mantled by an average of 2.5 meters to 3.5 meters of eolian sand and silt which exhibits varying degrees of caliche cementation. Locally the sediment mantle is less than 600 mm and as great as 8 meters. The regional ground water table lies about 100 meters beneath the site with ground water movement south toward the Snake River. Cementation within the sedimentary mantle and voids and fractures within the lavas permit perched water tables to form, sometimes at very shallow depths. The topography of the base is relatively flat sloping southerly at about 3.5 meters per kilometer.

b. Site Geology and Foundation Condition. The soils data available from explorations for other projects in the general area indicate that the foundation materials are silts, sandy silts, and silty sands overlying basalt. Cemented zones and caliche nodules are commonly found in the foundation soils. The surficial materials tend to be soft near the surface, probably due to freezing and thawing, but the soil becomes firm to very firm with depth. Depth to rock is quite variable and in previous explorations at other sites on the base has varied from 600 mm

to more than 8 meters. Average depth to rock is around 2.4 meters to 3.0 meters in the general area of the base.

Foundation soils at the project site consist predominantly of soft to stiff sandy silts (ML) and medium to dense silty sands (SM) overlying bedrock, refer to the exploration logs for detailed information. Varying amounts of gravels are dipersed in the silts and sands. Rock was encountered in several exploration holes at depths ranging from 457 mm to 2.4 meters, refer to the exploration logs for specific locations of rock. Several exploration holes did not encounter rock to depths of 3 meters, refer to the exploration logs for specific locations.

c. Ground Water. The regional water table is a few hundred meters below the surface in this area; however, perched ground water at shallow depths is commonly found in the general area. Perched ground water was not encountered in any of the exploration holes for the dates shown on the exploration logs.

d. Earthquake Design. Reference: Draft TI 809-04/AFMAN 32-1149 V1 (I), Seismic Design for Buildings, May 1998. From Table 3-1, Site Classification, based on the stiff soils and and limited information at this site, a site classification of D is recommended for design.

e. Environmental History. No observed visual or olfactory evidence of contamination was encountered during the exploration. Chemical analysis to determine the presence or absence of such materials was not performed. If any suspected hazardous material is found during the performance of this job, all work will stop and the Corps of Engineers inspector and the Base Environmental Office will be notified immediately.

4. Recommended Foundation Design.

a. Frost Protection. In accordance with TM 5-809-1, dated 28 March 1986 exterior footings shall be at least 940 mm below finished grade for heated structures and 1240 mm below finished grade for unheated structures for frost protection.

b. Soil Properties. Use assumed soil properties of $\phi = 25$ degrees, c = 0 kilograms per square meter (kg/m^2), and moist unit weight = 2000 kilograms per cubic meter (kg/m^3) for native soil backfill. For granular backfill materials, the parameters to be used are $\phi = 35$ degrees, c = 0 kg/m^2, and moist unit weight = 2080 kg/m^3.

c. Bearing Capacity. The native soils have an allowable bearing capacity of somewhat less than 144 kilopascals (kPa) for footings at the design frost depth. These fine grained soils at that depth will tend to be unstable during inclement weather. We therefore recommend overexcavation of 300 mm in both depth and width below the footings and replacement with select granular fill. This will provide a stabilized working surface and will distribute loads to permit a working allowable bearing capacity of 144 kPa dead load plus live load with

one-third overstress allowed for temporary dynamic loads, which is recommended. Select granular material shall meet the following gradation requirements:

Sieve Size	Percentage Passing by weight
75 mm	100
4.75 mm	35-70
0.075 mm	0-15

This material is readily available from off base gravel sources. Select granular material shall be compacted to 95 percent of maximum modified Proctor density.

For footings on rock, an allowable bearing capacity of 478 kPa dead load plus live load is recommended. Bearing pressures may be increased by one-third for temporary dynamic loads. Structures may be founded either on rock or on overburden; however, all structures shall be founded either uniformly on rock or uniformly on overburden.

e. Earth pressure coefficients, active, $K_a = 0.40$, at rest, $K_o = 0.55$, and passive, $K_p = 2.5$, are recommended for native soil backfill. For granular backfill, theoretical earth pressure coefficients for K_a, K_o, and K_p are .35, .45, and 3.0, respectively. The use of these coefficients assumes that the backfill surface is horizontal. Appropriate adjustments to these coefficients must be made for sloping backfill surfaces. Construction surcharges at the top of a wall should also be considered in the wall design.

f. Temporary side slope excavations for construction purposes shall be designed no steeper than 1 vertical on 1.5 horizontal.

5. Underground Utilities.

a. Frost Protection. To prevent frost damage, frost susceptible utility lines shall be placed with the top of the pipe at least 1240 mm below the finished ground line.

b. Corrosion Protection. Laboratory tests on soil samples for nearby sites in the general area of the base indicate pH values ranging from 7.6 to 9.2. Resistivity tests in the general area indicate that the soils have an anticipated corrosion activity range from mild to severe based on the field resistivity at other sites on the base.

6. Recommended Construction and Drainage Considerations.

a. Grades of at least 1 percent and preferably 5 percent, to promote drainage of water away from the structure, shall be provided around the perimeter of the structure.

b. Runoff from roofs shall be directed away from the structure by downspouts and storm drains or surface channels.

c. Walks and pavements adjacent to the structure shall be positively sloped away from the structure.

d. The site shall be prepared to avoid ponding of water in low areas. Sumps and pumps shall be provided at the bottom of excavations, if necessary, to remove rainwater or surface drainage which has entered the excavation.

7. Pavement Design.

a. General. Pavement for this facility shall be asphaltic concrete for the access roads.

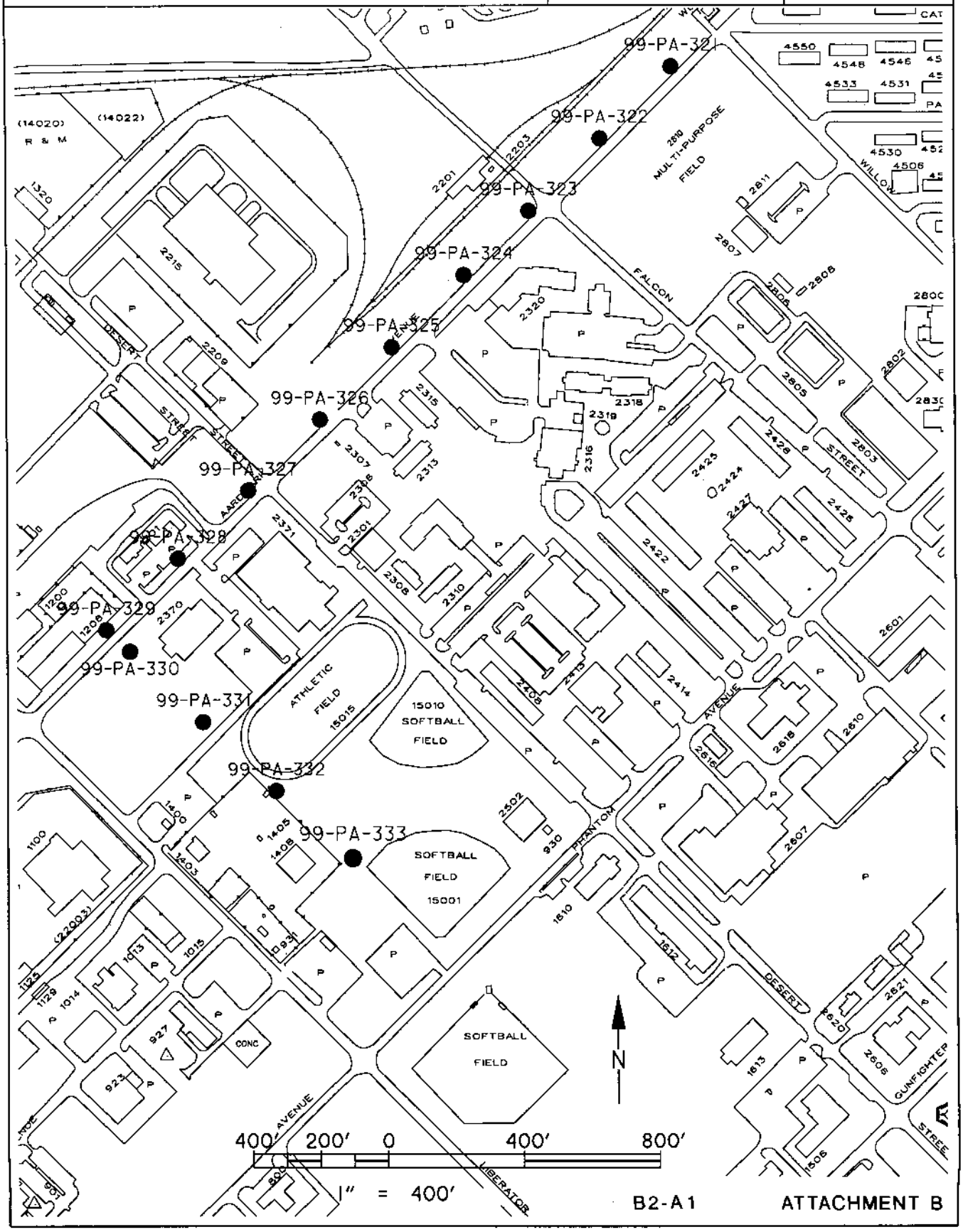
b. Pavement for roads and parking areas at Mountain Home Air Force Base have not been designed for frost and there have been no significant problems with the pavements because of frost action. However, nonfrost susceptible (NFS) base course materials have always been specified and local practice has been to use not less than 150 mm of base course. The base course shall be compacted to at least 100 percent of the maximum modified Proctor density. Base materials shall have not more than 5 percent passing the 0.075 mm sieve and not more than 3 percent finer than 0.02 mm size. The top 150 mm of the subgrade shall be compacted to at least 90 percent of the maximum modified Proctor density for cohesive materials and at least 95 percent of the maximum modified Proctor density for cohesionless materials..

8. References.

(1) Draft TI 809-04/AFMAN 32-1149 V1 (I), Seismic Design for Buildings, May 1998.

U.S. ARMY CORPS OF ENGINEERS, SEATTLE DISTRICT

PROJECT: REP MIL FAMILY HOUSING (PHASE II); MOUNTAIN HOME AFB, ID	COMPUTED BY: COLLINS	DATE: 09 NOV 99
SUBJECT: LOCATIONS OF EXPLORATIONS	CHECKED BY: SEGAL	SHT. 1 OF 4
		PART:



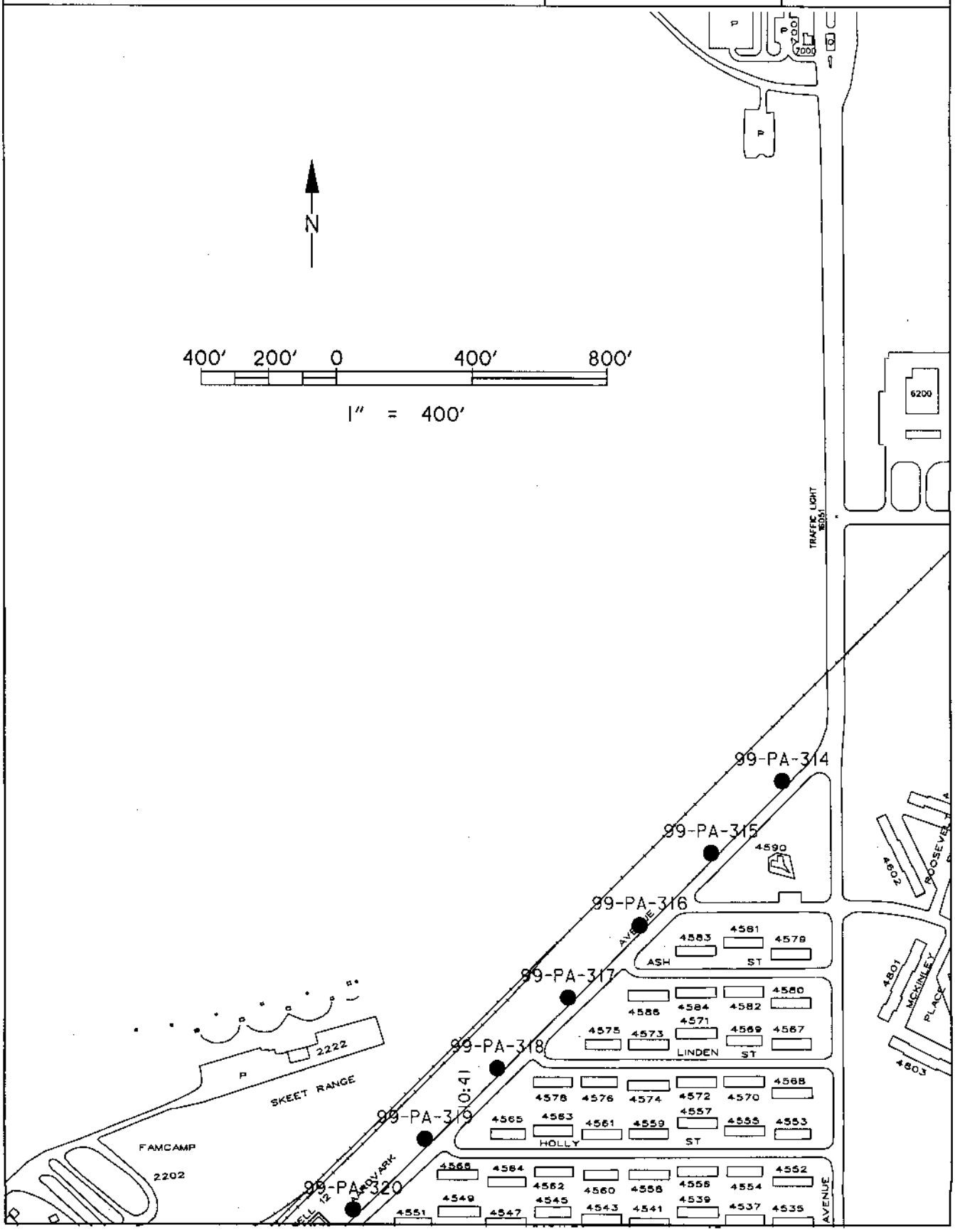
B2-A1

ATTACHMENT B

DESIGN FILE: i:ømcømhøgeotechørepfhphløloc1.dgn

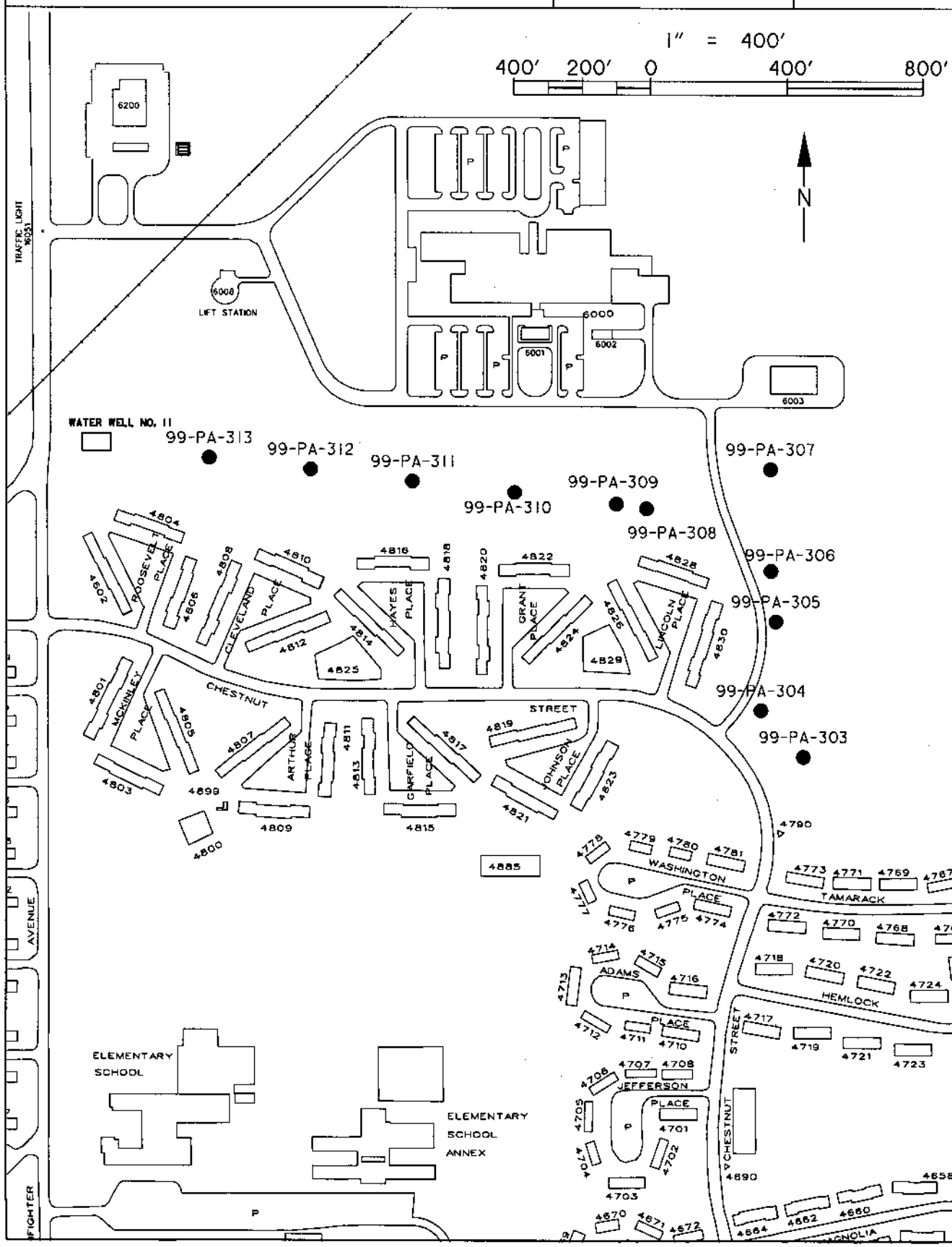
DATE AND TIME PLOTTED: 15-NOV-1999 10:39

PROJECT: REP MIL FAMILY HOUSING (PHASE II); MOUNTAIN HOME AFB, ID	COMPUTED BY: COLLINS	DATE: 09 NOV 99
SUBJECT: LOCATIONS OF EXPLORATIONS	CHECKED BY: SEGAL	SHT. 2 OF 4
		PART:



U.S. ARMY CORPS OF ENGINEERS, SEATTLE DISTRICT **ATTACHMENT B** B2-A3

PROJECT: REP MIL FAMILY HOUSING (PHASE II); MOUNTAIN HOME AFB, ID	COMPUTED BY: COLLINS	DATE: 09 NOV 99
SUBJECT: LOCATIONS OF EXPLORATIONS	CHECKED BY: SEGAL	SHT. 3 OF 4 PART:



DATE AND TIME PLOTTED: 15-NOV-1999 10:36

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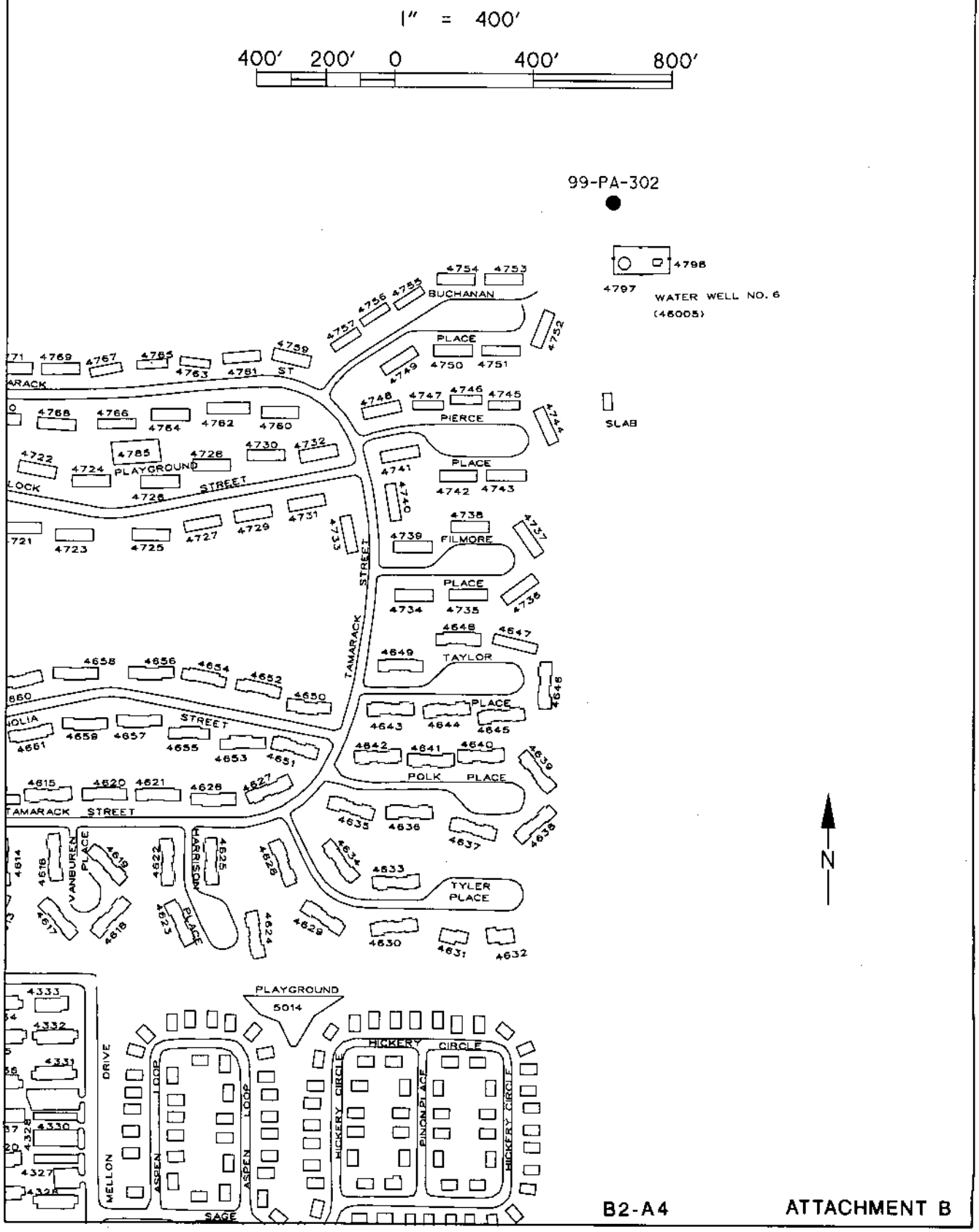
U.S. ARMY CORPS OF ENGINEERS, SEATTLE DISTRICT

PROJECT: REP MIL FAMILY HOUSING (PHASE II); MOUNTAIN HOME AFB, ID	COMPUTED BY: COLLINS	DATE: 09 NOV 99
SUBJECT: LOCATIONS OF EXPLORATIONS	CHECKED BY: SEGAL	SHT. 4 OF 4 PART:



B2-A4

ATTACHMENT B

DESIGN FILE: j:\mc\mh\geotech\rep\fph1\loc4.dgn DATE AND TIME PLOTTED: 15-NOV-1999 10:37

U.S. ARMY CORPS OF ENGINEERS, SEATTLE DISTRICT

PROJECT: REP MIL FAMILY HOUSING (PHASE II); MOUNTAIN HOME AFB, ID	COMPUTED BY: COLLINS	DATE: 09 NOV 99
SUBJECT: LEGEND AND ADDITIONAL NOTES	CHECKED BY: SEGAL	SHT. 1 OF 1 PART:

LEGEND

GP	POORLY-GRADED GRAVEL
SM	SILTY SAND
ML	INORGANIC SILTS OF LOW PLASTICITY
CL	CLAY OF LOW PLASTICITY
RK	ROCK
⫽	REFUSAL BY EQUIPMENT USED
● 99-PA-34	YEAR. TYPE AND NUMBER OF EXPLORATION HOLE PA = POWER AUGER
N=12	NUMBER OF BLOWS TO DRIVE SAMPLER 305 mm USING A 63 kg HAMMER DROPPED 762 mm (STANDARD PENETRATION TEST = BLOWS/305 MM) (UNLESS OTHERWISE NOTED)
COBBLES	PARTICLES OF ROCK THAT WILL PASS A 300 mm SQUARE OPENING AND BE RETAINED ON A 75 mm SIEVE
BOULDER	PARTICLES OF ROCK THAT WILL NOT PASS A 300 mm SQUARE OPENING

NOTES:

1. FOR EXPLORATION LOCATIONS SEE "LOCATIONS OF "EXPLORATIONS", SHEETS 1 THRU 4.
2. SOILS WERE VISUALLY CLASSIFIED ACCORDING TO THE "UNIFIED SOIL CLASSIFICATION SYSTEM."
3. SUBSURFACE EXPLORATION WAS CONDUCTED BY SEATTLE DISTRICT, U.S. ARMY CORPS OF ENGINEERS. EXPLORATIONS HOLES 99-PA-302 THROUGH 99-PA-333 FROM 26 - 27 OCTOBER 1999 USING A MOBILE POWER AUGER BK-81.

ATTACHMENT B

DESIGN FILE: J:ømcømhøgeotechømhrepifamhousmømhrplfhph20a.dgn DATE AND TIME PLOTTED: 10-NOV-1999 14:06

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-302	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED: — UNDISTURBED:
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE — STARTED 10-26-99 — COMPLETED 10-26-99
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE 2340 mm	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	200, 400, 600	ML "A"	SANDY SILT, STIFF, DRY, TAN			
	800, 1000, 1200, 1400, 1600, 1800, 2000	ML "B"	SANDY SILT, VERY STIFF, DRY, TAN N=18			
	2200, 2400, 2600, 2800, 3000, 3200	GP	N-50/88 mm SANDY BASALT GRAVEL (12 mm), VERY DENSE, MOIST, GRAY-BROWN REFUSAL AT 2340 mm ON ROCK			

B2-A6

ATTACHMENT B

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT Replace Military Family Housing (Phase II) — HOLE NO. 99-PA-302

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-303	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED: — UNDISTURBED:
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE — STARTED 10-27-99 — COMPLETED 10-27-99
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE 2400 mm	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	200, 400, 600	ML	SANDY SILT, SOFT, DRY, TAN			
	800, 1000, 1200, 1400, 1600, 1800, 2000, 2200	ML	SANDY SILT, W/ PIECES OF BASALT GRAVEL (12 mm) DENSE, DRY, TAN			
	2400		//			
	2600, 2800, 3000, 3200		REFUSAL AT 2400 mm ON ROCK			

B2-A7

ATTACHMENT B

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT Replace Military Family Housing (Phase II) — HOLE NO. 99-PA-303

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-304	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 10-27-99 / COMPLETED 10-27-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 457 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pope / Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		ML	SANDY SILT, MEDIUM, DRY, TAN			
	200					
	400		//			
	600		REFUSAL AT 457 mm ON ROCK			
	800					
	1000					
	1200					
	1400					
	1600					
	1800					
	2000					
	2200					
	2400					
	2600					
	2800					
	3000					
	3200					

B2-A8

ATTACHMENT B

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT: Replace Military Family Housing (Phase II)

HOLE NO. 99-PA-304

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-305	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED 10-27-99 — COMPLETED 10-27-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 457 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		ML	SANDY SILT, DENSE, DRY, TAN			
	200					
	400		//			
	600		REFUSAL AT 457 mm ON ROCK			
	800					
	1000					
	1200					
	1400					
	1600					
	1800					
	2000					
	2200					
	2400					
	2600					
	2800					
	3000					
	3200					

B2-A9

ATTACHMENT B

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT Replace Military Family Housing (Phase II) | HOLE NO. 99-PA-305

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-306	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED: — UNDISTURBED:
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED 10-27-99 — COMPLETED 10-27-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 1200 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	200, 400, 600	ML	SANDY SILT, SOFT, DRY, TAN			
	800, 1000	ML	SANDY SILT, DENSE, DRY, TAN			
	1200	RK	ROCK //			
	1400, 1600, 1800, 2000, 2200, 2400, 2600, 2800, 3000, 3200		REFUSAL AT 1200 mm ON ROCK			

B2-A10

ATTACHMENT B

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT Replace Military Family Housing (Phase II) — HOLE NO. 99-PA-306

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-307	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 10-27-99 / COMPLETED 10-27-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 3000 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pope / Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	200, 400, 600, 800, 1000, 1200, 1400, 1600, 1800, 2000, 2200	ML	SANDY SILT W/PIECES OF BASALT GRAVEL (6mm), SOFT-MEDIUM, DRY, TAN			
	2400, 2600, 2800, 3000	ML	SANDY SILT, SOFT-MEDIUM, MOIST, TAN			
	3200		BOTTOM AT 3000 mm			

ATTACHMENT B

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-308	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE — STARTED 10-27-99 — COMPLETED 10-27-99
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE 3000 mm	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		ML	SANDY SILT W/PIECES OF BASALT GRAVEL (12mm), SOFT-MEDIUM, DRY-MOIST, TAN			
	200					
	400					
	600					
	800					
	1000					
	1200					
	1400					
	1600					
	1800					
	2000					
	2200					
	2400					
	2600					
	2800					
	3000		BOTTOM AT 3000 mm			
	3200					

ATTACHMENT B

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-309	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED 10-27-99 — COMPLETED 10-27-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 3000 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	200, 400, 600, 800, 1000	ML	SANDY SILT, SOFT-MEDIUM, DRY, TAN			
	1200, 1400, 1600, 1800, 2000, 2200, 2400, 2600, 2800	ML	SANDY SILT W/ PIECES OF BASALT GRAVEL (12MM) AND CALICHE AT 2100 mm, DENSE, DRY, TAN			
	3000, 3200		BOTTOM AT 3000 mm			

ATTACHMENT B

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-310	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED 10-27-99 — COMPLETED 10-27-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 3000 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	200, 400, 600, 800, 1000, 1200, 1400, 1600, 1800	ML	SANDY SILT, SOFT-MEDIUM, DRY, TAN			
	2000, 2200, 2400, 2600, 2800	ML	SANDY SILT W/ PIECES OF BASALT GRAVEL (6MM) DENSE, DRY-MOIST, TAN			
	3000, 3200		BOTTOM AT 3000 mm			ATTACHMENT B

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-311	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED 10-26-99 — COMPLETED 10-26-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 2104 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		ML	SANDY SILT, SOFT-MEDIUM, DRY, TAN			
	200					
	400					
	600					
	800					
	1000					
	1200					
	1400					
	1600					
	1800					
	2000	RK	ROCK			
	2200		REFUSAL AT 2104 mm ON ROCK			
	2400					
	2600					
	2800					
	3000					
	3200					ATTACHMENT B

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-312	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED 10-26-99 — COMPLETED 10-26-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 2400 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		ML	SANDY SILT, MEDIUM, DRY, TAN			
	200					
	400					
	600					
	800					
	1000					
	1200					
	1400					
	1600					
	1800					
	2000					
	2200					
		RK	ROCK			
	2400		REFUSAL AT 2400 mm ON ROCK			
	2600					
	2800					
	3000					
	3200					ATTACHMENT B

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-313	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED 10-26-99 — COMPLETED 10-26-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 762 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g h
		ML	SANDY SILT, MEDIUM, DRY, TAN			SAGEBRUSH ON SURFACE
	200					
	400					
	600					
		RK	ROCK			
	800		REFUSAL AT 762 mm ON ROCK			
	1000					
	1200					
	1400					
	1600					
	1800					
	2000					
	2200					
	2400					
	2600					
	2800					
	3000					
	3200					ATTACHMENT B

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-314	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED: — UNDISTURBED:
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED 10-26-99 — COMPLETED 10-26-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 2252 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	200, 400, 600, 800, 1000, 1200, 1400, 1600	SM	SILTY SAND(F) W/OCC PIECES OF BASALT GRAVEL (6mm), COMPACT, MOIST, BLACK			
	1800, 2000, 2200	GP	SANDY BASALT GRAVEL (12mm), COMPACT, MOIST, BROWN			
	2400, 2600, 2800, 3000, 3200		REFUSAL AT 2252 mm ON ROCK			ATTACHMENT B

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-315	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED 10-26-99 — COMPLETED 10-26-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 3000 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		ML	SANDY SILT, SOFT-MEDIUM, DRY-MOIST, TAN			
	200					
	400					
	600					
	800					
	1000					
	1200	SM	SILTY SAND(F), MEDIUM, MOIST, BROWN			
	1400					
	1600					
	1800					
	2000					
	2200	GP	SANDY BASALT GRAVEL (12mm), COMPACT, DRY-MOIST, BROWN			
	2400					
	2600					
	2800	SM	SILTY SAND(F), MEDIUM MOIST, BROWN			
	3000		BOTTOM AT 3000 mm			
	3200					

ATTACHMENT B

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-316	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED 10-26-99 — COMPLETED 10-26-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 3000 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	200, 400, 600, 800, 1000, 1200, 1400, 1600, 1800	ML	SANDY SILT, MEDIUM, DRY, TAN			
	2000, 2200	SM	SILTY SAND(F) W/PIECES OF BASALT GRAVEL (12mm), MEDIUM, MOIST, BROWN			
	2400, 2600, 2800, 3000	GP	SANDY BASALT GRAVEL (12mm), COMPACT, MOIST, BROWN			
	3200		BOTTOM AT 3000 mm			ATTACHMENT B

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-317	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED: — UNDISTURBED:
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
	15. ELEVATION GROUND WATER
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED 10-26-99 — COMPLETED 10-26-99
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE 3000 mm	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		ML	SANDY SILT, SOFT-MEDIUM, DRY, TAN			
	200					
	400					
	600					
	800					
	1000					
	1200					
	1400					
	1600					
	1800					
	2000					
	2200					
	2400					
	2600					
	2800					
	3000		BOTTOM AT 3000 mm			
	3200					

ATTACHMENT B

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-318	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED 10-26-99 — COMPLETED 10-26-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 1952 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	200, 400, 600	ML	SANDY SILT, MEDIUM, DRY, TAN			
	800, 1000, 1200	GP	SANDY BASALT GRAVEL (12mm), COMPACT MOIST, BROWN			
	1400, 1600, 1800	SM	SILTY SAND(F), MEDIUM, MOIST, BROWN			
	2000	RK	ROCK			
	2200, 2400, 2600, 2800, 3000, 3200		REFUSAL AT 1952 mm ON ROCK			

ATTACHMENT B

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-319	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 10-26-99 / COMPLETED 10-26-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 3000 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pope / Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		ML	SANDY SILT, MEDIUM, DRY, TAN			
	200					
	400					
	600					
	800					
	1000					
	1200					
	1400	SM	SILTY SAND(F), MEDIUM, DRY-MOIST, BROWN			
	1600					
	1800					
	2000					
	2200					
	2400					
	2600					
	2800					
	3000		BOTTOM AT 3000 mm			
	3200					

ATTACHMENT B

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-320	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED: — UNDISTURBED:
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED 10-26-99 — COMPLETED 10-26-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 3000 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	200, 400, 600, 800, 1000, 1200	ML	SANDY SILT W/OCC PIECES OF BASALT GRAVEL (6mm), MEDIUM, DRY, TAN			
	1400, 1600, 1800, 2000, 2200, 2400, 2600, 2800	SM	SILTY SAND(F), MEDIUM, DRY-MOIST, BROWN			
	3000, 3200		BOTTOM AT 3000 mm			

ATTACHMENT B

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-321	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 10-26-99 / COMPLETED 10-26-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 3000 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pope / Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		ML	SANDY SILT, MEDIUM, DRY, TAN			
	200					
	400					
	600					
	800					
	1000					
	1200					
	1400					
	1600	ML	SANDY SILT W/PIECES OF WOOD CHIPS, MEDIUM-STIFF, DRY-MOIST, TAN			
	1800					
	2000					
	2200					
	2400					
	2600					
	2800					
	3000		BOTTOM AT 3000 mm			
	3200					

ATTACHMENT B

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-322	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED 10-26-99 — COMPLETED 10-26-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 3000 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	200, 400, 600	GP	SANDY BASALT GRAVEL (12mm), COMPACT, DRY-MOIST, BROWN			30m OF WIRE WRAPPED AROUND BOTTOM OF AUGER STEM
	800, 1000, 1200, 1400, 1600, 1800, 2000, 2200, 2400, 2600, 2800	ML	SANDY SILT, DENSE, DRY, TAN			
	3000		BOTTOM AT 3000 mm			
	3200					

ATTACHMENT B

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-323	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED 10-26-99 — COMPLETED 10-26-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 3000 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pape — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		ML	SANDY SILT, MEDIUM, DRY, TAN			
	200					
	400					
	600					
	800					
	1000					
	1200					
	1400					
	1600					
	1800					
	2000					
	2200					
	2400					
	2600					
	2800	SM	SILTY SAND(F), MEDIUM-DENSE, MOIST, BROWN			
	3000		BOTTOM AT 3000 mm			
	3200					

ATTACHMENT B

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-324	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 10-26-99 / COMPLETED 10-26-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 3000 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pope / Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	200, 400, 600	ML	SANDY SILT, MEDIUM, MOIST, TAN			
	800, 1000, 1200, 1400, 1600, 1800, 2000, 2200, 2400, 2600	SM	SILTY SAND(F), MEDIUM, MOIST, BROWN			
	2800, 3000	CL	CLAY, MEDIUM, MOIST, BROWN			
	3200		BOTTOM AT 3000 mm			ATTACHMENT B

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PROJECT Replace Military Family Housing (Phase II) HOLE NO. 99-PA-324

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-325	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED 10-26-99 — COMPLETED 10-26-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 3000 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	200, 400, 600, 800, 1000, 1200, 1400, 1600, 1800	ML	SANDY SILT, MEDIUM-DENSE, DRY-MOIST, TAN			60m OF GALV WIRE WRAPPED AROUND BOTTOM STEM OF AUGER
	2000, 2200, 2400, 2600, 2800, 3000	SM	SILTY SAND(F) W/SMALL PIECES OF WOOD CHIPS, DENSE, MOIST, BROWN			
	3200		BOTTOM AT 3000 mm			ATTACHMENT B

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. B2-A29

PROJECT Replace Military Family Housing (Phase II) HOLE NO. 99-PA-325

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-326	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE — STARTED 10-26-99 — COMPLETED 10-26-99
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE 3000 mm	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		ML	SANDY SILT, SOFT, DRY-MOIST, TAN			
	200					
	400					
	600					
	800					
	1000					
		SM	SILTY SAND(F), MEDIUM-DENSE, MOIST, BROWN			
	1200					
	1400					
	1600					
	1800					
	2000					
	2200					
	2400					
	2600					
	2800					
	3000		BOTTOM AT 3000 mm			
	3200					

ATTACHMENT B

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-327	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED 10-26-99 — COMPLETED 10-26-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 3000 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	200	ML	SANDY SILT W/OCC PIECES OF BASALT GRAVEL (12mm), MEDIUM, DRY-MOIST, TAN			
	400					
	600					
	800					
	1000					
	1200	SM	SILTY SAND(F) W/PIECES OF BASALT GRAVEL (12mm), MEDIUM-DENSE, MOIST, BROWN			
	1400					
	1600					
	1800					
	2000					
	2200					
	2400					
	2600					
	2800					
	3000		BOTTOM AT 3000 mm			
	3200					

ATTACHMENT B

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-328	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED 10-26-99 — COMPLETED 10-26-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 3000 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	200, 400, 600, 800, 1000	SM	SILTY SAND(F) W/OCC GRAVEL (25mm), MEDIUM-DENSE, MOIST, BROWN			
	1200, 1400, 1600, 1800, 2000, 2200, 2400, 2600, 2800, 3000	SM	SILTY SAND(F), MEDIUM-DENSE, MOIST, BROWN			
	3200		BOTTOM AT 3000 mm			

ATTACHMENT B

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-329	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 10-27-99 / COMPLETED 10-27-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 3000 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pope / Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		SM	SILTY SAND(F) W/OCC GRAVEL (12mm), COMPACT, MOIST, BROWN			
	200					
	400					
	600					
	800					
	1000					
	1200					
	1400					
	1600					
	1800					
	2000					
	2200					
	2400					
	2600					
	2800					
	3000		BOTTOM AT 3000 mm			
	3200					

ATTACHMENT B

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. B2-A33

PROJECT Replace Military Family Housing (Phase II) | HOLE NO. 99-PA-329

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-330	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED: — UNDISTURBED:
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
	15. ELEVATION GROUND WATER
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED 10-27-99 — COMPLETED 10-27-99
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE 3000 mm	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		ML	SANDY SILT, SOFT-MEDIUM, DRY-MOIST, TAN			
	200					
	400					
	600					
	800					
	1000					
	1200					
	1400					
	1600					
	1800					
	2000					
	2200					
	2400					
	2600					
	2800					
	3000		BOTTOM AT 3000 mm			
	3200					

ATTACHMENT B

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. B2-A34

PROJECT Replace Military Family Housing (Phase II) HOLE NO. 99-PA-330

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-331	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE — STARTED 10-27-99 — COMPLETED 10-27-99
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE 3000 mm	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		ML	SANDY SILT, SOFT-MEDIUM, DRY, TAN			
	200					
	400					
	600					
	800					
	1000					
	1200					
	1400					
	1600					
	1800					
	2000					
	2200					
	2400					
	2600					
	2800					
	3000		BOTTOM AT 3000 mm			
	3200					

ATTACHMENT B

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-332	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
	15. ELEVATION GROUND WATER
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED 10-27-99 — COMPLETED 10-27-99
	17. ELEVATION TOP OF HOLE
7. THICKNESS OF OVERBURDEN	18. TOTAL CORE RECOVERY FOR BORING %
8. DEPTH DRILLED INTO ROCK	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins
9. TOTAL DEPTH OF HOLE 3000 mm	

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		ML	SANDY SILT, SOFT-MEDIUM, DRY, TAN			
	200					
	400					
	600					
	800					
	1000					
	1200					
	1400					
	1600					
	1800					
	2000					
	2200					
	2400					
	2600					
	2800					
	3000		BOTTOM AT 3000 mm			
	3200					

ATTACHMENT B

DRILLING LOG	DIVISION USACE Northwestern Division	INSTALLATION Seattle District	SHEET 1 OF 1 SHEETS

1. PROJECT Replace Military Family Housing (Phase II)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) Mountain Home AFB, ID	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Haz-Tech Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile Power Auger BK-81
4. HOLE NO. (As shown on drawing title and file number) 99-PA-333	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
5. NAME OF DRILLER Mike & Troy	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED 10-27-99 — COMPLETED 10-27-99
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 3000 mm	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR Leon W. Pope — Troy D. Collins

ELEVATION a	DEPTH (mm) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		ML	SANDY SILT, SOFT-MEDIUM, DRY, TAN			
	200					
	400					
	600					
	800					
	1000					
	1200					
	1400					
	1600					
	1800					
	2000					
	2200					
	2400					
	2600					
	2800					
	3000		BOTTOM AT 3000 mm			
	3200					

ATTACHMENT B

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ATTACHMENT C - RESERVED

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ATTACHMENT D

LIST OF SITE/UTILITY PLANS

(1) The following drawings may be accessed under the "Plans" list on the Contract Viewer. NOTE: The utilities shown on these drawings depict existing conditions for the family housing area. These drawings are a composite developed from the available data for Mountain Home AFB, Idaho and contain the latest available information.

Replace Military Family Housing (Ph. 2),
Mountain Home AFB, Idaho
PN QYZH985003

G-1 Location and Vicinity Map, Sheet 1 of 5

C-1 Project Location Plan, Sheet 2 of 5

C-2 Woodland Grove Housing Demolition Plan, Sheet 3 of 5

C-3 Woodland Grove Housing Existing Tree Inventory, Sheet 4 of 5

C-4 Phase 2 and 3 Family Housing Site Plan

(2) The following drawings depict existing conditions for the electrical substation. These drawings are in AutoCAD electronic file format.

52159_r14a.dwg
52160_r14a.dwg
52161_r14a.dwg
52165_r14b.dwg
52166_r14a.dwg
52877_r14a.dwg
H_Circuit_Plan1a.dwg Disclaimer: It is understood that while the Corps of Engineers and it's information suppliers have no indication or reason to believe that there are inaccuracies in information incorporated in the electronic information representations furnished herein, The CORPS AND IT'S SUPPLIERS MAKE NO REPRESENTATION OF ANY KIND, INCLUDING BUT NOT LIMITED TO WARRANTIES OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE, NOR ANY SUCH WARRANTIES TO BE IMPLIED WITH RESPECT TO INFORMATION, DATA, OR SERVICES FURNISHED HEREIN.

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ATTACHMENT E - REPORTS

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ATTACHMENT E1 - ASBESTOS SURVEY REPORT

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99049

ASBESTOS SURVEY

(To be Provided)

ATTACHMENT E2 - LEAD BASED PAINT SURVEY REPORT FOR GROUPED HOUSING BUILDINGS

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Lead-Based Paint Survey Report for Grouped Housing Buildings

9/1/99

MOUNTAIN HOME AFB (MOUN)
Reporting Group:WG/GF

Prepared for:

Earl L. Claiborne, Jr.
366 CES/CEV

Prepared by:

Earl Claiborne
a United States Environmental Protection Agency
Certified Lead Based Paint Supervisor

Project Number: GY336MO-Pb

1.0 Introduction

(), performed a lead-based paint inspection of representative buildings belonging to the WG/GF Reporting Group located at the MOUNTAIN HOME AFB site to identify lead-based paint. This report established lead concentrations in painted surfaces as a general guidance tool for the purpose of tenant notificaiton and conducting safe renovation or demolition activities at the building..

This report was prepared for the express use and benefit of the 366 CES/CEV ,its agents and employees and may be used at its discretion in connection with the possible financing, refinancing, or notifications that pertain to the property referenced above. The information in this report or portions thereof, may be required to be included in notifications to the residents, employees, contractors, or other visitors to the building. This report is not intended to be used by the Owner or its agents as a specification or work plan for any of the work suggested or recommended herein.

shall not be responsible for identifying lead-containing paints located behind walls and/or columns, beneath flooring, under carpeting, above solid ceilings, underground or in any other inaccessible areas.

A total of 270 buildings are on file for this report group. Within this population a total of 5,706 lead samples were collected. Based on these samples, 17 material(s) within this reporting group should be considered to contain lead based on the HUD standards.

The table on the following page shows those materials which were sampled and found to contain lead in the paint with a frequency greater than or equal to the HUD statistical limit of 2.5%.

Summary of Group Testing Results: Reporting Group WG/GF showing Positive Materials

Description	Number of Sampled Materials in Sampling Population	% Positive	% Negative	% Inconclusive	Lead Status
Cabinet Door/other	3	**33.3%**	66.7%	0.0%	***Positive ***
Ceiling/other	518	**3.1%**	96.9%	0.0%	***Positive ***
Door Frame/other	44	**18.2%**	81.8%	0.0%	***Positive ***
Door Jamb/other (interior)	394	**34.3%**	65.7%	0.0%	***Positive ***
Door Exterior (outside)/wood	162	**61.7%**	38.3%	0.0%	***Positive ***
Door Interior/other	106	**5.7%**	94.3%	0.0%	***Positive ***
Exterior Basement Foundation/concrete	30	**13.3%**	86.7%	0.0%	***Positive ***
Threshold/other	26	**23.1%**	76.9%	0.0%	***Positive ***
Exterior Duct	37	**35.1%**	64.9%	0.0%	***Positive ***
Exterior Facade/other	120	**58.3%**	41.7%	0.0%	***Positive ***
Exterior Gutter	26	**3.8%**	96.2%	0.0%	***Positive ***
Exterior Soffitts/other	8	**25.0%**	75.0%	0.0%	***Positive ***
Exterior Trim/other	87	**63.2%**	36.8%	0.0%	***Positive ***
Floor - Other	242	**23.1%**	76.9%	0.0%	***Positive ***
Shelf Support/wood	209	**3.8%**	96.2%	0.0%	***Positive ***
Window Jamb/wood	5	**20.0%**	80.0%	0.0%	***Positive ***
Wallpaper	582	**6.5%**	93.5%	0.0%	***Positive ***
Total No. of samples	2,599	(of these materials)			

2.0 Group Reporting Protocol

Grouped lead status is determined by collecting and analyzing samples from representative buildings belonging to the same Reporting group. Buildings belonging to the same reporting group share a similar construction and painting history. Samples for each type of material (building component) are collected using an X-ray Flourescence (XRF) hand held analyzer. Under certain conditions, bulk samples are also collected.

Based on the tested results from the representative samples, a percentage positive value is determined for each building component (structure/feature/substrate combination) and compared to the HUD statistical limit (2.5%). Those components which have a percent of positive test results above or equal to the HUD statitical limit are classified as positive. Those components which have a percent of positive test results below the HUD statitical limit are classified as negative.

An individual test of a component is considered to be positive if the XRF or bulk sample results are above the action limit established for that type of sample. Dust samples are NOT considered when determining a material's tested results. If more than one sample is collected for a component within a building, the sample with the highest result is used to determine the testing result for that component within that building.

Grouped Lead Paint Sampling Report
Site: MOUNTAIN HOME AFB
Report Group: WG/GF

Description	Number of Samples in Sampling Population	% Positive	% Negative	% Inconclusive	Lead Status
Baseboards/other	49	**2.0%**	98.0%	0.0%	Negative
Cabinet Door/other	3	**33.3%**	66.7%	0.0%	***Positive ***
Varnished Cabinets/wood	71	**0.0%**	100.0%	0.0%	Negative
Closet Door/wood	3	**0.0%**	100.0%	0.0%	Negative
Varnished Closet Door/wood	204	**1.0%**	99.0%	0.0%	Negative
Ceiling/other	518	**3.1%**	96.9%	0.0%	***Positive ***
Door Frame/other	44	**18.2%**	81.8%	0.0%	***Positive ***
Door Jamb/other (interior)	394	**34.3%**	65.7%	0.0%	***Positive ***
Door Exterior (outside)/metal	53	**0.0%**	100.0%	0.0%	Negative
Door Exterior (outside)/wood	162	**61.7%**	38.3%	0.0%	***Positive ***
Door Interior/other	106	**5.7%**	94.3%	0.0%	***Positive ***
Exterior Basement Foundation/concrete	30	**13.3%**	86.7%	0.0%	***Positive ***
Threshold/other	26	**23.1%**	76.9%	0.0%	***Positive ***
Exterior Duct	37	**35.1%**	64.9%	0.0%	***Positive ***
Exterior Fence/wood	53	**1.9%**	98.1%	0.0%	Negative
Exterior Facade/other	120	**58.3%**	41.7%	0.0%	***Positive ***
Exterior Gutter	26	**3.8%**	96.2%	0.0%	***Positive ***
Exterior Soffitts/other	8	**25.0%**	75.0%	0.0%	***Positive ***
Exterior Trim/other	87	**63.2%**	36.8%	0.0%	***Positive ***
Floor - Other	242	**23.1%**	76.9%	0.0%	***Positive ***
Shelf Support/wood	209	**3.8%**	96.2%	0.0%	***Positive ***
Window Frame/other	2	**0.0%**	100.0%	0.0%	Negative
Window Jamb/wood	5	**20.0%**	80.0%	0.0%	***Positive ***
Wallpaper	582	**6.5%**	93.5%	0.0%	***Positive ***
Window Sill/other	365	**11.8%**	88.2%	0.0%	Negative

ATTACHMENT F - STANDARD TYPOGRAPHY

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STANDARD TYPOGRAPHY:

The Standard Typography to be used for Street Signs and House Numbers for this project (both Family Housing and Senior Officer Housing) is the Clarendon medium typeface as shown below. The letterforms have a strong historic character and good legibility. There are many versions of the clarendon typeface that are commercially available. The clarendon medium style shown below is recommended. Compare all purchased letters with the illustration below to assure conformity.

Clarendon Medium

ABCDEFGHIJKL
MNOPQRSTUVW
XYZ
abcdefghijklmno
pqrstuvwxyz
1234567890

END OF ATTACHMENT F

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ATTACHMENT G - LANDSCAPING CRITERIA

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ATTACHMENT G1 - ACCEPTABLE LANDSCAPE MATERIALS FOR MHAFB

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ACCEPTABLE LANDSCAPE MATERIALS FOR MHAFB

LAWN GRASSES

Common Name	*Botanical Name*	
1) Turf-type Tall Fescue	Festuca arundinacaea	100%, 5lb/1000sf
2) Crested Wheatgrass	Agropyron cristatum	100% 3lb/1000sf
3) Blue Grama	Bouteloua graclis	50% 1-1/2 lb/1000sf
Buffalograss	Buchloe dactyloides	50% 1-1/2lb/1000sf

**Sod is preferred, if budget allows.

DRYLAND GRASSES

Common Name	*Botanical Name*	*Seeding Rate*
Bluebunch Wheatgrass		7.0
Sandberg's Bluegrass		2.0
Bluebunch Squirreltail		1.0
Basin Wildrye		0.5
Blue Grama	Bouteloua graclis	2.5
Buffalograss	Buchloe dactyloides	2.5
Galleta Grass		2.5
Thickspike Wheatgrass		3.0
Streambank Wheatgrass		3.0
		TOTAL LB / ACRE= 24.0
Sheep Fescue	Festuca ovina	3-5 lb per 1000 sf. or 20lb per acre

Add forbs/wildflowers at the rate of 5-6lb/acre to the above mixes in improved areas.

ACCEPTABLE TREES AND SHRUBS FOR MHAFB

Common Name	*Botanical Name*
DECIDUOUS TREES	
Norway Maple	Acer platanoides
Marshals Seedless Green Ash	Fraxinus pennsylvanica 'Marshals'
Black Locust	Robinia pseudoacacia
Honeylocust	Gleditsia triacanthos 'inermis'
Hackberry	Celtis occidentalis
English Oak	Quercus robur
Catalpa	Catalpa speciosa
London Plane	Platanus acerifolia

ACCEPTABLE LANDSCAPE MATERIALS FOR MHAFB

DECIDUOUS SHRUBS	
Amur Maple	Acer ginala
Flowering Crab	Malus sp.
Pauls Scarlet Hawthorn	Crataegus oxycantha
Russian Olive	Elaeagnus augustifolia
Golden Raintree	Koelreuteria paniculata
Washington Hawthorn	Crataegus phaenopyrum
Flowering Plum	Prunus sp.
Flowering Cherry	Pyrus calleryana
Mountain Ash	Sorbus aucuparia
Mentor Barberry	Berberis mentorensis
Japanese Barberry	Berberis thunbergii
Smoke Bush	Cotinus coggyria
Cotoneaster	Cotoneaster species
Rose of Sharon	Hibiscus syriacus
Potentilla	Potentilla fruticosa
Spirea	Spirea sp.
Lilac	Syringa sp.
Burning Bush	Euonymus alata var. compacta
Siberian Pea shrub	Caragana arborescens
Skunkbush Sumac	Rhus trilobata
Dwarf Blue Arctic Willow	Salix purpurea 'Nana'
Blueleaf Honeysuckle	Lonicera koralkowii
EVERGREEN TREES	
Colorado Blue Spruce	Picea pungens 'Glauca'
Norway Spruce	Picea abies
Scotch Pine	Pinus sylvestris
Austrian Pine	Pinus nigra
Blue Atlas Cedar	Cedrus atlantica
Deodar Cedar	Cedrus deodara
Rocky Mountain Juniper	Juniperus scopulorum
Ponderosa Pine	Picea ponderosa
Lodgepole Pine	Pinus contorta
Black Hills Spruce	Picea glauca densata
EVERGREEN SHRUBS	
Juniper	Juniperus sp.
Mugo Pine	Pinus mugo var mughus
Pyracantha	Pyracantha sp.

ATTACHMENT G2 - SAMPLE TREE PRESERVATION PLAN

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SAMPLE TREE PRESERVATION PLAN

1.0 GENERAL CONDITIONS

A. Strict adherence to the Tree Preservation Plan, details and specifications will be enforced. If plans have not been prepared, owner is responsible to contract with a qualified professional to prepare a Tree Preservation Plan. All plans shall include identification of the individual trees to receive tree care as per these guidelines. If any deviation from the approved Plan, details and specifications occurs, the general contractor shall notify the qualified professional to determine what action should be taken.

B. Prior to any site disturbance, it shall be the responsibility of the general contractor to install tree preservation measures in accordance with plans and specifications prepared by a qualified professional. It is the general contractor's responsibility to safeguard the trees designated to be preserved.

C. The following must not occur within the tree protection area:

1. stockpiling of soils
2. operating or storing construction equipment
3. burning in close proximity to protected areas
4. regrading causing runoff or flooding
5. parking vehicles and storing supplies
6. spilling of toxic materials
7. spraying of herbicides in close proximity to protected areas

D. Fines for non-compliance with the Tree Preservation Plans and penalties for any trees lost due to negligence will be assessed according to the local governing agency's regulations.

1.1 SCOPE OF WORK

The landscape contractor shall provide all materials, labor and equipment to complete all tree preservation work as shown on the plans and specifications. This work may include site preparation, hardscape, grading, drainage, aeration, dewatering and fertilization. It is recommended that work on individual trees be performed by a certified arborist.

1.2 DEFINITIONS

A. **DIAMETER** (dbh - diameter at breast height) is used when measuring trees over 12 inches in diameter when measured at 4.5 feet above the ground.

B. **CALIPER** is the diameter of a tree trunk less than 12 inches in diameter.

C. **SPECIMEN TREES**: Trees having a diameter of 30 inches or more, or trees having 75 percent or more of the diameter of the current state champion tree for that species.

D. **CRITICAL ROOT ZONE** (crz) is equal to one foot radius for every 1 inch of dbh, except for isolated specimen trees which shall have a crz of 1.5 foot radius for each 1 inch dbh. For example, 30 inch dbh shall have a crz of 45 foot radius. Refer to Tree Preservation plan for delineation of the crz.

E. **DAMAGE** is any encroachment into the critical root zone.

F. **QUALIFIED PROFESSIONAL** shall be a registered landscape architect, licensed forester or other specialists recognized by the local regulatory agencies.

1.3 MATERIALS

A. Barricades/Fences: Chain link, welded wire, board or other approved product. Minimum height shall be 4 feet.

B. Cable, extra high strength steel, with pre-formed grip and drop forged attachments.

C. Erosion Control Bales: straw bales anchored by wood stakes or rebar.

D. Signage attached to tree protection fence: 11 inches x 15 inches or larger, highly visible to the public and contractors.

E. Silt Fence, as specified, example 30-inch or 4-foot woven fabric.

F. Fertilizer: 50 percent organic, slow release, granular or water soluble as dictated by plans and specifications or per soil test, arboricultural grade 32-7-7 or equivalent.

1.4 TREE PRESERVATION PROCEDURES

A. Stakeout

1. Upon issuance of the clearing, grading and sediment and erosion control permits by the plan review authorities, the general contractor shall stakeout the limits of clearing, grading, building footprints, sediment and erosion control devices that affect the tree preservation areas. In addition, the general contractor shall indicate pertinent floor grades on the stakeout.

2. After this procedure is completed, the general contractor shall stakeout (separate color code) the location of all tree preservation fencing.

3. The landscape contractor shall be required to meet onsite with the owner's representative, the qualified professional who prepared the Tree Preservation Plan and the local code enforcement officer to inspect the trees to be saved and to review the protective measures required.

B. Selective tree removal within the Tree Preservation area

1 . Within the tree preservation area, selected trees and brush as identified on the Tree Preservation Plan, may be removed by hand under the direction of the qualified professional.

2. All final stump cuts are to be made as close as possible to the existing grade.

C. Tree removal and site work outside the tree preservation area

1. All areas designated to be root pruned as detailed on the Tree Preservation Plan shall have the work performed at this time. If trenching to root prune, proper backfill procedures, including the layering of backfill and tamping to eliminate settlement, must be done.

2. All tree protection fencing, silt fencing and signage as detailed on the Tree Preservation Plan shall be installed prior to any clearing or grading.

3. All trees removed outside the tree protection fencing shall be taken down without encroachment into the tree preservation area. If stump removal becomes necessary, appropriate precautions should be taken to ensure that the crz is not disturbed.

D. Tree Maintenance Activities

1. All tree maintenance shall be carried out under the supervision of a certified arborist. All work performed shall meet or exceed the standards established by the National Arborist Association. All applicable safety requirements shall be strictly adhered to and enforced.

2. Pruning activities shall be performed on all trees as detailed on the Tree Preservation Plan maintenance schedule. Trees will be pruned to National Arborist Association pruning standards Classes I - IV.

3. Apply fertilizer as specified on the Tree Preservation Plan. Fertilizer shall be applied in late fall or early spring according to manufacturer's recommendations.

4. During periods of moisture stress, trees shall be watered whenever soil moisture content is below 50 percent of field capacity. This watering will result in additional cost to the owner as outlined in the contract documents.

5. Root area of trees where soil has been compacted due to construction activity shall be vertically mulched (aerated) at direction of the qualified professional. This shall be accomplished by auguring the soil in a 2-foot grid pattern to within 3 feet of trunk and to 10 feet beyond the drip line. A 2-inch to 3-inch hand operated augur shall be used to drill holes to a minimum depth of 12 inches. Type of backfill will be determined by the qualified professional. If this procedure is not addressed on the Tree Preservation Plan, it will result in additional cost to the owner.

6. Any trees whose trunks, limbs or roots are damaged during construction shall be treated within 24 hours. The party responsible for such damage will incur all costs associated with treatment.

7. Heavy accumulation of dust from construction activity may occur on the surface of tree foliage. To control dust, tree foliage may be hosed down upon the request of the qualified professional. This procedure will result in an additional cost to the owner as outlined in the contract documents.

E. Removal of all tree protection fencing, silt fencing and signage will be done by the general contractor when permitted by the local code enforcement officials. Restoration of all areas disturbed by the fencing and/or signage will be the general contractor's responsibility.

End of Tree Preservation Plan

ATTACHMENT H - WATER DISTRIBUTION SYSTEM DATA

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Section 1
Introduction

INTRODUCTION

This report for Mountain Home Air Force Base (MHAFB) summarizes the findings of the water flow and pressure analysis under Contract Number F44650-94-D-004. The objective of the project was to investigate the water pressure and system storage using the H2ONET® hydraulic model and develop recommendations for improving any deficiencies in the operations of the water distribution system.

This report explains how the H20NET hydraulic model was developed and provides a description of how the data pertinent to the water distribution system were integrated into the hydraulic model. It contains a description of the water distribution system, its appurtenances and operations, as well as a discussion on the flow allocation and existing demands. The report provides the results of the analysis conducted and the recommendations that may assist MHAFB in maintaining the water distribution system in optimal operating condition.

SYSTEM DESCRIPTION

The water distribution system at MHAFB was completed in 1943. The system serves a combined working civilian and military population of 5,967 persons. Of this number, 1,512 military personnel plus 3,376 military dependent live on the Base.

MHAFB is located in a semi-arid or high mountain desert climate. Located approximately 55 miles south east of Boise, MHAFB is situated between the Sawtooth and Owyhee Mountain ranges. **Figure 1-1** shows the location of MHAFB in relation to the City of Boise. The area receives an average annual precipitation and snowfall of 11.7 and 21.4 inches, respectively. The average temperature during the summer is 63°F and during the winter is 39°F.

Water Supply

MHAFB draws its water supply from the Snake River Aquifer via four wells. A summary of the well production is provided in **Table 1-1**. Water rights provide MHAFB with a withdrawal allowance of up to 11.1 million gallons per day (mgd) from the Snake River Aquifer.

Table 1-1
WELL PRODUCTION DATA

Well Number	Capacity (gpm)
2	680
6	900
11	1,200
12	1,200
TOTAL	**3,980 (5.7 MGD)**

Currently, wells 2 and 12 serve the Main Base pressure zone. The Housing zone is supplied by wells 6 and 11. The golf course irrigation system is supplied from one well (well 8) and it is used solely for the golf course. However, the golf course irrigation system is connected to the primary water distribution system and the larger system has been used to supplement the golf course irrigation.

Water Storage

Water drawn from the wells is pumped directly into the system or to one of four storage tanks as illustrated in **Table 1-2.**

Table 1-2
WATER STORAGE TANKS

Facility Number	H2ONET ID	Capacity (gallons)	Tank Type	Ground Elevation (ft)	Minimum Water Level (ft)	Maximum Water Level (ft)
4797	1000	200,000	Elevated	3,023.0	3,123.0	3,153.0
5250	2000	500,000	Ground	3,029.0	3,037.0	3,058.5
1407	4000	250,000	Elevated	2,990.0	3,090.5	3,120.0
1408	1408	1,000,000	Underground	2,968.0	2,978.0	2,988.0
TOTAL		**1,950,000**				

Distribution System

The change in elevation at MHAFB is approximately 40 feet in the direction of east to west across the Base. The relatively flat distribution system is divided into two pressure zones: the Main Base and Housing. The water distribution system is approximately 600,000 linear feet with pipe diameters ranging between 2 and 10 inches in diameter. Pipe materials consist of C900 PVC, cast iron, galvanized iron and asbestos cement.

Pipe diameters of 6 inches and greater were digitized into the model. Some 4-inch pipes critical to the distribution framework were also digitized in the model. An overall plan of the water distribution system is shown in **Figure 1-2** (located in a plastic sleeve following the Appendices).

Water Consumption

Historically, water consumption on MHAFB averages in the winter between 0.4 to 1.0 mgd and 4.5 to 5.0 mgd in the summer. The peak demand in the summer has been recorded near 6.0 mgd. The increase in consumption between seasons is due to irrigation (lawn watering) of Base green (improved) areas and Housing areas. The irrigation demands begins in April and extends to early October.

Section 2
Model Development and Calibration

MODEL DEVELOPMENT

The development of the H20NET model consisted of gathering all of the available data relevant to the water distribution system and its operations. This information was collected during a three-day site visit to Mountain Home AFB, at which time Water Operations personnel presented all of the pertinent data and a description of the water system operations.

The data for the physical system attributes collected during the site visit included:

- Pipeline configuration including diameter and material;
- Location of all valves, type, settings and operational controls;
- Location of all tanks, volume, dimensions, and water operating levels;
- Location of all wells, depth, static water level, pump elevation and output capacity; and
- Location of all pumps including pump curves, design operating points and operational controls.

Model Construction

The MHAFB hydraulic model was digitized from drawings of the water distribution system. System attributes such as pumps, tanks, and valves were input into the model according to information obtained from drawings and provided by Water Operations personnel. The model inputs for each pipeline included: diameter, roughness, material, pressure zone, description, and a numeric identifier. For this model, the description field entries incorporate the name of the nearest street or facility landmark. Pipe roughness coefficients used in the model varied between a "C" factor 100 to 120 depending on pipe material and the age of pipe.

Junctions are a component of the H2ONET model and are placed at pipe intersections, or where a pipe changes size or material type. At each junction, the model input includes: a numeric identifier, description, elevation, pressure zone, pattern number, and baseline demand. Junction nodes were also used in the model to simulate isolation valves and fire hydrants, each with separate numbering schemes to allow for differentiation. The junction nodes located in the Main Base and Housing pressure zones were given identifiers of one and two, respectively. Pattern numbers and baseline demand fields are related to demand allocation.

Valves and hydrants were represented in the hydraulic model by junction nodes. Typically isolation valves are not included in the hydraulic model, since it is more common to turn a pipe on or off as a representation of a valve. In the MHAFB model, isolation valves were included to allow a more realistic operator control for opening and closing of valves. The locations of all valves were scaled from the water distribution drawing (WDS-1).

All fire hydrants were input into the model as a set of three junction nodes, connected by a 6-inch pipe. One node was placed on the main indicating the location of the hydrant, the second node represents an isolation valve for the hydrant, and the third node represents the actual hydrant. The pipe material for each hydrant was assumed to be the same as the main from which

the hydrant extends. A numbering scheme was developed to identify a hydrant and its associated valve.

Identification of Water Distribution System Components

The numbering scheme used in the model allows for improvements and/or changes. Pipes and nodes were assigned identifiers by increments of five starting with the number five. During the development of the model, any modifications to the pipeline and any new junctions were numbered to match nearby elements of the same type. Tanks and pumps were numbered on multiples of 1000, 1101 and 1102, or for either the wellhead or facility number of that particular component.

All valves within the system, including isolation and pressure-reducing valves have numbers between 200,000 and 300,000. When possible, the valves were named in multiples of five. However, when new valves were entered into an already developed portion of the model, the valve identifier was provided a number other than one ending in '0' or '5'. Existing identifiers for isolation valves were included in the description field upon data entry. The existing identifiers were taken from the WDS-1.

A special numbering system was created to identify the fire hydrants. Most hydrants in the system have existing numeric identifiers, as noted on the WDS-1 or in the Form 995 sketches. Each hydrant and its associated gate valve were given identifiers of six places beginning with 100xxx for hydrants and 101xxx for the associated valves. The last three placeholders were specific to the hydrant in question and included the existing name for that hydrant. For example, hydrant 65 (as noted on the WDS-1) was given the identifier of 100065 in the model and the isolation valve used to open and close hydrant 65 was given the number 101065. If a hydrant had an alphanumeric name in the real system, it was replaced with a number in the model, as version 2.0 of H2ONET does not recognize alphanumeric identifiers. For example, hydrant 65A was identified as 1000658 and its associated isolation valve was named 1010658. For any clarification of hydrant names, refer to the model's description field. Hydrants and associated valves that did not have existing numbers were named with a similar system, using 190xxx and 191xxx, respectively.

Water Storage Tanks

MHAFB has four storage tanks. The Main Base is served by a 1 million gallon underground reservoir and a 250,000-gallon elevated tank. The Housing area is served by a 200,000-gallon elevated storage tank and a 500,000-gallon "at-grade" storage tank. Water Operations personnel have limited information on the actual dimensions of the elevated storage tanks. The elevated tank information provided was based on design and not "As-Built" drawings. In the hydraulic model, the diameters of the two elevated tanks were generalized to have 30 feet of bowl depth. Calculating the volume and using field measurements to verify the design drawings provided an estimated height and volume of the tanks; however, it is recommended that additional measurements of the elevated tanks be conducted to determine the actual dimensions so that volume vs. depth curves can be developed. This information is primarily beneficial for pump control and operations.

Water Supply

Currently the water supply for MHAFB is the Snake River Aquifer. MHAFB uses four wells to supply water to the four storage tanks. The wells were modeled using a constant-level reservoir. **Table 2-1** provides operational data for the wells serving MHAFB.

TABLE 2-1
WELL DATA FOR MHAFB POTABLE WATER SYSTEM

Well	H2ONET ID	Static Water Level (ft Below Ground)	Ground Elevation (ft)	Supplies
2[1]	2,100	366	2,993.0	1 Million Gallon Tank (Tank 1408)
4	4	370	2,991.0	NOT IN SERVICE
6	2,100	391	3,023.0	500,000 Gallon Grade Tank (Tank 2000)
11	11	365	3,010.0	200,000 Gallon Elevated Tank (Tank 1000) and System
12	12	362	2,996.0	250,000 Gallon Elevated Tank (Tank 4000) and System

[1]Pump data not available: well 2 was modeled as a constant-level reservoir.

Water Operations personnel have indicated that a new well will be drilled to replace well 4. The location of the new well has not been established. Well 8 is used to serve the golf course irrigation demand.

Pump Operations

The water distribution system includes well pumps that supply water to the storage tanks and booster pumps. A list of all operation equipment is illustrated in **Table 2-2**.

TABLE 2-2
PUMP DATA FOR MHAFB WATER DISTRIBUTION SYSTEM

Pump ID	H2ONET ID	Design Flow (gpm)	Design Head (ft)	Shutoff Head (ft)	High End Flow (gpm)
Well 2 [1]	2	NA	NA	NA	NA
Well 6	2100	1,600	368	488	2,600
Well 11	11	987	150	244	1,100
Well 12	12	1,500	240	378	2,000
Pump 1 at Bldg. 1403	1401	600	180	190	1,000
Pump 2 at Bldg. 1403	1402	600	180	190	1,000
Pump 3 at Bldg. 1403	1403	600	180	190	1,000
Housing Booster	2301	1,200	52	77	1,400
VFD Pump 1	2201	450	130	145	650
VFD Pump 2	2202	450	130	145	650

[1] Pump data not available; well 2 was modeled as a constant-level reservoir.

As mentioned previously, the well pumps primarily feed the storage tanks. Well pump 11 provides water to the elevated tank in Housing and supplements the Housing distribution system. During average day demand, the Housing area is fed by gravity from the 200,000-gallon elevated storage tank (Tank 1000) and the 500,000-gallon grade storage tank (Tank 2000). The 500,000-gallon tank and two pumps were recently constructed in the Housing area to increase water supply and pressures in Desert Vista, Oasis and Gunfighter Manor Housing. The two pumps are

fed from the 500,000-gallon grade tank and variable frequency drives (VFD) are used to maintain pressures under varying system demands. Since the installation of the VFD pumps, Water Operations personnel have noted an improvement in the system pressure during peak demand periods in these sections of Housing. The Housing booster pump is fed from the Main Base water supply system and operates during peak demand periods to supplement the Housing area.

The Main Base water supply system consists of a 250,000-gallon elevated storage tank (Tank 4000), a 1 Million gallon underground tank (Tank 1408) and four constant speed horizontal pumps located at the Water Plant (Building 1403). The pumps are supplied from the 1 million gallon underground tank and pump to the elevated tank, which feeds the Main Base distribution system. Under normal operations, two pumps are used to fill the elevated tank. During peak demands, the third pump is used to supplement the elevated tank in providing water for the Main Base. The fourth pump is presently out of service and was not included in the model. Well pump 12 provides water to the distribution system and supplements the pumps at Building 1403 to fill Tank 4000 during peak demand conditions.

Pump Data

Pump curves were gathered for well pumps 6, 11 and 12, the housing booster pump and the VFD pumps. Pump curve data was not available for Well 2. The pump at well 2 was modeled using a constant-level reservoir with a set water level above ground. Because well 2 feeds the underground storage reservoir, this method of modeling a well is acceptable.

The pump curve data are the original provided by the manufacturer and are not indicative of current performance. The performance of these pumps may not coincide with the original pump curves used in the model. To assure the pumps operate according to manufacturer specifications, Montgomery Watson recommends implementing a pump test program for all pumps to develop actual pump curve based on current performance. The information obtained from the test would be used to refine the model. In addition to conducting pump tests, we recommend installation of flow and pressure meters at the discharge side of each pump. The information should be recorded on an hourly basis and then used to verify pump operations and maintain a calibrated model.

MODEL CALIBRATION

The objective of calibration is to match real system operations with the hydraulic model output. This insures the model provides accurate results when executed for analysis. Typical real system data used for calibration include pump flow and head, fire hydrant flow and pressure, and storage tank levels, all recorded at regular intervals over a specified period of time (usually a 24 hour period). The hydraulic model is set up to run an extended period simulation under the same conditions. Model operations and pipeline roughness coefficients are adjusted until the model output agrees with the actual operating data.

Montgomery Watson conducted a site visit to verify the physical and operational data and the assumptions made during the development of the model. The diurnal curves estimated for irrigation and non-irrigation demand were shown to Water Operations personnel for pattern verification. After conducting several simulations under both demand periods, Water Operations personnel concurred that the results obtained from the model were comparable to the actual system.

Section 3
Water Demands

WATER CONSUMPTION

Water consumption for MHAFB was estimated using the Installation Water Resources Analysis and Planning System (IWRAPS) model. This model, developed for the Air Force, estimates water consumption based on building type and area. The use within a building is identified according to a list of water use categories developed for the IWRAPS model. Each category is assigned a corresponding standardized coefficient, which represents the average water consumption anticipated for each use category based on base specific data or the average of all Continental United States (CONUS) Bases. The categorical use area of the building is multiplied by the category coefficient resulting in the average water consumption for that facility. The sum of the use category demand for all facilities is the average day demand.

The facility use and areas were obtained from the MHAFB Real Property Inventory Detail List. Each facility identified in the Real Property Inventory Detail List was assigned to a category and the appropriate standard coefficient. **Table 3-1** summarizes the standard coefficient, total area, and water consumption for each IWRAPS category for MHAFB.

TABLE 3-1
IWRAPS FACILITY DEMANDS FOR MHAFB

Building Type	Standard Coefficient	Total Area (sq. ft.)	Demand (gpm)
Administration	0.03651	10.91	420,307
Barracks	0.00694	1.50	311,326
Bowling Center	0.10724	1.35	18,142
BOQ/VOQ	0.13382	2.30	24,711
Community Buildings	0.09112	6.62	115,333
Commissary	0.04012	2.99	107,471
Dining	0.49609	16.48	47,825
Family Housing	0.16749	228.19	1,961,840
Gyms	0.07958	3.96	71,662
Guest Housing	0.02081	0.27	18,912
Health/Dental Clinic	0.08184	1.92	34,692
Hospital	0.04535	7.36	140,571
Maintenance	0.12195	39.97	528,003
Laundry	0.03431	0.54	24,600
Service Station	0.23580	0.88	5,371
Warehouse	0.03544	10.13	244,901
Exchange Facility	0.01410	2.44	244,636

According to the IWRAPS model, the average day demand is approximately 550,000 to 600,000 gallons per day. This includes 15% for water losses in the system. The calculated demand is within 15% of the actual water consumption based on meter readings from the production wells.

DIURNAL PATTERNS

A diurnal pattern is a graphical curve that illustrates the consumption based on hourly meter readings for a 24-hour period. Diurnal patterns are developed from two sources: at all water supply sources and meters at each consumer. The data is analyzed to determine the overall consumption pattern. The overall pattern and the pattern for each consumer are input into the model to provide a typical 24-hour simulation of the water consumption for the entire water distribution system. From these sources, peak hour demands and maximum day demands are determined.

Since most consumers are not metered at, the baseline water consumption was determined using the IWRAPS model. Unfortunately, the IWRAPS program does not provide consumer patterns, which is necessary to determine the peak hour or maximum day demand. Some facilities on a base, such as non-appropriated fund activities (i.e., Burger King) are metered, but it is insufficient to develop consumption patterns.

The IWRAPS model provided the baseline water consumption of the Main Base and Housing area. To refine the overall Base consumption pattern, SCADA information from the water storage tanks provided additional water consumption information. The peak hour demands were determined based on historical data used in developing other H2ONET models and from Water Operations personnel. The diurnal patterns were developed for the non-irrigation (winter) and irrigation (summer) periods. The peak factors used in developing the curves are provided in **Table 3-2** and graphical illustrations for the Main Base and Housing irrigation and non-irrigation period patterns are illustrated in **Figures 3-1** and **3-2** respectively.

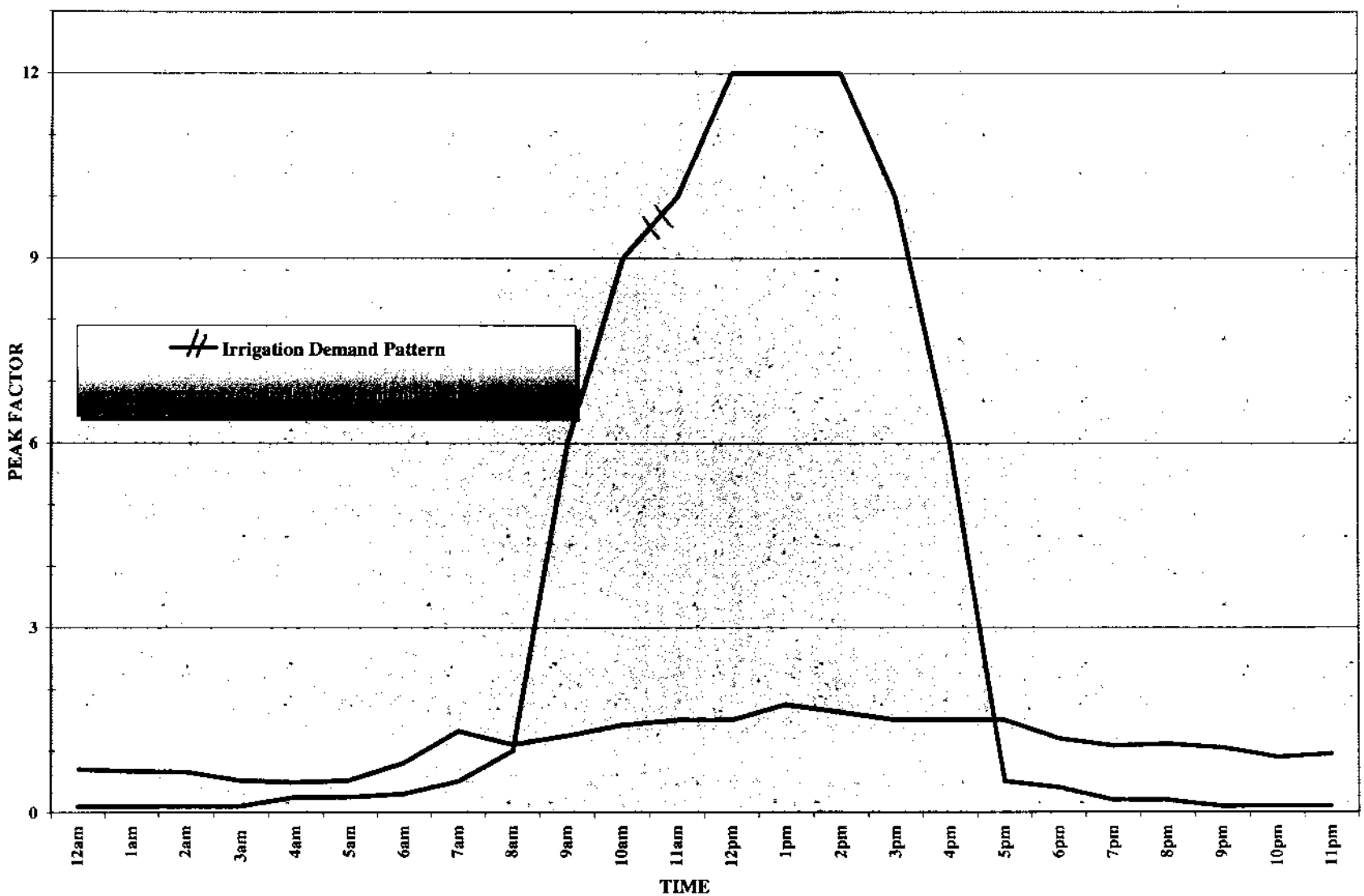


FIGURE 3-1
MAIN BASE DIURNAL CURVE PATTERN

ATTACHMENT H

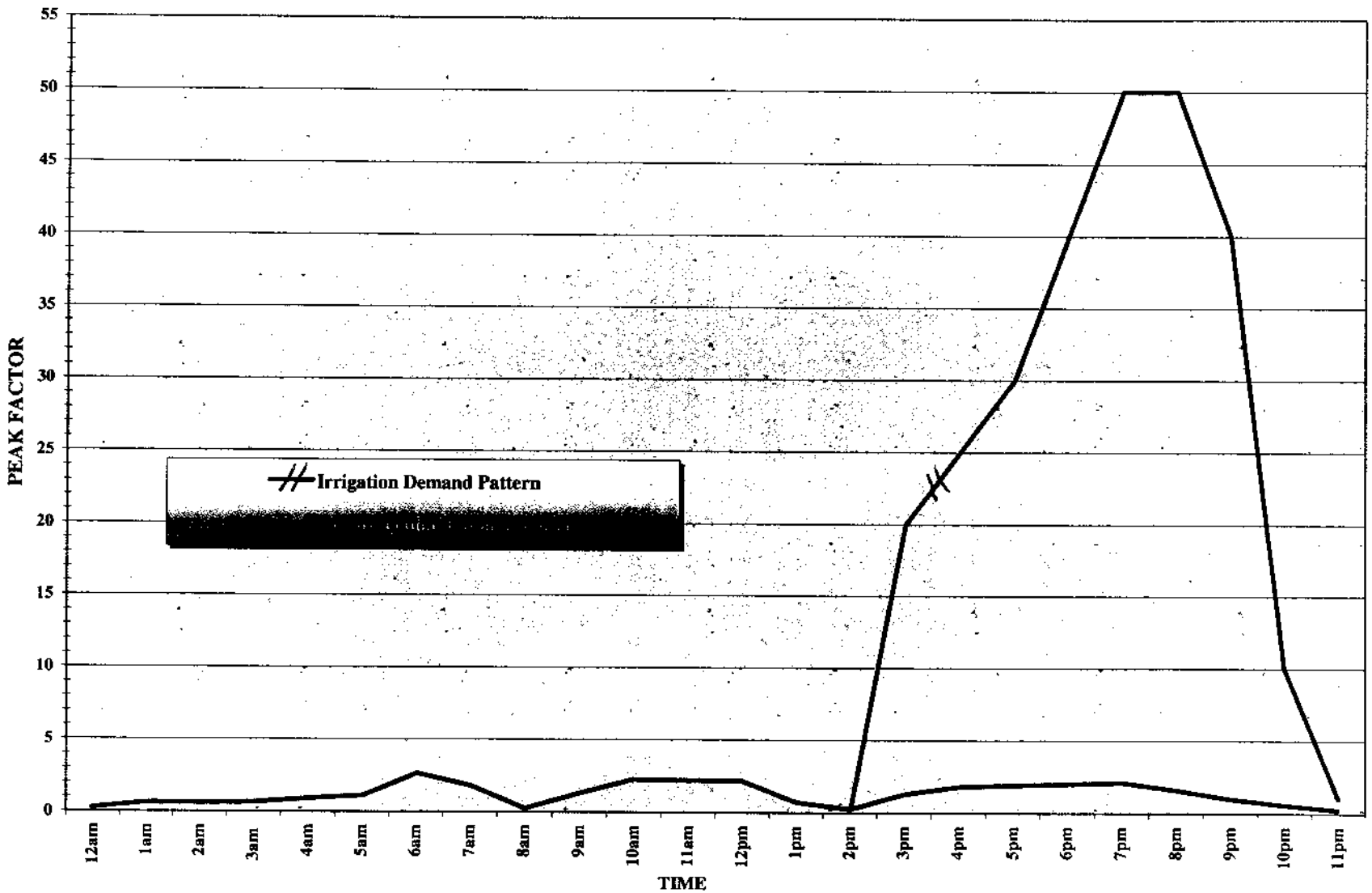


FIGURE 3-2
HOUSING DIURNAL CURVE PATTERN

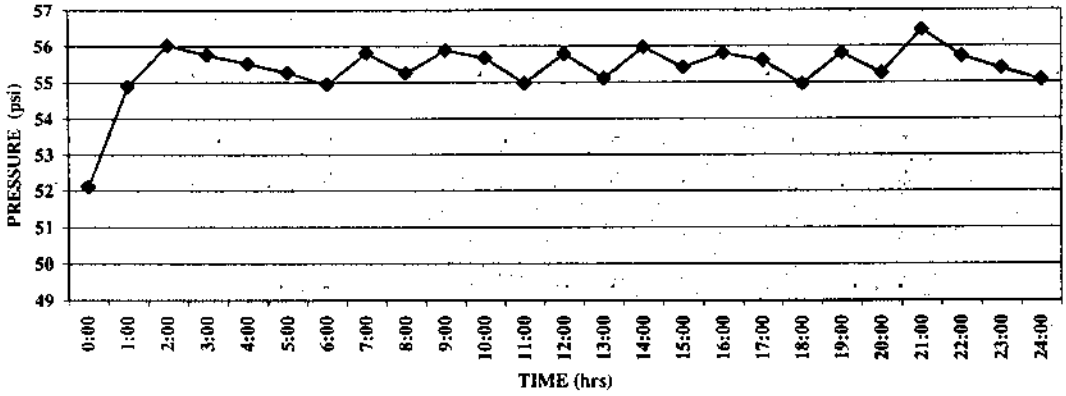
ATTACHMENT H

TABLE 3-2
PEAKING FACTORS FOR IRRIGATION AND NON-IRRIGATION PERIODS FOR MHAFB HYDRAULIC MODEL

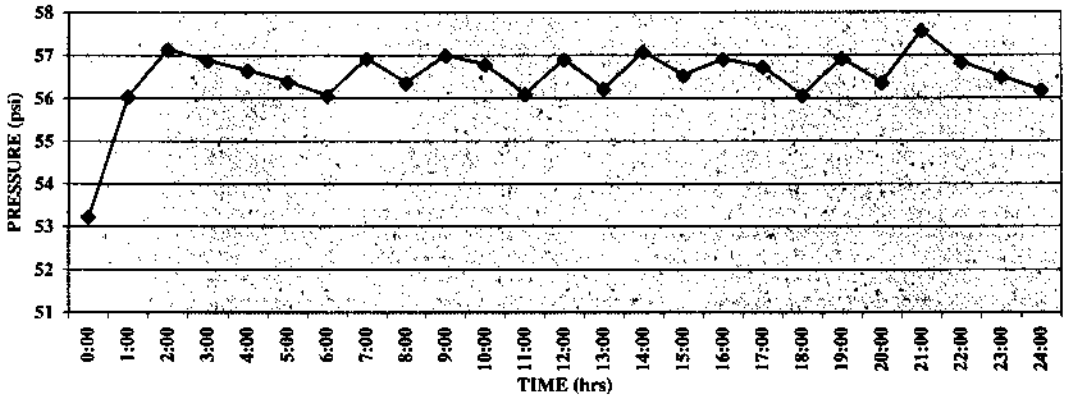
Time	MAIN BASE Non-Irrigation Period Pattern 1	HOUSING Non-Irrigation Period Pattern 2	MAIN BASE Irrigation Period Pattern 5	HOUSING Irrigation Period Pattern 6
12am	0.70	0.25	0.10	0.25
1am	0.67	0.62	0.10	0.62
2am	0.66	0.59	0.10	0.59
3am	0.52	0.63	0.10	0.63
4am	0.49	0.90	0.25	0.90
5am	0.52	1.12	0.25	1.12
6am	0.80	2.65	0.30	2.65
7am	1.32	1.80	0.50	1.80
8am	1.10	0.25	1.00	0.25
9am	1.25	1.30	6.00	1.30
10am	1.42	2.25	9.00	2.25
11am	1.50	2.20	10.00	2.20
12pm	1.50	2.17	12.00	2.17
1pm	1.75	0.72	12.00	0.72
2pm	1.63	0.25	12.00	0.25
3pm	1.50	1.30	10.00	20.00
4pm	1.50	1.80	6.00	25.00
5pm	1.50	1.90	0.50	30.00
6pm	1.20	2.00	0.40	40.00
7pm	1.08	2.10	0.20	50.00
8pm	1.11	1.60	0.20	50.00
9pm	1.05	1.00	0.10	40.00
10pm	0.90	0.60	0.10	10.00
11pm	0.95	0.25	0.10	1.00

Demand is allocated in H2ONET by allocating a baseline demand at selected junction nodes and multiplying these demands by the user-defined demand patterns. The Main Base and Housing diurnal pattern peaking factors shown in Table 3-2 were input into the model and assigned a pattern number of 1 and 2 for irrigation period model runs and 5 and 6 for the non-irrigation model runs, respectively. For the MHAFB model, 130 junction nodes were designated as demand junctions. Service areas were outlined with polygons, and all the demands exerted on the system by facilities within this area were

MAIN BASE NODE PRESSURE AT PEAK HOUR
6TH AVENUE



MAIN BASE NODE PRESSURE AT PEAK HOUR
14TH AVENUE



MAIN BASE NODE PRESSURE AT PEAK HOUR
WOODLAND GROVES

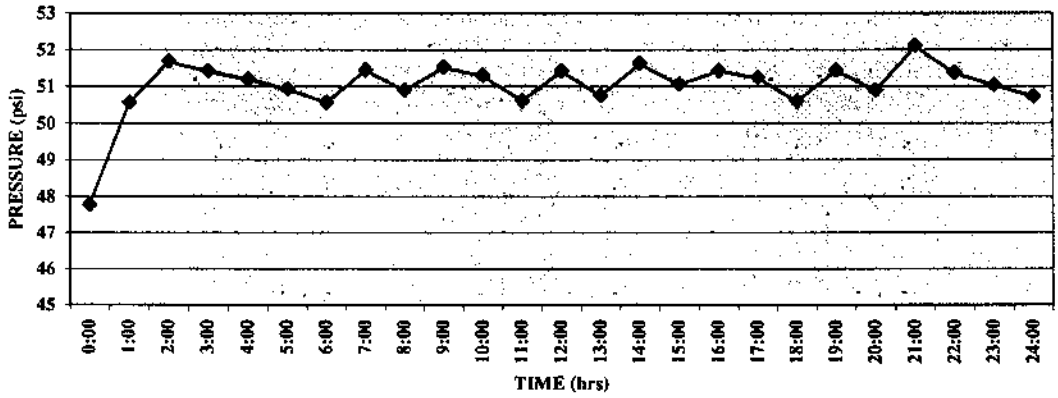
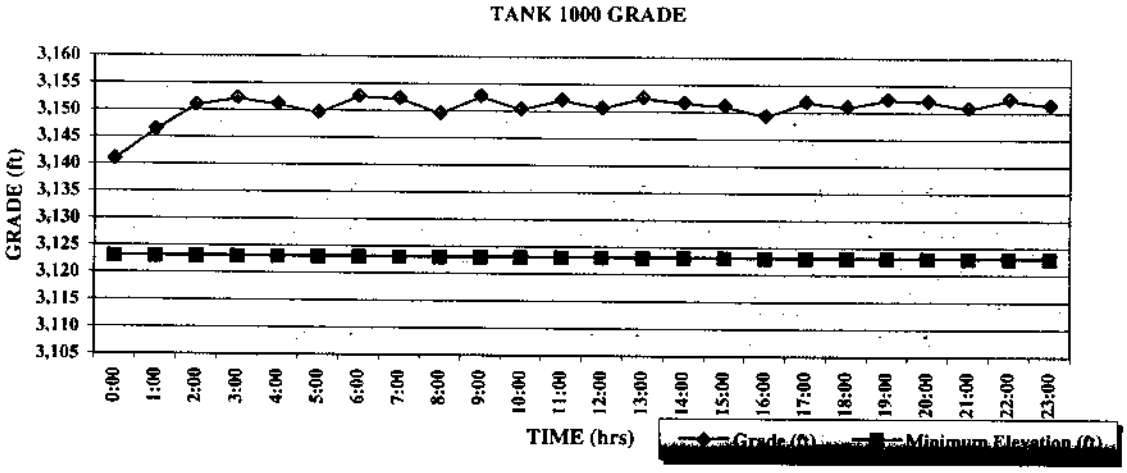
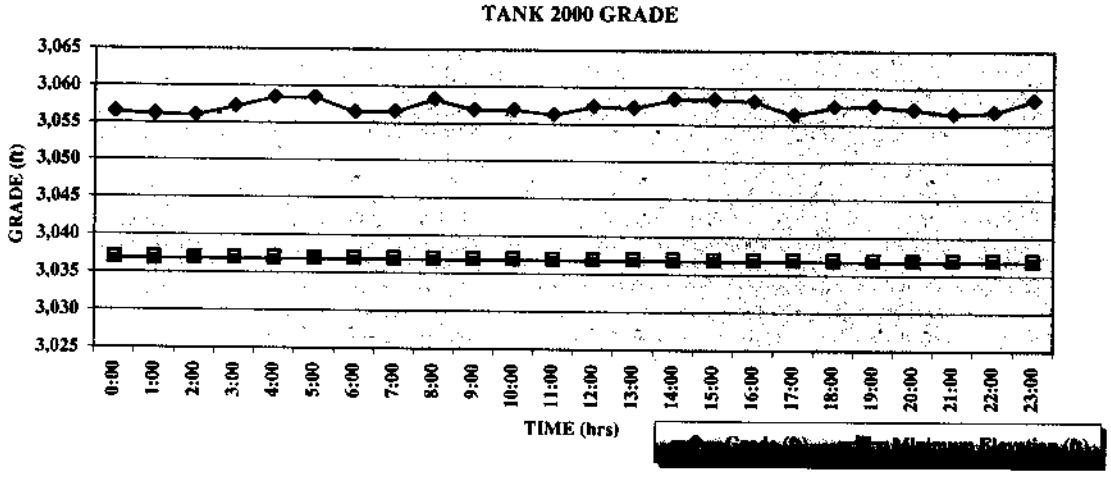


FIGURE 4-1
MOUNTAIN HOME AFB
EXISTING SYSTEM NON-IRRIGATION PERIOD MODEL RUN
MAIN BASE NODE PRESSURES AT PEAK HOUR

ATTACHMENT H





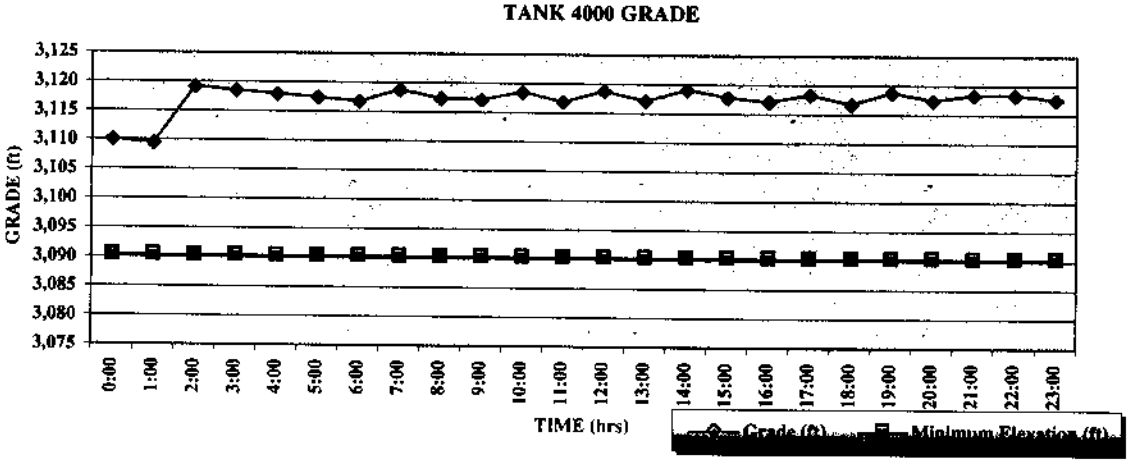
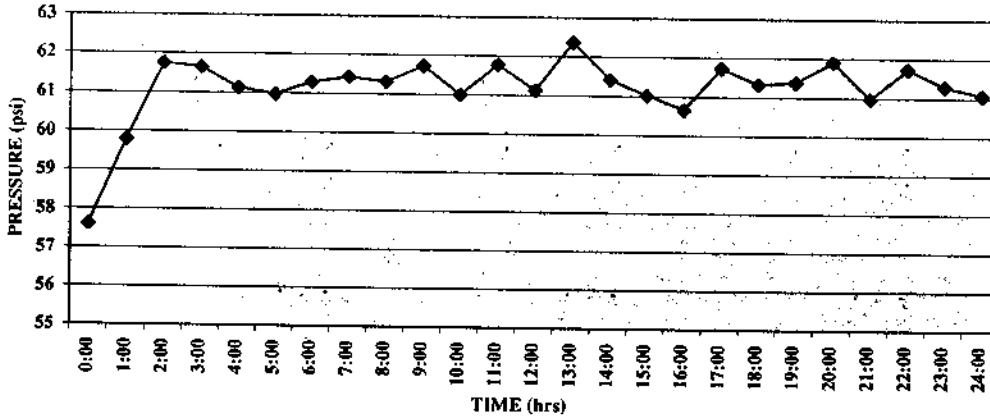


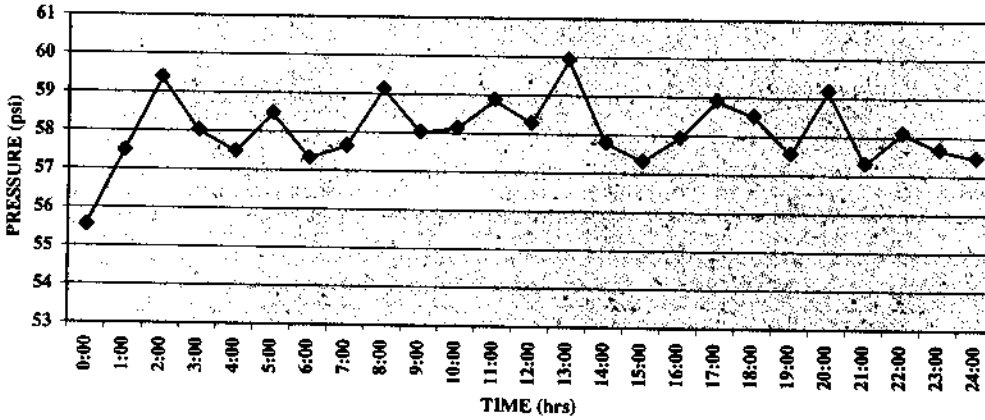
FIGURE 4-2
MOUNTAIN HOME AFB
EXISTING SYSTEM NON-IRRIGATION PERIOD MODEL RUN
TANK LEVELS

ATTACHMENT H

HOUSING NODE PRESSURE AT PEAK HOUR
PRESIDENTIAL ACRES



HOUSING NODE PRESSURE AT PEAK HOUR
DESERT VISTA



HOUSING NODE PRESSURE AT PEAK HOUR
BASE HOSPITAL

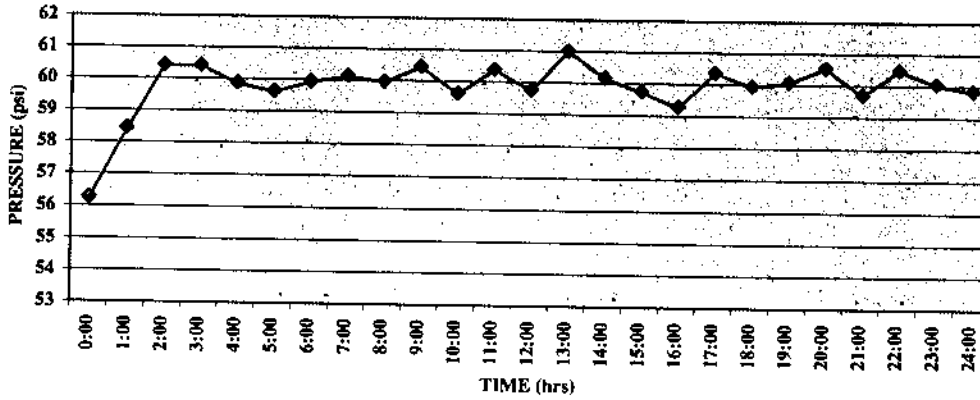


FIGURE 4-3
MOUNTAIN HOME AFB
EXISTING SYSTEM NON-IRRIGATION PERIOD MODEL RUN
HOUSING ZONE NODE PRESSURES

ATTACHMENT H

model, the water distribution system operates satisfactorily and improvements are not required. A pressure contour plan of the water distribution system at the peak hour of the non-irrigation period simulation is illustrated in **Figure 4-4.**

IRRIGATION PERIOD MODEL RUN

A 24-hour simulation of the water distribution system during the irrigation period indicates the Housing area is severely burdened. The water storage supply in Housing is depleted and normally does not replenish before the start of the next demand cycle. The 200,000-gallon tank (Tank 1000) drains within one hour after the peak demand starts, as shown in **Figure 4-5**. The water level in the 500,000-gallon tank (Tank 2000) drops to within 3 feet of its minimum water level. Throughout the peak demand period and until the tanks replenish, the water storage in the Housing Area is less than half of its volume. In the event of a fire during this period, there is an insufficient fire supply in the Housing area.

The Base system initially operates satisfactorily; however, due to the demand in the Housing area, the Base system is used to supplement the Housing area. The Housing booster pump, which is fed from the Base system, is placed in service; therefore, interconnecting the two pressure zones. Once this occurs, conditions on the Base deteriorate rapidly.

Throughout the irrigation demand period, all of the Base and Housing system components well pumps and booster pumps are in operation. With all the pumping systems operating, the water distribution system components cannot sustain or meet the demands imposed during the irrigation demands. Most of the pumps operate inefficiently and operate at the upper level of the performance curve, producing lower flows at a higher head. **Figure 4-6** shows representative node pressures at the peak hour for sections of the Base and Housing. A pressure contour plan of the water distribution system created at the peak hour of the irrigation period simulation is illustrated in **Figure 4-7.**

ANALYSIS

Results from the existing water distribution model indicate that the system operates efficiently only during non-irrigation periods. Water pressures remain constant and water storage tanks are half full or greater. During irrigation periods, the water distribution system operates at its limits and struggles to meet the demands. The model results are similar to conditions experienced in the actual water distribution system; low pressures were common and the storage tanks were devoid of water during the peak hour. The model confirms these severe deficiencies, which do not conform to fire and water quality standards.

Alternatives

The analysis evaluated two alternative system improvements that could alleviate the problems in the Housing zone during the summer irrigation period. Since the Base zone

did not demonstrate any inherent deficiencies in the initial analysis, the extent of the modifications was limited to the Housing zone. For each alternative examined, the Base and Housing areas were maintained as two separate pressure zones.

Alternative 1

Modifications to the water distribution system are as follows:

- Increase the water storage in the Housing area
  - Increase the 200,000-gallon (Tank 1000) tank to 3.2 MG
  - Increase the 500,000-gallon (Tank 2000) tank to 2.0 MG
  - Well 11 to supply the 200,000-gallon tank through a new 10-inch C900 PVC pipe
  - Increase the pumping capacity of the VFD driven pumps to 2,400 gpm with a Total Dynamic Head (TDH) of 130 ft
  - Increase the pumping capacity at well 11 to 1,000 gpm with a TDH of 480 ft
  - Increase the pumping capacity at well 6 to 2,200 gpm with a TDH of 480 ft

Alternative 2

Modifications to the water distribution system are as follows:

- Use wells 6 and 11 to supply the distribution system
  - Increase the pumping capacity at well 6 to 6,500 gpm with a TDH of 575 ft
  - Increase the pumping capacity at well 11 to 6,500 gpm with at TDH of 563 ft
- Maintain the existing water storage volume in Housing and utilize the tank for low demand period and for fire supply during high demands

RESULTS OF ANALYSIS

Alternative 1

The upgrade to the water distribution system in Alternative 1 did maintain adequate water pressure and flow throughout the simulation period. A variation in pressure was observed in Oasis, Desert Vista and Gunfighter Manor Housing. The pressure during non-peak times ranged between 70 and 75 psi; however, during the irrigation demand period, the pressure dropped to approximately 30 psi, which is the minimum pressure recommended. The pressure in Presidential Acres ranged from 35 to 45 psi during the same peak demand hours which is the minimum pressure recommended.

Fire flow analysis

A fire flow analysis was performed on several nodes in each of the two pressure zones. The fire flow analysis represents a worst-case scenario of a fire occurring at various locations on the Base during the peak hour demand. The analysis was performed under a steady state condition or at an instantaneous point in time for each hydrant. H2ONET results show that sufficient flow and residual pressure was available. The American Water Works Association (AWWA) recommends a minimum pressure of 20 psi during fire conditions, which is typically used in the water industry (AWWA 1989, M31).

The results for the hydrants selected indicate that the available flow ranges from 435 to 3,396 gpm. According to AWWA, fire flow, while sustaining a minimum pressure of 20 psi, in a residential area must be no less than 1,000 gpm. The hydrants simulated in Desert Vista, Oasis, Gunfighter Manor and Woodland Groves all had available flows of less than 1,000 gpm. Because of the system modifications made in Alternative 1, there is a sufficient water supply, system pressure and pumping capacity. However, the low fire flows observed are due to the pipe size. To meet the fire flow demand during current peak conditions, the water distribution system must be upgraded to larger diameter pipes in conjunction with the provision of increased storage capacity.

Alternative 2

Results of the model for Alternative 2 indicate that increasing the pumping capacity of the wells and pumping directly into the water distribution system would not meet the objectives of the analysis. The pressure in the distribution system during the peak demand period was between 20 and 40 psi. However, higher pressures were common during non-peak hour ranging between 70 and 80 psi. When fire flow conditions were simulated, the pressure in the Housing area dropped below 20 psi and flows were below 1000 gpm.

Pipe diameters were increased in the model, and the pressure did increase to above 20 psi. However, this is not a viable solution because it will present additional problems during the low demand periods. With the pipes sized for the high demand period, in low demand conditions, the water velocity in the pipes decreases resulting in water stagnation, which poses health hazard to all consumers.

Alternative 2 was not considered feasible due to the extent of improvements required to the piping network and the pumping capacity required. The improvements would result in a distribution system that would not comply with health standards during average day demands.

New Pressure Zone

In the Alternative 1 analysis, low pressure and flow was experienced in Dunes Housing and Base Hospital areas during the irrigation period. The same condition was noted in Woodland Groves Housing. The problems in these areas may be associated with their location in the water distribution system. The Dunes Housing area and the Base Hospital are located at the fringes of the Housing zone and Woodland Groves is located on the far end of the Base zone. In addition, these areas are not only situated at the extreme points but also at higher elevations within their respective zone, resulting in low pressure and flow.

In the model, a new service zone was created that encompasses Dunes Housing, Woodland Groves Housing and the Base Hospital. The new zone would have its own water source and would operate as a separate system. The new zone was created in the

model by placing a new valve at the intersection of Chestnut and Tamarack Streets that isolates Dunes Housing and the Base Hospital from the Housing zone.

As part of the new pressure zone, several modifications were required to the existing water distribution system. These modifications are as follows:

- Upgrade the existing 8-inch pipe to 12-inch. This pipe currently connects well 12 to this area at the intersection of Gunfighter Avenue and Chestnut Street.
- Increase the pump capacity at well 12 was to 2,200 gpm at 600 ft TDH.
- Upgrade the main loop pipe in Dune Housing from 8-inch to 10 inches in diameter. The pipe material should consist of C900 PVC.
- Increase the pipe diameters in Oasis Housing from 4-inch to 8-inch. The pipe material should consist of C900 PVC.
- Provide a pressure-reducing valve near the intersection of Gunfighter Avenue and Chestnut Street to maintain pressure within 55-65 psi.

New Pressure Zone Model Results

Results from the model indicate, that pressures in the new pressure zone ranged between 64 to 68 psi during the non-irrigation period and between 55 and 62 psi during peak hour demand in the summer. Fire flow simulations indicated that a minimum of 2,500 gpm would be available in Dunes and Woodland Groves during the peak hour, while maintaining a residual pressure of 20 psi.

The new pressure zone is a feasible solution to correcting the pressure and flow problems experienced in the Woodland Groves and Dunes Housing area as well as the Hospital area during the peak summer demand period. However, since well 12 would now supply the new pressure zone, it can no longer be used to supply the Main Base system. Therefore, the Main Base would not have a redundant water source. Before these modifications are implemented, we recommend that well 4 be re-activated or construct an alternate well to supply the Main Base system. **Figure 4-8** presents the delineation of the three pressure zones in the MHAFB water distribution system.

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ATTACHMENT I - AIR FORCE FAMILY HOUSING GUIDE

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Air Force Family Housing Guide

for Planning, Programming, Design, and Construction

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CHAPTER 1

INTRODUCTION AND BACKGROUND

1.1 Purpose and Use of this Guide

This Guide provides definitive guidance for the planning, programming, designing, and constructing of Air Force Family Housing (FH). It supplements Air Force Instruction (AFI) 32-6002, *Family Housing Planning, Programming, Design, and Construction*, by providing more detailed and quantifiable standards and technical guidance.

- It provides a consolidated source of relevant information, and references other supporting publications.
- It incorporates and consolidates information previously found in the Air Force *Unit Assessment Guide with Guidelines for Neighborhood Improvement* (hereafter referred to as the *Unit Assessment Guide*) and AFR 88-25, *Military Family Housing Design and Construction Manage-ment*.
- The Major Commands (MAJCOMs) will use this Guide to establish policy and oversight control; each base will use this Guide as a definitive implementation tool.
- It provides standards and criteria for all Air Force FH Projects. These projects include the construction, acquisition, improvement, maint-enance, and repair of FH units, utility systems, and mobile home parks. The *Air Force Housing Support Facilities Guide* contains guidance for housing support facilities.

1.2 Air Force Family Housing Goal and Objectives

The Air Force FH Goal statement defines the ideal end-state for military communities and housing. It is not intended to be a static end-state, but one that responds to the dynamics of Air Force families.

The Air Force FH Goal:

- **To house Air Force families in the highest quality, energy-efficient housing that supports the needs of the military family and reinforces a strong sense of community.**

Air Force FH Objectives support the achievement of the FH goal. These objectives are:

- **To bring the existing required housing stock up to contemporary housing standards (codes, livability, and amenities) through either improvement or replacement.**
- **To reduce housing deficits so that they are within 10 percent of the FH demand at each base.**
- **To reduce energy consumption levels by 30 percent of FY 85 levels by the year 2005.**

1.3 The Whole House/Whole Neighborhood Concept

The terms "whole house" and "whole neighborhood" are used to define a comprehensive approach to the improvement/replacement and repair of existing FH units and neighborhoods. In the past, because of previous programming constraints, bases did many FH unit and

infrastructure repairs and improvements on a piecemeal basis. Ultimately, this method caused work to be duplicated and often caused more problems than it solved. The Air Force paid start-up costs for multiple projects when one comprehensive renovation project could have addressed all the improvement or repair issues at one time. It is difficult to ensure the compatibility of subsequent projects and their respective materials and systems when the projects overlap or when several projects run concurrently. Concurrent housing projects also put undue inconvenience on military families living in the homes, since workers must enter homes several times, as opposed to entering the homes once to complete a comprehensive project.

Whole house/whole neighborhood improvement efforts must:

- Be comprehensive.
- Extend the useful life of facilities and infrastructure by 25 years.
- Be cost effective.
- Restore the housing unit to structural soundness.
- Upgrade the building envelope to achieve acceptable energy standards.

Whole House improvements address improvements and repairs of items within 5 feet of the exterior wall of the unit. These improvements include:

- Mechanical, electrical, and plumbing system repairs and improvements.
- Building system repairs and improvements relating to foundations, walls, and roofs.
- Floor plan modifications to improve livability.
- Utilities, systems, or infrastructure provided for the sole use of the unit.

Whole Neighborhood improvement efforts address the environment outside the 5-foot line from the exterior of the housing units. These improvements include but are not limited to:

- Utility repairs and improvements, such as power distribution and repairs to water supply and sewage systems.
- Street repair and replacement.
- Fencing.
- Streetscape repair and improve-ments, such as adding landscaping, street lighting, and signage.
- Community amenities, such as playgrounds, community walkways, and fitness trails.

AFI 32-6002 provides additional guidance on Whole House/Whole Neighborhood improvement criteria.

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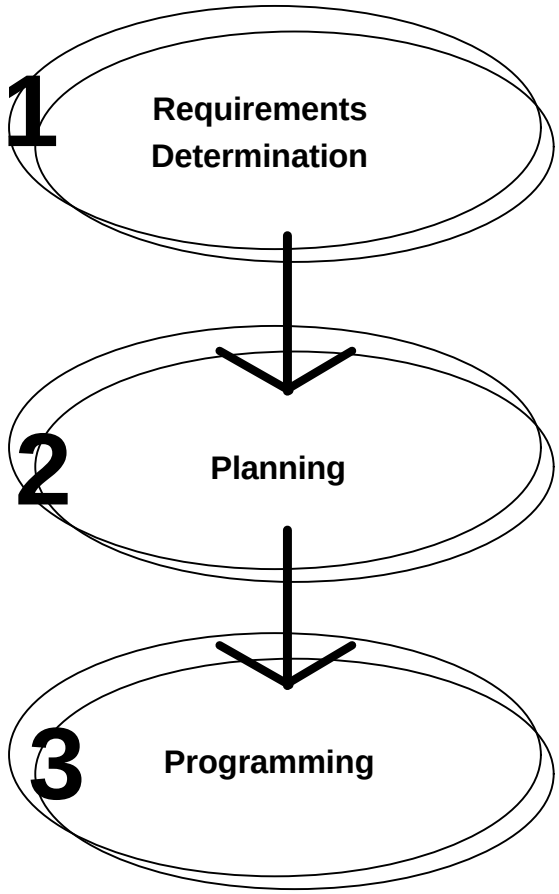
CHAPTER 2

PROJECT DEVELOPMENT

The housing project development process is composed of three distinct steps as illustrated in Figure 2.1:

Figure 2.1: Project Development Process



2.1 Determination of Housing Requirements

Current DoD guidance states that the local community should be the first source for satisfying the demand for housing generated by military families. On-base housing built with appropriated funds can be used to meet housing demand that is not satisfied in the local community. A Housing Market Analysis (HMA) assesses the type and amount of housing that is available in the local community that meets DoD suitability criteria.

2.1.1 Housing Market Analysis (HMA)

The HMA provides a detailed study of the housing market area of a particular Air Force installation to identify the current and projected supply and demand for FH. The HMA analyzes the local housing market to determine the ability of that market to provide suitable housing for Air Force personnel and families and other DoD members supported by the Air Force. Its importance cannot be overstated since it provides the basis and justification for a base's FH planning and programming.

Bases must prepare HMAs in accordance with the latest version of the *Air Force Housing Market Analysis Guidance Manual* (obtained through each Major Command). Bases must keep the HMA current because it becomes a component of the Housing Community Plan, which is discussed in Section 2.2.1.

The HMA methodology:

- Considers both military and civilian housing supply and demand when analyzing the market area for its

suitability for housing Air Force members.

- Analyzes the housing market area by each pay grade's housing requirement, both by number of bedrooms and cost.

- Acknowledges that military personnel must compete with civilians for obtaining suitable community rental housing off-base.

- Compares military demand for housing to the supply of suitable off-base housing.

2.1.2 Housing Requirements Analysis (HRA)

The HRA is an important product of the HMA process. The purpose of an HRA is to organize the HMA FH requirements according to pay grade and number of bedrooms required. The HRA information provides the basis for the Housing Community Plan and validates all FH projects.

- Bases must complete the HMA and the HRAs every 3 years or whenever there is a mission realignment for the installation. Every time the HRAs change, they should be compared to the HRAs found in the HCPs. This will determine the need for an HCP update.

Figures 2.2.1 through 2.2.6 show the summary tables found in an HRA. Figures 2.2.7 through 2.2.9 are also included since the entire set of tables appears in the Housing Community Plan (discussed in the next section). Figures 2.2.7 through 2.2.9 also draw upon information contained in Figures 2.2.1 through 2.2.6, so it is important to show both sets together.

- **Remember that it is DoD policy to first satisfy military personnel and FH requirements in the local community.** New construction or Whole-House improvements are justified only if the HMA concludes that there is a deficit of suitable units in the local community.

In order to give the reader a sense of "what the numbers mean" and how they are derived, figures from an actual base are shown in Figures 2.2.1 through 2.2.9.

Figure 2.2.1: Total Family Load - Current (Less Voluntary Separated). These figures are not part of the calculations but serve as a benchmark indicating the current number of families eligible for FH by military rank and bedroom requirement. They are based on the currently assigned strength.

Figure 2.2.2: Total Family Load - 5-Year Forecast (Less Voluntary Separated). These figures are based on the mission and personnel requirements expected for the installation five (5) years from the base year of the analysis. They are used to calculate the Net FH Requirement in Figure 2.2.4 and are based on projected authorized strength.

Figure 2.2.3: Available Community Housing - 5-Year Forecast. These figures show the availability of suitable community housing to meet the 5-year forecast for families shown in Figure 2.2.2.

Figure 2.2.4: Net FH Requirement. This table shows the housing requirement which cannot be provided in the community and provides the anticipated on-base requirement. Figure 2.2.4 is the difference between Figure 2.2.3 and Figure 2.2.2. except as noted below. Note that all two and three-bedroom unit requirements for SGO are moved to four-bedroom unit and two-bedroom unit requirements for FGO and SNCO are moved to three-bedroom unit.

For example, Figure 2.2.2 indicates that in 5 years, there will be a requirement for 659 three-bedroom Junior NCO FH units. Figure 2.2.3 forecasts that in 5 years, there will be 126 suitable units in the local economy to meet the Junior NCO, three-

bedroom need. Therefore the total FH need for this rank category and bedroom type would be calculated as follows:

659 (Housing Units Needed)
- 126 (Suitable Units Available)
533 FH Units Needed

The above calculation is completed for each rank category and corresponding bedroom type. Columns and rows are summed to determine deficits/surpluses by rank category and bedroom type. Note that AF policy authorizes Senior Officers a four-bedroom unit, if available. Therefore, the two- and three-bedroom requirements have been consolidated with the actual four-bedroom requirements for the senior pay grades. Also, the two bedroom requirement for FGOs and SNCOs has been consolidated with the actual three-bedroom requirement.

Figure 2.2.5: Family Housing (FH) Assets - As Built. Figure 2.2.5 shows the availability of Air Force-owned or leased FH units to help offset the net requirement shown in Figure 2.2.4.

The base Housing Flight can provide information on the existing FH, which is reported on the DD Form 1410, *Family Housing Inventory and Occupancy Report*; and DD Form 1411, *Family Housing Inventory Designation and Assignment Report.* The Housing Flight generates these reports which must reflect units that have been approved for construction and those already under construction.

Figure 2.2.6: Mismatches-Deficit [Surplus]. The data in Figure 2.2.6 indicate whether there is a deficit or surplus of FH units on base. The calculation to obtain figures in Figure 2.2.6 is based on the availability of Air Force-owned FH units (Figure 2.2.5) and the need for units calculated in Figure 2.2.4. Using the same Junior NCO three-bedroom category:

533 (AF Housing Units Needed)
- 981 (AF-Owned Units)
[448] Surplus On-base Units

The same follows for each rank category and bedroom type until the entire housing picture is characterized in Figure 2.2.6. Remember that these figures are based on the five-year family load forecast (Figure 2.2.2).

You will only see the next three tables (Figures 2.2.7 through 2.2.9), in conjunction with Figures 2.2.1 through 2.2.6, in a Housing Community Plan. It is important to show them in this document because they yield the project requirements for housing programming efforts.

Figure 2.2.7: Waiting List - Current. These data show the number of families by rank category and bedroom type required that are on the waiting list for FH. The Housing Flight provides these data. Although these figures are taken into consideration when determining assignments of FH units, they are not used in any subsequent calculations.

Figure 2.2.8: FH Renovation Decision Showing Conversion or [Demolition]. These data show the revised FH assets after the incorporation of the HCP design concepts and recommendations. This figure's data revise Figure 2.2.5 data as a result of the decision to either renovate/convert/construct or to remove housing units in order to minimize deficits and surpluses shown in Figure 2.2.6. Using the same Junior NCO category, the table shows that there will now be 565 Air Force-owned, Junior NCO three-bedroom units (Figure 2.2.8) as opposed to 981 previously reported (Figure 2.2.5).

These 416 (981- 565 = 416) units did not just go away. Note that the Junior NCO two-bedroom inventory went from 29 units (Figure 2.2.5) to 445 units — an increase of 416 units. In other words, 416 units of the 448 unit surplus in Junior NCO units (Figure 2.2.6) were used to offset the 955 Junior

NCO two-bedroom unit deficit indicated in Figure 2.2.6.

Note that there is no change between Figures 2.2.5 and 2.2.8 for the total number of units. This indicates that no units are being demolished or lost through conversion.

Figure 2.2.9: Revised Mismatches - Deficit [Surplus]. Just as Figure 2.2.5 is revised by Figure 2.2.8 to show the revised Air Force-owned units, Figure 2.2.6 data are revised in Figure 2.2.9 to show a revised deficit or surplus of units for each rank category and bedroom type. The data in Figure 2.2.9 are obtained by subtracting Figure 2.2.4 from Figure 2.2.8. So for the same Junior NCO examples above, the table shows that the surplus of Junior NCO three-bedroom units went from [448] (Figure 2.2.6) to [32] (Figure 2.2.9) and correspondingly, the deficit for Junior NCO two-bedroom units went from 955 (Figure 2.2.6) to 539 (Figure 2.2.9). This is demonstrated as follows:

565 (FH Unit Assets - Fig. 2.2.8)
- 533 (Units Needed, Fig. 2.2.4)
[32] Unit Surplus (Fig. 2.2.9)

and

445 (FH Unit Assets, Figure 2.2.8)
- 984 (Units Needed, Figure 2.2.4)
539 Unit Deficit (Figure 2.2.9)

The tables shown in Figures 2.2.1 through 2.2.9 represent an HRA Summary as well as an entire renovation project in tabular form by military grade groupings and bedroom requirements.

Figure 2.2.1:
Total Family Load - Current
(Less Voluntary Separated)

	2BR	3BR	4BR	TOTAL
GO	0	0	0	0
SGO	57	64	39	160
FGO	344	294	91	729
CGO	473	153	43	669
Subtotal	874	511	173	1558
SNCO	325	302	138	765
JNCO	1776	566	237	2579
E1-3	275	8	3	286
Subtotal	2376	876	378	3630
Total	3250	1387	551	5188

Figure 2.2.2:
Total Family Load - 5-Year Forecast
(Less Voluntary Separated)

	2BR	3BR	4BR	TOTAL
GO	0	0	0	0
SGO	46	38	37	121
FGO	170	233	151	554
CGO	349	125	38	512
Subtotal	565	396	226	1187
SNCO	260	274	224	758
JNCO	1638	659	271	2568
E1-3	240	21	4	265
Subtotal	2138	954	499	3591
Total	2703	1350	725	4778

Figure 2.2.3:
Available Community Housing - 5-Year Forecast

	2BR	3BR	4BR	TOTAL
GO	0	0	0	0
SGO	29	25	24	78
FGO	234	211	45	490
CGO	282	79	26	387
Subtotal	545	315	95	955
SNCO	228	167	50	445
JNCO	654	126	22	802
E1-3	156	6	0	162
Subtotal	1038	299	72	1409
Total	1583	614	167	2364

Figure 2.2.4:
Net FH Requirement

	2BR	3BR	4BR	TOTAL
GO	0	0	0	0
SGO	N/A	N/A	43	43
FGO	N/A	[42]	106	64
CGO	67	46	12	125
Subtotal	67	4	161	232
SNCO	N/A	139	174	313
JNCO	984	533	249	1766
E1-3	84	15	4	103
Subtotal	1068	687	427	2182
Total	1135	691	588	2414

Figure 2.2.5:
FH Assets - As Built

	2BR	3BR	4BR	TOTAL
GO	0	0	0	0
SGO	0	58	7	65
FGO	0	62	60	122
CGO	1	173	28	202
Subtotal	1	293	95	389
SNCO	0	127	142	269
JNCO	29	981	415	1425
E1-3	0	0	0	0
Subtotal	29	1108	557	1694
Total	30	1401	652	2083

Figure 2.2.6:
Mismatches - Deficit [Surplus]

	2BR	3BR	4BR	TOTAL
GO	0	0	0	0
SGO	N/A	[58]	36	[22]
FGO	N/A	[104]	46	[58]
CGO	66	[127]	[16]	[77]
Subtotal	66	[289]	66	[157]
SNCO	N/A	12	32	44
JNCO	955	[448]	[166]	341
E1-3	84	15	4	103
Subtotal	1039	[421]	[130]	488
Total	1105	[710]	[64]	331

Figure 2.2.7:
Waiting List - Current

	2BR	3BR	4BR	TOTAL
GO	0	0	0	0
SGO	0	0	2	2
FGO	0	16	9	25
CGO	0	33	5	38
Subtotal	0	49	16	65
SNCO	0	6	3	9
JNCO	0	538	35	573
E1-3	0	17	1	18
Subtotal	0	561	39	600
Total	0	610	55	665

Figure 2.2.8:
FH Renovation Decision Showing Conversion or [Demolition]

	2BR	3BR	4BR	TOTAL
GO	0	0	0	0
SGO	0	0	43	43
FGO	0	62	60	122
CGO	23	173	28	224
Subtotal	23	235	131	389
SNCO	0	127	142	269
JNCO	445	565	415	1425
E1-3	0	0	0	0
Subtotal	445	692	557	1694
Total	468	927	688	2083

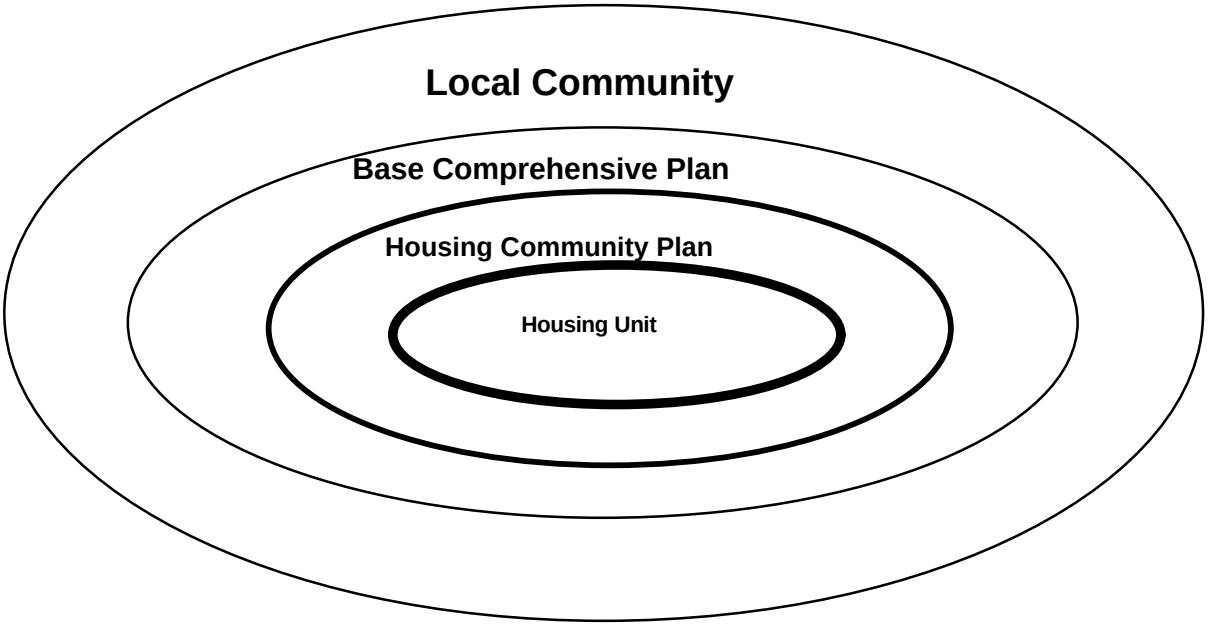
Figure 2.2.9:
Revised Mismatches - Deficit [Surplus]

	2BR	3BR	4BR	TOTAL
GO	0	0	0	0
SGO	N/A	N/A	0	0
FGO	N/A	[104]	46	[58]
CGO	44	[127]	[16]	[99]
Subtotal	44	[231]	30	[157]
SNCO	N/A	12	32	44
JNCO	539	[32]	[166]	341
E1-3	84	15	4	103
Subtotal	623	[5]	[130]	488
Total	667	[236]	[100]	331

2.2 Planning Considerations

It is important for the housing planner to understand the relationship between the housing planning process and the Base Comprehensive Plan (BCP) process (as Illustrated in Figure 2.3). The BCP is the primary planning tool for the base to meet its long-term objectives with respect to mission and community support. The BCP addresses issues such as base population and demographics, land use, long-term facility planning, vehicular and pedestrian circulation, infrastructure, and architectural compatibility.

Figure 2.3: Planning Considerations



Housing areas are a part of the overall base plan. Recommendations on housing community development are a part of the general base land use plan. The Housing Community Plan (HCP), a component of the BCP, continues the planning process where the BCP leaves off by providing specific recommendations for neighborhoods, communities, and individual housing units.

2.2.1 The Housing Community Plan (HCP)

The HCP provides a long-range plan for the planning, programming, design, improvement, replacement, and construction of FH. The HCP is the key to the Whole-House/Whole Neighborhood program. It is the justification for housing design projects submitted to HQ AF/CEH by the base's respective MAJCOM. Every installation must have an initial HCP, except for those installations where the housing inventory contains fewer than 100 units. Bases should update HCPs approximately every 3 years, depending on the mission requirement of the installation. In many cases,

an update may consist of simply revising the Housing Requirements Analysis based on a new Housing Market Analysis.

- HCPs, first initiated in 1988, use a comprehensive approach to planning, programming, and designing FH. The HCP provides a complete review of all aspects of an FH area, resulting in a plan to improve not only the housing units, but all aspects of the neighborhood.

An HCP accomplishes the following:

- It identifies the total FH requirement by grade and number of bedrooms per dwelling unit.

- It provides comprehensive housing unit and neighborhood-level concept designs and cost estimates for FH improvement projects. The HCP then serves as the basis for the development of all FH projects.

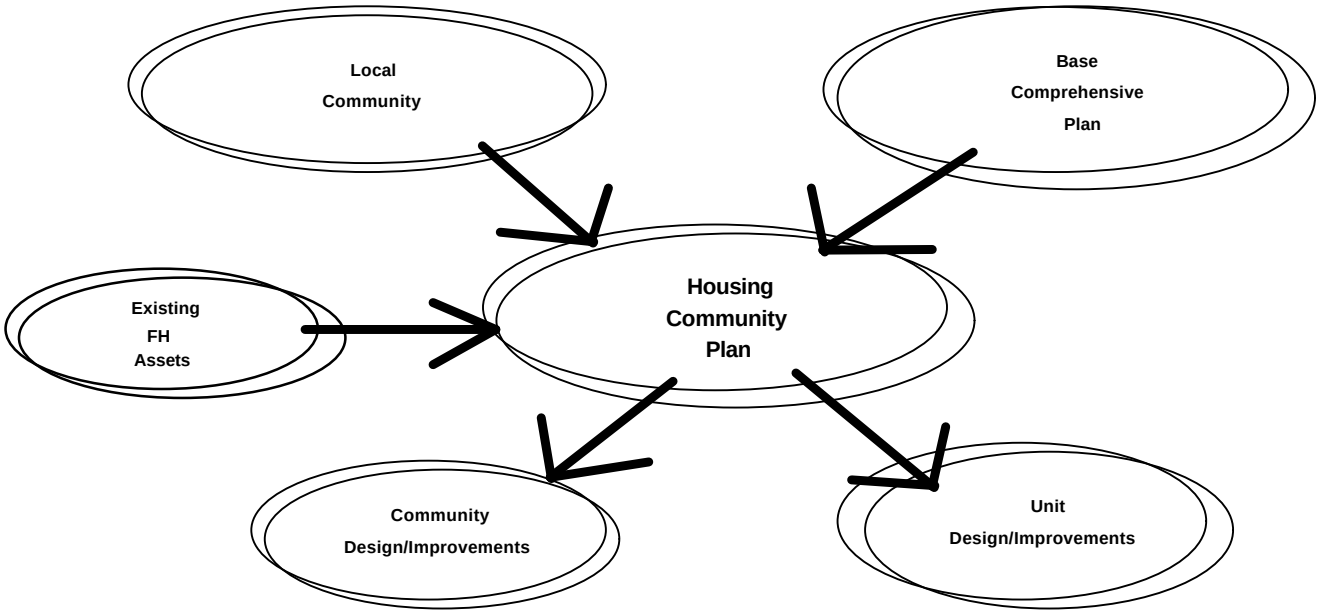
- It provides a comprehensive construction execution/phasing plan for programming outyear improvement projects.

- It incorporates existing Operations and Maintenance (O&M) projects into improvement projects. Future updates of all HCPs will provide an O&M plan that will interface with the HCP phasing plan. All housing O&M and future Maintenance and repair (M&R) project submissions must identify the phase of the HCP with which they are complying.

- It provides a comprehensive, cost-effective programming and implementation plan in support of Air Force requests for FH appropriations over a 10-year period.

The relationship of the HCP to its inputs and outputs is illustrated in Figure 2.4.

Figure 2.4: HCP Process



The HCP is organized into four major sections that cover:

- **Section 1:** The HRA, which demonstrates the supply and demand for FH.
- **Section 2:** Community improvements, with designs for circulation, streetscape, recreational opportu-nities, infrastructure, and utilities.
- **Section 3:** Unit improvements, with designs for floor plans, building exteriors, yards/patios, and building systems.
- **Section 4:** A multi-year phasing plan and cost estimates.

The second and third major sections, Community and Unit Improvements, contain detailed design/improvement recommendations accompanied by cost estimates for the particular item being discussed. The Community Improvements section contains master plans for each FH neighborhood. Each neighborhood plan defines the character or identity for that neighborhood in terms of the areas of focus described above. The Unit Improvement section addresses each type of unit according to the areas of focus noted above.

The fourth major section, the HCP Phasing Plan, summarizes the long- range plan. Both community and housing unit improvements are summarized and costed by neigh-borhood and phase. Each phase becomes the basis for programming documents (DD Form 1391) submitted by the MAJCOM to HQ AF/CEH for inclusion in the construction budget submission. AFI 32-6002 provides additional guidance for programming (DD Form 1391) procedures.

Figure 2.5 below summarizes the FH planning standards, their purpose, and how often they must be updated.

Figure 2.5: Summary of Base Planning Standards

Planning Standards	Purpose	Update
Base Comprehensive Plan (BCP)	Base-wide Long-Range Plan; Defines FH Land Uses	Every 5 years
Housing Market Analysis (HMA)	Assess Local Housing Market	Every 3 years
Housing Requirements Analysis (HRA)	Validate FH Demand	Every 3 years
Housing Community Plan (HCP)	FH Long-Range Plan	Every 3 years or as mission changes

2.2.2 HCP Update Policy

The base is responsible for ensuring that HCPs are updated every 3 years, and that the updates revise the comprehensive concept in accordance with changing requirements and investment policies.

- Updates must build upon the existing HCP, and should not completely revise the comprehensive concepts generated in the original HCP, unless major mission changes warrant this action.
- All HCP updates will require an Executive Summary that includes an assessment of the existing housing inventory and its ability to meet the updated requirements.
- An Economic Analysis may be required in conjunction with an HCP update. The economic analysis covers the next 3-year program projection based on the phasing plan in the HCP and approved projects.
- A tri-service cost model replacement estimate must be prepared for all units in the plan that exceed $50,000 times the area cost factor. If the estimated cost to improve units exceeds 70% of replacement costs, then the plan must include a replacement project.

If, during the design phase of a housing project, the economic analysis indicates that replacing units rather than improving them is the most economical means to upgrade the housing inventory, the designer should complete a comprehensive site plan for the entire housing area. This will then be incorporated as an appendix of the existing HCP and will be used as the primary site plan in a subsequent HCP update.

By using the generic statement of work for HCP updates (developed by HQ AF/CEH in conjunction with the Army Corps of Engineers), the integrity of the original HCP can be ensured.

HCP updates are required after a new Housing Market Analysis (HMA) has been completed (every 3 years).

- Once a new HMA is completed, the base can prepare a new HRA that assesses the impact of new requirements on the existing HCP.
- The new HRA's degree of impact will determine whether a full HCP update is required or whether annotated changes will suffice.

All contracts for HCP updates will be funded by HQ AF/CEH.

- HQ AF/CEH reviews and validates the MAJCOM HCP update programmatic requirements prior to releasing the contract for execution.

- HQ AF/CEH, working with the Corps of Engineers, has set up an Indefinite Quantity (Open End) Architect-Engineer (A-E) contract to support all MAJCOMs in completing the HCP updates.

- After updating the HCP, the MAJCOM will ensure copies are distributed to all the respective office levels (base, MAJCOM, HQ USAF, and SAF/MII).

2.2.3 Environmental Planning/ Compliance

The principal guidance documents for ensuring environmental compliance for construction are the *National Environmental Policy Act of 1969*, (NEPA) as amended (40 CFR 1500-1508) and AFI 32-7061, *The Environmental Impact Analysis Process*. The Air Force Environmental Impact Analysis Process (EIAP) specifies the responsibilities of HQ USAF, MAJCOMs and base-level environmental offices, installations, environmental protection committees, and the Air Force Center for Environmental Excellence.

The NEPA and AFI 32-7061 require the Air Force to incorporate environmental considerations into its planning and decision-making through a systematic, interdisciplinary approach.

Three levels of environmental analysis are provided in the following documents:

- The *Categorical Exclusion* (CATEX) is used for classes of actions that have been evaluated and determined to have no environmental impact. A complete listing of Air Force-related actions that can be categorically excluded appears in AFI 32-7061.
- An *Environmental Assessment* is an analysis of the potential environmental impacts of a proposed action. It requires minimal public interaction during preparation. Actions that generally require an Environmental Assessment are: minor construction projects, movement of aircraft or personnel, real estate acquisitions, and some waste site cleanup efforts.
  - If significant impacts are not identified, the Air Force signs a Finding of No Significant Impact (FONSI). Informal co-ordination with appropriate environmental agencies is encouraged while the Environmental Assessment is being prepared; however, there is no requirement for formal review of documents outside the Air Force. The resulting FONSI must be made available to the interested public.
  - If the determination is made that significant environmental impacts may occur from the proposed action, then there must be a finding that preparation of an Environmental Impact Statement is necessary.
- An *Environmental Impact Statement* (EIS) is a detailed study of major federal actions that may have significant environmental ramifications. The format for the EIS is documented in the Council for Environmental Quality (CEQ) regulations. For unclassified actions, the Air Force must notify the public that a project or proposal with potential significant environmental impacts is being considered.
  - Input from the public is solicited and included in the preparation of the EIS.
  - The outcome of the EIS process is a Record of Decision (ROD) which is a document, signed by the agency sponsoring the proposed action, that explains the action and its potential environmental consequences, and discusses any potential mitigation that has been adopted to minimize the impact of the proposed action.

2.2.4 Economic Analysis (EA)

An economic analysis (EA) is required:

- For all new FH construction as well as replacement projects.
- For FH support facility construction projects with a total cost of over $2,000,000.
- For improvement projects when the most expensive unit exceeds $50,000 multiplied by the local area cost factor.

Bases prepare the Economic Analysis in accordance with the *Air Force Family Housing Economic Analysis Guidance Manual.* The MAJCOMs then certify the EA.

Other special analysis procedures apply when leasing is a feasible alternative. Department of Energy indices should be used to analyze utility costs. The Economic Analysis must be documented to allow for complete replication by reviewers. This includes costs that are traceable to their most basic inputs and units of measure.

The EA methodology provides the opportunity for cooperative analysis between the base-level civil engineer (CE) and financial manager (FM), the MAJCOM CE and FM, and the Air Staff CE and FM. The EA is used to determine if replacement or improvement is most cost effective.

2.2.5 Investment Strategy

Following the determination of the requirements, each base must select the appropriate investment strategy, within Air Force and DoD directives. HQ AF/CE provides the appropriate funds, through P-711, P-713, P-714, and P-722 fund codes, in accordance with requirements. P-714 funds are used for planning and designing projects in the Acquisition Program and Post Acquisition Improvement Program (PAIP). Upon appropriation, these funds are issued in a lump sum to the MAJCOM for distribution. P-711 funds are used for new construction and replacement construction projects. P-713 funds are used for projects that provide improvements to existing FH units/ facilities. Both P-711 funds and P-713 funds are provided to the MAJCOM for distribution upon award of a project. P-722 funds are used for planning, designing, and constructing projects in the Maintenance and Repair Program. Upon appropriation, these funds are issued in a lump sum to the MAJCOM for distribution.

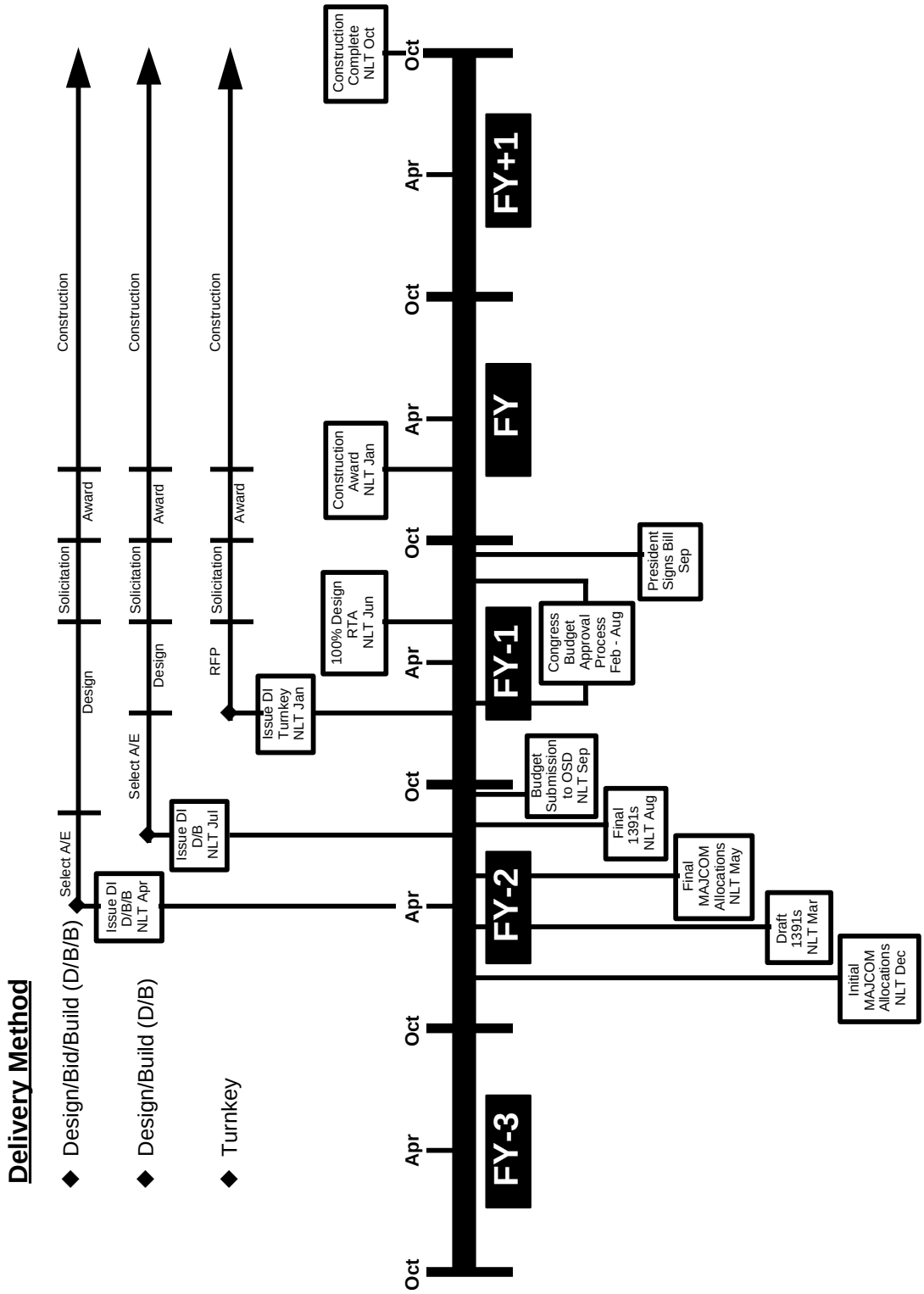
2.2.6 Execution Goal and Strategy

The execution goal is to have construction funds obligated within the fiscal year they are appropriated and to expend the funds not later than (NLT) the end of the next fiscal year (refer to Figure 2.6). The key objectives to achieving this goal are:

- To reach 100% design or Ready For Proposal (RFP)/Ready to Advertise (RTA) status NLT June of FY-1.
- To be prepared to award construction contracts NLT 30 days after the Air Force receives construction funds, ideally within the window of October to December of the fiscal year of execution, depending on the appropriation.

Figure 2.6 illustrates a model timeline for housing project execution. It indicates the timeframe in which the steps of the project should be executed to ensure the project is completed on time. It assumes that all planning and programming coordination has been accomplished through HQ AF/CEH. It also indicates project design timelines for three commonly used delivery methods (Design/Bid/Build; Design/Build; and Turnkey).

Figure 2.6: Housing Project Execution Timeline



2.2.7 Programming/Reprogramming Limitations and Procedures

Use the following statutory guidance found in AFI 32-6002, *Family Housing Planning,*

Programming, Design, and Construction when programming FH projects:

- **2.2.7.1 Statutory Unit Improvement Cost Limit (AFI 32-6002 Paragraph 1.11.2)**

- **Unit Improvement Cost:** The unit improvement cost includes both major and minor improvement costs as well as concurrent maintenance and repair and minor alteration costs for a single FH structure or one unit of a multiple-FH structure. The unit improvement cost includes the cost for both the housing unit and associated facilities, such as a carport, garage, storage, driveway or other assigned parking, patio, privacy fence, utility (water, sewer, electricity, gas etc.) service lateral lines, and other attached facilities. This is identified as "family housing" cost in Block 9, DD Form 1391.

- **Neighborhood Improvement Cost:** The neighborhood improvement cost (including concurrent maintenance and repair) consists of "common neighborhood" improvement costs and "associated neighborhood" improvement costs.

  - **Common Neighborhood:** The housing area or facilities outside of the housing units that support the entire housing community and are not associated with individual units or discrete groups of units, such as main/secondary roads and their sidewalks, general common-use parking areas, utility mains (water, sewer, electrical, gas etc.), playgrounds, and bus shelters, etc. (If programming as part of a unit improvement project, this is identified as common neighborhood im-provement in Block 9, DD Form 1391).

  - **Associated Neighborhood:** The housing area or facilities directly associated with the FH units, such as access roads and their sidewalks, parking spaces, walkways between roads/parking and housing unit, landscaping adjacent to housing unit, and utility branch lines servicing the housing unit, etc. (This is identified as "support facilities" cost in Block 9, DD Form 1391).

- **Statutory Limit (SL):** The unit improvement cost limit is $50,000 (for a non-accessible unit) or $60,000 (for a unit that is accessible to disabled persons) times the Area Cost Factor (ACF) at the time of contract award. The ACF is a local escalation or de-escalation factor based on the local economy. The ACF does not apply in non-CONUS installations. This limit includes both the unit improvement cost and prorated associated neighborhood cost, but excludes common neighbor-hood improvement cost. The unit with the highest combined cost total (unit improvement cost plus prorated associated neighbor-hood improvement cost) becomes the "Most Expensive Unit" for a project and is identified in Block 9, DD Form 1391. The unit improvement cost is the total funded cost, which includes construction cost, contingency, and supervision, inspection, and overhead (SIOH). Projects where the cost of the most expensive unit exceeds the statutory limit require SAF/MII approval, Congressional notification, and an economic analysis showing the cost effectiveness of improvement over other alternatives. These projects are included in the annual President's Budget.

- **Three-Year Rule:** The base should not undertake improvement, minor improvement, major maintenance and repair, and minor alteration work for 3 years after a new construction, replacement construction, improvement,

or minor improvement project is completed. The rationale for this policy is that all work necessary to bring the unit up to current standards should be programmed in a single improvement project. There are exceptions to this rule for health and safety issues (AFI 32-6002, Paragraph 1.3.5).

- **Minor Improvement Project (MIP):** MIP costs cannot exceed the statutory improvement unit cost limit. The limit includes the cost of all improvement, maintenance and repair, and minor alteration work planned and accomplished during the current fiscal year.
  - Indicate all current fiscal year planned or accomplished work for the unit in the DD Form 1391 to ensure the total cost does not exceed the statutory limit (AFI 32-6002, Paragraph 1.11.4.4).
  - The three-year rule also applies to MIPs. Subsequent MIPs year after year would be considered pyramiding.

2.2.7.2 Unit Maintenance and Repair Thresholds (AFI 32-6002, Paragraph 1.12.3)

- **General Officer Quarters Maintenance and Repair Threshold:** The annual obligation limit for the total cost of all maintenance and repair and minor alteration work accomplished by job order, work order, or contract on general officer quarters is $25,000 per unit (AFI 32-6002, Paragraph 1.12.3.1).
- **Non-General Officer Quarters Maintenance and Repair Threshold:** The annual obligation limit for total cost of major maintenance and repair, and minor alteration work, accomplished by job order, work order, or contract on non-general officer quarters is $15,000 per unit (AFI 32-6002, Paragraph 1.12.3.2).

2.2.7.3 Application Rule

Apply only one threshold at any time. The improvement unit cost limit applies during the construction period of an improvement project. Once the construction is completed and the unit is occupied, the three-year rule and maintenance and repair thresholds apply.

2.2.7.4 Improvement to Replacement

Bases may replace FH units instead of improving them (10 U.S.C. 2825, *Improvement to Family Housing Units*) under either of the following:

- If the improvement of existing housing units has been authorized by law and, after a review of post design or bid cost estimates, the improvement project is no longer cost effective.
- An economic analysis demonstrates that the cost of improving the units would exceed 70% of the cost to replace the units for the same pay grades, and it further demonstrates that the replacement project is more cost effective than the improvement project.
- If the replacement units are intended for different pay grades, a justification of the need for replacement must be based on long-term requirements.
- In order to change an improvement project to a replacement construction project, bases must submit request to AF/CEH through the MAJCOMs. SAF/MII must approve project substitution, notify Congress and wait 21 days before the contract can be awarded. Bases must be able to complete the replacement project within

the dollar amount originally appropriated for the improvement project.

2.2.7.5 Rules on Total Project Cost and Scope Variances

- Total project cost refers to the Programmed Amount (PA).

  PA = (Cost Per Unit) x (Units)

  With prior HQ USAF approval, bases may exceed the PA by 25%, provided that funds are available. Alternately, projects may cost less than the PA. Bases must reprogram and Congress must re-approve variances of the PA greater than 25% or $2 million, whichever is less.

- Scope variances refer to the number of units being improved or replaced. Bases may increase or decrease this number by up to 25% of the original number of units with prior SAF/MII approval. Increases or decreases of more than 25% must be approved by Congress.

2.2.8 Other Statutory Limitations

Title 10 United States Code (10 U.S.C.) states three limits on FH projects. Section 2822, *Requirements for Authorization of Number of Family Housing Units,* requires that the acquisition of any housing unit by construction, purchase, lease, or rental guarantee must be specifically authorized by law. Section 2825 sets a statutory cost limitation for improvement of a single housing unit (as discussed earlier in Section 2.2.7), and Section 2826, *Limitations on Space by Pay Grade,* sets a maximum net floor area by pay grade and number of bedrooms. Except for the statutory improvement cost limit (10 U.S.C. 2825), Congress must approve all requests to exceed these limits and must include such approvals in the annual National Defense Authorization Act. The Air Force cannot waive these limits by notifying the Congressional oversight committees. Officials who make decisions that lead to violation of these limits violate United States federal law.

Statutory Limitation on Space (10 U.S.C. 2826):

- This section of the law specifies the maximum net floor area that is permitted in the acquisition, construction, and improvement of FH units, regardless of the funding source. See Figure 4.1 for limits to the net floor area. See Appendix 1, Glossary of Acronyms and Terms, for an explanation of the net floor areas. These limits apply to new construction and improvement projects as well as leased units. They also limit the net floor area for minor improvement and alterations (in-house, contract, and self-help).

- Exceeding the statutory limitation on space requires specific statutory authority in the annual National Defense Authorization Act.

- In order to permit the award of a turnkey project, a 5% flex on the maximum net floor area may be allowed with prior SAF/MII approval to the contractor offering the most satisfactory proposal that is determined to be in the best interest of the government. See Military Handbook 1190, *Facility Planning and Design Guide,* Chapter 13, Section C and 10 U.S.C. 2826.

2.2.9 Related Directives and Documents

See Appendix 2 for a listing of FH directives and documents.

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CHAPTER 3

NEIGHBORHOOD DESIGN

FH planning is a comprehensive process that considers the entire neighborhood environment in addition to the housing units themselves. The "whole neighborhood" process cannot be successful if attention is given only to the quantitative issues such as the housing unit living space allowances and the number of bedrooms.

The purpose of the Housing Community Plan and its Whole House/Whole Neighborhood focus is to increase the overall quality of the entire FH area. It provides a comprehensive plan for improving the overall quality of the FH environment by integrating elements such as utility and infrastructure planning, site planning, open/recreation space development, and "streetscape" development. Other important elements include the consideration of community support functions, such as youth centers, child development centers, schools, fire stations, and other community service functions similar to those found in the civilian community.

Goals and Objectives:

The **Goal** of neighborhood design for Air Force FH is to develop and sustain a residential environment that responds to the Air Force family and reinforces the connection between the families and the community.

Planners can accomplish the Air Force neighborhood Goal by using the following site development **Objectives:**

- **Objective No. 1:** Plan/provide adequate infrastructure.
- **Objective No. 2:** Use residential building blocks to create neighborhood identity.
- **Objective No. 3:** Strengthen the neighborhood with efficient traffic patterns.
- **Objective No. 4:** Create a full range of private and shared recreation facilities.
- **Objective No. 5:** Use environmentally sensitive landscape design to enhance the environment.

3.1 Plan/Provide Adequate Infrastructure

This Guide defines infrastructure as the systems required to support the community. These systems include electrical power, water supply, natural gas, sewage/waste disposal, storm water management systems, tele-vision/cable TV, and roads and accessibility routes.

3.1.1 Site Planning

Ensure that special attention areas, such as wetlands, coastal/shoreline zones, and natural habitats, are considered when making Whole Neighborhood improvements or executing new construction.

Locate new housing in compatible areas with respect to flightlines; sound mitigation techniques are used where housing exists in non-compatible areas with respect to flightlines. In accordance with the Air Force Air Installation Compatible Use Zone (AICUZ) program, from Figure 4.5 in AFMAN 32-7067, *Planning in the Noise Environment*:

- Housing is not compatible within noise level zone Ldn 75 dB or higher. Prohibit housing in this noise level area.

- Housing development is discouraged in noise level zone Ldn 65-75 dB.

Housing is prohibited within runway clear-zones or accident potential zones per AFMAN 32-8008V3, *Airfield and Heliport Planning and Design Criteria,* and the AICUZ program guidance.

When no other viable alternative exists and residential uses are planned in areas above Ldn 65 dB, designers must incorporate sound-proofing measures into the design and construction of the housing to achieve an outdoor to indoor noise level reduction (NLR) of at least 25 dB in the Ldn 65-70 dB range and 30 dB in the Ldn 70-75 dB range. Since normal construction can be expected to provide a NLR of 20 dB, the reduction requirements are often stated as 5 or 10 dB over standard construction and normally assume mechanical ventilation and closed windows year round.

The design of a housing project must include all site preparation, site improvements, and off-site roads and utility systems that are required exclusively for the support of the housing project. This work is provided within the total project cost.

Site preparation work includes the demolition of existing structures, correction of drainage problems and unsuitable subsurface conditions, clearing, grubbing, and rough grading, as applicable.

Site improvements include utility systems, roads, streets, curbs and gutters, walks, driveways, off-street parking, recreation areas, bike/jogging paths, lawns, landscaping, and finish grading as required to support the function and livability of the housing.

Figure 3.1: Housing Density by Location and Type of Unit (Units/Acre)

Housing Type	Location			
	A	B	C	D
Field Grade and above:				
One/Two Family	6	4	3	2
Multi-family	8	5	4	3
Enlisted/Company Grade:				
One/Two Family	12	8	6	5
Multi-family	16	10	8	6

Location A -- Dense metropolitan areas and most overseas locations

Location B -- Highly developed urban areas not included under location A

Location C -- Suburban and moderately developed areas

Location D -- Rural areas

The densities for FH projects, expressed in units per acre, are listed in Figure 3.1. Various categories of housing types and locations are shown. The densities are maximums for new construction and other acquisition projects and are target maximums for existing housing areas.

Open space is a precious resource in FH areas. Site plans must be as efficient as possible with the land available. The goal is to have at least 20% of the site as open space, unless the amount of available land dictates otherwise.

3.1.2 Utilities Systems Metering

To accurately monitor the consumption and cost data for electricity, gas, and water utilities, master meters are required for FH areas.

In general, a water meter will supply at least 150 housing units; a gas meter, at least 50 units; and an electric meter, at least 50 units. FH projects with fewer than 25 units normally will not be master metered but may be considered for master metering if local conditions indicate the desirability of such a measure.

For any existing project, no more than two primary line meters are used for the metering of a specific utility. Normally, if additional housing units are constructed, the existing master metering system is modified to meter the new area. However, if it is more economical, the new area may be designated as a separate project with no more than two additional primary line meters installed for each utility.

When the project layout is such that it is not possible to meter a specific utility for the entire project with two primary line meters, then the base may select two typical areas of the project for partial metering. The demand and consumption figures for the specific utility are in direct proportion to the number metered. The base selects a typical area that provides a reasonably uniform sampling of all housing configurations and occupant grades. If metering two typical areas is not reasonable, the two meters should be located so that combined readings will provide a uniform sample.

If permanent metering facilities for FH units are not installed, temporary meters may be used periodically to spot check utility costs. Consider provisions to ease the installation of temporary meters in the design of utility supply feeders.

3.1.3 Collocation of Utilities

Where feasible and acceptable to the local utility supplier or servicing agency, consider the joint use of trenches for two or more utilities. However, do not collocate water supply and sewage lines, but space these in accordance with local codes. Whenever gas lines are installed near other buried utilities, take precautions during the design and installation process to minimize the risk of damaging the gas line during subsequent work on other utilities, and adversely affecting other utilities should a leak occur in the gas line. If water and gas lines are installed in the same trench, locate the gas line on a shelf of undisturbed earth at least 12 inches above and to one side of the water line.

3.1.4 Water Systems

HUD 4940.2, Minimum Design Standards for Community Water Supply Systems contains basic water systems criteria.

Total water requirements are based on average daily and peak-day consumption data, when available. When such data are not available, demand requirements are calculated as illustrated in Figure 3.2:

Figure 3.2: Water Usage

No. of Bedrooms	Gallons/Day/Unit
2	250
3 or more	350

- For fire suppression, provide water systems capable of maintaining a minimum residual pressure of 10 psi at the hydrants. Fire suppression water demand for unsprinklered FH is 500 gallons per minute (GPM) for one-story structures, 750 GPM for two-story structures, and 1,000 GPM for three-story (and greater) structures, with a duration of 1-1/2 hours. Water demand for sprinklered FH is the sprinkler water demand plus 250 GPM, with a duration of 45 minutes.

- Locate fire hydrants such that no dwelling unit is more than 350 feet from one hydrant and no more than 500 feet from a second hydrant. Provide a minimum of one hydrant per 25 units.

- Measure the distances between dwelling units and hydrants along paved roads, streets, or parking areas.

- Size the water service lines to provide the minimum flow pressure for fixtures and equipment, as established by the National Plumbing Code, with a maximum velocity of 10 feet per second (fps). The minimum size of service lines is 3/4 inch.

3.1.5 Sanitary Sewer

HUD 4940.3, *Minimum Design Standards for Community Sewage Systems* provides the basic sanitary sewer criteria. Concrete pipe, steel pipe, and asbestos cement nonpressure pipe are not acceptable materials for use in any sanitary sewage system. Polyethylene is a recommended material.

3.1.6 Gas Distribution System

The American National Standards Institute (ANSI) Standards B31.8 (1968) and B31.8b (1969), *Gas Transmission and Distribution Piping Systems*, provides the basic criteria for gas distribution systems. The design of gas distribution systems, up to the outlet of the service regulator (or to the outlet of an individual service-line valve when multiple units are served from a single regulator), must also comply with the following criteria:

- Do not install gas lines under buildings or under slabs adjacent to buildings, unless the lines are placed in sleeves that vent to open air. Check building code requirements for the separation of the vent from the building.

- Provide a separate service regulator with the service-line valve for each housing unit. The required service-line valve located upstream of the service regulator will suffice if a regulator is provided for each unit. If a single regulator supplies more than one unit, equip each individual service line with an additional service-line valve between the regulator and the building.

- Install all regulators and service-line valves on the exterior of the buildings above the finish grade. For other than polyethylene piping, install an insulating coupling in each service line (above ground and in a dry location) to interrupt the continuity between the piping buried underground and the piping inside the living unit.

3.1.7 Electrical Distribution System

Electrical systems must conform to the applicable criteria in the National Fire Protection Agency (NFPA) 70, *National Electrical Code*, and the American National Standards Institute (ANSI) C2*, National Electrical Safety Code*.

Any items containing polychlorinated biphenyl (PCB) are prohibited.

Plan new electrical distribution systems radially with primary and secondary feeders underground where feasible.

Provide a residential street lighting system that supplies a minimum average illumination level of 0.2 foot candles.

3.1.8 Storm Drainage

Storm water management system capacity is based on the amount of paved surfaces, the frequency of severe storms, and the inches of precipitation for the locality. Use the 10-year storm frequency as a minimum base-line when developing a storm water management system.

Bases should identify secondary drainage patterns. Provide redundancy in drainage systems, such as retention ponds, to support for overloaded or blocked primary systems.

Positive drainage ensures that water drains away from all buildings. Locate collection swales at a minimum of 20 feet from any building. When natural drainage is used in lieu of underground systems, provide sufficient finish grades and the lengths and slopes of swales to provide protection for living units and yards and to prevent ponding in common areas.

3.1.9 Corrosion Control

Protect ferrous materials in the underground utility systems from corrosion by providing coating, wrapping, cathodic protection, or isolation of dissimilar materials, in accordance with Engineering Technical Letter (ETL) 91-6, *Cathodic Protection.*

3.1.10 Vehicular and Pedestrian Circulation

Street systems must provide convenient and safe access and circulation within the housing area. The street system should minimize through traffic in the housing area. Roads and streets must be adequate to accommodate occupant traffic, service vehicles (including maintenance, trash removal, buses, moving vans, and firefighting equipment), and snow removal equipment, where applicable.

Design all paving in the housing areas subject to vehicular traffic to support wheel loads of 6,000 pounds.

Provide curbs and gutters on all new streets and design these in accordance with MAJCOM and installation Facilities Excellence Plans. If an installation does not have such a plan, the MAJCOM will provide specific guidance. Curbs may be the standing or roll-over type. Provide curbs depressions at driveways and at handicapped ramps. The minimum curb radius at intersections is 20 feet.

Provide driveways with a minimum width of 9 feet. If the driveway is long or curved or is used as a sidewalk, the minimum width is 10 feet. When the driveway is intended to provide space for off-street parking, the minimum length is 24 feet, exclusive of any street walks.

Provide street signs and markings in accordance with the Federal Highway Administration's *Manual of Uniform Traffic Control Devices* and AFP 88-40, *Sign Standards*.

3.1.11 Telephone and Television Systems

The telephone company serving the installation is responsible for installing and maintaining the telephone distribution system up to the demarcation point (the point where the telephone company wiring connects to government-owned wiring). The state public utility commission governs the location of, and the terms and conditions applicable to, the demarcation point. The base communications-computer systems officer can provide specific guidance on local conditions.

Where commercial cable TV (CATV) service is available, the CATV service contractor is responsible for installing and maintaining the distribution system from the signal source to the final connections at the occupants' receivers. Government-owned antenna wiring in housing units may be used to provide the service if local conditions permit. The state utility commissions and local franchise agreements govern the terms and conditions for CATV service.

The base communications-computer systems officer can provide specific guidance on local conditions. Air Force Instruction (AFI) 64-101, *Cable Television*

Systems on Air Force Bases, also provides detailed guidance.

3.2 Use Residential Building Blocks to Create a Neighborhood Identity

Using a "building block" model can help organize the design of an overall neighborhood. The following sections describe how to use this model.

3.2.1 Cluster Development

In either designing or improving an Air Force neighborhood, it is key to understand the "building block" concept—the relationship of each dwelling unit to a cluster of units, a neighborhood, and the base as a whole.

This is an important planning concept since homes of identical design set in a monotonous, 90-degree street grid pattern with very little physical definition between public and private spaces, create an unattractive, “cookie cutter” appearance to the neighborhood. The monotony often found in large tract-housing neighborhoods makes it difficult for families to develop a sense of identity, ownership, and belonging within their home, street, and neighborhood.

People relate more easily to small groups or clusters of homes than to a large undifferentiated housing tract. Therefore, it is imperative that means be found to strengthen peoples' sense of belonging to their own local street or cluster.

A designer developing a housing area plan on an empty site should employ the principle of a spatial "hierarchy." This means using the design building blocks in order to give shape to the community and achieve a sense of local identification for residents (see Figure 3.3, Hierarchy of Neighborhood Building Blocks).

These design building blocks start with the individual homes. The table in Figure 3.4, Unit Configuration Criteria, will be used to determine the size of the units and how housing units can be configured to achieve desirable configurations and densities.

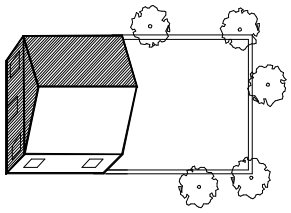
The next building block would encompass a group of homes comprising a sub-neighborhood or “cluster”. Plan the site so that housing units are clustered into mini- or sub-neighborhoods organized around a central element, such as a cul-de-sac or common area (see Figure 3.3).

Finally, clusters would be joined to create "neighborhoods." This type of relationship makes it possible for people to be part of a very large housing area while instilling a sense of place and pride in the individual street or cluster within which they live.

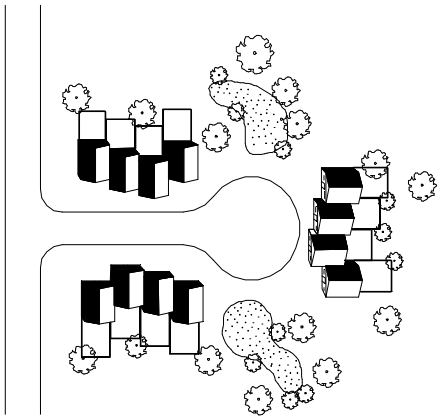
Plan housing areas so that community members can identify “their own" place in the overall neighborhood.

Figure 3.3: Hierarchy of Neighborhood Building Blocks

BUILDING BLOCK 1
The individual dwelling unit and private space



BUILDING BLOCK 2
A cluster of units forming a sub-neighborhood and its related recreational space



BUILDING BLOCK 3
A neighborhood made up of a group of clusters

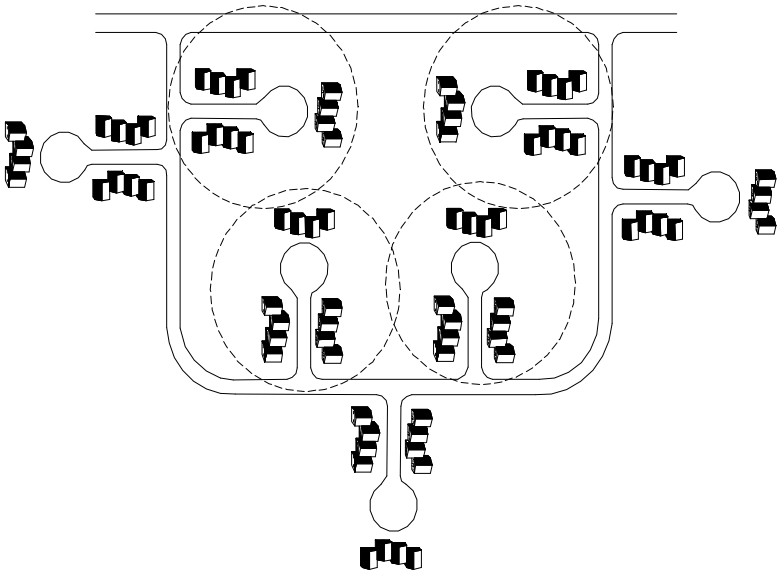


Figure 3.4: Unit Configuration Criteria

Rank	Housing Type	No. Bedrooms (Net Area/Unit)	Maximum No. Attached Units
07+	■ Detached Single-Family	4 (2,100 SF or 195 SM)	0
06	■ Detached Single-Family or Attached Multi-Family	4 (1,700 SF or 158 SM)	2
04-05	■ Detached Single-Family or Attached Multi-Family ■ Detached Single-Family or Attached Multi-Family	4 (1,550 SF or 144 SM) 3 (1,400 SF or 130 SM)	2 4
01-03 E7-E9	■ Detached Single-Family or Attached Multi-Family ■ Detached Single-Family or Attached Multi-Family ■ Attached Multi-Family[3] ■ Attached Multi-Family	5 (1,550 SF or 144 SM) 4 (1,450 SF or 135 SM) 3 (1,350 SF or 125 SM) 2 (950 SF or 88 SM)	2 4 4 6[1]
E1-E6	■ Detached Single-Family or Attached Multi-Family ■ Detached Single-Family or Attached Multi-Family ■ Attached Multi-Family[2] ■ Attached Multi-Family[2]	5 (1,550 SF or 144 SM) 4 (1,350 SF or 125 SM) 3 (1,200 SF or 111 SM) 2 (950 SF or 88 SM)	2 4 6[1] 6[1]

NOTE:

1. In cases with extreme site and/or cost constraints, the maximum number of attached units may be increased to eight.
2. Units of 1,200 SF or less will not be planned in detached configurations.
3. Detached single-family units may be planned if due to site conditions they are shown to cost less than attached multi-family units.

Where surpluses exist in the existing inventory and units are candidates for demolition (identified in the Housing Community Plan), select units for demolition such that the cluster concept is strengthened.

Design other functional aspects, such as traffic flow and recreation spaces to work with the neighborhood building blocks.

Some Air Force housing areas are already designed using the building block principles. At other bases, however, the existing street layout is essentially a grid, with very large, relatively undifferentiated housing areas. The following are possible techniques for breaking up large undifferentiated areas into smaller, sub-neighborhoods:

- Modify traffic patterns to support the "building block" concept.
- Provide shared facilities, such as recreation and open spaces, to help create a network of neighborhoods within the housing tract.
- Use landscape design and earth-shaping techniques to emphasize the hierarchy of spaces within the neighborhood.

These key methods are discussed further in Sections 3.3, 3.4, and 3.5.

3.2.2 Mobile Home Park

In mobile home park neighborhoods, provide year-round vision blocking vegetation for landscape screening. Landscaping within the park and at the park perimeter should be used in the same manner as in conventional neighborhoods to create a hierarchy of spaces. In addition, consider the following:

- **Mobile Home Site Plan Guidelines:**
  - Provide one carport with an attached storage shed behind each unit. Also provide one additional parking space adjacent to the carport (see Figure 3.5).
  - Provide a patio and front walk for each unit (see Figure 3.5).
  - Plant trees and shrubs and provide planting beds to screen the patio area and enhance the appearance of each unit (see Figure 3.5).
- **Site Furnishings:** Coordinated residential improvements in conjunction with the design of site furnishings can improve the community's appearance:
  - Site fixtures, including signage, street lights, bus shelters, fencing, storage sheds, benches in public areas, and litter receptacles are visually prominent features. Coordinate the selection of each item in order to present a unified architectural appearance.
  - Develop a standard sign style to coordinate signage throughout the community. This includes community and neighborhood signs, informational signs, and unit address numbers. Unify signage with respect to size, shape, color, type, and style.

- Remove existing storage sheds that are inadequately designed or are not coordinated with the housing unit design. Provide adequate built-in storage units where they are lacking. Coordinate storage design with the housing unit and yard design.

- Limit backyard enclosures to a 4-foot-high fence provided by and at the option of the residents.

- **Community Services:** Design site elements for public services to improve the community's appearance:

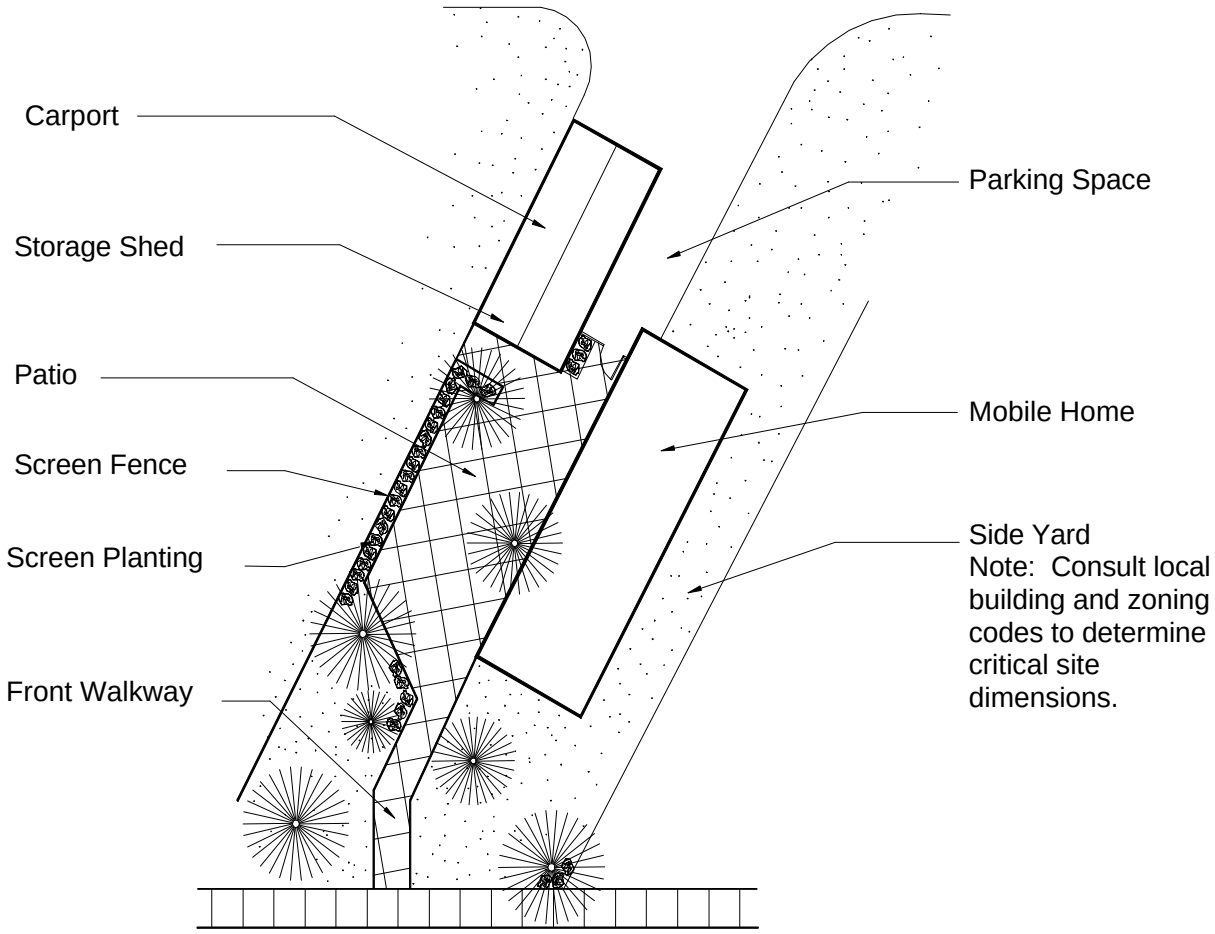
  - Use landscaping to screen trash containers from view in all locations. Use plastic trash containers as opposed to metal containers.

  - Provide a bulk pickup dumpster to every multi-family cluster, as needed.

  - Provide each neighborhood with at least two bus shelters for school children. Enhance these structures with plantings, benches in sitting areas inside and outside the shelters, and night lighting. New shelters should complement other site furnishings.

  - Provide door-to-door mail delivery for units in the mobile home parks that do not have cluster mail boxes.

Figure 3.5: Mobile Home Site Plan Guidelines



3.3 Strengthen Neighbor-hood Structure with Efficient Traffic Patterns

The development of improved vehicular circulation systems is one of the most powerful ways to strengthen the identity of neighborhood building blocks. Although the street system should provide safe, convenient access to and from the housing units and the neighborhood, it must not play a dominant role with respect to the overall housing area environment.

It is important to remember that in housing areas, pedestrian-oriented circulation, such as walks, jogging/exercise paths, and bike paths, must be the dominant circulation system. The street system must defer to and be supportive of the pedestrian-oriented system.

Use a hierarchy of streets in the same way that a building block hierarchy has been identified for homes, clusters, and neighborhoods. Each street serves an identifiable function. Plan streets based on the following criteria (see Figures 3.6 and 3.7):

The local street: This is a street that carries low volumes of traffic. Its function is to provide access to the housing cluster. It can be a cul-de-sac type configuration or a loop street.

- Size cul-de-sacs to accommodate the minimum turning radii of emergency vehicles on the base. Design cul-de-sac turning radii at no smaller than 50 feet.

- Vehicular speed on these streets should not exceed 10 mph. Drivers must have a clear view of the entire street since children will be playing in and around the street.

The collector street: This street handles the traffic from a group of clusters and their respective local streets. A collector street provides access to the base traffic arterials or to adjoining neighborhoods on the base.

- Provide pedestrian-activated traffic lights at crosswalks and intersections of bicycle and jogging paths leading to and from housing clusters.

- Provide a clear delineation of pedestrian and bicycle/jogger crossings on the street pavement. A change of material, such as brick or stone pavers, at crossings is highly desirable.

- It is undesirable to have housing units located adjacent to collector streets. Provide safety fencing if this situation is unavoidable.

- Use entry landscape architecture and landscaping features to identify housing cluster entry points.

Figure 3.6: Family Housing Street Development

Street Type	Characteristics:
Local	Block, Cluster, or Cul-de-sac Level; Serves individual units; Feeds collectors.
Collector	Neighborhood or Community Level; Serves dwelling unit clusters; Feeds arterials.
Major	Base Level; Connects different areas of the Base; Feeds off-base streets.

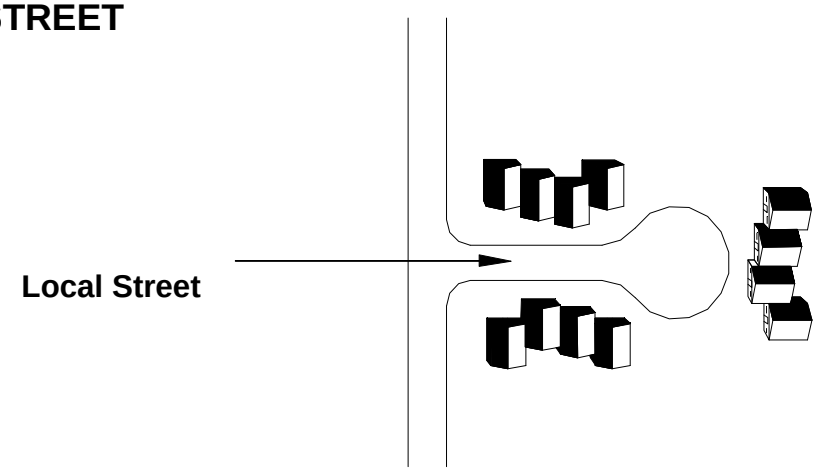
The major street: Major streets carry traffic from collector streets and provide access to other areas of the base. Housing units should not be accessible from a major street.

- Major streets should not pass through FH areas. If this is an existing condition, analyze options for redirecting traffic patterns and making the former major street a collector street.
- Where major streets are located adjacent to housing areas, provide visual buffers, such as swales, landforms, trees, berms, and/or other landscape forms, between the major streets and FH units.
- If a major street serves abutting homes, planners should take steps to rework the street system in order to reduce traffic volumes on the street.
- Provide pedestrian-activated traffic lights at crosswalks leading to and from housing areas.
- Use entry landscape architecture and landscaping features to identify neighborhood entry points.

Traffic counts are not given in Figure 3.6. This is due to the fact that traffic volumes vary widely from base to base; so a collector at one base may constitute a major street at another base. Rather, a street's designation is based on the function it serves. The Base Civil Engineer can provide traffic counts for the base. Figure 3.8 shows the recommended widths for collector and local streets.

Figure 3.7: The Street System

1. THE LOCAL STREET



2. THE COLLECTOR STREET

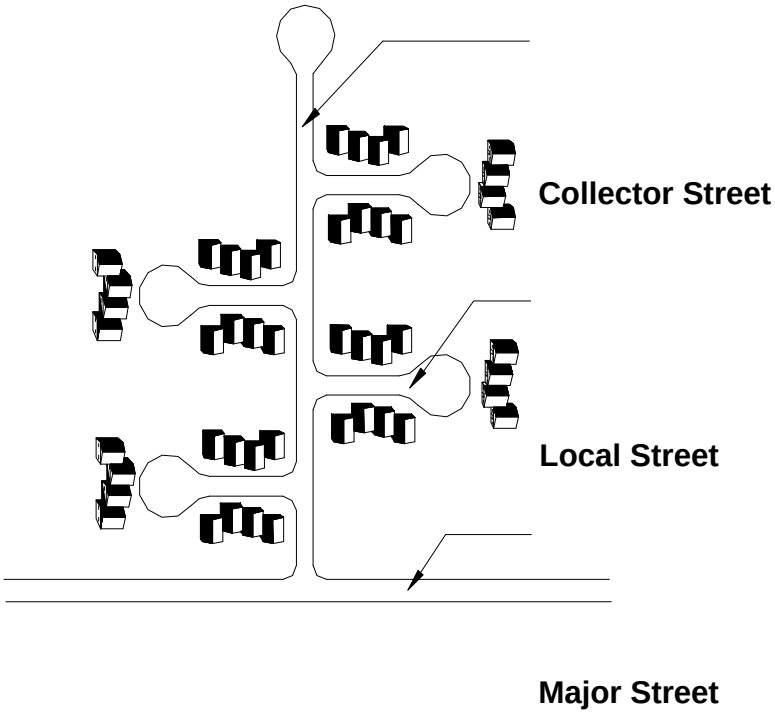


Figure 3.7: The Street System (continued)

3. THE MAJOR STREET

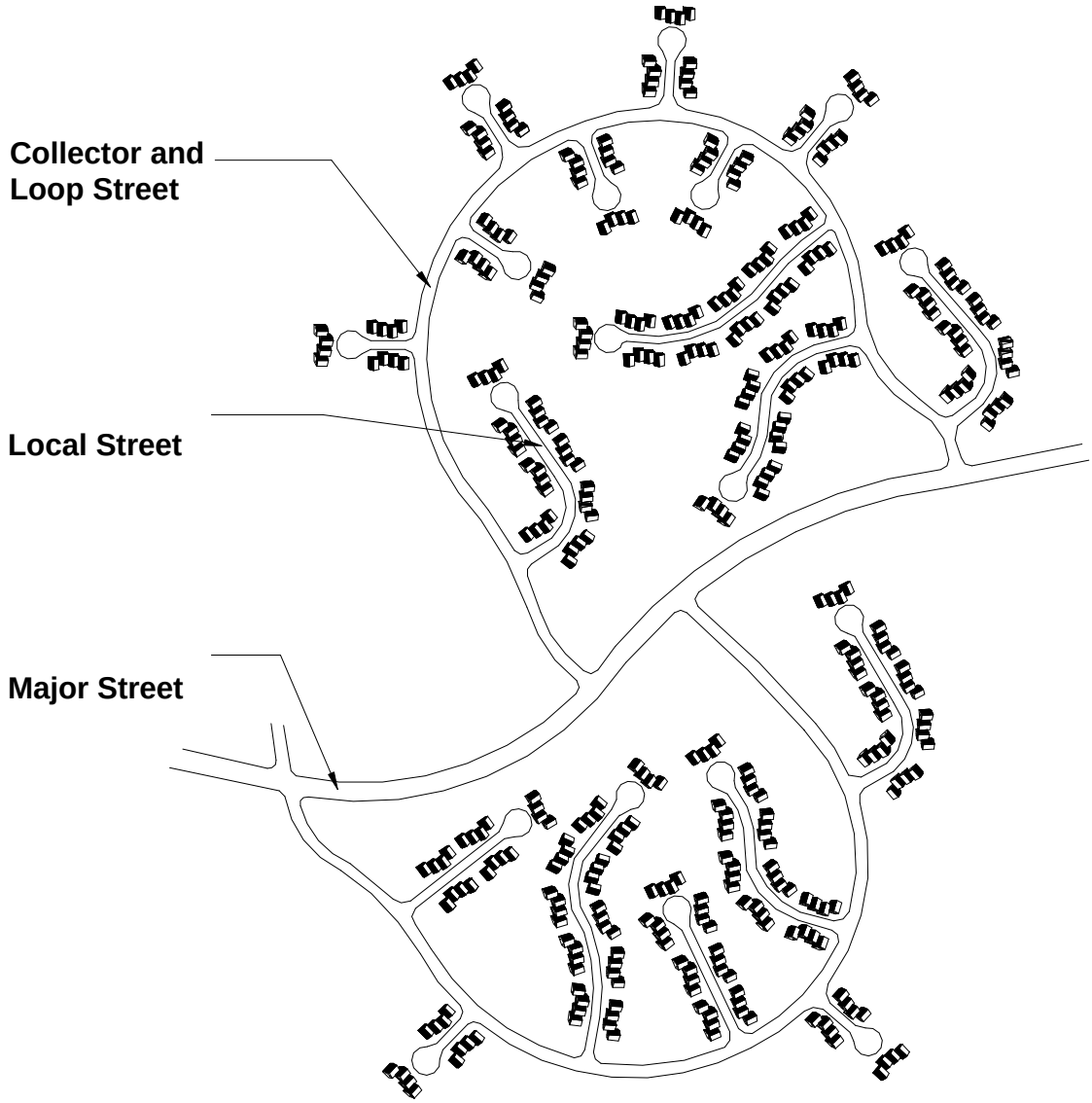


Figure 3.8: Recommended (Minimum) Street Widths (in feet from backs of opposite curbs)

Type of Street	No Parking	Parking on One Side	Parking on Both Sides
Collector Streets	28	*32	*40
Local Streets	NA	32	36

* Note that it is an undesirable situation to have housing units facing (front entry and driveway) a collector street and should be avoided in new and improvement projects.

Let the street system follow the natural topography of the site to the maximum extent practicable. Align the streets vertically and horizontally to minimize grading. Design gradients at intersections to be as flat as possible to improve sight lines and safety.

Right-of-ways (ROWs) include the street pavement, plus a planting strip on either side of the street to accommodate street signage, sidewalks, bus stops, and landscaping. The strip width should be 15 feet on secondary streets and 20 feet on main arteries.

Setbacks for individual units would begin at the edge of the ROW. The ROW should be considered public space, while the setback area of each unit is considered private space belonging to the individual unit.

If properly designed, the street system will support the FH neighborhood and will not impose itself upon the neighborhood. Older FH neighborhoods may require some modifications. The following are the key points for planning traffic patterns in FH areas:

- Use shorter street segments rather than long, straight streets in housing clusters.
- The cul-de-sac configuration is one desirable form for a local street. It restricts traffic volumes to local traffic and adds to the sense of community. In addition, because it is a short street, there is little chance for traffic to build up speed, as it would on a long, straight street. Thus, it is a safer street.
- Design the "cul-de-sac" length not to exceed 750 feet. This length is measured from the center of the turnaround to the center line of the intersecting street.

Another option is the *loop street*, as illustrated in Figure 3.7. A loop street should not be circuitous. By looping back to the street it began on, it also effectively discourages all but local traffic.

A repetitive street grid pattern, with all 90-degree turns, lacks reference points for defining housing clusters and neighborhood edges (see Figure 3.9), and can unnecessarily increase the number of streets required for access to each home. Differentiation between local, collector, and major streets becomes blurred. As a result, the sense of neighborhood is degraded.

Use a combination of loops and cul-de-sacs off of collector streets to service dwelling unit clusters. Figures 3.10 and 3.11 show such a street system. Figures 3.10 and 3.11 also show ways to minimize circuitous streets and to strengthen neighborhood clusters. The basic layout is a modified grid that provides access to all of the houses with

fewer streets. The resulting modifications enhance the neighborhood character of the entire housing area.

- Make street modifications with the "big picture" in mind. Evaluate the impact of closing or eliminating streets on overall base circulation patterns as well. For example, although it is highly desirable to remove major streets from housing areas, it may not be practical, depending on the location of the street and the costs associated with reconfiguring it.

- Employ speed reduction methods, such as lowering the speed limit or adding traffic lights, on streets that must be left open or accessible to non-housing area traffic.

- Provide vehicular circulation patterns that acknowledge pedestrian circulation.

- Provide for a separate and distinct pedestrian circulation system that emphasizes safety. Also, make sure the pedestrian system conforms to currently accepted accessibility requirements (curb cuts, ramps, slip resistant surfaces, etc.).

- Provide 4 feet (minimum) wide walks that connect unit clusters and recreation areas. Evaluate the need for providing walkways on both sides of the street.

- Provide demarcation for crosswalks either through conventional striping or a change in materials at collector and major streets. Locate crosswalks at intersections to the maximum extent possible (also see Section 4.5.3, Walkways).

- If community support projects, such as a neighborhood community center, are planned, consider locations at the end of collector streets to provide a neighborhood focus and point of reference (Figures 3.10 and 3.11).

Figure 3.9: Typical Existing Grid Condition.

This system permits free traffic flow in all directions; however a sense of identity at the housing cluster level is more difficult to achieve.

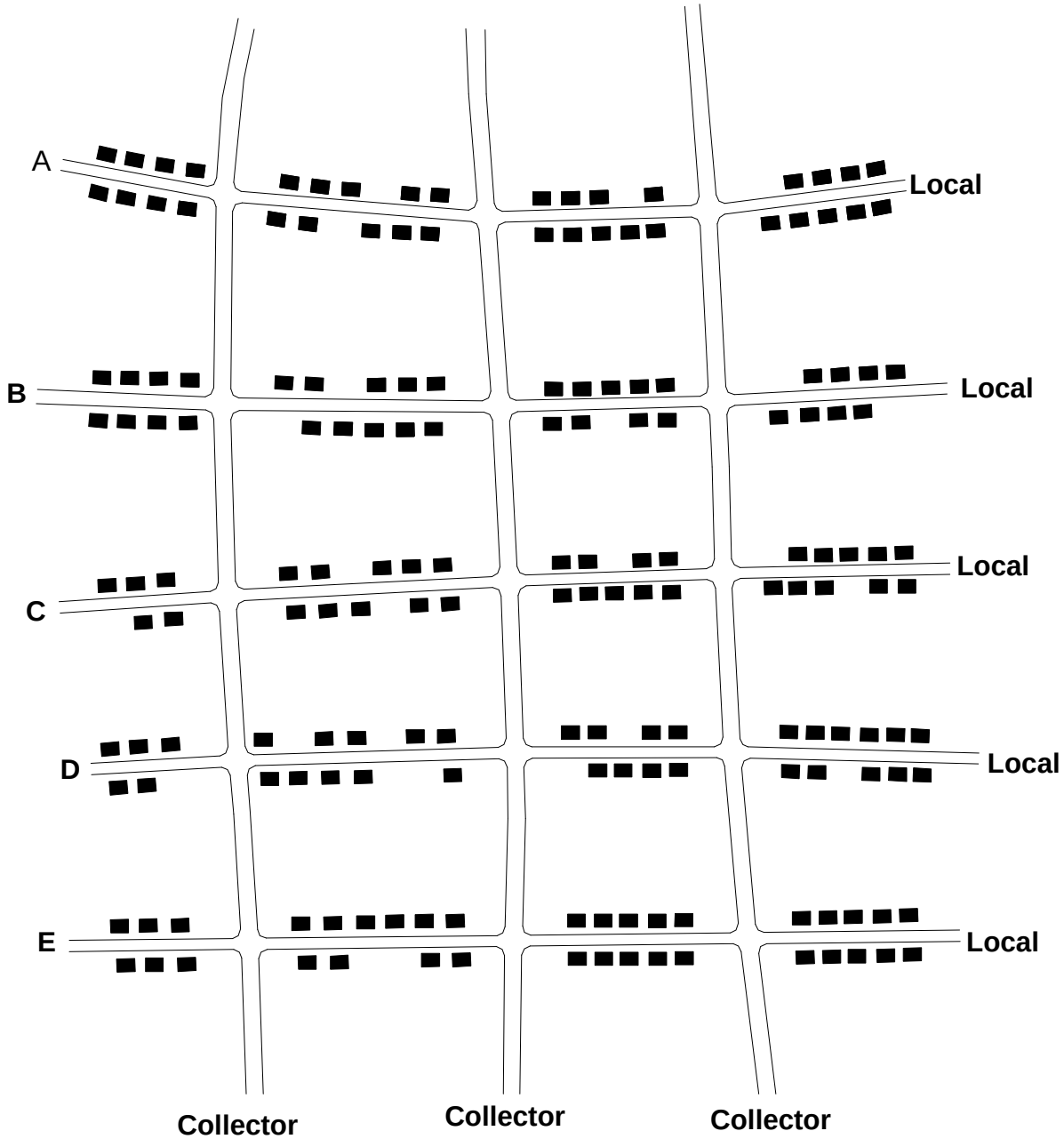


Figure 3.10: Modification of the Grid (Method A).

The grid system can be modified to create smaller neighborhood identities. Individual clusters are then created by adding loop streets and cul-de-sacs.

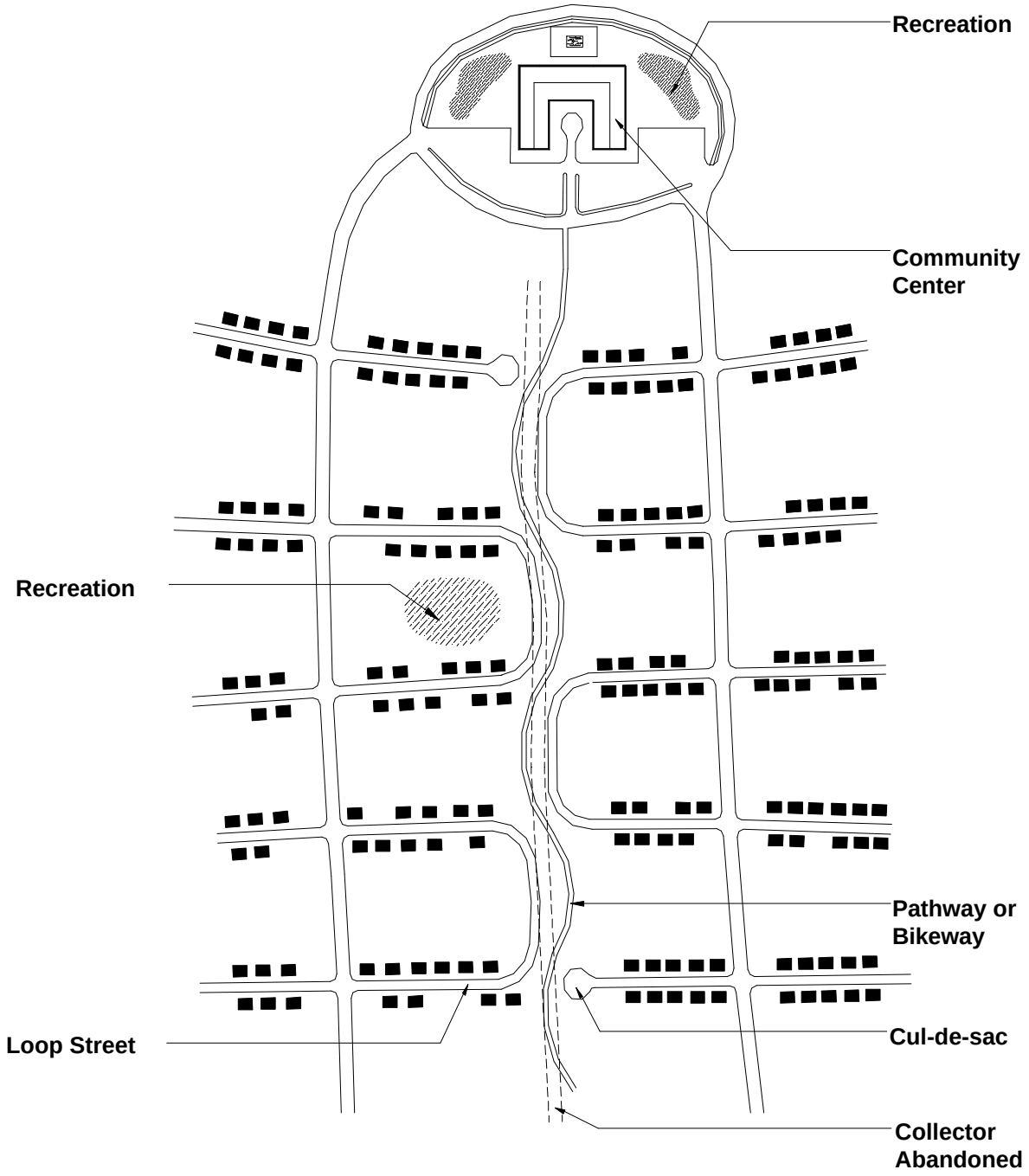
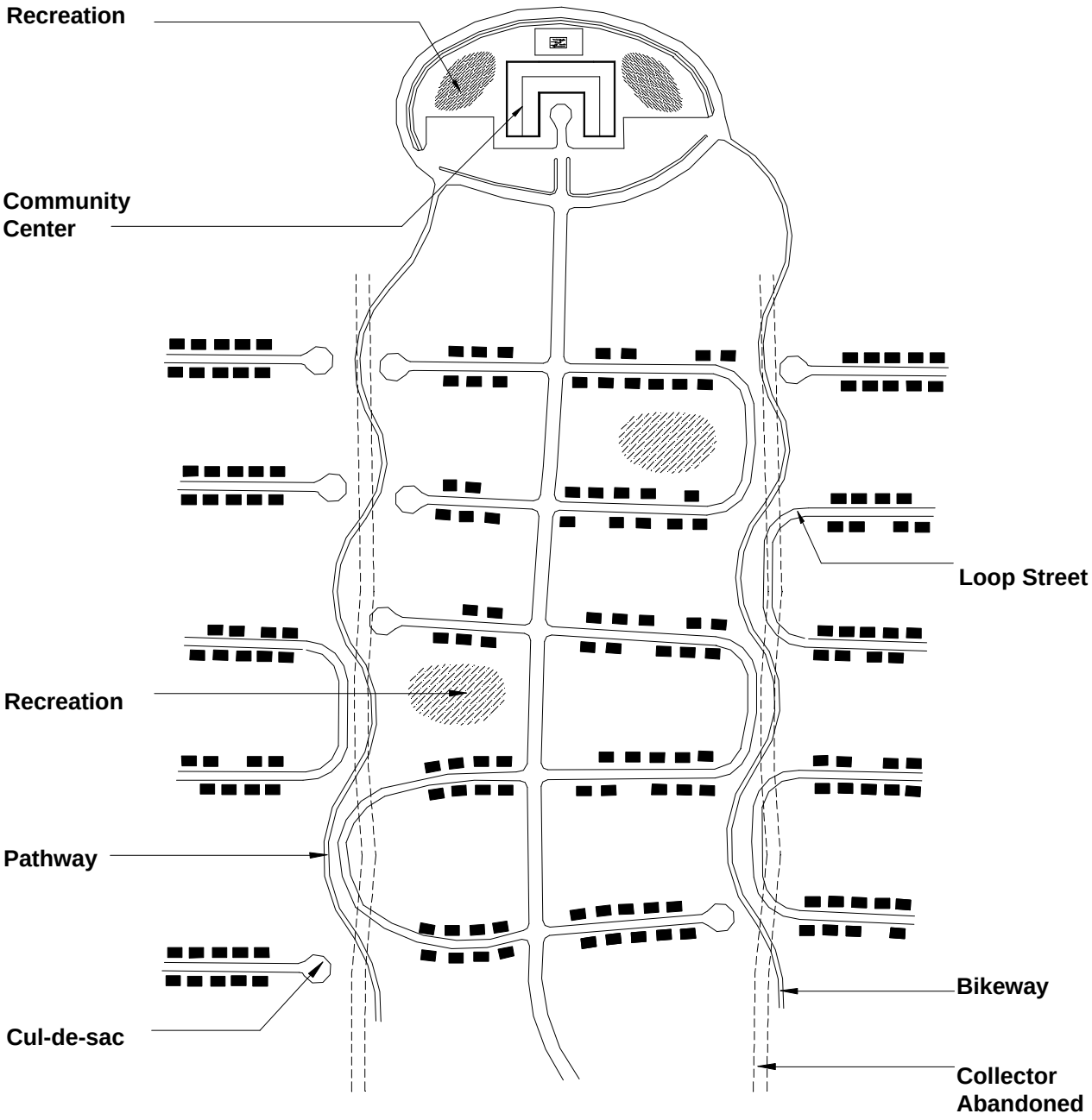


Figure 3.11: Modification of the Grid (Method B).

Another solution may be to close streets and create common recreation opportunities.



3.4 Create a Full Range of Private and Shared Recreation Facilities

Just as the housing area and street system should be composed of building blocks, it is also important that recreation opportunities be developed in a series of related blocks (Figure 3.12, Public and Private Outdoor Spaces), as follows:

- **Recreation Block 1:** For each family dwelling, provide an adjoining private or semi-private outdoor space (patio or similar space). This space should be partially or completely surrounded by a privacy screen.

- **Recreation Block 2:** For each cluster, provide common open space, picnic tables, benches, children's play equipment, and other relatively modest recreation facilities for common use.

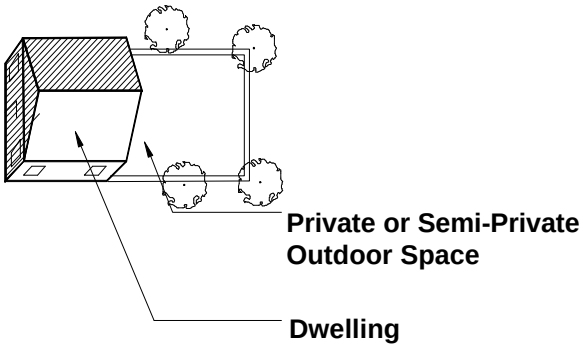
- **Recreation Block 3:** For each neighborhood, provide playgrounds for children, common open space, landscaped areas with trees, sitting areas, walkways, bikeways, jogging trails, gardens, and other recreation activities for common use by the residents of a number of clusters.

- **Recreation Block 4:** For each housing area as a whole, provide specialized recreation facilities, including large playfields for baseball and football, tennis courts, rooms for clubs and other activities, bikeways, swimming facilities, jogging and walking trails, and wooded, informal freeform landscape areas. Biking and walking trails should link individual neighborhoods and provide easy access to major play areas, schools, and work locations. These facilities can reinforce the residents' sense of identification with the base and housing area as a whole.

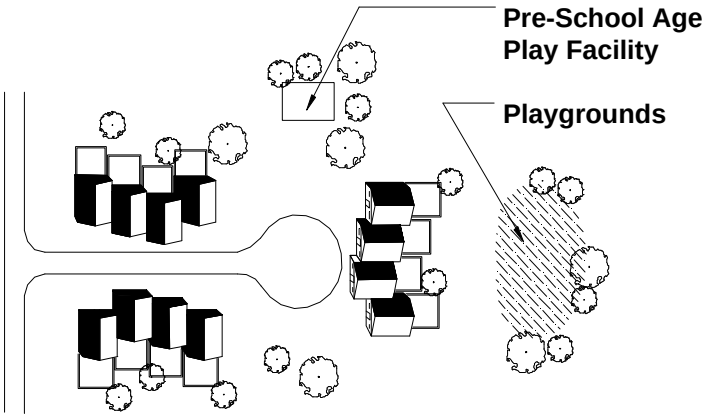
To the extent feasible, site outdoor recreation facilities so that they are easily accessible to FH residents. The provision of these facilities can increase residents' sense of satisfaction and can enhance the overall environment of the neigh-borhood.

Figure 3.12: Public and Private Outdoor Spaces

RECREATION BLOCK 1
Private Outdoor Space



RECREATION BLOCK 2
Cluster Facilities



RECREATION BLOCK 3
Neighborhood Facilities

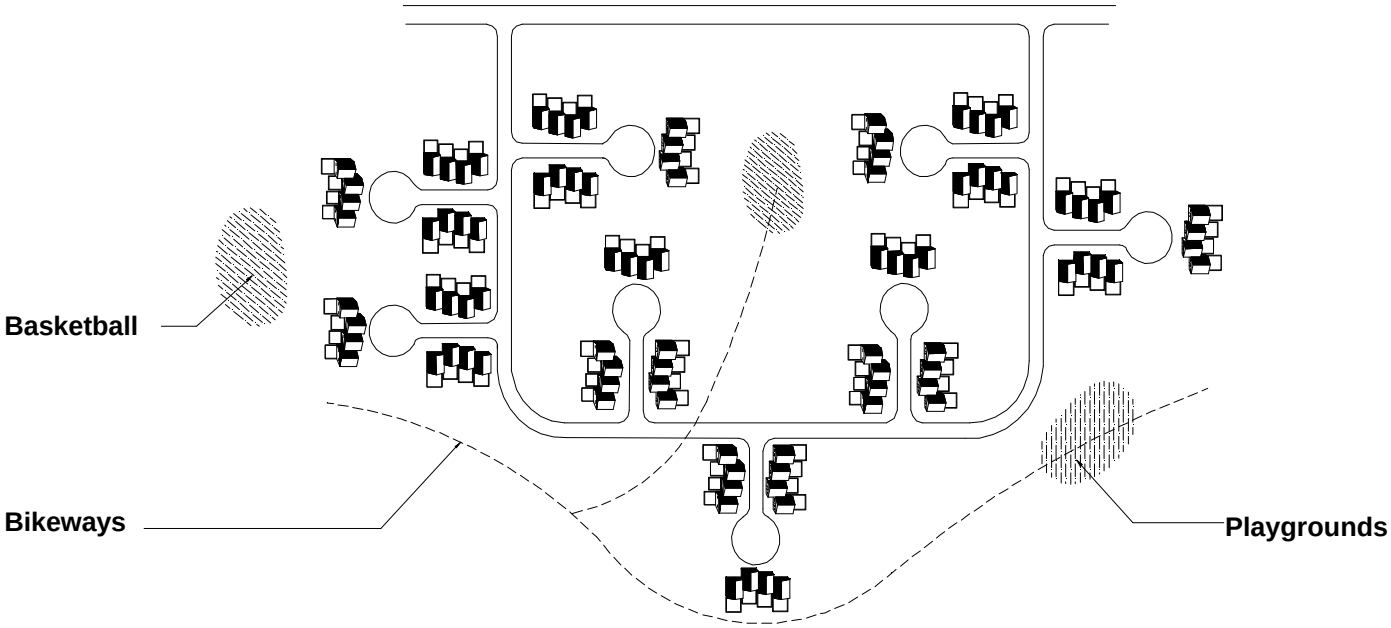
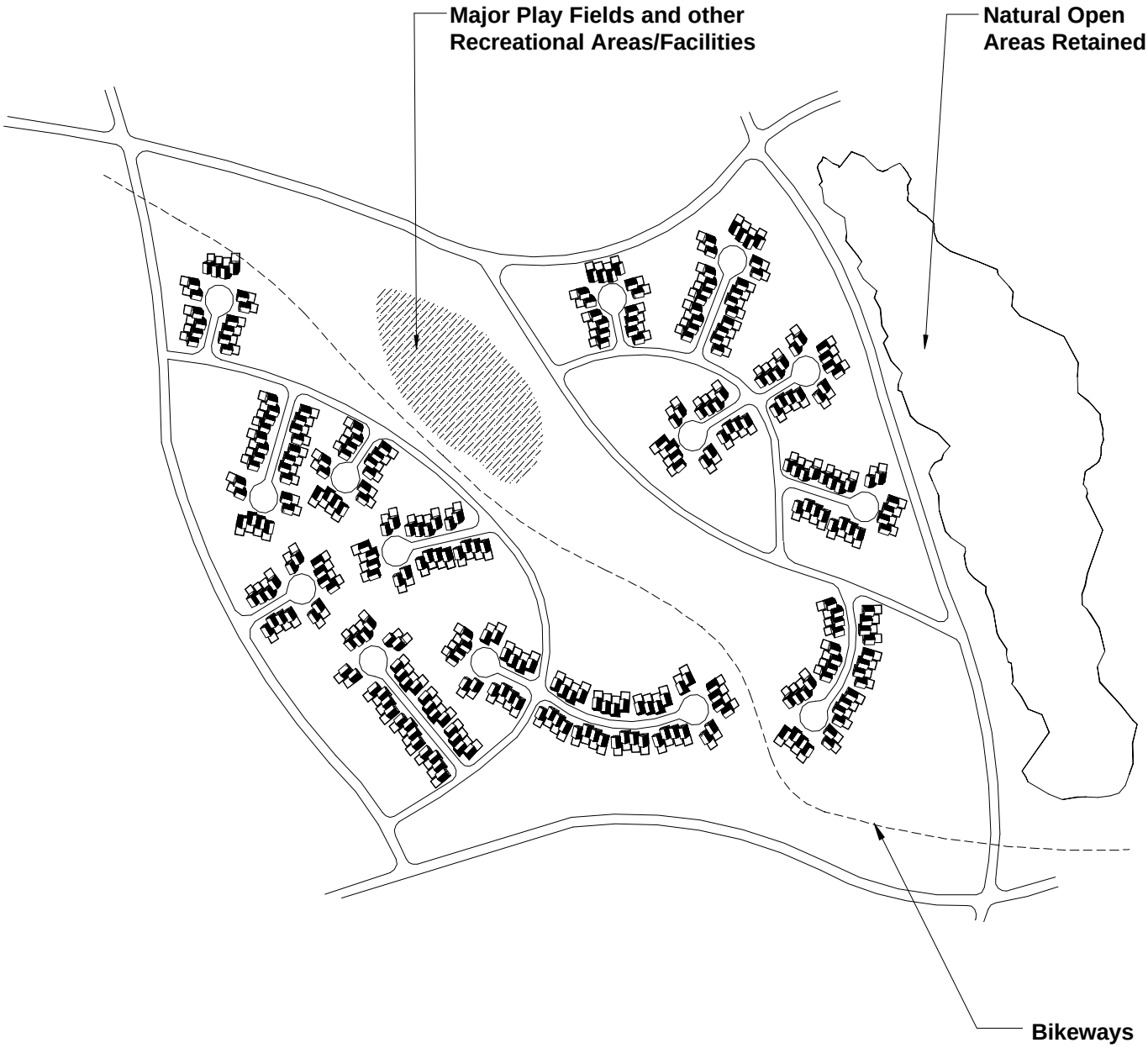


Figure 3.12: Public and Private Outdoor Space (continued)

RECREATION BLOCK 4

Entire Housing Area Facilities



3.5 Use Environmentally Sensitive Landscape Design to Enhance the Environment

Landscape design helps soften the hard edges of structures in the neighborhood and enhances the visual environment. It is DoD policy to utilize environmentally compatible and economically efficient landscaping practices that conserve water and prevent pollution. This includes the use of native plant species that fit naturally into the environment, and that can minimize maintenance demands. Consult the installation's Base Comprehensive Plan, the *USAF Landscape Design Guide,* and Executive Memorandum, dated 26 April 1994, *Environmentally and Economically Beneficial Practices on Federal Landscaped Grounds,* for guidance.

- Include both non-deciduous and deciduous plants of differing heights, shapes, colors, and textures in the design. Tree planting alone can provide a major improvement in the housing environment. It is also very important to remember that the choice of landscaping materials should minimize maintenance requirements.

- Landscape the entrances of neighborhoods. Entry points should be attractively landscaped since they provide a first impression of the area beyond. Strive for a unified appearance and balance between hard (street furniture, walls, fences, etc.) and soft (plantings, berms, etc.) items.

- Landscape neighborhood edges more heavily to separate neighborhoods from major streets or other base activities outside the housing area. This landscaping can take the form of shrubs, wooded areas, fences, berms, or a combination of these methods.

- Landscape to emphasize and reinforce sub-neighborhoods within the community. Landscaping can separate neighborhoods and clusters from one another, thus helping to break up a monotonous housing grid into smaller identifiable units.

- Consider cul-de-sac islands as opportunities for integrating landscaping and recreation areas. A playground, earth berm, and trees in a cul-de-sac can create an attractive area, provide additional recreation facilities, and soften the hard edges of the built environment.

- Provide privacy screening in the form of shrubs, berms, or fences to separate private outdoor spaces from public use areas. Privacy screening can also increase the effective size of the dwelling unit by providing more useable outdoor space. Screening private outdoor space from public streets also hides clutter such as toys, grills, lawn chairs, etc. that would otherwise be visible from public areas (see Figures 3.13 and 3.14).

- Plant various types of trees to emphasize the individual character of each space (see Figure 3.15, Different Functions of Trees within the Landscape). Consider the following use of trees:

  - Plant trees to define streets and paths.

  - Use dense stands of trees to separate housing from a major street or non-residential area.

  - Plant a cluster of trees to break up long, barren vistas, or long, repetitious building facades.

  - Choose flowering trees to add color or interest to a particular street or cul-de-sac.

- Provide foundation planting around the base of buildings. Foundation planting

visually ties the houses to the ground and to each other, and substantially transforms an otherwise barren area. Arrange foundation planting in groups and clusters (never scattered at equal distance) to be fully effective.

- Plant shrubs in beds separated from turf areas by turf headers such as steel edging or concrete mow strips.

- Landscape parking lots to reduce the visual impact of parked cars while providing shade for the vehicles, and also to visually separate parking areas from the dwelling units. Parking areas, if close to units, create a feeling of clutter and increase the sense of density.

- Landscape to define a visual edge to the neighborhood. This can be accomplished through the use of trees, shrubs, berms, or combinations of these treatments.

- Modify flat topography to the extent practical. Flat topography tends to emphasize negative visual elements of a housing area. Gentle berm grade changes at neighborhood entrances, around parking areas, or between clusters can help screen negative elements and further define neighborhoods.

- Use groundcover to lower overall maintenance requirements. Ground-covers other than grass can reduce mowing and other maintenance costs. Examples of groundcovers include ivy, wood chips, or hardy plants.

The *USAF Landscape Design Guide* provides a comprehensive source of information on landscape design that conforms to Air Force goals.

Figure 3.13: Lack of Privacy Screening

Back yards and patios visible from a busy public street.

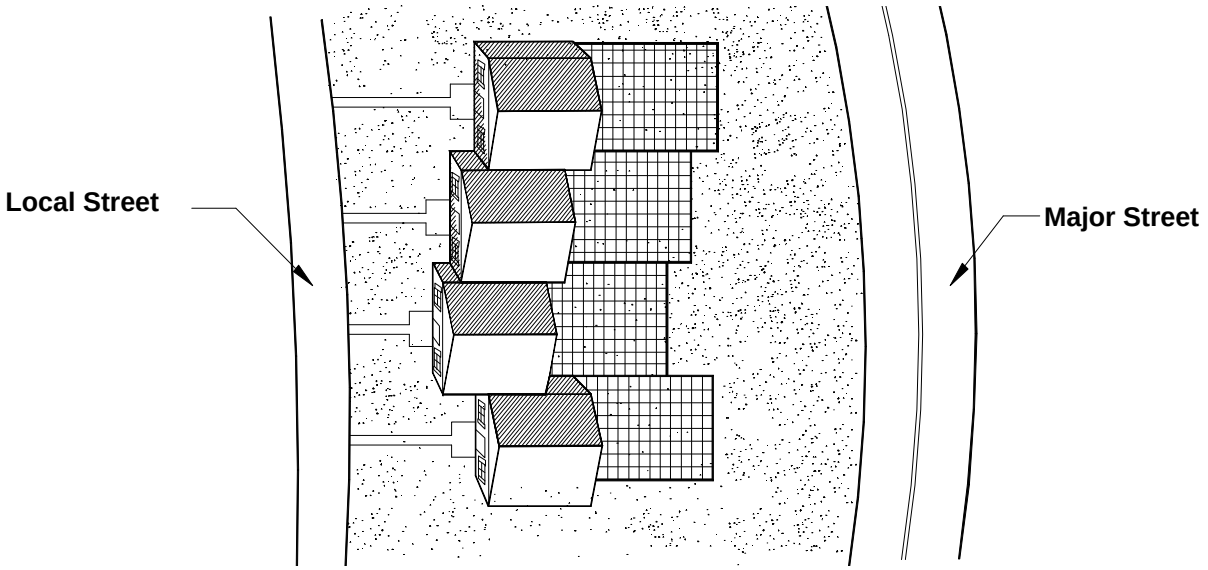


Figure 3.14: Added Privacy and Separation

Shrubs, trees, and berms screen private areas from public view.

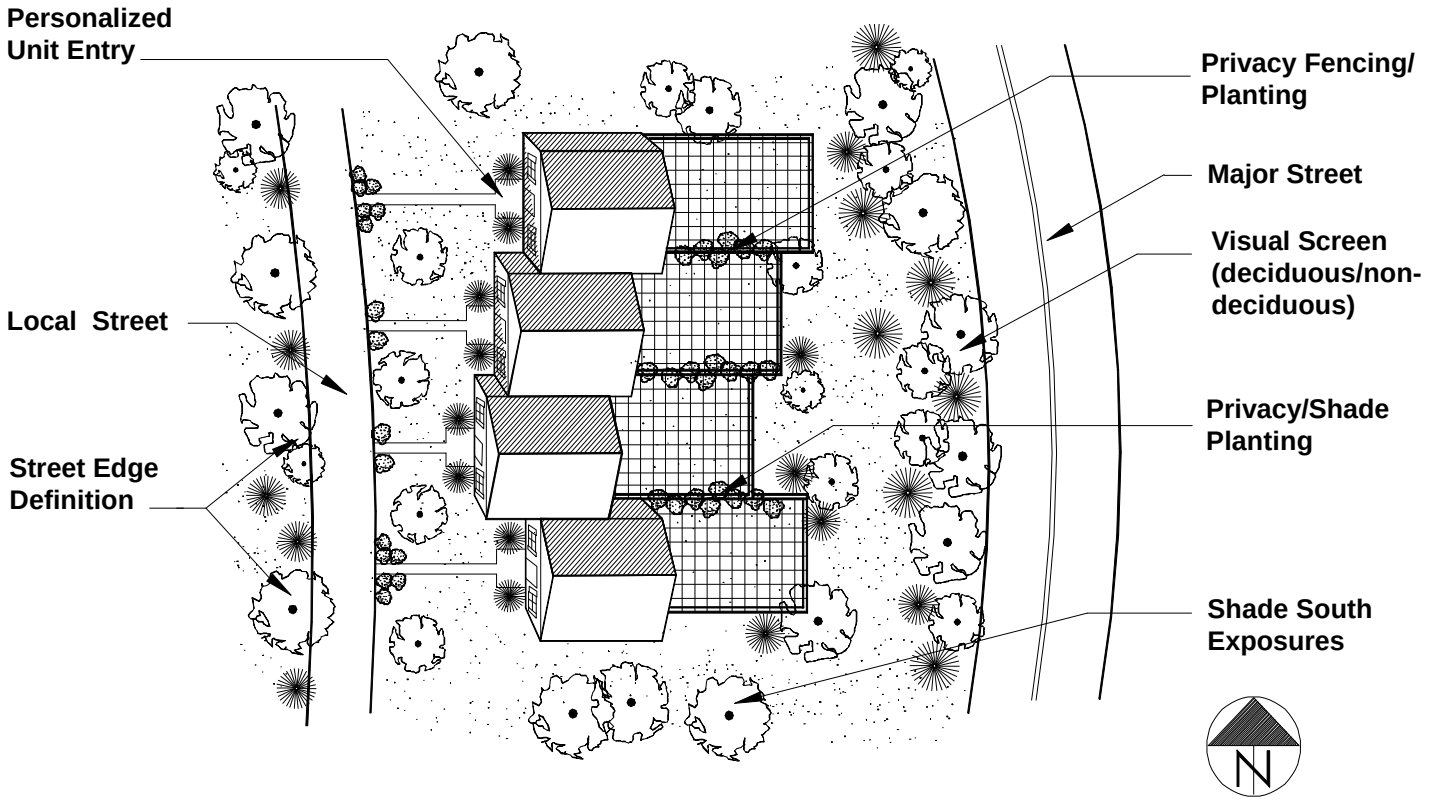
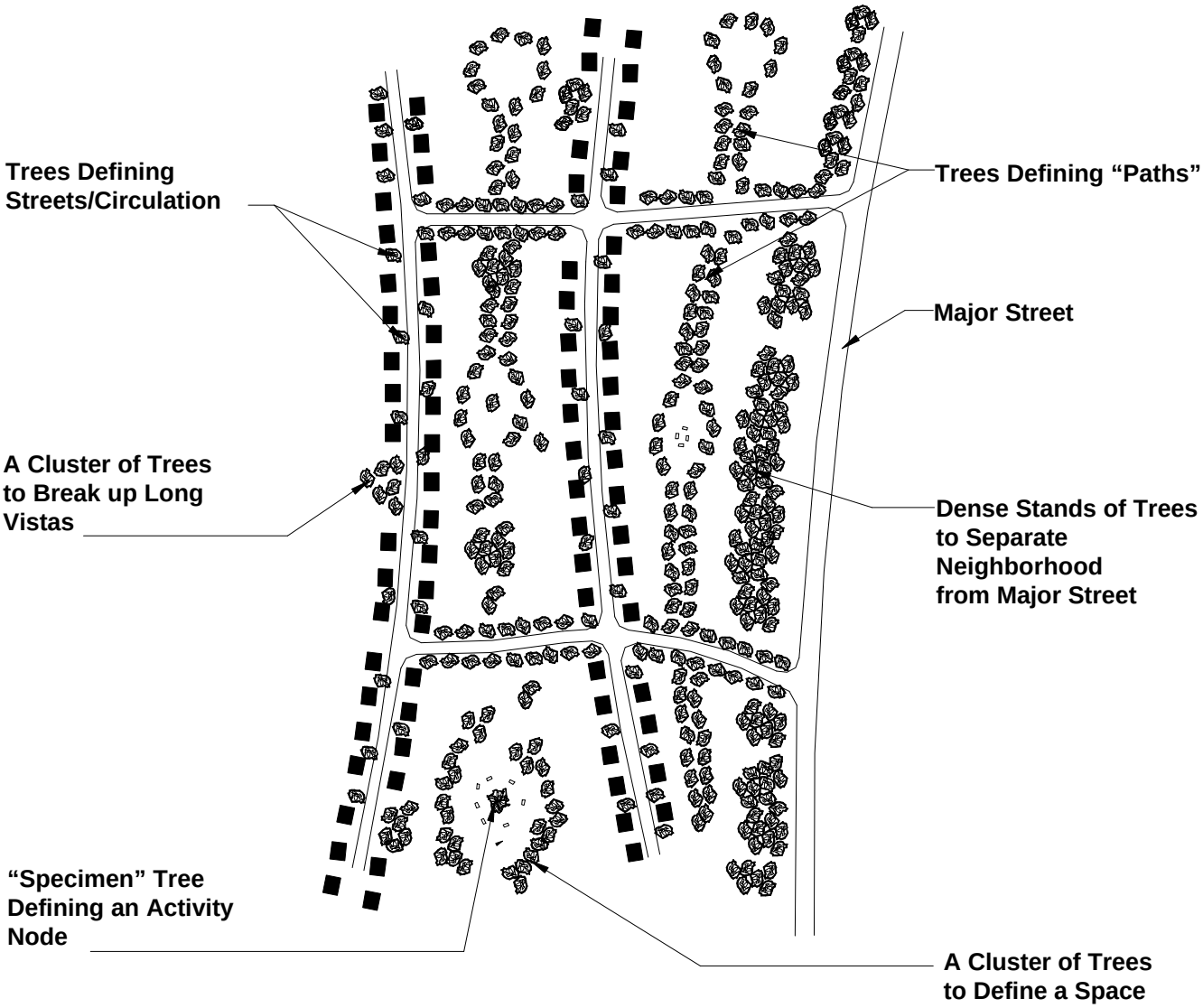


Figure 3.15: Different Functions of Trees within a Landscape Plan.



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CHAPTER 4

UNIT DESIGN CRITERIA

4.1 Purpose

The requirements and guidance stated in this Guide apply to all Air Force FH projects in the United States, its territories and possessions, and in foreign countries. This includes all projects for the acquisition of new housing; for the improvement of existing housing; and for the site development or site improvement of FH areas, including utility services and distribution systems, in any of the Air Force FH programs listed below:

- New Construction.
- Build-Lease (CONUS).
- Build-Lease (overseas).
- Rental-Guarantee.
- Land Out-Lease.
- Post-Acquisition Improvement.
- Maintenance and Repair.

4.2 Livability

When determining the acceptability of a design, consider factors such as:

- The effective and appropriate use of the site.
- The compatibility with local conditions, requirements, and customs.
- The aesthetic and functional characteristics of the design.
- The responsiveness to the needs of the users.
- Cost effectiveness.

These standards describe the characteristics of a project that will provide long term livability, maximum utility, durability, economy of maintenance, and a safe, healthy environment. The following guidelines are intended to provide housing professionals the maximum flexibility in the design and selection of materials or methods of construction. In some cases, it may be desirable to exceed the minimum, particularly for such items as usable space or the quality of equipment, materials, and finishes. Generally, exceeding minimum standards should be an objective as long as the end result is practical, cost-effective, within the level of funding authorized for the project, and does not exceed statutory limits described in Section 2.2.8. The ultimate success of the design solution for any project will depend on the degree of architectural and engineering judgment used in the application of these standards.

4.3 Design Standards

The guidelines in the following sections define the minimum level of housing quality acceptable to the Air Force. This guidance is intended to assist housing project managers and design professionals with developing “whole house” improvement, new, and replacement projects:

- For new FH constructed with appropriated funds, the design requirements represent what is expected in acceptable housing. Designs should comply with the standards of this Guide.

- The intent of Build-Lease (10 U.S.C. 2828a, *Leasing of Military Family Housing,* also known as Section 801), Rental-Guarantee (Section 802), and Land Out-Lease Housing programs is to provide housing without the expenditure of appropriated funds for construction. Consequently, those programs rely primarily on local codes and livability standards to establish the quality of the housing. Build-Lease and Rental-Guarantee projects use a Statement of Work developed by the DoD for use, uniformly, by all military branches. Some of the requirements in this Guide are not specifically included in the DoD Statement of Work because proposals are expected to offer housing designs that are marketable in the private sector. However, while the Air Force guidelines in this document are not contractual requirements, they should be used as a basis to determine the acceptability of proposed designs within the maximum net floor areas authorized. Figure 4.1 presents the maximum authorized net floor area by number of bedrooms for each pay grade. Figures 4.2 and 4.3 provide sample calculations for determining the net floor area. Public Law 102-522, *Fire Administration Act of 1992,* requires that leased housing comply with the fire protection criteria specified in Section 4.12.1, Smoke Detectors, and Section 4.12.2, Fire Sprinklers.

- In the revitalization of existing units, regardless of the funding method used, the project constraints of the project may make full compliance with all of the requirements of these design criteria impractical, particularly regarding minimum sizes, areas, and dimensions. In some cases, sound professional judgment may indicate that a minor deviation is acceptable and preferable to a solution in which the additional benefits derived from full compliance would not justify the additional work and extra cost required to achieve such compliance. These adjustments should become part of the HCP concept development.

- In general, the guidelines in this document establish a baseline level of quality for the entire Air Force, regardless of the housing type, project size, or funds involved.

- Modular homes should meet Air Force standards of material and space. The contractors can submit modular home proposals. If the modular homes meet Air Force standards, they will be reviewed competitively along with other options.

- It is not the intent of this guide to discourage new or non-traditional design and construction techniques. In the interest of achieving high quality residential environments with maximum cost efficiency, the Air Force is open to new and innovative design and construction techniques to achieve this end. Therefore, modular, pre-manufactured, or composite systems construction are encouraged if they can address and meet the intent of the guidelines in this document.

Figure 4.1: Maximum Net Floor Areas Authorized

A If the occupant's paygrade is	B then the number of bedrooms is	C and the maximum net floor area is
0-7 and above	4	2,100 SF (195 SM)
0-6	4	1,700 SF (158 SM)

0-4 and 0-5	4	1,550 SF (144 SM)
	3	1,400 SF (130 SM)
0-1 through 0-3 and E-7 through E-9	5	1,550 SF (144 SM)
	4	1,450 SF (135 SM)
	3	1,350 SF (125 SM)
	2	950 SF (88 SM)
E-1 through E-6	5	1,550 SF (144 SM)
	4	1,350 SF (125 SM)
	3	1,200 SF (111 SM)
	2	950 SF (88 SM)

NOTE: The following are exceptions to the above:

a. The applicable maximum net floor area prescribed above may be increased by 10% for the housing unit of an officer holding a special command position (as designated by the Secretary of Defense), for the housing unit of the commanding officer of a military installation, and for the senior non-commissioned officer of a military installation.

b. The maximum net floor area prescribed above may be increased in any case by 5% if the Secretary of the Air Force determines that the increase is in the best interest of the government (1) to permit award of a turnkey construction contract to the contractor offering the most satisfactory

Figure 4.1: Maximum Net Floor Areas Authorized (continued)

proposal; or (2) to permit purchase, lease, or conversion of housing units. An increase in the maximum net floor area of a housing unit under paragraph a above when combined with an increase in the maximum net floor area of such unit under this paragraph may not exceed 10% of the otherwise applicable limitation prescribed in this Figure.

c. The Secretary of the Air Force may waive the limitation on net area with respect to an FH unit leased in a foreign country if it is not possible to obtain a suitable FH unit within the applicable maximum net floor area prescribed above.

d. The maximum net floor areas prescribed in this table apply to FH provided to civilian personnel, based on civilian pay scales comparable to military grades, as determined by the Secretary of Defense.

e. In harsh climates (defined as having more than 7,500 heating degree days annually), the net floor area may be increased up to 300 square feet for indoor recreation space.

f. Floor areas may be increased to provide air-lock entries at exterior doors in areas with winter design temperatures (97.5 percent) of -10°F (-23°C) or less.

Net Floor Area: The space within the interior faces of exterior walls and party walls of living units, with the following exclusions:

- Utility rooms.
- Laundry rooms.
- Interior bulk storage.
- Exterior bulk storage.
- Washer and dryer space, if not located in separate utility or laundry room (not to exceed 30 square feet).
- Furnace or boiler equipment, domestic water heater, heat pump, and solar equipment if any, if not located in a separate utility room.
- Stairways on each floor (including intermediate landings between floors).
- Stair landing at each floor level above the first floor (not to exceed 10 square feet per floor).
- Finished space under stairs with headroom less than 4’ 6”.
- Unfinished attic space.
- Unfinished basement space.
- Porches, open or enclosed, which are not heated or cooled and which retain the basic characteristics of a porch.
- Arctic entries (not to exceed 20 square feet) in northern climates.
- Terraces, patios, and balconies.
- Carports and garages.
- Common stairways, halls, and entries in multi-family dwellings.
- Areas required solely for installed solar energy systems, including collection and storage equipment and mass walls as well as interior spaces required by and designed specifically for passive solar energy systems.
- Increases required to meet accessibility standards (not to exceed 75 SF).

Figure 4.2: Net Area Calculations (Method A)

NET AREA

DEDUCTIBLE AREA

0 4 8 12

SCALE IN FEET

TOTAL INSIDE AREA:

AA	13'-6"	x	30'-0"	=	405.00 SF
BB	2'-6"	x	6'-6"	=	16.25 SF
CC	15'-6"	x	23'-6"	=	364.25 SF
DD	14'-0"	x	31'-6"	=	441.00 SF
EE	6'-6"	x	13'-6"	=	87.75 SF
			TOTAL		1,314.25 SF

DEDUCTIBLE AREAS:

FF	11'-9"	x	5'-7 1/2"	=	66.10 SF
GG	10'-6"	x	4'-0"	=	42.00 SF
HH	3'-0"	x	5'-7 1/2"	=	16.90 SF
			TOTAL		125.00 SF

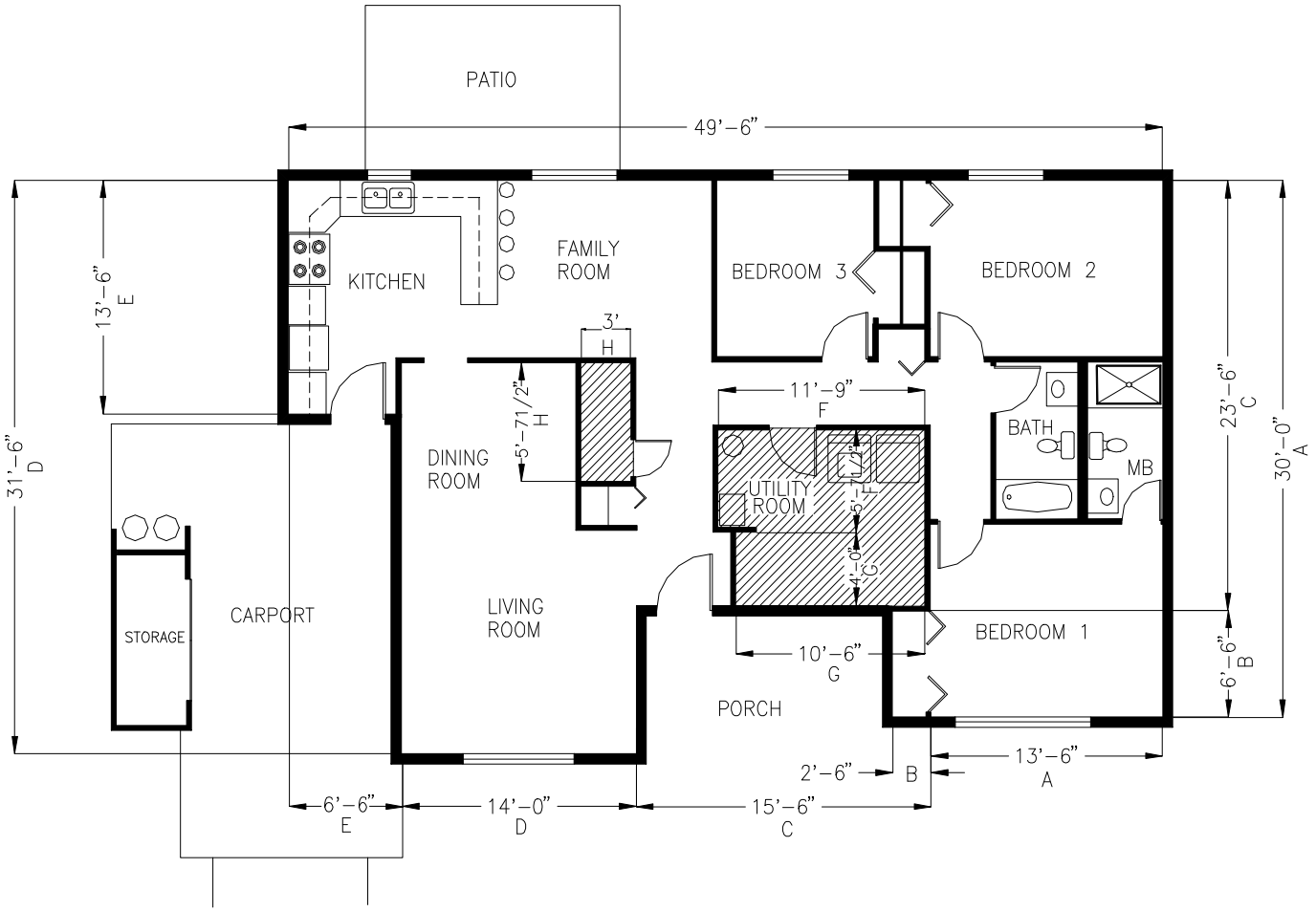


Figure 4.3: Net Area Calculations (Method B)

NET AREA

DEDUCTIBLE AREA

0 4 8 12

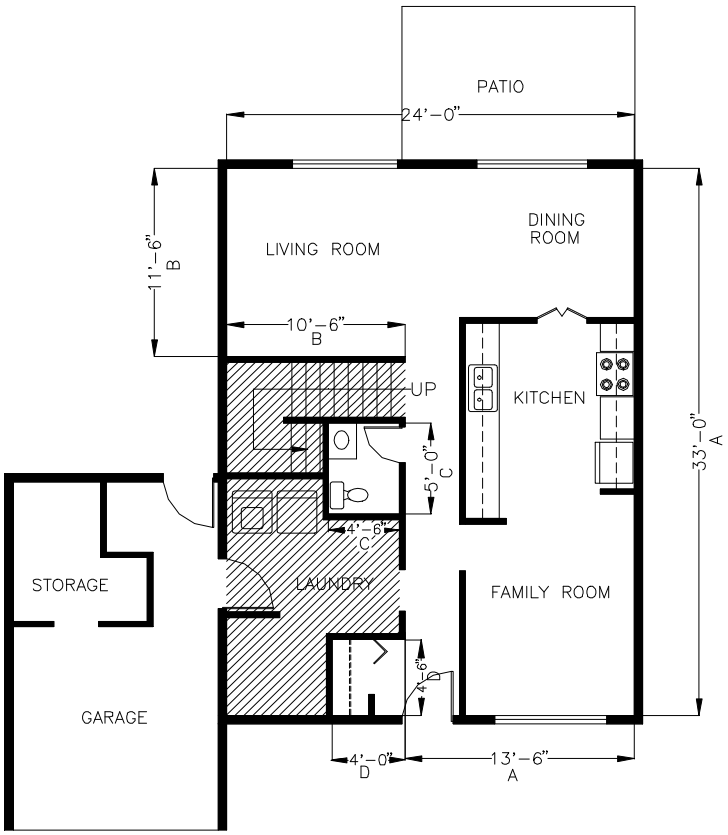
SCALE IN FEET

FIRST FLOOR:

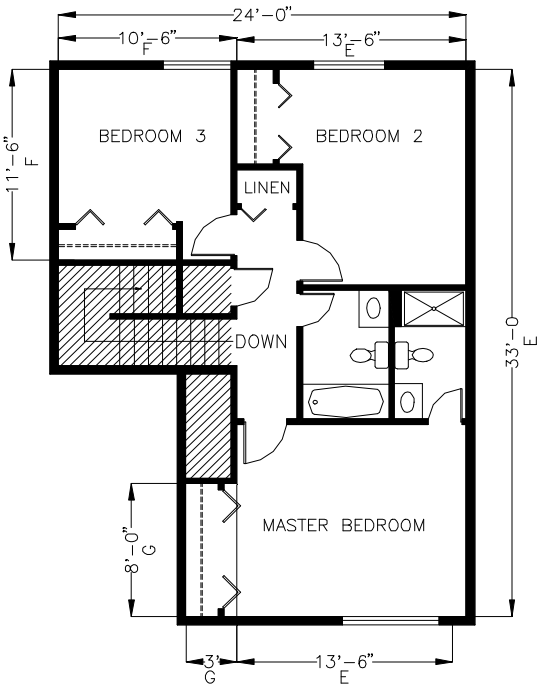
AA	13'-6" x 33'-0"	445.50	SF
BB	10'-6" x 11'-6"	120.75	SF
CC	4'-6" x 5'-0"	22.55	SF
DD	4'-0'" x 4'-6"	18.00	SF
	TOTAL	606.80	SF

SECOND FLOOR:

EE	13'-6" x 33'-0"	445.50	SF
FF	10'-6" x 11'-6"	120.75	SF
GG	3'-0" x 8'-0"	24.00	SF
	TOTAL	590.25	SF



FIRST FLOOR PLAN



SECOND FLOOR PLAN

4.4 Codes and Standards

To ensure FH maintains parity with the local community, it must conform to the local building codes. When Air Force neighborhoods are located outside the jurisdiction of a local code, use a model code (BOCA, UBC, etc.) that is accepted within the geographic area of the project. In the event of a conflict between local or model codes and this Guide, the most restrictive code applies.

The Council of American Building Officials (CABO) has developed a nationally recognized model code for housing: *One and Two Family Dwelling Code*. It standardizes residential code requirements by compiling data from the various national model codes. There are however, construction materials and practices (other than those listed in the CABO code) that are adequate for the purposes intended or that apply to the region typically served by the relevant model code. All viable alternatives require individual consideration by the design professional.

The standards for the design and construction in the codes listed below serve as the basis for criteria applicable to Air Force FH. In general, local codes will take precedence. If no local code exists, the project will be covered by the next level of code upward. For example, in the eastern U.S., if no building code governs, the BOCA National Building Code will govern.

Appendix 2 provides a list of additional references for Codes and Standards relevant to FH projects. A partial relevant listing includes:

- American National Standard Institute (ANSI) A117.1, *Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.*
- ANSI B31.8 and B31.8b, *Gas Transmission and Distribution Piping Systems.*
- ANSI C2, *National Electrical Safety Code.*
- *Americans with Disabilities Act (ADA) Accessibility Guidelines of 1990.*
- *Code for the Installation of Heat Producing Appliances.*
- HUD 4940.2, *Minimum Design Standards for Community Water Supply Systems.*
- HUD 4940.3, *Minimum Design Standards for Community Sewage Systems.*
- *National Building Code* (BOCA).
- National Fire Protection Association (NFPA) 101, *Code for Safety to Life from Fire in Buildings and Structures* (Life Safety Code).
- NFPA Standard 13, *Installation of Sprinkler Systems.*
- NFPA Standard 13D, *Installation of Sprinkler Systems in One and Two Family Dwellings and Mobile Homes*.
- NFPA Standard 13R, *Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*.
- NFPA 70, *National Electrical Code*.
- NFPA 74, *Standard for Installation, Maintenance, and Use of Household Fire Warning Equipment*.
- *National Mechanical Code* (BOCA).
- *National Plumbing Code* (BOCA).

- *Occupational Safety and Health Act* (OSHA).
- *One and Two Family Dwelling Code* (CABO).
- *Standard Building Code* (SBCC).
- *Standard Gas Code*.
- *Standard Mechanical Code* (SBCC).
- *Standard Plumbing Code* (SBCC).
- *Uniform Building Code* (ICBO).
- *Uniform Federal Accessibility Standard* (UFAS).
- *Uniform Mechanical Code* (ICBO).
- *Uniform Plumbing Code* (ICBO).

4.4.1 Metric Measurements

This document uses the English measurement system; the metric equivalents of English measurements are not shown, except for Figures 3.4 and 4.1. However, in compliance with Executive Order 12770, *Metric Usage in Federal Government Programs,* July 25, 1991, all future FH studies and documents will be converted to the metric measure-ment system. Starting in FY97, all FH projects will be programmed using both metric and English units. AF/CEH will establish a metric conversion transition plan for design and construction to target projects starting in FY98.

4.5 Lot and Site Design

Housing planners and designers must ensure that lot and site designs conform to the standards or requirements stated in the Base Comprehensive Plan and the Housing Community Plan.

Ensure that local zoning regulations do not have jurisdiction on AF land when planning new projects. Prior to laying out new sites, survey local communities with similar housing types to the one being planned to observe how these projects addressed site design issues.

4.5.1 Landscape Design

In this section, considerations refer to landscaping such as trees, shrubs, groundcover, and turf directly associated with the FH unit. Landscaping stabilizes the soil adjacent to the unit, provides shade, can reduce heating and cooling loads, and can enhance the aesthetic quality of the unit and the surrounding neighborhood.

Figure 4.4: Landscape Design

Common Problems	■ Improperly selected or placed shrubs, causing damage to foundation walls and slabs. ■ Lack of trees, poor tree selection, and trees located too close to the house foundation and utility lines. ■ Poorly established turf/grass. ■ Absence of shrubbery that screens the front view of the house foundation.
Considerations	■ Provide a complete landscape design: shrubs, groundcover, turf, and trees. Undisturbed areas may remain in their natural state. ■ Provide enough landscaping to control erosion and dust, to prevent muddy areas around housing units, to provide necessary visual/privacy screening, and to soften the visual environment. ■ Provide foundation planting that visually integrates the ground/foundation line. ■ Select plant materials that are hardy, appropriate to the locale, and will not result in excessive maintenance costs. ■ Use landscaping to help individualize the unit, and to provide a sense of privacy and enclosure in the patio areas. ■ If necessary, provide irrigation systems to maintain hard-to-reach common areas. Individual yard areas are not allowed to have irrigation systems. However, ensure that hose bibs are provided so occupants can maintain their lawns. ■ Install frost-proof hose bibs if required by the local climate.

4.5.2 Grading/Drainage

Proper grading of the soil around a housing unit will allow surface water to drain away from the foundation. This is critical in minimizing moisture penetration through the foundation walls into basements, crawl spaces, and under slabs.

Figure 4.5: Grading/Drainage

Common Problems	■ Improper grading of yards and the areas behind shrubs and flower beds. This causes rainwater to collect against the building foundation and results in excessive settlement or up-lift, cracking of the foundation and/or floor, and rotting of the wood members. ■ Missing roof gutters, downspouts, and splash blocks. This allows water running from the roof to erode the soil, or allows water to pond near the foundation.
Considerations	■ Provide gutters and downspouts for all roof areas. Place splash blocks under downspouts that are not connected to storm drains. ■ Grade slopes away from the house in all directions for a minimum of 10 feet at 5 to 8 percent grade. ■ Ensure that foundation planting beds are designed to positively drain so that water will not pond next to the foundation wall.

■ 4.5.3 Walkways

Walkways provide pedestrian access to and from housing units, public sidewalks, and other common use areas. These elements are often an after thought. It is important that they are considered as an integral part of the environment.

Figure 4.6: Walkways

Common Problems	■ Lack of sidewalks, or walks that are improperly located, sized, or designed. ■ Lack of addressing accessibility for the disabled.
Considerations	■ Provide walks and any necessary pavement to all unit entries. ■ Provide paved access between the house, trash container locations, and roadside pick-up locations. Use the driveway to accommodate this requirement wherever possible. ■ Provide street walks that are at least 4 feet wide. Walks adjacent to parking bays should be at least 6 feet wide to accommodate vehicle overhang and still allow walking space. ■ Locate walks adjacent to the curb, except where snow removal procedures dictate a separation, or as needed for appropriate landscape treatment.

Figure 4.6: Walkways (continued)

Considerations (continued)	■ Design walks as needed to accommodate the width of mechanical snow removal equipment. ■ Locate walks on both sides of the street when possible. Street walks should serve all facilities or areas that are subject to pedestrian traffic, such as schools, recreation areas, and bus stops, in addition to the housing units. ■ Design walks to conform to the Uniform Federal Accessibility Standards. ■ Design walks for site conditions, e.g., soils, weather, proper drainage, etc. Provide contraction and isolation joints.

■ 4.5.4 Driveways/Parking

Driveways serve a dual purpose by providing both automobile access to a garage or carport and space for parking. The design of the driveway or parking area can also affect the appearance of the house and neighborhood. An individual parking pad provides off-street parking for one or two automobiles. Garages and carports are covered in Section 4.7.1 of this Guide.

Figure 4.7: Driveways/Parking

Common Problems	■ Cracked, broken, or unevenly settled concrete or asphalt. ■ Poor surface drainage that allows ponding of water. ■ Poor location with respect to the housing unit and street access.
Considerations	■ Provide driveways with a minimum width of 10 feet. ■ As a minimum, provide off-street parking at the rate of 2.0 spaces per individual unit. Count carports, garage spaces, and driveways in satisfying the off-street parking requirements. Count garages and carports as one space. For planning purposes, provide an additional 0.5 spaces per unit to accommodate guest parking in the FH community. ■ Where side-by-side parking is provided, either in driveways or in common parking, provide a minimum parking space width of 9 feet. ■ When the driveway is used to provide off-street parking for the unit, provide a minimum length of 24 feet to accommodate 2 cars, exclusive of walks at the street. ■ Do not design common parking areas such that cars are required to back into main collector streets.

4.6 Foundation and Building Exterior

4.6.1 Foundation

The purpose of the foundation is to transfer the building's structural loads to the surrounding soil. There are two foundation types that are typically used in FH: foundation wall systems (concrete block or poured concrete), or slab-on-grade with thickened slab edges.

Figure 4.8: Foundation

Common Problems	■ Uneven settling causing cracks and penetrations. ■ Water penetration.
Considerations	■ Extend the top of the foundation 8 inches above finished grade. ■ Do not use foundation insulation material containing urea-formaldehyde. ■ Seal foundations thoroughly and completely against moisture penetration. ■ In areas with excessive radon levels, ensure that the foundation acts as a barrier to prevent radon gas in the soil from entering the living area of the house. Evaluate the option of providing a radon exhaust system. ■ Ensure adequate reinforcement of concrete and masonry components to prevent or minimize cracking. ■ Ensure all holes and cracks in the structure and around all penetrations through floors and walls not required for ventilation are sealed with appropriate materials. ■ Provide vapor barriers under all concrete floor slabs on grade. Provide foundation insulation in extreme cold climates. ■ Provide adequate natural ventilation of crawl spaces. Cover crawl space floors with a tightly sealed, continuous barrier. Seal walls between the crawl space and the interior space in the living unit. ■ Provide adequate make-up air for all appliances and equipment that exhaust, consume, or otherwise reduce the amount of air inside the housing unit and create negative air pressure in the unit. ■ Provide floor insulation in crawl spaces according to the guidelines in the *Design Guide for Energy Efficient Revitalization of Military Family Housing for Improvement and New Construction,* developed by the National Association of Home Builders (NAHB) and Oak Ridge National Laboratory. Ideally, to help keep pipes in the crawl space from freezing, insulate the foundation wall and put a vapor barrier on the ground as opposed to insulating the floor.

4.6.2 Roof

The roof structure provides the structural "skeleton" for the loading associated with roofing materials (dead loads) and snow and wind (live loads). The roof is commonly framed with either individual structural members ("stick built") or prefabricated trusses. The Air Force policy is to use sloped roofs for ease of maintenance and for providing a residential scale to the neighborhood.

The roofing materials (shingles, underlayment, and sheathing) provide a waterproof membrane, a surface to shed water, and attic insulation to isolate the conditioned (heated or cooled) air of the house from the outside environment.

Roof flashing is installed at the juncture or change in direction of materials. It is typically composed of sheet metal (e.g., aluminum, galvanized steel, or copper), roofing felts, or asphalt sheets. The most common locations of roof flashing are at the intersection of the roof and chimney, at the intersection of the roof and walls extending above the roof, and at the intersection or valley formed by two roof sections. Vents and other rooftop equipment are also flashed at their penetrations through the roof.

Roof overhangs (eaves, soffits, and facias) protect the walls from sun, rain, ice, or snow and divert water away from the foundation. In warmer climates, extended overhangs can shade walls and windows from the summer sun. In cold climates, overhangs can be reduced to let more sunlight warm the exterior walls and enter the interior of the unit.

Figure 4.9: Roof

Common Problems	■ Improper slope to drain roof and the selection of improper roofing materials and/or construction techniques for the slope chosen. These poor design choices can result in roof leaks and rotted structural roof framing. ■ Inadequate structural capacity of some roof members. ■ Lack of flashing, or improper use of flashing material or installation techniques. ■ Inadequate ventilation or inadequate insulation for the climate. ■ Improper or inadequate roof fasteners and materials. ■ Insufficient overhang in hot climates to shield wall surfaces from the summer sun and too much overhang in cold climates which contributes to ice dam build-up. ■ Unprotected soffit and fascia panels that may rot if exposed to extended periods of high moisture. ■ Gutters that are improperly shaped, sloped, or attached to the roof.

Figure 4.9: Roof (continued)

Considerations	***Roof Slopes and Overhangs*** ■ Design roofs sloped to a minimum of 3 in 12. ■ Cover roof slopes of 3 in 12 or steeper with 235-lb. asphalt shingles or 215-lb. tabbed fiberglass reinforced asphalt shingles. ■ Avoid roof slopes of 2 in 12 or less as much as possible. ■ Cover existing slopes over 2 in 12 and less than 3 in 12 with either shingles or built-up roofing, if installation techniques are in full compliance with manufacturer's recommendations and applicable codes. ■ Evaluate the use of overhangs to minimize or maximize exposure to the sun (solar gain) and other elements. ***Roof Coverings*** ■ Avoid wood shingles in new construction. ■ Where metal roofs are installed, ensure adequate sound attenuation is used to minimize the sound from rain and outside noise. ■ In very cold climates, do not use shingles on roofs with a slope of less than 3 in 12. ■ Do not use other roof covering materials (i.e., metal, slate, clay, or concrete tile) except when dictated by local conditions and when justified or supported by an economic analysis that has considered less costly alternatives. However, use materials that match the historic theme of the FH units. ■ Coordinate roof covering colors and textures to harmonize with other house and neighborhood colors. The type and color of roofing contributes significantly to the overall appearance of the neighborhood and the "curb appeal" of the house. ***Maintenance Considerations*** ■ Always employ gutters and consider using gutter guards. ■ Base the roof overhang design on the local climate. ■ Place splash blocks under all downspouts that are not connected to the storm drain system. Ensure that the water discharge is not directed onto a walkway or toward the foundation. ■ Avoid the use of soffits, fascia, and gutter materials that require field painting and intensive cyclical maintenance. ***Attic Ventilation and Insulation*** ■ Provide attic vents, including soffit vents, ridge vents, and gable vents to allow for ventilation of attic spaces. Use temperature sensitive attic fans when possible. Do not use wind turbine vents.

Figure 4.9: Roof (continued)

Considerations (continued)	***Attic Ventilation and Insulation* (continued)** ■ Make sure that plumbing vents and exhaust fans do not vent into the attic, but penetrate the roof. Ensure these penetrations extend above the roof per local building codes. Also ensure they have adequate flashing. ■ Provide ceiling and roof insulation according to the guidelines in the *Design Guide for Energy Efficient Revitalization of Military Family Housing for Improvement and New Construction.* ■ Consider using radiant barriers in the roof system. Recent research has indicated that attic temperatures in the summertime can be reduced by 20°F in warm climates.

■ 4.6.3 Exterior Wall Structure

In traditional residential construction, the exterior wall is commonly framed with 2 x 4 wood studs spaced 16 inches on center. However, 2 x 6 studs spaced 24 inches on center are structurally acceptable and enable increased insulation where needed. Some units are built of solid masonry, usually 8 x 8 x 16 inch concrete block, which requires specialized installation and application. In rarer situations, load-bearing brick, adobe blocks, or possibly light-gauge steel are used. The structural portion of the exterior walls transmits roof loads to the foundation and is constructed to resist wind loads and collapse of the entire structure.

Exterior finish materials provide an attractive means of protecting the building from all weather conditions. Acceptable materials include brick masonry, wood, metal, and vinyl siding, or stucco. Exposed, painted, or bare conventional concrete masonry units are not acceptable. However, decorative CMU (e.g., split face) can be used. Exterior insulation systems, such as *Dryvit*, are becoming increasingly popular and economical to use as a finish material. Consider this option if warranted by local conditions.

Figure 4.10: Exterior Wall Structure

Common Problems	■ The most common defects in wood frame structural walls are infestation by insects and rotting caused by excessive moisture. The most common defect of concrete block, load-bearing brick, or adobe walls is cracking due to the settling of the foundation.

Figure 4.10: Exterior Wall Structure (continued)

Common Problems (continued)	■ Moisture penetration, which causes insulation failure. ■ The failure of walls will cause doors and windows to be out of plumb and cracks to occur in drywall. ■ Inadequate insulation.

Considerations	■ Use acceptable finish materials and quality specifications for the exterior wall construction. Acceptable materials for FH are:
	  ■ Brick masonry
	  ■ Glazed concrete masonry
	  ■ Architectural concrete masonry
	  ■ Stucco
	  ■ Prefinished wood
	  ■ Factory-finished or vinyl-clad steel or aluminum siding
	  ■ Solid vinyl siding
	  ■ Exterior insulating systems (EIS) or other insulated composite wall systems consisting of an insulation core, reinforcing mesh or fabrics, and a cementitious exterior finish.
	■ Avoid materials requiring field finishing (painting, staining, sealing, etc.).
	■ Avoid aluminum siding in regions subject to hail storms. Vinyl siding is an acceptable alternative.
	■ Provide wall insulation according to the guidelines in the *Design Guide for Energy Efficient Revitalization of Military Family Housing for Improvement and New Construction.*
	■ Specify non-ozone-depleting chemical (ODC) insulating materials.
	■ Always provide a vapor barrier on the warm side of the insulation in exterior walls.

■ 4.6.4 Exterior Windows and Doors

Windows serve to admit natural light and ventilation to the house and offer a means of egress in the event of a fire. At the same time, windows should provide security and add to energy efficiency.

Exterior doors provide entry to and exit from the house while facilitating energy efficiency and security.

Windows and doors should be compatible with the overall house style and design. Windows and doors come in a variety of materials and assemblies, and a fair amount of time is required to understand and select the most effective option.

Figure 4.11: Windows

Common Problems	■ Excessive air infiltration and heating/cooling loss. ■ Failure of materials (mechanisms, hardware, air seals, screens, etc.). ■ Deteriorated and missing caulking and sealant at joints. ■ Inadequate glazing for weather conditions. ■ Egress criteria are not met.
Considerations	■ Use energy-efficient windows (insulating type, low E glass, double or triple glazing, storm windows, thermal breaks, weather-stripping, etc.). ■ Provide at least one window in each bedroom that meets the minimum requirements for egress in the event of fire: Width: At least 20 inches clear opening Height: At least 24 inches clear opening Area: At least 5.7 square feet clear opening Sill Height: Not more than 44 inches above the floor ■ Provide removable screens for operable windows. ■ Provide locks on all windows. ■ Seriously consider solid vinyl or metal or vinyl-clad wood windows to reduce maintenance costs (e.g., painting, damage due to moisture, etc.). ■ Specify windows that are manually operated. Avoid cranking mechanisms except in units designed for accessibility. ■ Consider the energy impact and passive solar performance in the placement and size of windows. ■ Maximize the amount of natural light in the living areas. Consider using energy efficient skylights (where practicable) when roof slope is at least 3 in 12 inches. Consider the impact of the skylight to the elevation of the house and solar gain in hot climates.

Figure 4.12: Doors

Common Problems	■ Poor thermal characteristics. ■ Allow excessive air infiltration and heating/cooling loss. ■ Failure of materials (hardware, locks, etc.). ■ Water penetration at sills. ■ Missing storm or screen doors. ■ Door style does not match the style of the house.

Figure 4.12: Doors (continued)

Considerations	■ Consider steel insulated exterior doors for increased energy performance. ■ Consider the use of fiberglass doors and frames or other non-corrosive materials in corrosive environments. ■ Provide a door chime or knocker at the front entrance. ■ Provide a wide-angle viewer at 60 inches above the finished floor on doors without windows or sidelights. ■ For patios, use swinging doors that are less costly in terms of maintenance and are easier to repair. Use doors with good insulating characteristics. ■ Provide dead-bolt locks on all entry doors. Provide security bars or other secondary locking devices on sliding patio doors. ■ Provide lock cores compatible with the base keying system. ■ Provide weather-stripping gaskets and seals on all exterior doors. ■ Consider using secondary doors at front entrances that will accept a fully glazed panel or a screen. ■ Select door styles that complement the architectural style of the house (e.g., avoid a colonial door on a contemporary/modern design).

■ 4.6.5 Balcony

Balconies are a method of providing additional living space and access to outdoor space for units located entirely above the ground floor. Balconies should provide functions similar to patios but on a smaller scale. Balconies can be a source of maintenance problems if they are not carefully considered in the design process.

Figure 4.13: Balconies

Common Problems	■ Structural damage due to exposure to the elements. ■ Ponding of water when the balcony does not slope away from the house. ■ Inadequate materials that lead to structural failure of the guardrails, deck, or supports.
Considerations	■ For each living unit located entirely above the ground floor, provide a balcony with a minimum area of 40 square feet and a minimum front to back dimension of 6 feet.

Figure 4.13: Balconies (continued)

Considerations (continued)	■ If feasible, try to locate balconies within the building envelope as opposed to cantilevering off of the structure. ■ Construct exterior/cantilevered balconies using solid decks with an impervious surface (e.g., lightweight concrete), sloped to drain to the outer edge. ■ Consider placing the balcony to allow direct access from the living room, dining room, or family room. ■ Design the balcony to the local code but with at least a minimum structural design live load of 60 pounds per square foot. ■ Provide railings with intermediate rails or patterns such that a 4-inch sphere cannot pass through. Provide a railing at least 36 inches high from the deck surface. ■ Ensure all wood members are pressure treated/painted to withstand exposure to the local elements for at least 2 years. ■ Ensure all steel/metal members are primed and painted with primers/paints specifically designed for application to metals and that can withstand exposure to the local elements for at least 2 years. ■ Use deck finishes with high slip resistance. ■ In general, for all exterior features (balconies, railings, stair components, etc.), provide priming and paint to withstand local weather extremes for at least two years.

■ 4.6.6 Main Entry

Entry porches should provide safe, convenient access into the house. They should be well lighted and protected from the elements. An entry porch should be considered an entry feature and should add both identity and "curb appeal" to the housing unit. Entry porches or stoops are typically constructed of concrete, may have one or more steps, and may be covered with a roof projection. Like balconies, entry porches can be a source of costly maintenance problems if not carefully considered in the design process.

Figure 4.14: Main Entry

Common Problems	■ Hidden main entry. ■ Lack of a unit identification number.

Figure 4.14: Main Entry (continued)

Common Problems (continued)	■ Lack of weather protection, adequate drainage, and non-slip surfaces. ■ Inadequate stair tread width or landing size. ■ Risers of different heights and treads of different depths. ■ Inadequate lighting. ■ Lack of a railing or other safety considerations.
Considerations	■ Design main entries to provide a sense of identity to each home. Remember that the visual impact from the street (curb appeal) and from the front entrance is extremely important. ■ Locate all unit identification so that it is clearly visible from the street. ■ Slope the porch stoop 1/4 inch per foot away from the house to provide positive drainage. Eliminate depressions in the surface that cause ponding. ■ Provide porch surface materials that have high slip resistance. ■ Conform to the Uniform Federal Accessibility Standard (UFAS) for stair design requirements. Generally, tread depths of less than 11 inches, riser heights of more than 7 inches, and stair widths of less than 3 feet are unacceptable. Slope the tread from the rear to the front. The rear of the tread cannot be more than 1/4-inch higher than the front of the tread. ■ Provide railings on both sides of steps and around the landings. Ensure the railing has intermediate rails/patterns such that a 4-inch sphere cannot pass through. ■ If a covered entry/porch is not a part of the design, protect the entry area with a minimum 3-foot overhang or covered area in front of the door. ■ Provide adequate lighting so that no areas of the entry are left dark. Also provide a means for visitors to signal their arrival at the main entry (door bell, chime, buzzer, etc.). ■ Eliminate all “blind spots” in the entryway. ■ Provide mailboxes that meet the criteria of the local U.S. Postal Service and enhance the aesthetic quality of the streetscape.

■ 4.6.7 Exterior Stairs

Although not an optimal configuration, especially in colder climates, exterior stairs can be used to provide access to living units located above the ground level. Certain considerations must be addressed if exposed exterior stairs are used; in general, they are very similar to the considerations for balconies and entry porches.

Figure 4.15: Exterior Stairs

Common Problems	■ Lack of protection from the elements. ■ Low slip-resistance in foul weather. ■ Inadequate lighting. ■ Inadequate materials for local weather conditions.
Considerations	■ Shelter all exterior stairs from wind and precipitation. This is especially important in cold climates where ice build-up results in a safety problem. To prevent ice build-up, do not use open-riser designs. ■ Make treads and landing surfaces slip resistant. Ensure that slip resistance is a characteristic of the surfacing material; do not adhere non-slip strips to a slippery tread or landing surface. ■ Conform to local building codes and the Life Safety Code for stair/tread dimensions. ■ Slope landings 1/4-inch per foot to prevent ponding. ■ Provide railings on both sides of the stairs and at landings. Ensure the railings have intermediate rails or patterns such that a 4-inch sphere cannot pass through. Provide a railing of at least 36 inches in height measured vertically from the nosing (front edge) of the treads. ■ At a minimum, provide light fixtures at the top and bottom of the stairs, preferably operated automatically based on outdoor light levels. ■ Design the stairs to permit the movement of a queen-size bed box springs and other bulky furniture items. ■ Ensure all wood members are pressure treated and designed to withstand extended exposure to local weather extremes. ■ Ensure all steel/metal components are primed and painted to withstand local weather extremes.

4.7 Exterior Structures

4.7.1 Garage/Carport

Garages and carports provide sheltered, off-street automobile parking. Most garages provide miscellaneous storage, while some carports have built-in storage space overhead or in bins or closets. The off-street covered parking policy is as follows:

- Single-car garages or carports (12 feet 8 inches by 22 feet 4 inches maximum clear dimensions) are authorized for all units where site conditions permit.
- Bulk storage can be included in the garage or carport as long as the total maximum bulk storage allowance is not exceeded. The maximum clear dimensions may be increased when bulk storage is included in the garage or carport. Provide 12-inch-deep, heavy-duty shelving.
- Double-car garages or carports (20 feet 10 inches by 22 feet 4 inches maximum clear dimensions) will be considered for approval by AF/CE for senior installation officials (special command position, commanding officer, and senior non-commissioned officer) on a case-by-case basis. All other FH units are authorized a single-car garage.

Figure 4.16: Garage/Carport

Common Problems	■ The absence of attached, covered parking (either garages or carports) or covered parking located inconveniently for the dwelling units. ■ Inadequately sized and nonfunctional spaces of poor construction quality. ■ Concrete floor slabs with cracks, differential settling, and poor drainage. ■ Ineffective or non-existent fire walls between the house and garage or between attached garages. ■ Lack of adequate and locked storage within the covered parking space. ■ Poor-quality garage doors that are inoperable or require frequent maintenance, or lack of quality hardware for safe and easy operation and secure fastening (locking hardware) of the garage door. ■ Service entry from the garage/carport and main entrance to the unit are the same.

Figure 4.16: Garage/Carport (continued)

Considerations	***Design and Layout*** ■ Avoid combining the main and service entries of the housing unit. ■ Provide attached garages for each single family living unit whenever possible. If garages cannot be attached, locate them as close as possible to the kitchen and service area of the house. Garages are especially critical in areas where the winter temperature reaches -10 °F or colder, or where constant exposure to salt air or high winds require enclosed shelters. ■ Combine the exterior bulk storage with the carport or garage, if possible. ■ Design garages and carports to complement the architectural features and materials of the house. ***Construction*** ■ Design the garage/carport such that the floor slab is a minimum of 4 inches below the floor of an adjoining house or storage space. Where the drop is greater than 7 inches, provide appropriate stair design. Slope the slab toward the vehicle opening for positive drainage. ■ For attached garages, provide a 1-hour rated fire wall as a minimum between the house and garage, and between adjacent garages. Consult the locally accepted building code. ■ Where exterior storage is included in carports, provide lockable storage with a door width of at least 36 inches. Install shelves and a wall-switch-controlled light fixture. ■ Where carports or garages of adjoining units share a common roof, provide a fire separation between the occupants' spaces with a floor to ceiling, full parking space length partition. Cover the partition with finished materials on each side. ■ For garages not directly attached to units, provide a 36-inch passage door from the garage to the exterior in addition to the roll-up vehicle door. ***Hardware and Accessories*** ■ For attached garages or carports, provide a light switch inside the living unit in addition to the switch in the parking area. ■ Consider using motion-sensitive lighting for convenience and security. ■ Provide a minimum of one weatherproof Ground Fault Circuit Interrupting (GFCI) duplex convenience outlet in each garage or carport per occupant. ■ Provide garage door locking hardware that provides safe and easy operation. The door should be operable by adults with limited physical strength. Provide weather-stripping for garage and service doors when they are attached to the housing unit.

4.7.2 Exterior Bulk Storage Areas

Exterior bulk storage areas augment indoor storage and can be used for items normally used outdoors. This storage area may be located in the garage or carport, or in a storage room within or attached to the house. Provide access to these storage areas from the exterior of the housing unit.

Figure 4.17: Exterior Bulk Storage Areas

Common Problems	■ Lack of exterior bulk storage areas. ■ Lack of locks on doors for security. ■ Doors that are too narrow to accommodate home maintenance equipment (e.g., lawn mowers). ■ Nonexistent or inappropriate light fixtures. ■ Nonexistent or inadequate storage shelving. ■ Lack of paved access between the living unit and storage area. ■ Non-weather-tight construction.
Considerations	■ Avoid locating exterior storage in separate sheds. ■ Divide bulk storage between interior and exterior storage areas. See Section 4.8.10 for interior storage requirements. Exclude exterior bulk storage from the authorized net floor areas. The exterior bulk storage areas shall comply with the following requirements: **Number of Bedrooms** / **Minimum Exterior Bulk Storage Area** / **Maximum Exterior Bulk Storage Area** **2** / **24 SF** / **70 SF** **3** / **24 SF** / **80 SF** **≥4** / **30 SF** / **100 SF** ■ Provide walk-in storage areas with a minimum depth (front to back) of 4 feet clear for exterior storage. Provide an outside service door opening wide enough to accommodate lawn mowers and typical lawn tools. ■ Locate the outside service door conveniently to the outdoor living and lawn areas. Provide paved access to the door. ■ Provide a switch-controlled light at the outside service door. ■ Provide 12-inch-deep, heavy-duty shelving.

4.7.3 Trash Enclosure

External trash enclosures provide an area for the placement of household trash for subsequent pick-up by a trash collection service. They should also effectively screen potentially unsightly trash accumulation.

Figure 4.18: Trash Enclosure

Common Problems	■ Undersized containers and enclosures. ■ Inadequate screening. ■ Inconvenient location for residents and collection services. ■ Enclosures not integrated into the architectural theme of the house and neighborhood.
Considerations	■ Provide each living unit with an exterior area large enough for two 30-gallon containers and recycling containers used by the base. Locate the area convenient to the trash pick-up point. Provide paved access for the occupant. ■ Acceptable trash enclosure materials include wood fencing, brick masonry, and decorative concrete masonry units (CMU). Consider the overall architectural environment when designing the enclosure. Stress functionality and simplicity. ■ Provide enclosures to screen refuse that might be visible from the street, common area, or other living units. ■ Consider garages and carports in providing adequate trash container enclosures. ■ If "dumpster" type trash enclosures are used to support a number of FH units rather than individual trash containers, locate the dumpsters in an area that would be the least offensive to the housing occupants, is convenient for pick-up service, and is adequately screened.

■ 4.7.4 Patios/Ground-Level Decks

Patios or decks provide the occupants of ground-level units with a private outdoor living area to augment interior living spaces. Most of the considerations that apply to other exterior features also apply to patios and ground-level decks.

Figure 4.19: Patios/Ground-Level Decks

Common Problems	■ Nonexistent or inadequate outdoor living space. ■ Differential settling of concrete patios, concrete failures, and improper slopes that allow water to collect at the building wall. ■ Improper design, material selection/specification, and construction techniques of wood decks that lead to rot, insect damage, and deterioration of the rails, decking, and structural supports.

Figure 4.19: Patios/Ground-Level Decks (continued)

Considerations	■ For each living unit that opens to the exterior at ground level, provide a concrete patio with a minimum area of 120 square feet and a minimum front-to-back dimension of 8 feet. A raised deck of the same size, constructed of weather-resistant and slip-resistant materials, is an acceptable alternative to the concrete patio when warranted because of finished grade conditions. All wood used should be pressure treated. ■ Screen patios/decks from streets, common areas, and adjacent living units with a combination of walls, fencing, or planting. ■ Provide direct access from the living room, dining room, or family room. ■ Provide deck rails as required by local code. ■ Ensure the patio or deck elevation (floor height) is a minimum of 4 inches below the floor of an adjoining house or storage space. If the drop is more than 7 inches, provide steps with proper stair design. ■ Where concrete patios adjoin the house, seal the joint between the house and the slab but allow for differential settlement between the patio slab and the house foundation. ■ Slope all patios and decks a minimum of 1/4-inch per foot away from the house and ensure level surfaces to prevent ponding.

■ 4.7.5 Privacy Fence

Privacy fences and screens define both an outside area for family activities and individual space. Although fences/walls ensure privacy, they can create other problems in terms of security/visibility and maintenance. If fencing is being considered as an effective option over the less expensive landscaping, choose fencing if it is clearly the most cost-effective solution.

Figure 4.20: Privacy Fence

Common Problems	■ Lack of privacy for individual units. ■ Lack of fence uniformity throughout the housing area. ■ Improper design, material selection, or construction techniques that lead to structural damage and failure.

Figure 4.20: Privacy Fence (continued)

Considerations	■ Provide each FH unit with an outdoor space that provides the opportunity to increase privacy. This space can be partially or completely enclosed by a privacy screen depending on the density of housing. ■ Provide visual screening by using structural walls or fencing with materials that will provide maximum privacy to occupants. ■ Acceptable materials include wood fencing (various designs), brick masonry, or decorative CMU. ■ For attached units, consider full-yard privacy fencing. ■ Provide privacy fences with a maximum height of 6 feet. ■ Consider landscaping or planting as a substitute for part or all of the screening. ■ Consider establishing pre-approved fence materials/designs for erection through self-help depending on the occupant's need or desire for fencing.

4.8 Interior Plan Requirements

4.8.1 Functional Area Relationships

This section provides a general overview of the functional areas of FH. Paragraphs 4.8.2 through 4.8.12 give space-by-space analyses of and criteria for these various functional areas.

Figure 4.21: Functional Area Relationships

Entry/Foyer	■ Provide each housing unit with an entry or foyer, an entry light, and a nearby coat closet. Locate the entry in or adjacent to the living room and provide access to other areas without passing directly through the living room. Allow access from the foyer to the kitchen, the hall, or the stairs leading to the sleeping areas.
Living and Family Rooms	■ Offer a family room, which may be a separate room or part of an open floor plan which incorporates the living, dining, and family room functions, in units with three or more bedrooms. Regardless of the configuration, meet minimum square footage requirements for each functional area. In two-bedroom units in which the living room is used as the entertainment area, locate the kitchen/food-preparation areas away from direct sight of the living room. Similarly, ensure bathrooms do not have direct access from living areas. In the living room, include one wall with a minimum length of 12 feet to accommodate a sofa and end tables. In those units that contain both a living room and a family room, position the living room relative to the kitchen and bath as described above. Include an exterior door to the patio or balcony to provide access to outdoor living space from the living or family room.
Dining Room	■ The primary dining area may be a separate room. If so, size it such that it can accommodate a table and chairs for 6 persons plus a china closet and/or buffet. Do not provide direct access to bathrooms from the dining room or food-preparation areas. Direct the circulation pattern through the dining room along one wall instead of through the middle of the room. In some units, the primary eating area may be positioned at the end of the living room or offset from the living room forming an "L". Consider doors between living and dining areas where the controlled separation can enhance the versatility of the overall space.
Secondary Dining Area (Breakfast Nook, Dining Counter, etc.)	■ A secondary dining area may be provided as part of a larger kitchen. This secondary eating area may be in direct sight of food preparation areas but not in direct sight of the bathroom. Make this area accessible to less formal spaces such as the family/recreation room or outside living spaces, if possible.

Figure 4.21: Functional Area Relationships (continued)

Kitchen	■ Locate the kitchen adjacent to the dining room and family room with direct access to each. Provide a controllable visual separation between the kitchen and all formal living areas. When convenient, allow access from the kitchen to a covered parking area and to interior utility and exterior service areas.
Bedrooms	■ Provide master bedroom plus one or more additional bedrooms in each FH unit. Separate these sleeping areas from all other functional areas of the house, but locate bathrooms nearby. Provide access to the bathrooms from the bedrooms without passing through or within sight lines of other areas of the house. Provide a dedicated master bath for the master bedroom in units having three or more bedrooms. Size the master bedroom to accommodate a king-size bed and other furnishings.
Bathrooms	■ Locate bathrooms near the bedrooms and out of sight of the other areas of the house. In two-story units, provide a half-bath or powder room to serve the first floor. When a half-bath is provided on the main floor, consider accessibility to both guests and family activities. Open a half-bath to circulation space rather than to a living space.
Laundry Area	■ Provide a laundry area large enough to accommodate a washer and dryer plus shelving or cabinets for storing laundry supplies out of sight of the entry, entertainment, and eating areas. Do not locate the laundry area within a bathroom.
Storage	■ Provide storage areas in the form of clothes closets, linen closets, and interior bulk storage in the housing unit for seasonal personal effects. Also provide exterior bulk storage for larger items, such as athletic and lawn-care equipment (see Section 4.7.2).
Hallways & Stairways	■ Hallways, stairways, and stairwells are areas dedicated to circulation. Incorporate circulation into living space to minimize usable floor space lost to circulation.
Fireplaces	■ Although fireplaces are becoming increasingly common in larger homes in the private sector, issues of initial and life cycle costs, energy efficiency, fire safety, and maintenance preclude the addition of fireplaces in Air Force FH. However, existing fireplaces can be left in place.
Furniture	■ Design circulation areas to permit the movement of queen size beds and other bulky items of furniture: Hallway and Stairway Width: 3 feet minimum Stairway Headroom: 6 feet 8 inches minimum. Stairway Treads: 11 inches maximum Stairway Risers: 7 inches maximum.

Figure 4.21: Functional Area Relationships (continued)

Space Considerations	■ Consider architect-engineer or in-home comprehensive interior design services to provide suggested furniture layouts and efficient circulation patterns. ■ Centrally locate and arrange circulation space to serve as many functional areas as possible without the need for a number of extended hallways. ■ Consider furniture placement in each habitable room to accommodate at least two furniture arrangements to serve the typical family in that type of house. Consider the placement of windows, doors, electrical outlets and switches, and HVAC supply and return registers in furniture arrangements. Consider the vertical as well as the horizontal dimension of the rooms. ■ Provide a minimum ceiling height of 8 feet in all FH units unless unique conditions warrant variance. Do not allow ceiling heights to be less than seven feet, except in halls, baths, and utility rooms; avoid the low ceilings in these areas if possible. ■ Provide acoustical separation between living units as noted below. Determine the Sound Transmission Class (STC) ratings in accordance with ASTM E 90 and E 413. Determine the Impact Insulation Class (IIC) in accordance with ASTM E 492 (*Tapping Machine Method*): ■ Walls between living units: min. STC = 50. ■ Floor/ceiling assemblies between living units and assemblies within a unit: min. STC = 52 min. IIC = 52 ■ Between adjacent bathrooms; bathrooms and living areas; and living areas and bedrooms: min. STC = 42 ■ Between adjacent bedrooms: min. STC = 37

■ 4.8.2 Foyer

The foyer is the principal point of entry to and from the housing unit. It provides the first impression. Lay out or modify this space so it is clear to the guests which spaces are private and which are public.

Figure 4.22: Foyer

Common Problems	■ Lack of definition and separation from the other rooms/functional areas. ■ Inadequate size to accommodate entry/exit functions (removing/putting on coats, hats, etc.) and storage of such clothing. ■ No coat closet is available. ■ Lack of adequate lighting. ■ Use of inappropriate materials.

Figure 4.22: Foyer (continued)

Considerations	■ Locate the entry adjacent to the living room but provide access to other areas without having to pass through the living room. ■ Provide a minimum 2 feet 4 inches deep by 5 feet wide coat closet. ■ Provide a minimum of 5 feet (front to back) by 6 feet 6 inches (side to side) entry vestibule, including coat closet. ■ Provide a main entrance door with a minimum width of 3 feet. ■ Provide a switched light in the entry. ■ Provide door stops to prevent doors from damaging adjacent walls. ■ Use flooring made of a durable, moisture-impervious, and slip-resistant material. ■ In areas with winter design temperatures (97.5 percent) of -10° F (-23° C) or less, provide air-lock entries in foyers. ■ In harsh climates (defined as having more than 7,500 heating degree days annually), the net floor area may be increased by up to 300 square feet for indoor recreation space (see Section 4.8.12.1).

■ 4.8.3 Kitchen/Secondary Dining Area

The kitchen provides an area for food preparation and storage, eating, after-meal cleanup, utensil and general storage, and other miscellaneous activities. Provide a kitchen layout that is both functional and practical.

Figure 4.23: Kitchen/Secondary Dining Area

Common Problems	■ Inefficient overall arrangement. ■ Inadequate amount of work surfaces. ■ Inadequate amount of storage space. ■ Inadequate ventilation. ■ Inadequate number, placement, and type of electrical receptacles. ■ Poor integration with other living spaces.
Considerations	***Layout*** ■ For units having three or more bedrooms provide a secondary eating area in or adjacent to the kitchen.

Figure 4.23: Kitchen/Secondary Dining Area (continued)

Considerations (continued)

***Layout* (continued)**

- Size the secondary eating area to accommodate seating for four people at either a table or a counter.
- Arrange the kitchen so that the "work triangle" (the total of the distances between the center of the range front, the refrigerator, and the sink) does not exceed 24 linear feet.
- Locate the sink between the range and refrigerator, if possible.
- Provide a water- and slip-resistant surface, such as resilient sheet vinyl (Fed. Spec. L-F-475a(3) Grade B or C). Provide vinyl or wood baseboards that complement the cabinet and counter materials and finishes.
- Provide both overall and task lighting in addition to natural lighting. Maximize natural light. Task lighting can be the fluorescent, under-cabinet type, or recessed, incandescent, ceiling-mounted lights.
- Provide visual access to outdoor living/play areas.
- Provide a minimum of 4 feet of space between base cabinets and an opposing wall or cabinets.
- Provide adequate space for an occupant-owned freezer, but not necessarily in the kitchen. Also consider providing freezer space in the laundry room, the storage areas, or the garage. (If the annual heating degree days exceed 4,000, locate the freezer space within the housing unit's heated envelope). Provide a 115V convenience outlet.

Cabinets

- Provide cabinets with the following minimum storage (see Figures 4.24 and 4.25 for sample calculations):

Item	Minimum Depth	ENL/CGO 2 BR Units	ENL/CGO/FGO 3/4/5 BR Units	SGO/GO 4 BR Units
Wall Cabinet Shelving	12"	24 SF	28 SF	30 SF
Base Cabinet Shelving	24"	24 SF	28 SF	30 SF
Drawers	24"	12 SF	14 SF	18 SF
Countertops	24"	18 SF	20 SF	22 SF

- In addition to cabinets prescribed herein, whenever possible, include pantry closets (in or adjacent to the kitchen) for the storage of packaged foods and house-cleaning equipment and supplies.
- Provide kitchen cabinets that meet the requirements of the National Kitchen Cabinet Association. Obtain cabinets that are standard, factory-manufactured products of modular kitchen cabinet suppliers. Ensure the finish of the exposed surfaces are a natural or stained finish on solid hardwood or hardwood plywood or a plastic laminate on plywood substrate.

Figure 4.23: Kitchen/Secondary Dining Area (continued)

Considerations (continued)

***Cabinets* (continued)**

- Do not allow the use of the following:
  - Top mounted center drawer guides.
  - Particle-board core for frame members, doors, drawer fronts, or any member requiring screw holding capability.
  - Unsealed surfaces of materials that use urea-formaldehyde binders.

Countertops

- Provide countertops that harmonize in color and design with the cabinets, the appliances, and the floor covering.
- Do not use butcher block laminate or ceramic tile for counter tops.
- Provide seamless, rounded corners at counter nosings and at the intersection of the counter top and the splash block.
- Provide countertop space for an occupant-owned microwave oven. Locate the space near the normal food preparation area, but not in conflict with countertop spaces noted hereafter.
- Ensure the minimum vertical separation between the counter top and wall cabinets is 1 foot 6 inches.
- Consider using 42-inch high cabinets to maximize kitchen storage space.
- Provide a countertop with a minimum width of 15 inches on each side of the range and sink and on one side of the refrigerator (adjacent to the opening side of the refrigerator door).
- The required minimum total area of countertop space (exclusive of sink and range space) is as follows:

Grade and Bedrooms	Countertop Area
ENL/CGO 2-BR Units	18 SF (approx. 87 linear inches)
ENL/CGO/FGO 3/4/5-BR Units	20 SF (approx. 100 linear inches)
SGO/GO 4-BR Units	22 SF (approx. 112 linear inches)

Appliances

- Provide energy-efficient kitchen appliances, to include a range, range hood ducted to the exterior, refrigerator, dishwasher, and a garbage disposal. Washers and dryers are not included.
- Ensure the kitchen range, range hood, refrigerator, and dishwasher harmonize in color and design with the kitchen decor.

Figure 4.23: Kitchen/Secondary Dining Area (continued)

Considerations (continued)

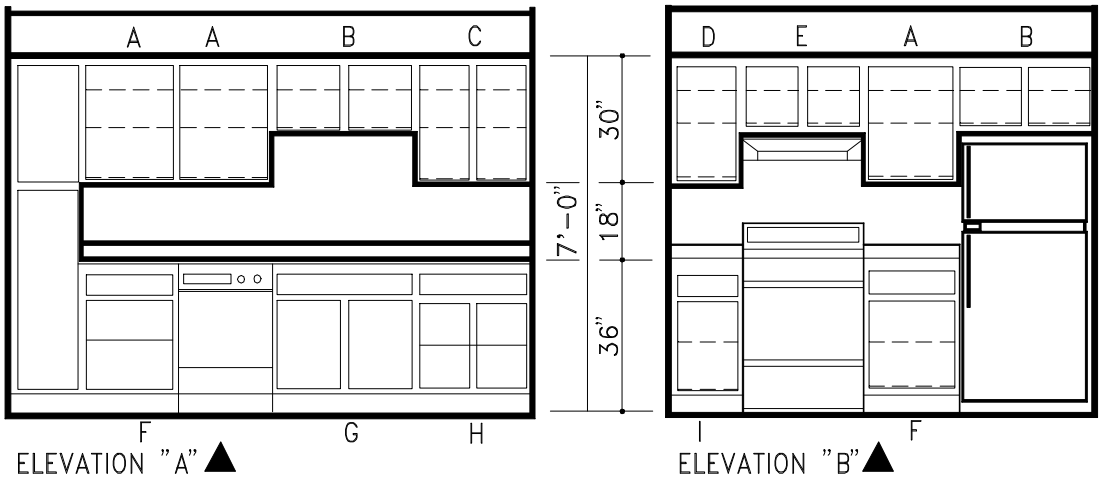
***Appliances* (continued)**

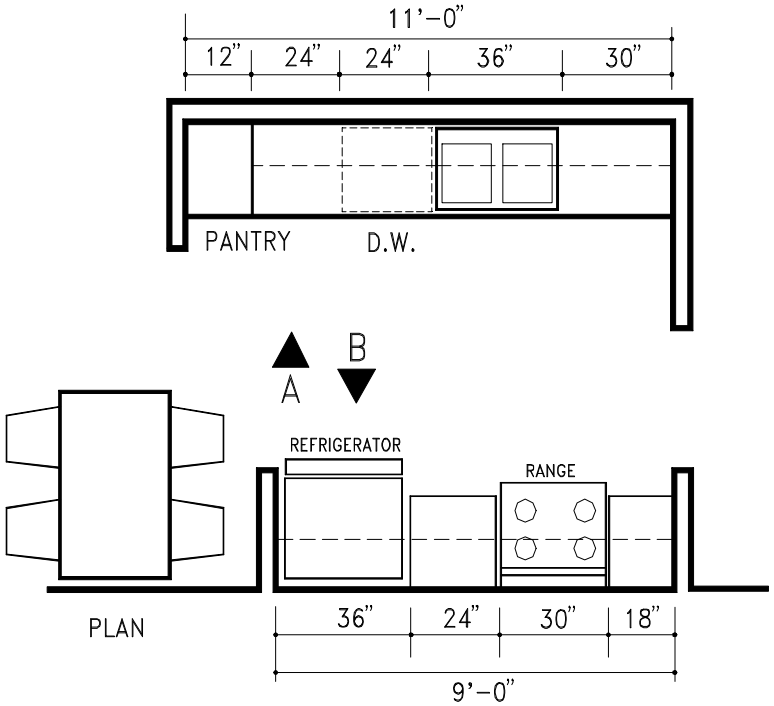
- Provide gas or electric ranges depending on the most cost-effective utility in the locality.
- Ranges in SGO and GO units may be 30 inches wide with double ovens (upper and lower) or 40 inches wide with double ovens (side by side).
- Do not locate the range adjacent to the refrigerator or directly in a corner of the kitchen.
- Do not provide range-hood extinguishers in new projects. Existing devices may be left in place as permitted by Air Force Policy Letter, *Policy on Kitchen Range Hood Fire Protection in Military Family Housing (MFH),* 30 June 1993. Remove immediately all low-cost, throw-away kitchen range fire protection devices located over gas ranges. They may be left in place over electric ranges until their service life expires. Permanently-installed kitchen range fire protection devices may be installed on existing projects that were awarded prior to 30 September 1993. They should remain in-place until the housing unit is sprinklered (see section 4.12.2) or until the kitchen range fire protection device has reached the end if its service life.
- Use built-in ovens and stovetops as the exception when conventional stoves will not work.
- Specify range controls at the back of the range rather than the front to prevent small children from turning on the burners (see Section 4.13, Accessibility, for policy variation).
- Provide refrigerators with two-doors with top freezer and automatic defrost food compartment. Use the following table as a guide; issue larger appliances when facility configuration and resources permit:

Number of Bedrooms	Refrigerator Size (Cu Ft)
1, 2, and 3	16.5 - 17.4 (GSA size G)
4 and 5	20.5 - 21.4 (GSA size I)

- Select dishwashers for under-the-counter installation with a drain, air gap, racks, spraying system, and detergent dispenser. Install dishwashers adjacent to the kitchen sink. Set water heater boosters, if required, at 140°F.
- Provide a water-hammer arrestor for dishwashers.
- Provide an under-sink, continuous-feed, ½ horsepower (HP) minimum garbage disposal. Provide an electrical switch for the disposal adjacent to the sink.
- Provide ample (minimum of two circuits) Ground Fault Circuit Interrupting (GFCI) electrical receptacles above the countertop to accommodate a variety of small appliances.

Figure 4.24: Sample Kitchen Cabinet Calculations (Method A)





WALL CABINET SHELVING AREA:

CABINET	QTY	WIDTH	# SHELVES	LF SHELVES 12" DEEP	SHELF AREA (SF)
A	3	2'-0"	3	6'-0"	18.0
B	2	3'-0"	2	6'-0"	12.0
C	1	2'-6"	3	7'-6"	7.5
D	1	1'-6"	3	4'-6"	4.5
E	1	2'6"	2	5'-0"	5.0
				TOTAL SHELF AREA, WALL CABINETS	47.0 SF
				(minimum: 28.0 SF)	

BASE CABINET SHELVING AREA:

CABINET	QTY	WIDTH	# SHELVES 12"	# SHELVES 24"	LF SHELVES 12"	LF SHELVES 24"	SHELF AREA (SF)
F	2	2'-0"	1	1	2'-0"	2'-0"	12.0
G	1	3'-0"	-	1	-	3'-0"	6.0
H	1	2'-6"	1	1	2'-6"	2'-6"	7.5
I	1	1'-6"	1	1	1'-6"	1'-6"	4.5
					TOTAL SHELF AREA, BASE CABINETS		30.0 SF
					(minimum: 28.0 SF)		

DRAWER AREA:

Cabinets (F+ H+ I+ F)

Total: 8'-0" LF x 2'0" deep = 16.0 SF

(minimum: 14.0 SF)

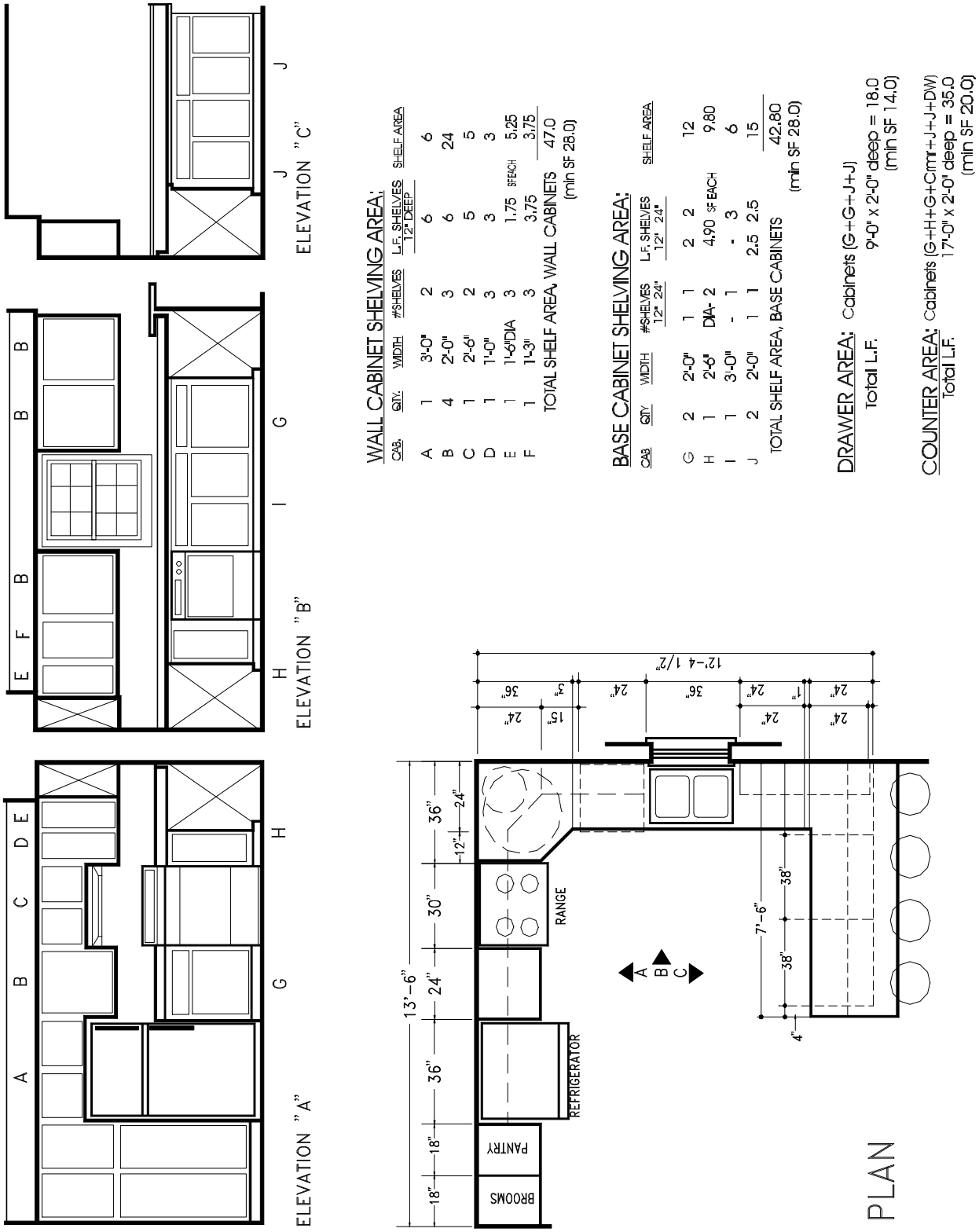
COUNTER TOP:

Cabinets (F+ H+ I+ F+ DW)

Total: 10'-0" LF x 2'0" deep = 20.0 SF

(minimum: 20.0 SF)

Figure 4.25: Sample Kitchen Cabinet Calculations (Method B)



4.8.4 Dining Room

The dining room provides a formal space for a variety of family-oriented and entertainment functions. Consider this space formal in character in comparison to family/recreation or kitchen dining/snack areas.

Figure 4.26: Dining Room

Common Problems	■ Insufficient space to accommodate necessary furniture. ■ Door swings and circulation paths make furniture placement awkward. ■ Inadequate number and placement of electrical receptacles for accommodation of electric utensils and appliances used in the dining room.
Considerations	■ Consider natural and artificial light and ventilation sources. ■ Consider providing views to the exterior. ■ Provide a dining room with a minimum dimension of 9 feet. ■ Provide a dining room with a minimum floor area, in square feet, as follows:

No of Bedrooms	ENL	CGO	FGO	SGO	GO
2	100 SF	100 SF	-	-	-
3	100 SF	100 SF	130 SF	-	-
4	100 SF	130 SF	130 SF	130 SF	130 SF
5	130 SF	130 SF	130 SF	130 SF	130 SF

4.8.5 Living Room

The living room traditionally was the principal activity space for the family. With the addition of larger kitchens and family recreation rooms, living rooms have been relegated to more formal or even ceremonial functions with respect to the family and entertaining guests.

Figure 4.27: Living Room

Common Problems	■ Inadequate configuration to foster/support activities. ■ Main entry doorway opens directly into the living room. ■ Awkward configuration making furniture placement difficult.

Figure 4.27: Living Room (continued)

Considerations	■ Consider the available natural light, ventilation sources, and exterior view in laying out or modifying existing spaces. ■ Provide the following minimum floor areas:

No of Bedrooms	ENL	CGO	FGO	SGO/GO
2	150 SF	150 SF	--	--
3	150 SF	150 SF	150 SF	--
4	150 SF	150 SF	170 SF	170 SF
5	170 SF	170 SF	170 SF	170 SF
	170 SF	170 SF	170 SF	170 SF

- The minimum dimension for all unit types is 11 feet 6 inches.
- Minimize having to traverse the living room to access other areas of the house.
- Provide the ability to accommodate two different furniture arrangements.
- Lay out the space or modify existing spaces to work in conjunction with the dining room.

4.8.6 Family Room

The family room or "rec" room, especially if located adjacent to the kitchen, has become the focus of activities for families. This space is decidedly informal and is the location for most family activities during weekday evenings and weekends.

Figure 4.28: Family Room

Common Problems	■ Poor location with respect to the kitchen and outdoor spaces. ■ Windows, doors, or door swings make furniture placement difficult or awkward.
Considerations	■ Provide a minimum floor area of 100 square feet with a minimum dimension of 9 feet. ■ Locate the family room adjacent to the kitchen. ■ Do not plan family rooms for two bedroom units, since the allowed square footage is relatively modest. When doing an improvement project on a three bedroom E-1 to E-6 (1200 SF) unit, waive the family room requirement if the existing physical layout does not offer a cost-effective way to provide the room.

Figure 4.28: Family Room (continued)

Considerations (continued)	■ Consider the kitchen, family room, and outdoor living space as a planning unit in the new designs, or consider modifications to existing units that will allow this relationship to occur. ■ Maximize daylight in this space. Take advantage of views. ■ Design this space or modify it to accommodate at least two different furniture layouts. ■ Provide visual and acoustical separation between the family room and formal living areas (i.e., living and dining rooms). ■ Provide an exterior door to the patio or balcony.

4.8.7 Bedrooms

Bedrooms, clearly, must accommodate restful sleep. However, recent housing trends have yielded bedrooms that acknowledge and facilitate other activities, such as quiet relaxation (reading, study, listening to music) as well as functioning as "dressing rooms" for everyday activities.

Figure 4.29: Bedrooms

Common Problems	■ Inadequate size/proportion to support multiple activities. ■ Lack of natural light. ■ Inadequate closet space. ■ Poor location with respect to high-activity ("noisier") areas of the house.
Considerations	■ Optimize bedrooms to the maximum extent to provide for functional flexibility. Visualize furniture arrangements for accommodation of a king-size bed in the master bedroom and twin beds in other bedrooms. Check window, door, and closet locations to allow for furniture placement. ■ Provide separate access to each bedroom. ■ Provide acoustical insulation in all walls that separate "noisy" and "quiet" areas. Do not allow direct lines of sight into bedrooms from the living room, dining room, kitchen, or other living areas. ■ Provide minimum bedroom dimensions as follows: **Bedrooms #1 & 2** — **10 feet** **Bedroom #3 & 4** — **9 feet** **Bedroom #5** — **8 feet**

Figure 4.29: Bedrooms (continued)

Considerations (continued)

■ Provide minimum bedroom floor areas as follows:

	2BR	3BR	4BR	5BR
Bedroom #1	**150**	**150**	**150**	**150**
Bedroom #2	**130**	**130**	**130**	**130**
Bedroom #3	**-**	**90**	**100**	**100**
Bedroom #4	**-**	**-**	**90**	**90**
Bedroom #5	**-**	**-**	**-**	**80**

■ Provide minimum clear (face of wall) closet space dimensions as follows:

		Minimum Widths		
	Depth	ENL/CGO	FGO/SGO	GO
Bedroom #1 (master)	**2'-0"**	**6'-0"**	**8'-0"**	**10'-0"**
Bedroom #2	**2'-0"**	**4'-0"**	**6'-0"**	**6'-0"**
Bedroom #3	**2'-0"**	**3'-0"**	**4'-0"**	**4'-0"**
Bedroom #4 & #5	**2'-0"**	**3'-0"**	**3'-0"**	**3'-0"**
Linen Closet	**1'-4"**	**2'-0"**	**4'-0"**	**4'-0"**

	■ In linen closets, provide a minimum of four full depth shelves. Consider the use of modular shelving to maximize closet space and versatility. ■ Maximize closet space by providing double closet rods and closet organizers. Ensure more than adequate structural support since it is common to overload hangar rods. ■ If possible, install vinyl-coated steel wire shelving. Do not use sheet metal shelving. Include a shelf between 66 and 72 inches above the floor level. If the ceiling height exceeds 84 inches, consider including two shelves. ■ Provide intermediate vertical support for closet openings exceeding 5 feet in width. ■ If space permits, use swinging doors rather than bi-fold doors. ■ Make sure window dimensions and locations provide for emergency egress.

■ 4.8.8 Bathrooms

The primary function of a bathroom is to provide for personal hygiene. However, recent housing trends put more emphasis on bathrooms as another space to relax and "escape" temporarily from the stresses of each day. It is important to keep these dual functions, utility and quality of life, in mind when renovating or designing new bathrooms.

Figure 4.30: Bathrooms

Common Problems	■ Poor layout. ■ Inadequate size. ■ Poor access to other areas of the house. ■ Improper number of baths on a floor. ■ Inadequate ventilation. ■ Lack of proper lighting. ■ Wall plugs without GFCIs.
Considerations	■ The minimum number of bathrooms based on the number of bedrooms on a floor is as follows: **No. of Bedrooms on Floor** — **No. of Bathrooms on Floor** **None** — **½ (except basement)** **1 or 2** — **1** **3 to 5** — **2** ***Layout*** ■ Ensure each unit contains at least one full bath consisting of a water closet (toilet), lavatory (vanity sink), and a bathtub with an integral shower. Shower stalls may be substituted for bath tubs in additional full baths. ■ Ensure a half bath has a water closet and a lavatory. ■ Avoid placing bath tubs and showers under windows. If this is unavoidable due to space constraints, detail sills to provide positive drainage. Cover sills with water impervious materials. ■ Provide direct access to the master bathroom from the master bedroom in three-, four-, or five-bedroom units. ■ Do not allow direct lines of sight into bathrooms from other rooms. ■ Provide at least one full bath with bathtub that is directly accessible from a hall without requiring passage through another room. ■ Do not allow bathrooms to open directly off of family living spaces (living, dining, etc.). ***Size*** ■ Provide a bathroom with minimum size of 5 feet by 8 feet. ***Hardware*** ■ Provide neutrally colored bathroom fixtures, preferably white or almond. Economically justify deviations from this guidance. ■ If used, ensure that gel-coated glass fiber reinforced bathtubs and showers conform to ANSI Standard Z124.1, *Plastic Bathtub Unit*.

Figure 4.30: Bathrooms (continued)

(continued)	***Hardware*** ■ Provide water-saving type water closets requiring a maximum of 1.6 ga lons per flush. ■ ed cast iron; porcelain enameled steel; acrylic or gel-coated, and glass fiber reinforced. Install shower stalls of the following types: ceramic tile walls with ceramic tile floors; precast, cast in place, or pressure molded receptors; or gel-coated, glass fiber ■ Provide flow-control devices on shower heads to limit water flow to a maximum of gallons per minute at pressures between 20 and 60 pound per square inch (PSI). ■ dish, robe hook, toothbrush holder, medicine cabinet, toilet paper holder, and mirror. Do not provide soap dishes and toothbrush holders if countertop space is provided. Provide recessed medicine cabinets with adjustable shelves. ■ between fixtures and tile. ■ imum width of or neutrally colored laminated plastic surface with lavatory bowls of vitreous china or of porcelain enamel on cast-iron or steel. Provide full-height wall or door mirrors. In half baths, provide lavatories in vanities as above (preferred) or of vitre porcelain enamel on cast-iron or steel (pedestal type). Do not use wall-hung lavatories. Provide the maximum amount of cabinetry/storage space possible within the bathroom. Provide water-impervious wainscot, to a minimum of 6 feet above the fin around all bathtubs and showers. ***Construction*** Collocate baths/wet (plumbing) walls as much as possible without degra ing/sacrificing livability or quality of living spaces. ■ attic spaces. Provide air backflow dampers for when fans are not operating. Provide water and slip-resistant floor covering including ceramic tile, te razzo, or seamless sheet vinyl.

Considerations (continued)	**(continued)** ■ ■ Provide wall bases that match the chosen flooring (e.g., ceramic floor/ceramic base, ■ Use water-resistant gypsum wall board on all bathroom walls and ceilings. Use semi-gloss latex or alkyd-based paint on wall board and painted doors, windows, and trims in bathrooms. Vinyl wall covering is acceptable. Ensure proper pre-treatment of walls to account for high moisture levels. Provide good ambient light throughout; task lighting over the vanity is criti ■ Provide ceiling-mounted supplemental heating, if necessary. Provide a quad-plex GFCI above the vanity countertop, but no higher than 5 feet above the floor. ■ Provide durable, dependable, and simple fixtures and fittings. Ensure r placement parts are available through the Family Housing Maintenance Shop. Emphasize durability and simplicity of design, materials, and finishes. For example, ensure all wood, metal, or ceramic finishes match and co plement each other. For example, do not use brushed stainless steel towel hooks with polished stainless steel

■ Laundry Room/Area

The laundry area provides space for clothes for miscellane maintenance tasks.

occupants an organ

Figure 4.31: Laundry Room/Area

	■ Poor location with respect to the garage/carport, kitchen, and service entry. Poor configuration. ■ ■ Lack of protected convenience outlets.

Considerations	■ "service" functions for the home. ■ ■ Provide vinyl-coated steel wire (modular) shelves at least 12 inches deep above or ■ If possible, provide utility rooms. If laundry and interior storage are co bined in a utility room, do not count this area in the calculation of net square footage. (Some ■ Provide a standard 115-volt AC receptacle, water supply connections with a single- ■ Provide water hammer arrestors. Provide a 220-volt AC receptacle and/or gas source for the dryer, if re ■ Drain the washer through a 2-inch minimum standpipe with the mouth 3 feet above ■ Vent the clothes dryer through an exterior wall (not into attics) with a 4-inch diameter more than 20 feet of run with no more than three 90-degree turns. Ensure the dryer vent is accessible for cleaning. Do not discharge the dryer vent onto a balcony or patio, near entry doors, or near an ■ Provide adequate lighting and maximize available daylight. Avoid locating laundry closets in the food preparation area of the kitchen. ■ ■ Provide water- and slip-resistant floor covering, such as tile or seamless sheet vinyl. Provide baseboards to match the flooring material. ■ ■ Ensure there is a method to contain water overflows in laundry areas l cated on the second floor. Connect overflow drains to the wastewater system. When laundry closets are used, ensure they are sized to provide adequate wall and working clearances based on washer/dryer models commonly procured by the base.

■ Interior Storage

Storage space is an essential and i tegral part of daily activities. Consider this when using "left over" spaces but rather elements

storage spaces are not "after thoughts"

home.

Figure 4.32: Interior Storage

	■ Insufficient space. Inadequately located to complement daily activities.

Considerations	Provide interior bulk storage space for houses without basements or usable attic space. Provide the following interior bulk storage space in addition to that listed in calculations. **Maximum Interior Bulk Storage Area** **2-Bedroom** — **24 SF** **≥4-Bedroom** — **24 SF** **80 SF** **100 SF** Provide vinyl-coated steel wire or wooden shelving. Do not use sheet metal or particle-board.

■ 4.8.11 Stairs

Stairs not only provide the function of allowing access between floors, they are also architectural features that deserve consideration in terms of how they can enhance the quality of the living space. They also must facilitate safety and accessibility.

Figure 4.33: Stairs

Common Problems	■ Improper design for safety and accessibility. ■ Inadequate headroom throughout the stair run. ■ Missed opportunity to enhance living space (e.g., using stairway as a natural light well).

Figure 4.33: Stairs (continued)

Considerations	■ Evaluate the stairway's potential to enhance the quality of the living space by making it an architectural feature, incorporating amenities such as book shelves in the wall supporting the stairs, or allowing increased natural light by locating windows in the stairwell. ■ If possible, provide direct access from the entrance foyer to the stairway to the second floor without passing through any other room. ■ Provide widths not less than 3 feet clear (face of walls). Provide 4 feet if possible to permit the movement of large beds and bulky furniture. ■ Provide a minimum of 6 feet 8 inches of headroom throughout the stair run. ■ Provide 7-inch maximum riser height and 11-inch minimum tread width. ■ Ensure open guardrails have intermediate rails or patterns such that a 4- inch sphere cannot pass through. ■ In stairways of three or more steps, provide a handrail at least 30 but no more than 38 inches from the stairs, measured vertically from the nosing of the treads. The rail must accept a 300-pound impact load. ■ Provide carpeting, if desired.

■ 4.8.12 Basements

Normally, the Air Force does not program basements for FH. This is due to the fact that, historically, the economic cost is higher than the benefit to the Air Force. A basement, in this document, is defined as a space that is either above or below grade, but is located below the primary living level of the dwelling unit, and is used for storage, utility purposes (washer/dryer, work shop, etc.), to house mechanical/electrical equipment, or as habitable space (family room, arctic recreation rooms, bedrooms, etc.).

HQ AF/CEH will consider special cases where installations can justify providing basements based on life cycle costs related to energy efficiency, operations and maintenance, structural integrity, or site constraints. The basement, if used as outlined above, will not be calculated as part of the dwelling unit's authorized net square footage (see Figures 4.2 and 4.3), except for habitable rooms such as family or recreation rooms. The base must provide documentation to HQ AF/CEH, through the MAJCOM, that demonstrates:

- The climatic conditions support or dictate the use of a basement, above or below grade, for energy efficiency, safety, or life cycle cost reasons.
- Locating mechanical equipment and conventional exterior bulk storage within the dwelling unit envelopes will decrease energy consumption of the units by at least 10 percent and/or the efficiency of the overall site plan by at least 20 percent (e.g., it decreases the building to open land ratio).
- The structural integrity of the overall building system is compromised by not providing a basement.
- Soil-bearing conditions are sufficient for the intended design. This documentation must be certified by a registered professional engineer in the locality.
- The intended design is sufficient for existing soil-bearing conditions. This

documentation must also be certified by a registered professional engineer in the locality.

- Habitable spaces, such as family rooms or sleeping rooms, are protected by the appropriate fire-rated separations/assemblies and conform to the more restrictive of either the *NFPA Life Safety Code* or locally accepted building code requirements. This documentation must also be certified by a registered architect in the locality.

Other rules governing the incorporation of basements are:

- The base, in the programming documents, must provide a separate line item cost to provide all basements in each project/phase.

- If habitable spaces that are ordinarily located on the main or secondary levels of the dwelling unit are located in a basement, they still must be calculated as part of the authorized net square footage for the dwelling unit.

4.8.13 Arctic Recreation Rooms Policy

Arctic recreation rooms are a special class of recreation space recognized by the FY 92/93 Defense Authorization Act (P.L. 102-190, Section 2808) that amends USC 2826. The purpose of the policy is to provide interior recreation space for FH in locations where "harsh climatic conditions severely restrict outdoor activity for a significant portion of the year."

- Authorized Air Force installations, at the time of the writing of the policy include: Eielson, Elmendorf, K.I. Sawyer, Grand Forks, Minot, Malmstrom (Harve, Consrad, Forsythe), Plattsburgh, and Cavalier AFBs.

- The amendment provides an additional 300 SF (net) of indoor living space for recreational use, which will not be counted against the maximum applicable net floor area of a dwelling unit (see section 4.8.12, Basements).

- In addition, the related HASC/SASC Conference Report (102-311) allows the "conversion of basements, attics, and other space within existing or planned FH units to indoor recreation space."

In terms of execution:

- Locate this space so that it can maximize the use of daylight for family activities and solar gain to help decrease energy costs.

- Provide pre-fabricated "sun rooms" if adequate protection is provided to the occupants and if the requisite insulation values can be maintained for the building envelope. Also, provide a method of circulating excess heat into other areas of the home.

- Provide this space as an extension of or adjunct to the living room and/or family room, if it is functionally and technically feasible.

- In harsh climates, defined as having more than 7,500 heating degree days annually (see AFM 88-29, *Engineering Weather Data*), increase the net floor area for indoor activity up to 300 square feet. The minimum for this indoor activity room is 200 square feet.

- Consider converting unfinished basements, attics, or other areas. If the additional space is located with the family room, the area must function as a separate room.

4.9 Interior Design

When used correctly, colors, textures, and finishes create a warm, inviting, and flexible atmosphere for the FH occupant. By emphasizing durability, simplicity, and neutrality, families can maximize the use of their existing furnishings.

Figure 4.34: Interior Design

Common Problems	■ Interior designs that are too color/shade specific. ■ Use of high-maintenance, low-durability materials. ■ Finishes and colors that conflict with the residents' furnishings.
Considerations	■ Include interior design professionals in the selection of interior finishes, colors, equipment, and built-in furnishings to produce an integrated visual design theme. ■ Select materials and finishes to achieve a balance between initial cost, maintenance cost, durability, appearance, and occupant convenience and satisfaction. Emphasize neutral colors. ■ Use gypsum wall board (GWB) as the primary material for wall and ceiling finishes, and use water-resistant GWB in bathrooms, laundry areas, and other areas subject to high humidity or contact with water. Use fire-rated GWB to achieve fire-rated assemblies between adjacent units (see Figure 4.51, *Fire Sprinklers*, for additional guidance, local codes, and NFPA 101. *The Life Safety Code*). ■ Provide floor coverings of hardwood, sheet vinyl goods (Federal Spec L-F-475a(3) Grade B or C), carpet, or ceramic tile. Do not use carpet in kitchens, bathrooms, entry areas, or patios/porches exposed to weather elements because there is a high potential for maintenance and replacement costs resulting from spills, stains, and water damage. ■ For ceramic tile, select the darkest complimentary grout color to coordinate with the tile color. Ensure that it is properly sealed to prevent excess soiling. Also ensure high slip resistance. ■ If hardwood floors are specified, use vinyl-impregnated or polyurethane finishes. ■ Use high-quality vinyl composition tile with a through pattern. ■ See Section 4.9.1, Carpet Policy, for information on carpet selection and acquisition. ■ Provide a light-stained or painted wood base throughout the living areas of the house. When using stained wood bases, specify a quality hardwood and stain to match the other wood finishes in the unit.

Figure 4.34: Interior Design (continued)

Figure 4.35: Carpet Policy

Common Problems	■ Carpet selection and acquisition does not conform to the Air Force Chief of Staff FH carpet policy.
Considerations	***Policy*** ■ Install carpet only in authorized areas. Authorized areas include all living areas, except kitchens, baths, patios/porches, and areas exposed to the weather. Give special care to the entry area by using an impervious, slip-resistant material (tile) instead of carpet. ■ Replace carpet only after it has been certified as worn out by the Base Civil Engineer (BCE) and approved for replacement by the Installation Commander. ***Acquisition*** ■ Remember that wall-to-wall carpeting, including padding, is an integral part of the housing unit. Accordingly, attribute the cost of its purchase and maintenance to the maintenance and repair costs for the house. ***Selection*** ■ Select carpet to conform to the following construction specifications: ■ Woven, tufted or fusion bonded. ■ Plush cut, frieze (twist), cut and loop, or loop. ■ Minimum Face Weight: 32-ounce. plush cut; 28-ounce cut and loop or frieze (twist) piles; or 24-ounce. loop pile. ■ Use synthetic (polypropylene) backing. Do not use organic (jute) backing. ■ For homes with heavy wear and tear, provide carpeting with a minimum density rating of 4,000. For homes with low wear and tear, provide carpeting with a minimum density rating of 3,200. Calculate density as follows: $\text{Density} = \frac{36 \times \text{Pile Weight}}{\text{Pile Height (Thickness)}}$ ■ For occupants of homes with low wear and tear who want a plusher look, provide carpeting with a pile height of 440 minimum. ■ Gauge: 1/8 or 1/10. ■ Ensure the carpet passes the Department of Commerce (DOC) FF 1-70 Pill Test (7 passes from 8 specimens) and the requirements of NFPA 101, *The Life Safety Code.* ■ Ensure the yarn is branded by the fiber producer, Nylon-6, 6, or Nylon-6, with a soil- and stain-resistant finish. ■ Provide 3/8" to 1/2" high-density polyurethane foam underlayment that meets HUD Use of Material Bulletin 72A *HUD Building Product Standard and Certification Program for Carpet Cushion.*

Figure 4.35: Carpet Policy (continued)

Considerations (continued)	***Selection* (continued)** ■ Select carpet from a neutral palette. Do not use white and extremely pale tints. Avoid pattern carpet. Use only one carpet color throughout the housing unit. ***Carpet in GOQs*** ■ Charge the cost of carpet purchase and maintenance in General Officer Quarters (GOQs) to the $25,000 annual limit for GOQ facility maintenance and repair. ■ To replace carpet in GOQs in less than 7 years, obtain approval in advance from HQ USAF in accordance with established policy. ■ Avoid white and extremely pale tints. Select light or medium value neutral colors such as beige, taupe, or gray for installation in housing. ***Installation*** ■ Install carpeting according to the manufacturer's recommendations to ensure that warranties will be valid. Do not install carpeting over existing carpeting or existing padding, unless the pad is in exceptionally good condition. ***Assistance*** ■ Request assistance from Installation, MAJCOM, or AFCEE Design Group Interior Designers. Contact the Air Force Center for Environmental Excellence (AFCEE) Design Group for assistance.

4.10 Electrical/Plumbing/Mechanical Systems

4.10.1 Electrical/Telephone/TV Systems

The electrical system supplies electrical power to the outlets and appliances in the home.

Emphasis should be on the integration of and most efficient operation of these systems to yield the highest possible quality of living environment.

Figure 4.36: Electrical/Telephone/TV Systems

Common Problems	■ Inadequate circuits to handle equipment/appliance loads for the dishwasher, garbage disposal, air conditioner, or heat pump. ■ Insufficient capacity for current as well as future electrical loads. ■ Inconvenient outlet locations or insufficient number of outlets per building code. ■ Lack of circuit protection in high risk areas (i.e., kitchens, baths, and laundry rooms). ■ Insufficient quantity and quality of lighting. ■ Surface-mounted (either inside or outside the house) telephone and TV cabling in unit interiors.
Considerations	***Exterior Service*** ■ Ensure electrical systems conform to the most current accepted versions of the National Electrical Code and National Electrical Safety Code. ■ Provide master-metered electrical service in the FH area. Make provisions to facilitate the installation of individual electric meters at a later date by providing a blanked-off meter base installed in the service entrance at the appropriate location. Meter bases should not be placed in a visually accessible location. ■ Ensure that service entrance conductors and equipment are rated at 150 amperes (minimum) for each living unit (200 amperes where heat pumps or air conditioning units are provided). ***Interior Service*** ■ Locate the service panel within the dwelling unit, easily accessible to the occupant, but not in areas such as living rooms, dining rooms, bedrooms, or behind clothes in closets. Provide recessed, deadbolt, circuit breaker-type panels. ■ Provide a convenience outlet behind gas ranges to supply power for the range clock, timer, and lights.

Figure 4.36: Electrical/Telephone/TV Systems (continued)

Considerations (continued)	***Interior Service* (continued)** ■ Provide separate, dedicated branch circuits in each living unit for the following (where applicable): air-conditioner, heat pump, furnace, water heater (electric), range (electric), dishwasher, garbage disposal, clothes washer, clothes dryer (electric), microwave, and small appliances (minimum of two circuits in the kitchen/dining room area). ■ Provide a minimum of one weatherproof Ground Fault Circuit Interrupting (GFCI) duplex convenience outlet in garages/carports, patios/balconies, and near the front entrance. ■ Provide GFCI duplex outlets in the bathroom, at the kitchen sink, and in laundry room areas as well as other high risk areas, as determined by the architect/engineer. ■ Install wire that conforms in size with local code. ■ Provide proper bracing for ceiling junction boxes to support ceiling fans. ***Lighting*** ■ Provide lighting that is not only efficient and economical but that is simple in design and is in keeping with the architectural character of the unit. ■ Provide exterior lighting, controlled from inside the living unit, at each exterior door and in the carport or garage. Ensure adequate lighting levels to promote safety and security. ■ As a minimum, provide wall-switched light fixtures in the kitchen, dining room, bedrooms, walk-in closets, bathrooms, halls, stairs, garage, bulk storage areas, and utility rooms. ■ Prewire the family room for a ceiling-mounted fan and/or ceiling light. ■ In addition to general area lighting in the kitchen, provide under-cabinet task lighting, to include the sink area. ■ In each habitable room without light fixtures (e.g., living, dining, etc.) and in each bedroom, provide a wall-switched control for one-half of a duplex outlet in two separate locations within the room. ***Telephones/CATV*** ■ Provide prewired, flush-mounted telephone jacks in kitchens and bedrooms. Install jacks in all bedrooms, and the family and living rooms. ■ Provide a minimum of two prewired flush-mounted television antenna jacks in each living unit. Provide 75-ohm coaxial antenna cable for all wiring.

4.10.2 Water Supply and Disposal Systems

The water supply system must provide a safe and efficient source of hot and cold water for cooking, drinking, and providing personal hygiene. Plumbing fixtures and fittings are covered in section 4.8.8, Bathrooms.

Figure 4.37: Water Supply and Disposal Systems

Common Problems	■ Inadequate design resulting in problems such as low pressure and inadequate supplies. ■ Inadequately designed or inefficient systems and/or fixtures. ■ Lack of access for residents. ■ Lack of adequate venting of waste lines.
Considerations	■ Provide a master meter to monitor water consumption within FH projects. ■ For basic design criteria, refer to *HUD Minimum Design Standards for Community Water Supply Systems 4940.2*. ■ For water supply and distribution, provide a stop and waste valve with a drain inside the house on the water supply line entering each housing unit. Locate the valve in a utility or service area, closet, cabinet, or other area that is separated from the living area but offers easy access by the occupant. ■ Provide cold water supply cutoff valve to each hot water heater. ■ Design water supply piping to eliminate water hammer. ■ Provide hose bibs in easily accessible locations at the front and rear of each ground-floor living unit. In areas subject to freezing, provide frost-proof hose bibs as well as interior shutoff valves. ■ In each living unit, provide a storage-type water heater with a pressure-temperature relief valve and drain. Ensure gas and electric water heaters have factory-preset thermostats to limit water temperature to 120° F (49° C) maximum. Install storage tanks with minimum capacities (gallons) as follows: **Fuel / 2-BR / 3-BR / 4- to 5-BR** **Gas / 30 / 40 / 50** **Electric / 40 / 52 / 80** ■ If economic and/or efficiency gains can be realized, install a flow-through type water heater in lieu of the storage type. Equip all gas water heaters with American Gas Association (AGA)-approved ignition devices, including electronic pilotless ignition. ■ Provide plumbing access panels for all bathtubs/showers. ■ Provide accessible clean outs for wastewater lines.

Figure 4.37: Water Supply and Disposal System (continued)

Considerations (continued)	■ Verify acceptable supply and wastewater piping materials based on local codes. Do not use lead piping. ■ Provide proper venting for all wastewater lines. ■ To the maximum extent possible, locate vents in the rear of the housing units. ■ Provide drains for air conditioning condensation, high-efficiency furnace condensation, humidifier overflow, and the water heater drain and relief valve. ■ Drain the clothes washer through a trapped, 2-inch minimum diameter standpipe, with the top of the pipe 3 feet above floor and the bottom of the trap a minimum of 4 inches above floor. ■ Ensure that the domestic water valve (DWV) system conforms to the *Uniform Plumbing Code*. ■ Provide cleanouts for sewer lateral lines. Provide a box with a hinged cover in outdoor locations.

■ 4.10.3 Heating System

The emphasis for the heating system must be on efficiency, ease of maintenance, durability, and the ability to provide a comfortable living environment.

Figure 4.38: Heating System

Common Problems	■ Inappropriate heating equipment for the local climate. ■ Insufficient heating unit capacity. ■ Uneven distribution of heat and low operating efficiency of heating equipment. ■ Inefficient ducting layouts and perceptible air flow noise. ■ Improper duct installation that causes air leakage. ***District heat or individual unit hydronic (hot water) or steam systems.*** ■ Hot and cold rooms. ■ Radiators interfering with drapes and furniture placement. ■ Clanging or hissing radiators. ■ Scale build up in radiators. ■ Insufficient boiler capacity. ■ Corroded pipes.

Figure 4.38: Heating System (continued)

Considerations	■ Select heating systems based on the lowest life-cycle cost of available fuels that are appropriate for residential heating. Consider the fuel requirements of other appliances, equipment, and systems (e.g., cooling, domestic water heating, and cooking). ■ Consider heat pump systems as the primary heating/cooling method in climates that can optimize heat pump efficiency. ■ Plan for an indoor design temperature of 68° F (20° C) for new or retrofit heating systems. ■ Design the system in accordance with ASHRAE Standards 90.2P, *Energy Efficient Design of New Low-Rise Residential Buildings.* ■ Consider including provisions for humidification in areas having more than 3,000 (Fahrenheit) or 1,660 (Celsius) heating degree days. ■ Equip gas-fired furnaces with American Gas Association (AGA)-approved ignition devices, including electronic pilotless ignition. ■ Do not provide portable room heaters, floor furnaces, or floor heat lamps. If desired, install heat lamps in bathrooms. ■ Do not use under-floor ductwork within or below the floor slab due to the danger of pesticide contamination. ■ Ensure that duct systems are installed based on industry standards and that they are balanced for optimum performance. ■ Use timer or set-back thermostats to the maximum extent practicable. ■ On heat pumps, provide set-back thermostats that facilitate gradual increases in temperature at the end of the set-back period to minimize electrical consumption of resistance heating elements. ■ Do not use a fireplace as a means of heating an FH unit. (Fireplaces are prohibited in FH; however, existing fireplaces can be left in place.)

■ 4.10.4 Air Conditioning System

The emphasis for the cooling system must be on efficiency, ease of maintenance, durability, and the ability to provide a comfortable living environment.

Figure 4.39: Air Conditioning System

Common Problems	■ Inappropriate cooling equipment for the local climate. ■ Insufficient cooling unit capacity.

Figure 4.39: Air Conditioning System (continued)

Common Problems (continued)	■ Uneven distribution of cool air, and low operating efficiency of cooling equipment. ■ Inefficient ducting layouts and perceptible air flow noise. ■ Improper duct installation that causes air leakage.

Considerations	■ Air conditioning units shall conform to the Uniform Mechanical Code and ASHRAE 90.2P, *Energy Efficient Design of New Low-Rise Residential Buildings*.
	■ Plan for an indoor design temperature of 78° F (26° C) for new or retrofit air conditioning.
	■ As a guide, provide air conditioning in areas where the ambient temperature during the six warmest months (as indicated in AFM 88-29, *Engineering Weather Data*) is:
	  ■ 67° F (20° C) wet bulb (WB) for 800 or more hours.
	  ■ 80° F (27° C) dry bulb (DB) for 350 or more hours.
	  ■ 93° F (34° C) dry bulb (DB) for 155 or more hours.
	■ Balance the above criteria with actual local climatic conditions.
	■ To the maximum extent practicable, do not rely on window or through-the-wall units to provide air conditioning.
	■ Ensure that all air conditioning systems up to 65,000 BTU per hour deliver a seasonal energy efficiency ratio (SEER) of not less than 10 BTUH per watt input.
	■ Obtain values for SEER and high side pressure factor (HSPF) from the most recent *Directory of Certified Unitary Air Conditioners and Heat Pumps* published by the Air Conditioning and Refrigeration Institute (ARI). Determine the cooling capacity of air conditioners and heat pumps at ARI Cooling Rating conditions.
	■ Use a common thermostat to provide temperature control by the occupant in both heating and cooling modes.
	■ Select systems with refrigerants that have an ozone depletion potential (ODP) of less than .05. Do not purchase ozone depleting chemical (ODC) air conditioning equipment.
	■ Replace ODC equipment with non-ODC equipment at the end of its useful life.

4.11 Environmental

4.11.1 Environmental Exclusion Legislation

Listed below are the key components of Environmental Legislation that affect Air Force housing programs.

The House and Senate Appropriations Conference language in the FY 94 Military Construction budget raised the reprogramming thresholds and established environmental exclusions.

- Reprogramming thresholds are set at 125 percent of PA or $2.0 million, whichever is less.
- The Conference excluded all environmental hazard remediation costs from this threshold, such as asbestos removal, radon mitigation, lead-based paint abatement or removal, etc., under unforeseen circumstances.
- Environmental remediation cost exclusions can only be taken for hazardous materials specifically mentioned in the conference language.
- The environmental exclusion also applies to the after-the-fact notification requirement for exceeding the GOQ Maintenance and Repair (M&R) threshold of $25,000 per unit, or the Non-GOQ M&R threshold of $15,000 per unit. This new language expands the old asbestos exclusion to cover all legislated environmental hazard remediation.
- After-the-fact Congressional noti-fication is also required for new/ replacement construction or improvement projects when environmental exclusion is applied to reprogramming thresholds. Submit the after-the-fact noti-fication to Congress semi-annually.

4.11.2 Asbestos

The Air Force is committed to minimizing and managing asbestos hazards in FH. Asbestos refers to the group of silicate-based fibers that are found in some soils and rocks and have been frequently used for a number of applications relating to buildings. There are two basic varieties of asbestos-containing materials (ACM): non-friable and friable. Non-friable ACMs contain asbestos fibers within a tightly-held matrix of cement or similar binding material. The fibers remain in the matrix unless the ACM is broken, sanded, cut, or otherwise separated. By contrast, friable ACMs can easily release fibers if a relatively small force is applied. The inhalation or ingestion of asbestos fibers has been shown to increase the risk of several serious health problems, including lung cancer, asbestosis (scarring of the lung), and mesothelioma (cancer of the lung and stomach linings).

Figure 4.40: Asbestos

Common Problems	■ In existing housing, building products that may contain friable ACMs include sprayed-on or troweled-on coatings, joint compounds, insulation board, mastic adhesives, pipe wraps, paper tape, duct-work flex connectors, and roof shingles. Non-friable ACMs have been used in siding, roofing, and piping and in wall, floor, and ceiling materials.
Considerations	■ Use Environmental Protection Agency (EPA) document EPA 560/5.83-624, *Guidelines for Controlling Asbestos-Containing Materials in Buildings*, for guidance on reducing asbestos contamination and on the use, handling, and removal of materials that contain asbestos. ■ In existing housing, it is not mandatory that all asbestos be removed. In renovation projects, however, where some asbestos insulation must be removed in order to modify or replace piping in a system, remove all asbestos insulation in the system and replace it with an acceptable insulation. This policy applies also to other building materials containing friable asbestos. If the integrity of some of the ACM is infringed to the extent that exposure to occupants will result, remove all of that ACM. ■ For additional guidance, refer to the *Asbestos Handbook for Remodeling*, *1989*, published by the National Association of Home Builders, Washington, DC. ■ Allow asbestos inspection and assessment to be conducted only by trained specialists accredited under a program meeting the minimum requirements established by EPA as authorized under the EPA *Asbestos Hazardous Emergency Response Act* (AHERA). ■ Use only designers and contractors meeting the requirements of AHERA to plan, manage, and conduct asbestos abatement.

■ 4.11.3 Lead-Based Paint

The integrated pollution prevention, minimization, and management program extends to lead-based paint (LBP) in FH. Lead poisoning is traceable to several sources, one of which is LBP. While most lead poisoning results from ingestion of lead dust, some cases due to the ingestion of paint chips, especially by small children, have been reported. Ingestion of lead has been linked to various health problems, including developmental problems, loss of intelligence, short-term memory loss, kidney failure, and in some cases, death. Risks are considerably higher for children than for adults.

Figure 4.41: Lead-Based Paint

Common Problems	■ Before being banned in the 1970's, LBP was used extensively in many homes throughout the United States. ■ The Department of Housing and Urban Development forbade further use of LBP in 1973 and the manufacture of such paint was made illegal in l977. It is possible, therefore, to find LBP in any home built before the mid-1970's. LBP is likely to be present in most homes built before 1980. ■ Lead has been used in both interior and exterior paints. Nearly any painted surface can contain LBP, including walls, floors, ceilings, and door and window trims. Many units targeted for revitalization will likely contain some LBP.
Considerations	■ Do not use or specify paint containing more than 0.06% lead by weight (calculated as lead metal). Test existing lead paint for the above criteria and conduct abatement in accordance with HUD guidelines. ■ Identify and evaluate potential LBP hazards in accordance with *Air Force Policy and Guidance on Lead-Based Paint in Facilities*, issued 24 May 1993. ■ Follow the procedures for locating LBP as described in U.S. Department of Housing and Urban Development*, Lead-Based Paint; Interim Guidelines for Hazard Identification and Abatement in Public and Indian Housing,* April 18, 1990. Note, however, that the number of units and locations within units to be tested under the guidance of the HUD document were developed solely to provide a high degree of confidence that all units would be lead-free if all test results did not detect lead-based paint. ■ Determine the required level of testing (number of units and locations) based on the likelihood that LBPs will be found (review as-built drawings and specifications). If LBP presence is strongly suspected, but its locations are not known, request a higher level of testing. ■ Inspection requires specialized procedures to determine if a hazard exists. Lead paint detection can be done on site with an X-ray fluorescence (XRF) spectrum analyzer or in a laboratory using atomic absorption spectroscopic (AAS) or other techniques approved by ASTM or other recognized testing authority. Paint with lead levels of 1.0 mg/cm^2 when using the XRF or 0.5 percent by weight when using AAS is considered hazardous. ■ In-place management of LBP by interim methods may reduce the LBP hazard to acceptable levels. In-place management procedures include monitoring the condition of painted surfaces; reducing or eliminating dust by washing with high phosphate detergent or top coating with latex paint or wall coverings; repairing deterioration with latex paint; and by performing cleanup activities, such as high-efficiency particle air vacuuming, disposing of contaminated carpeting, and decontaminating upholstered furniture to the extent possible.

Figure 4.41: Lead-Based Paint (continued)

Considerations (continued)	■ When in-place management does not reduce the risk of hazardous LBP exposure to an acceptable level, perform abatement. Abatement or long-term and permanent measures include eliminating the hazardous exposure by replacing building components (doors, cabinets, molding, etc.), encapsulating with drywall or siding, and removing it in accordance with the HUD guidelines mentioned above. Abatement may be applied throughout a unit or in selected areas only. ■ Abatement procedures normally include covering, encapsulating, or removing the hazard. Abatement, clean-up, worker protection, and any necessary follow-up testing should always be performed by qualified personnel. ■ FH facilities occupied by children under age seven are high-priority facilities for identifying, evaluating, controlling, and eliminating LBP hazards. ■ To assist in the costing of abatement, refer to the latest edition of the *Lead-Based Paint Cost Estimating Guide for Military Family Housing and Child Care Facilities*, prepared for Headquarters Civil Engineering Support Agency (HQ AFCESA).

■ 4.11.4 Lead Contamination of Drinking Water

The quality of domestic potable water must comply with the *Safe Drinking Water Act*. In addition to paint, another potential source of lead poisoning is concentrations of the metal in drinking water. Normally, lead can enter the water supply at three points: the source of the supply (e.g., groundwater, reservoirs, rivers); the distribution system from the source to homes; and the plumbing in a home. Lead found in domestic potable water requires immediate attention, since, according to a 1986 EPA study, the lead in drinking water is absorbed in the body at higher rates than lead from food or other sources.

Figure 4.42: Lead Contamination of Drinking Water

Common Problems	■ Studies have indicated that newer housing (up to 2 years old) will have higher lead levels because pipes more than 2 years old develop a filmy coating that acts as a protective barrier between the water and the materials of the plumbing system. ■ Since lead connectors and service lines were commonly installed in homes built before 1920, these houses may have very high lead levels. ■ The use of lead-based solder in copper plumbing, lead or brass fixtures, lead pipe service connections, or corrosive (lead-dissolving) water in the plumbing can cause lead contamination in the water.

Figure 4.42: Lead Contamination of Drinking Water (continued)

Considerations	■ For guidance with respect to Air Force FH, refer to Engineering Technical Letter (ETL) 87-l, *Lead Ban Requirements of Drinking Water*, 15 January 1987. ■ For testing purposes, refer to Environmental Protection Agency 40 CFR Parts 141 and 142, Drinking 'Water Regulations; Maximum Contaminant Level Goals and National Primary Drinking Water Regulations for Lead and Copper; Proposed Rule; 18 August 1988 for criteria for determining lead contamination of potable water. ■ For additional information, refer to The Nature and Extent of Lead Poisoning in Children in the United States: A Report to Congress, July l988, U.S. Department of Health and Human Services, Public Health Service. ■ Check with the local and state authorities to determine the current threshold limit of water lead contamination before conducting an inspection. Currently, authorities in some parts of the country are investigating a reduced maximum contaminant level for lead to as low as 5 micrograms per liter (µg/l). ■ Check water lead contamination inspection records. In a section where a potential problem is indicated, draw water samples. ■ If the source of lead contamination is on base (e.g., distribution system, housing unit pipes, etc.) take immediate steps to eliminate the source of contamination. ■ Take water samples from domestic water faucets, building water service connections, and neighborhood water mains at or near connections to the next upstream level of the water supply. Take two samples from each source. Take the first sample after 5 minutes of flushing the system. Expect the first sample to have more lead due to the potential for standing water in pipes to become contaminated. ■ In cases where the first sample shows water lead levels of more than the current threshold limit of water lead contamination, but flushed samples are under the threshold, still plan action to reduce the lead concentration. Introduce a corrosion inhibitor (e.g., silicate- or phosphate-based compounds) that will coat the piping interior, sequester various chemical elements, or neutralize the water's aggressiveness. ■ When the flushed sample is higher than the current threshold limit, consider major repair or replacement. Repair may require the resoldering of all pipe joints or the insertion of pipe coating material in specific home and/or neighborhood main(s). Replacement might range from replacing the service line to the neighborhood main, to the more costly alternative of replacing of water piping and fixtures within the house. ■ Consult an engineering firm that specializes in the identification of lead contaminants and the engineering of solutions. Obtain a written report of conditions supplemented by specific recommendations to alleviate the problems.

■ 4.11.5 Radon

Air Force policy is to eliminate the hazards of radon, a naturally occurring radioactive gas that is present in varying degrees in many soils. This gas is released into buildings, especially basements and crawl spaces. Estimates put exposure to elevated radon levels as second only to cigarette smoke as a leading contributor to lung cancer.

Figure 4.43: Radon

Common Problems	■ Cracks and other openings in the foundation walls and ground slabs. ■ Negative air pressure within the living unit, lack of crawl space ventilation, and lack of a tightly sealed continuous barrier of the crawl space floor which allows radon to leak into living spaces. ■ Radon-contaminated water supplies where the groundwater contains high levels of radon. ■ In some cases, radon as been found to emanate from stone, fly ash, and other earth-based building products.

Considerations	■ Establish and conduct a radon testing program on base.
	■ In regions with known concentrations of radon, ensure that foundation walls and slabs are properly designed to mitigate or eliminate seepage of radon into the structure.
	■ In new and existing structures, provide methods to adequately ventilate the entire structure to increase the number of air changes (replacement of the unit's air volume) per day.
	■ Consult the following for additional guidance:
	  ■ Engineering Technical Letter (ETL) 89-9, *Radon Reduction in New Facility Construction*.
	  ■ EPA 86-004, *Citizens' Guide to Radon*, l986, U.S. Environmental Protection Agency, Office of Air and Radiation, Washington, DC.
	  ■ EPA 520/1-90-017, *The National Radon Contractor Proficiency Program*, July l990, U.S. Environmental Protection Agency, Office of Radiation Programs, Washington, DC.
	  ■ EPA 520/1-90-001, *National Radon Measurement Proficiency Program, Cumulative Proficiency Report,* January 1990, U.S. Environmental Protection Agency, Office of Radiation Programs, Washington, DC.
	  ■ *Indoor Radon and Radon Decay Product Measurement Protocols*, U.S. Environmental Protection Agency, Office of Radiation Programs, Las Vegas Facility, Las Vegas, NV.
	  ■ EPA *Model Standards and Techniques for Control of Radon in New Residential Buildings.*

■ 4.11.6 Freon and Chlorofluorocarbons (CFCs)

The Air Force policy on ozone depleting chemicals (ODCs) and, specifically chlorofluorocarbons (CFC), is outlined in AFI 32-7080, *Pollution Prevention Program*. Freon, the most commonly used CFC, is used in air conditioning equipment and refrigerators, and has been identified as a major contributor to ozone depletion. In 1987, the United States ratified the *Montreal Protocol*, a document intended to initiate a global ban on ODC production. Purchases of air conditioning systems using Class I ODC refrigerants was prohibited as of June 1993. Target dates have been set to replace all equipment using ODCs at the end of its economic life with non-ODC equipment.

The Air Force goal is to prevent pollution by eliminating the release of CFCs into the environment. The intent is to accomplish this by employing new conservation methods, such as recovering, recycling, and reusing ODCs. In existing chillers and refrigerators, CFCs are in a closed system

that can be viewed as a reusable resource. The *Clean Air Act Amendment* of 1990 requires the recycling or recovery of CFC refrigerants so that reclaimed or recycled CFCs can be reused.

In addition to refrigerants, CFCs were widely used as the propellant and gas filler for foam insulation. When damage or destruction of the insulation occurs, CFCs are released into the atmosphere. Manufacturers of both polystyrene and styrofoam are converting to substitutes for CFCs.

Replacements for CFCs are not simply "drop-in" substitutes. Equipment that currently uses CFCs requires extensive conversion to accommodate the non-CFC chemicals. Tests on operating units have indicated a significant decrease in capacity and an increase in power consumption where substitute chemicals have been used. Another concern is that the new chemicals may be totally incompatible with existing refrigerant/oil combinations.

Figure 4.44: Freon and Chlorofluorocarbons (CFCs)

Common Problems	■ Materials and equipment that contain CFCs, including refrigerators, air conditioning systems, and insulating products.
Considerations	■ Specify CFC-free refrigerators, air conditioning systems, and insulation options, where practical or required by law or regulation. ■ During renovation projects, ensure that CFCs are recovered from HVAC units being replaced, and that foam insulation is disposed of properly. ■ Prevent atmospheric discharges by requiring operating and testing practices and conservation measures, such as recovery, recycling, and reuse of ODCs. ■ In renovations and repairs, ensure CFCs are captured prior to the removal of CFC-containing equipment.

■ 4.11.7 Termiticides

Termite infestation, although present throughout the U.S., tends to occur more severely in warmer climates. If termite infestation occurs, it is usually found in wood members in close proximity to the ground. There are several methods to retard termite infestation; the most common method is the use of chemicals in the ground around and below the foundation wall. However, using chemicals is a reactive response. The damage may have already been done.

Figure 4.45: Termiticides

Common Problems	■ Termite infestation. ■ The chemicals used to poison termites (termiticides) can be hazardous to humans and can intrude into other areas of a home, usually through HVAC ducts in or below the floor slab.

Considerations	■ Ensure the likelihood of infestation is considered during new and renovation projects. Select the best method of prevention based on local conditions. ■ Do not rely on chemicals to solve termite infestation. Be pro-active by using methods to inhibit infestation before the problem begins. ■ Use pressure-treated wood in all cases where wood structural members are either less than 18 inches above grade or are accessible by termites from grade. ■ The Uniform Building Code requires a minimum clearance of 18 inches between the bottom of unprotected floor joists (12 inches for girders) and the ground. ■ Ensure adequate ventilation of and positive drainage in crawl spaces. ■ Do not locate heating and cooling ducts in or under slabs on grade in all geographic areas that are subject to termite infestation. See Engineering Technical Letter (ETL) 84-10, *Air Force Building Construction and the Use of Termiticides*. ■ In revitalization projects, replace all HVAC ducts in or below the floor slab with an above-the-floor system.

■ 4.11.8 Recycled/Recyclable Materials

It is the Air Force's goal to use existing natural resources as efficiently as possible, as well as to minimize, and ideally, eliminate negative impacts on the local environment. Recycling is an important element of that goal, not only in providing family housing but as part of the everyday lives of Air Force members.

4.12 Fire/Life Safety

Ensuring that projects meet applicable industry standards and codes is the primary responsibility of design, engineering, and construction professionals. However, it is important that Air Force project managers understand the importance of these codes and standards. By adopting model and local building codes, the Air Force is endeavoring to safeguard life and property by controlling the design, construction, and quality of materials used in FH. Safety requirements specific to systems are discussed under their respective headings (e.g., Electrical/Plumbing/ Mechanical, etc.) and in referenced documents in the appendices. This section is meant to complement those sections and to look at life safety issues holistically with respect to a housing unit.

Although the Air Force wants to conform to community building standards, in some cases, Air Force neighborhoods may lie outside the jurisdiction of any local code. In this case, a model code used within the region should be applied. In the event of a conflict between local or model codes and this Guide, use the most restrictive code.

Figure 4.47: Fire/Life Safety

Common Problems	■ The most common problem affecting life safety is the obsolescence of electrical, HVAC, plumbing, or structural systems in the existing, aging housing inventory. Examples include failed insulation or connections; wiring without circuit protection; non-conforming window heights and opening dimensions; grounded receptacles that may have been added to some houses without proper grounding; and gas lines that may have deteriorated in crawl spaces. ■ Structures may present a high fire risk due to improper floor plan design and failure to provide required structural protection, such as fire separations (walls, ceilings, floors, and area separation).
Considerations	■ Use the Council of American Building Officials (CABO) *One and Two Family Dwelling Code* as the model code for FH. This code standardizes the requirements for FH by using a compilation of data from national model codes listed hereafter. There are, however, construction materials and practices other than those listed in the CABO code that are adequate for the purposes intended or that apply to the region typically served by other national/model codes. These include: ■ *National Building Code*, Building Officials Code Administrators International, Inc. (BOCA). ■ *Uniform Building Code*, International Conference of Building Officials (ICBO).

Figure 4.47: Fire/Life Safety (continued)

Considerations (continued)

- *Standard Building Code*, Southern Building Code Congress International, Inc. (SBCCI).
- *Life Safety Code*, National Fire Protection Association (NFPA 101).
- *National Electrical Code*, National Fire Protection Association (NFPA).

- Use the following flame spread (FS) and smoke development (SD) ratings as called for by the locally accepted building code. Also, refer to the values listed in MIL-HDBK-1008, when tested in accordance with American Society for Testing and Materials (ASTM) Test E-84:

MATERIAL	FS	SD
Floor, Wall, and Ceiling Finishes		
Exit Enclosures (Apartment Buildings)	**25**	**50**
Other Spaces, Not Sprinklered	**75**	**100**
Other Spaces, Sprinklered	**200**	**200**
Thermal and acoustical insulation		
Exposed	**25**	**50**
Within Wall Assemblies	**100**	**None**
Totally Enclosed per MIL-HDBK-1008	**None**	**None**

- In renovation projects, use the opportunity of project planning to review existing floor plans, construction, and systems for ways to bring existing conditions up to current life safety standards.
- Provide smoke detectors in accordance with Section 4.12.1 of this document.
- Provide automatic residential sprinkler systems in accordance with section 4.12.2 of this document.
- In new projects, do not use kitchen range hood extinguishers (some existing devices may be left in place as permitted by Air Force Policy Letter, *Policy on Kitchen Range Hood Fire Protection in Military Family Housing (MFH), 30 June 1993)*. Remove immediately all low-cost, throw-away kitchen range fire protection devices located over gas ranges. Leave these fire protection devices in place over electric ranges until their service life expires. Do not remove kitchen range fire protection devices installed on projects that were awarded prior to 30 September 1993 until the housing unit is sprinklered or until the kitchen range fire protection device has reached the end of its service life.

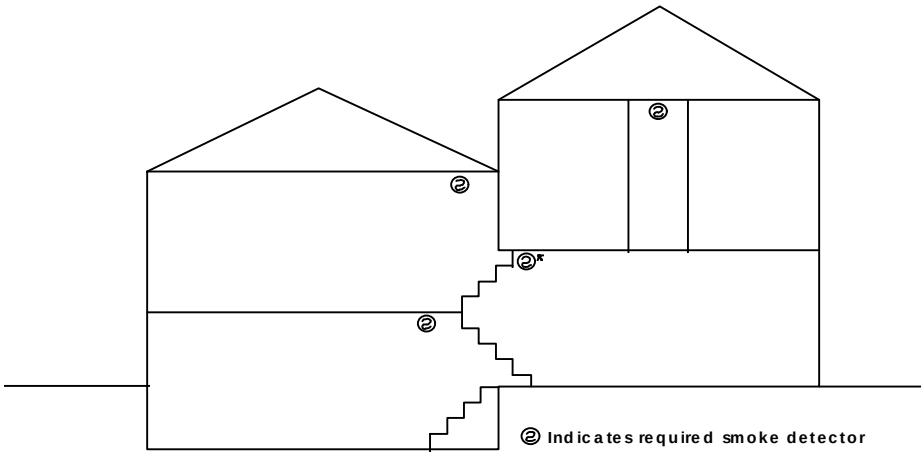
4.12.1 Smoke Detectors

The installation of smoke detectors is an essential step in ensuring occupant safety. Public Law 102-522, *Fire Administration Act of 1992,* requires the installation of hard-wired smoke detectors in all housing units.

It is important that these devices not be an after-thought; they should be an integral part of FH projects. It is the Air Force project manager's respon-sibility to ensure this happens.

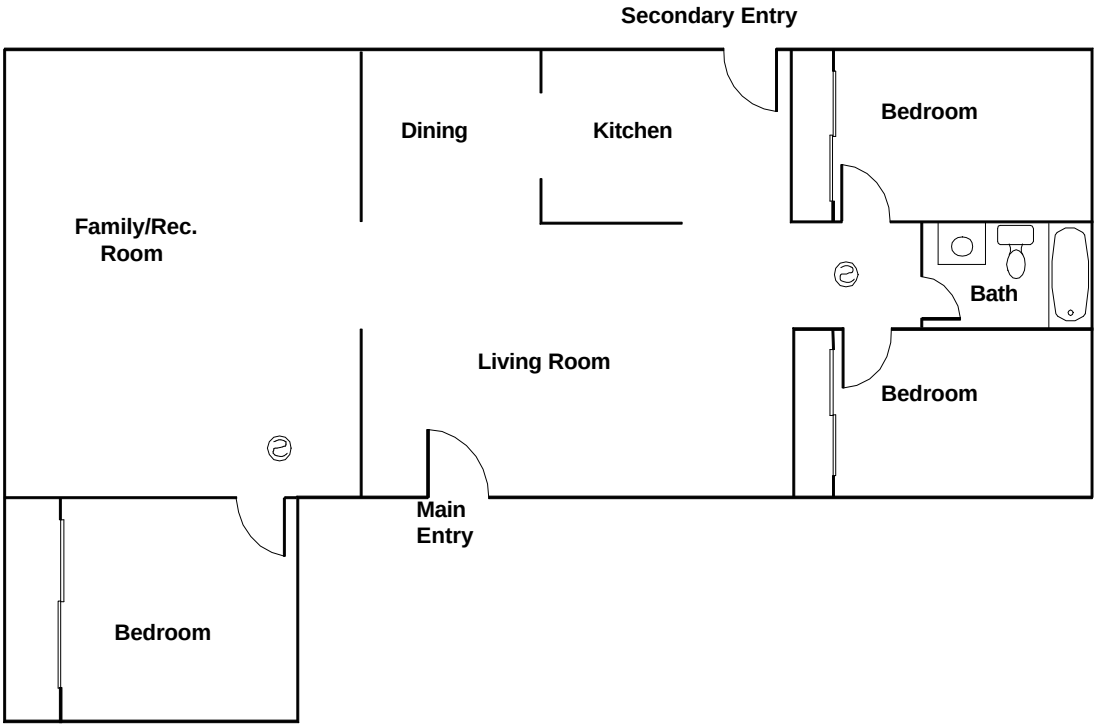
Figure 4.48: Smoke Detectors

Figure 4.49: Smoke Detector Locations in Existing FH



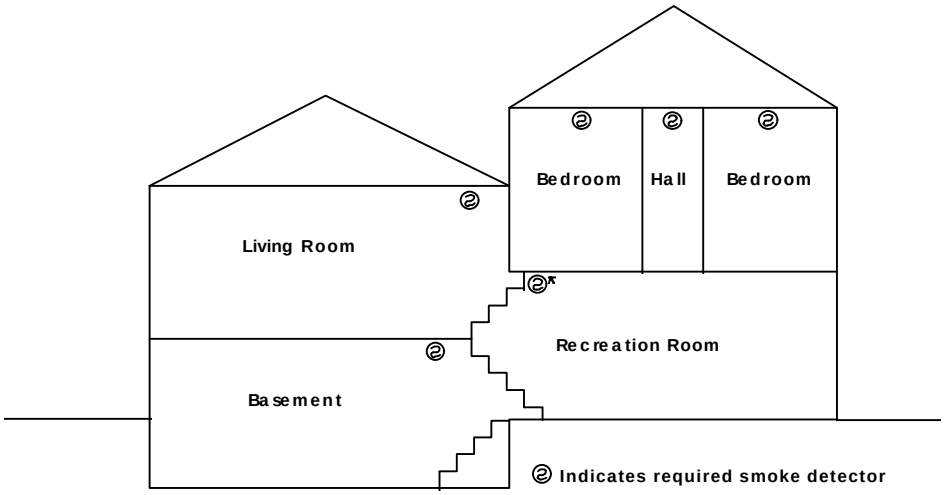
Split-Level arrangement. Smoke detectors are required where shown.

* Smoke detector required only if a door is provided between living and recreation rooms.



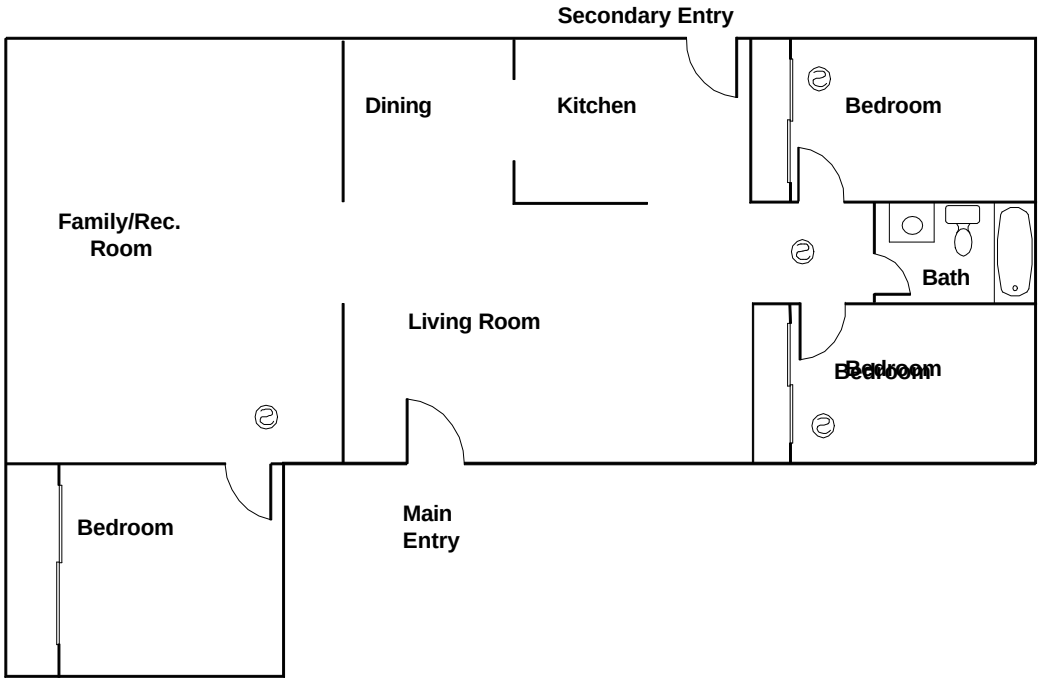
In FH with more than one sleeping area, a smoke detector is required to protect each sleeping area.

Figure 4.50: Smoke Detector Locations in New FH (including Whole House Improvement)



Split-Level arrangement. Smoke detectors are required where shown. Note that smoke detectors are required in each bedroom.

* Smoke detector required only if a door is provided between living and recreation rooms.



In FH with more than one sleeping area, a smoke detector is required to protect each sleeping area. Note that smoke detectors are also required in each bedroom.

4.12.2 Fire Sprinklers

Due to the speed with which residential fires can spread and the severity of the damage caused by fire, fire sprinkler systems have become more common in residential applications and have been mandated by building code in multi-family housing. Sprinkler systems activate before room temperatures and smoke/toxic gases reach critical levels thus allowing occupants to escape. Public Law 102-522 requires sprinkler protection in FH units having three or more residential units under one roof.

Fire sprinklers, however, are not required in all situations. Since sprinkler systems are costly and can jeopardize project budgets, other methods, such as fire-rated assemblies, can be used to contain the spread of fire.

Figure 4.51: Fire Sprinklers

Common Problems	■ Non-existent or poor fire protection. ■ Units do not meet the criteria in Engineering Technical Letter (ETL) 93-4, *Fire Protection Engineering Criteria - Automatic Sprinkler Systems in Military Family Housing*, **or** conform to the implementation guidance for sprinkler systems in FH as established in AF/CE Policy Memorandum dated 31 January 1994.

Considerations	■ Provide sprinkler protection (in accordance with MIL-HDBK-1008 and National Fire Protection Association (NFPA) Standards 13 or 13R) for FH units having three or more residential units under one roof as follows:
	  ■ For one, two, and three-story dwellings, provide fire sprinklers in all new FH units beginning with the FY 95 program.
	  ■ Waive this requirement for townhouse-style (attached), multi-family housing units if all of the following apply:
	  ■ The housing area is located within the recommended response time and distance of a local fire company according to Department of Defense Instruction (DoDI) 6055.6, and
	  ■ The units comply with the most current accepted edition of the NFPA 101, *Life Safety Code*) for residential occupancies, and
	  ■ The units are constructed with a 2-hour fire-rated wall between units meeting the requirements of the most current edition of the Council of American Building Officials (CABO) *One and Two Family Dwelling Code*. This rated wall must be continuous from the foundation through the roof, and must be designed to allow the collapse of the construction on the fire-side of the wall without collapse of the wall itself.

Figure 4.51: Fire Sprinklers (continued)

Considerations (continued)	■ Perform a life cycle cost analysis, with the assistance of an Architect-Engineer (A-E) and/or design agent, to determine if the use of sprinklers or a fire wall is more cost effective.
	
	■ In dwellings with four or more stories, provide sprinklers when the units undergo Whole House improvements, are replaced, or built new, beginning with the FY 95 program. If there is no Whole House or replacement project (P-713/P-711) programmed for existing buildings, program an operations and maintenance project (P-722) to install sprinkler protection.
	
	■ Always provide fire sprinkler protection in accordance with NFPA Standards 13, 13D, or 13R for all housing units (single-family, duplex, and multi-family) in a residential area under the following conditions:
	
	  ■ When new housing areas are located outside the recommended response times and distances of a local fire company according to DoDI 6055.6, and
	
	  ■ When economic and risk analyses prove it is more beneficial to close an existing fire station or not to build a proposed fire station.
	
	■ Analyze sprinkler installation and fire station closure in existing housing areas with 300 or fewer unsprinklered housing units.
	
	■ Ensure that a mechanical engineer reviews drawings and specifications to ensure that adequate water supplies and pressures are available for new fire sprinkler systems.

4.13 Accessibility

Access to Federal facilities by the disabled has been mandated by the *Americans With Disabilities Act* (ADA). This includes military FH. The Air Force has set a planning and procurement goal of 5 percent (with a minimum of one unit of each bedroom type/rank category per base) of all Air Force housing to be made accessible or easily modifiable to conform to accessibility requirements.

FH units must be accessible not only to disabled people with wheelchairs, but also to disabled people who do not use wheelchairs, such as visually and/or hearing-impaired persons.

It is important to become familiar with the guidelines and responses called for by the ADA in addressing all physically challenged persons. The *Uniform Federal Accessibility Standards* (UFAS) provides excellent, comprehensive documentation, including clear diagrams and dimensions, for use in accessibility design. This document is available at no cost through the Federal Government Printing Office (GPO).

Figure 4.52: Accessibility

Common Problems	■ Poor accessibility due to steps, steep slopes, narrow passages, and insufficient space for maneuvering. ■ Common-use areas, such as walks, streets, parking, play areas, recreation areas, picnic areas, meeting facilities, swimming pools, and paths to common areas, are frequently overlooked in providing accessibility.
Considerations	■ In providing accessibility in common areas, recreational facilities, outdoor developed areas, and individual housing units, comply with criteria in the *Uniform Federal Accessibility Standards* (UFAS) and in the latest version of the *Americans with Disabilities Act Accessibility Guidelines*. ■ In the designs of new units and the renovation of existing units, consider incorporating features that would facilitate adaptation for accessibility at a later date. Examples of such features include the height of electrical switches, outlets, and other controls; the height of shelving and closet rods; opening widths; circulation patterns; the availability of accessible emergency egress; and the flexibility of the plan to permit modifications necessary to provide accessible kitchens and bathrooms. ■ Refer to the Housing Community Plan to identify new construction requirements to accommodate persons with disabilities and the units that are most suitable for conversion. ■ Increase the net floor area of a unit by up to 75 SF to meet accessibility standards (see Figure 4.1). Complete the necessary construction in a way that allows the house to be easily converted back when the family with the person with disabilities moves.

Figure 4.52: Accessibility (continued)

Considerations (continued)	■ Remember that a key aspect of accessible design is to provide an "accessible" path from parking areas to all areas of the dwelling. ■ Once an accessibility requirement is identified, give the highest priority to the necessary modifications. ***Entry*** ■ Design and construct common entrances to multi-unit facilities to be accessible to persons with disabilities. ■ Provide ramps when necessary at entries. On some sites, provide ramps at side or back doors, which may be more easily adapted to be the primary accessible entry. Include handrails on ramps that exceed 72 inches in length. Slope ramps no greater than 1 in 12, with a 30-inch maximum rise. Provide ramps with a minimum width of 36 inches. Consult the UFAS. ■ Design outdoor living areas with low thresholds and adequate turnaround space. Provide thresholds with a maximum height of 1/2-inch, with a beveled slope no greater than 1 inch in 2 inch. ***Interior Accessibility*** ■ To ensure the unit is accessible, provide certain functions on the first floor, including entry, entertainment, food preparation, eating, sleeping, bathing, laundry, and storage. Provide wood or resilient flooring, or a very low-pile, dense-weave carpet to allow ease of movement. Provide controls, electrical outlets, and switches no more than 48 inches and no less than 15 inches from the floor. Provide accessible outdoor living spaces, such as patios, decks, and balconies, along with parking areas and walkways. ■ Provide an entry door with a clear width of at least 32 inches when the door is open 90 degrees. Provide a minimum of 60 inches diameter clear space for the wheelchair inside the entrance. Provide lockset hardware (lever-handled, push-type, or U-shaped) mounted no higher than 48 inches. ■ Provide for accessibility of all first-floor rooms. Ensure all corridors are at least 36 inches wide and door clear widths are 32 inches. Provide lever-handled door hardware. Consult the UFAS for required door clearances. ■ Provide windows that are within easy reach and that are operable by one hand with less than 5 pounds of force. Use casement windows with either lever or crank opening mechanisms, with locking mechanisms placed within reach of a seated person. ■ Consult the UFAS for comprehensive guidance, diagrams, and dimensions.

Figure 4.52: Accessibility (continued)

Considerations (continued)	***Bathrooms*** ■ Provide baths with adequate space for a person in a wheelchair to enter and close the door, use the fixtures, reopen the door, and exit. Ensure clear floor space is a minimum of 66 inches by 48 inches. ■ Provide a toilet seat with a height of 15 inches and no more than 19 inches from the floor, with toilet paper dispenser positioned 19 inches from the floor. ■ Provide a wall-hung lavatory without a vanity cabinet for wheelchair access. Mount the lavatory rim and surrounding counter surface no higher than 34 inches and provide a clearance of at least 29 inches from floor to bottom of apron. Provide levered or push-type faucets. Provide clear floor space of 30 inches by 48 inches with 19 inches clear under the lavatory. Cover or insulate the hot water supply and drain pipes. ■ Provide clear floor space, a circle with a minimum diameter of 60 inches, to facilitate wheel chair maneuverability. Allow 9 inches of the 60 inches to be accommodated under lavatory counters. ■ Provide the necessary reinforcing for the installation of grab bars in appropriate locations per the UFAS. ■ Provide a seat at the head-end of the bathtub. Also provide a shower spray unit with a hose length of at least 60 inches that can be used as a hand-held or fixed shower. Install an adjustable-height vertical bar that does not obstruct the use of the grab bars and that holds the shower spray unit during fixed shower use. ■ Provide vanity bases only if they can be removed without the use of special tools or knowledge. Finish all flooring that is located beneath removable vanity bases. ***Kitchen*** ■ Provide a minimum clear floor space of 30 inches by 48 inches in front of all appliances and 19 inches under sinks. ■ Provide a minimum 60-inch clear width between cabinet fronts, counters, or walls in U-shaped kitchen areas. ■ Provide kitchen sinks and the surrounding counters no more than 34 inches above the finished floor. Ensure one sink bowl is no more than 6½ inches deep with a levered or push-type faucet. ■ Provide a kitchen sink with at least 30-linear inches of work surface adjacent to the sink. Consider counters designed for repositioning to a minimum height of 28 inches. Use either a single integral unit or separate components for the sink and work surfaces. Allow accessibility by a wheelchair occupant to the base cabinets directly under the sink and counter work surface by ensuring these items are removable. Ensure that when the counter is lowered, the exposed sides and back of the adjacent cabinets are constructed of a durable, non-absorbent material finish. Finish all flooring located beneath the removable cabinets.

Figure 4.52: Accessibility (continued)

Considerations (continued)	***Kitchen* (continued)** ■ Select a range with range-top controls that can be operated without reaching across burners. ■ Provide either a side-by-side refrigerator/freezer or an over/under refrigerator/freezer that has at least 50 percent of the freezer space below 54 inches above the floor. ■ Provide kitchen wall cabinets with lower shelves or drawer space at a height of no more than 48 inches. Mount handles as close to the bottom of the wall cabinet doors as possible and as high as possible on base cabinet doors. ***Laundry*** ■ When laundry equipment is provided, choose front-loading machines with controls on the front and with a minimum of 30 inches by 48 inches clear space in front of the equipment with the doors open. ***Tactile and Audible Considerations*** ■ Ensure that the requirements for the visually and hearing impaired are also reviewed. ■ Use the above points only to provide an outline for some of the key points of accessible design. It is imperative that the housing project manager and the design architect-engineer consult the ADA and UFAS in addressing accessibility requirements.

4.14 Energy Conservation

The Air Force policy is to maximize energy conservation by improving energy efficiency and maximizing the use of renewable forms of energy in all projects to the maximum extent practicable. Additionally, Congress has mandated the use of solar systems, to the extent that they are economically feasible.

Executive Order 12902, *Energy Efficiency and Water Conservation at Federal Facilities*, dated 8 March 1994, establishes the guidelines that apply to FH. The Air Force has set an overall goal to achieve a reduction of 30 percent in energy consumption in its FH (measured on a gross square footage basis) by the year 2005 using FY 85 as the baseline.

The objective is to minimize the use of petroleum-based fuel by switching to a less polluting and non-petroleum-based energy source, such as natural gas, solar, or other renewable energy source. Where alternative fuels are not practical or cost effective, strive to improve the efficiency with which petroleum products are used.

Figure 4.53: Energy Conservation

Common Problems	■ Residential energy defects fall into four broad categories: 1. **Excessive air infiltration:** Nearly 50 percent of the space heating load can be caused by air infiltration. Air infiltration commonly originates from loose-fitting windows, and a lack of caulking around window sills, door frames, and construction joints. Air also enters from exterior penetrations of the building envelope, including electrical service, cable television, air conditioning, plumbing penetrations, and electrical receptacles and switches. 2. **Excessive heat loss through the building envelope:** The building envelope consists of the portions of a house that separate the indoors from the outdoors, including the ceiling, roof, walls, floor, windows, and doors. The most common problem is inadequate or poorly installed wall and ceiling insulation. The insulation of slabs, crawl spaces, and basement walls is routinely neglected. Insufficient window glazing for the climate conditions, uninsulated entry doors, and missing or insufficient vapor barriers are also common problems. 3. **Inefficient heating and cooling equipment, appliances, and lighting:** Many housing units have mechanical equipment that have poor energy efficiency ratings and ineffective control hardware and strategies. Domestic hot water systems, for example, are frequently the second largest energy user in multi-family buildings. Household appliances and lighting, to a lesser extent, waste energy. Refrigerators and freezers provide opportunities for energy reductions. In recent years,

Figure 4.53: Energy Conservation (continued)

Common Problems (continued)	manufacturers have made significant improvements in the efficiency of residential equipment (especially fuel-burning equipment) and appliances. In some cases, the improvement in efficiency alone can make replacement an economically feasible alternative to repairing outdated equipment. **4. Improper ventilation:** Exhaust fans and clothes dryers increase the heating/cooling load on the house and cause discomfort in the immediate area. Exhausting kitchen waste heat to the outside can help reduce cooling loads.
Considerations	***General Notes*** ■ Use the Base's Residential Energy Evaluation Manual (REEM) to begin evaluating ways to reduce energy consumption. ■ Perform infiltration tests on FH dwellings to determine infiltration levels. Use the appropriate infiltration barriers (e.g., sealants, vapor barriers, etc.) on exterior surfaces to minimize infiltration. ■ Provide master metering to provide accurate future energy use data for conservation programs. ■ Ensure an adequate supply of fresh combustion air from outside the building for all fuel burning furnaces and domestic water heaters. ■ Provide air-lock entries at exterior doors in areas with winter design temperatures (97.5 percent) of -10° F (-23° C) or less. ■ Plant deciduous trees in strategic locations to reduce cooling loads in the summer and allow solar gains in the winter. ■ Consider landscaping as a means of blocking winds and increasing energy conservation. ■ Use building orientation and siting, when building new, to capitalize on passive heating and cooling. ***References & Assistance*** ■ For overseas projects or revitalization projects in CONUS, ensure an individual energy and economic analysis is performed to establish an appropriate energy budget and to be used as a baseline for turnkey proposals. ■ For new projects within CONUS, use the Department of Energy (DOE) *Conservation Optimization Standard for Saving in Federal Residences (COSTSAFR)* microcomputer program or an approved equivalent to help establish the project's energy budget.

Figure 4.53: Energy Conservation (continued)

Considerations (continued)	***References & Assistance* (continued)** ■ The *Design Guide for Energy Efficient Revitalization of Military Family Housing for Improvement and New Construction* was developed by the National Association of Home Builders and Oak Ridge National Laboratory to provide residential energy design and inspection guidelines needed to achieve energy efficient designs and higher energy savings. The organization of the Guide follows the process used in developing renovation projects: ■ It outlines the responsibilities of the Architect-Engineer (A-E) in developing contract documents. It provides information on the most current technologies for identifying the problem as well as detailed procedures for determining the most cost-effective measures for bringing the structure into compliance with energy saving objectives. ■ It also provides guidance on inspecting housing from an energy efficiency standpoint, and offers information and methodology needed to select among various energy saving alternatives and guide specifications. ■ The Inspection Guide helps to ensure that construction inspectors understand the technologies available and that these technologies (e.g., installation of high-efficiency equipment) are properly installed. ■ The Guide also focuses on an energy retrofit program for housing units that are not scheduled for major revitalization or replacement in the very near future. It aims to reduce energy costs of homes by using a small investment until the unit can be scheduled for Whole House improvements. ■ Consult any of the following for information on air infiltration issues: ASHRAE, *Handbook of Fundamentals*, ASHRAE *Standard 90.1*, NAHB Research Center, *Insulation Handbook*, and NAHB Research Center, *Moisture in Homes Handbook*. Homes with more than 0.5 air changes per hour (ACH) are considered unacceptable. Houses with natural filtration rates between 0.3 and 0.5 ACH are in the acceptable range. Below this range, the indoor air quality is at risk and mechanical ventilation may be warranted. ■ ASHRAE covers the procedures for air infiltration tests using either "blower doors" or "tracer gas" measurements. Blower doors subject the complete building envelope to a uniform air pressure to determine the location of air leaks. The other method releases known quantities of tracer gases into the building and then measures the drop in gas concentrations after outdoor air has infiltrated the building. ■ Consult any of the following for information on thermal protection of the building envelope: the ASHRAE *Handbook of Fundamentals* (ASHRAE *Standard 90.2P) Energy Efficient Design of New Low-Rise Residential Buildings*, and NAHB Research Center *Insulation Handbook*. The *Insulation Handbook* provides clear instructions on the proper methods of design and installation. Section 4.6, Foundation and Building Exterior, establishes target levels of insulation and window glazing.

Figure 4.53: Energy Conservation (continued)

Considerations (continued)	***References & Assistance* (continued)** ■ The U.S. Department of Housing and Urban Development HUD-CPD 1269 *Energy in Housing and Community Development/Guide to Performing Energy Retrofit during National Multi-family Property Rehabilitation,* October l990, provides an informative discussion of various issues relevant to housing renovations. It discusses energy audits, heating and cooling systems, lighting and appliances, and includes a sample energy audit form. ***Mechanical/Electrical Hardware and Appliances*** ■ Conduct a life-cycle cost analysis for the selection of efficient and cost effective systems. The selection of equipment generally represents a compromise between system efficiency and net installed costs. Many different combinations of systems may be appropriate for a given project. ■ Select energy-efficient appliances, such as refrigerators, ranges, and dishwashers. All appliance manufacturers are required to make the energy rating, known as the "Energy Guide," available. Use these ratings in the selection of home appliances. ■ Consider the energy efficiency of lighting as well as equipment and appliances. Consider the use of fluorescent fixtures with high-efficiency ballasts and lamps for interiors. Practically speaking, an average fluorescent bulb with a higher initial cost and fixture will provide a given level of lighting at about one-fifth the cost and 10 to 20 times the life of a conventional incandescent bulb and fixture. Use high-intensity discharge (HID) for outdoor lighting in areas such as parking lots and community areas. ■ In outdoor areas, evaluate lighting fixtures for energy efficiency while keeping in mind that the quality of lighting is also important.

4.15 Historic/Cultural Resources

The National Historic Preservation Act of 1966 and subsequent executive orders require the Air Force to take into account the consequences of their actions on historic housing facilities that are listed on or are eligible for listing on the National Register of Historic Places. Responsibility for the majority of Air Force preservation duties falls to each installation. All work planned for historically significant quarters must be coordinated with the State Historic Preservation Office (SHPO) and other local officials.

Also, historic or potentially historic dwellings are not exempt from current building codes and life safety requirements. They must be addressed in addition to compliance with historic structure guidelines.

Figure 4.54: Historic/Cultural Resources

Common Problems	■ Lack of documentation of facilities with historic or potentially historic significance. ■ Subsequently, such buildings or areas having historic significance have been destroyed or degraded.
Considerations	■ Inventory and document significant or noteworthy historical housing and settings within the installation. ■ When historic units need repair or improvement, always coordinate with the State Historic Preservation Office (SHPO). ■ Avoid alterations that detract from the design integrity of historic housing and their settings, such as inappropriate building modifications and intrusions of incompatible uses, buildings, or structures. ■ When altering a historic house, make a reasonable effort to retain, uncover, and/or restore as much of the original materials, details, and design character of the building as is feasible. ■ When introducing new parts or mixing old with new elements on the building exterior, preserve the original design character by obtaining competent professional design assistance. ■ Avoid imitative designs when introducing new buildings within the setting of historic buildings. Encourage designs that are compatible with the old in their scale, form, and use of materials. ■ Repair rather than replace deteriorated architectural features wherever possible. ■ Ensure that the surface cleaning of structures is undertaken with the gentlest means possible.

Figure 4.54: Historic/Cultural Resources (continued)

Considerations (continued)	■ Whenever possible, complete new additions or alterations to historic houses in such a manner that if such addition or alteration were to be removed in the future, the essential form and integrity of the structure would remain intact. ■ Consider using a landscape architect to preserve and protect landscape plantings of historic value. ■ Provide fire/smoke detection, fire sprinklering, and life safety/means of egress measures per current codes (reference sections 4.12.1 and 4.12.2). ■ Design adequate fire and life safety into existing structures without sacrificing historic integrity. See NFPA 913, *Recommended Practice for the Protection of Historic Structures and Sites.* ■ Protect and preserve archeological resources affected by, or adjacent to, any historic dwellings. ■ Contact the National Historic Trust in Washington, DC for detailed guidance on conducting historic facility documentation as well as for the varying requirements between structures with historic significance and structures actually on the National Register of Historic Places.

CHAPTER 5

HOUSING PROJECT MANAGEMENT

5.1 Purpose

This chapter outlines the process of providing FH by focusing on the two broad categories of project Design (Section 5.2) and Construction Management (Section 5.4). Section 5.3, Alternate Delivery Methods: Design-Build and Turnkey, outlines a method that consolidates the traditional design and construction process. Section 5.5, The Post-Construction Process, discusses the post construction process and how the Air Force takes control of the new housing units.

This chapter provides an overview of the process based on the conventional Design-Bid-Build method that is most often used. Alternate methods are addressed at the end of the chapter. An important supplement and companion to this chapter is the *U.S. Air Force Project Manager's Guide to Design and Construction*, which outlines the project design and management process in detail.

5.2 Design Management

5.2.1 The Design Process

In order to end up with a successful project that provides quality housing for Air Force members, numerous representatives from the base, major command (MAJCOM), Headquarters Air Force (AF/CE) and other outside agencies must work together. Responsibilities for the management of the design are divided between numerous representatives. The primary representatives include (also see Appendix 1):

- Project Programmer: The project programmer is responsible for the particular project at the base, MAJCOM, and AF/CE level.
- Design Manager (DM): The DM is responsible for ensuring the design execution meets critical milestones. Although the DM is normally the MAJCOM, this function could be performed by another group, such as the Air Force Center for Environmental Excellence (AFCEE).
- Design Agent (DA): The DA is responsible for the execution of the project. The DA is normally the Base Engineer.

The construction manager (CM), construction agent (CA), and contracting officer (CO) will be discussed in Section 5.4.

Once a base has identified a housing construction project, reviewed it for compliance with the HCP (see Chapter 2), and had it programmed and approved by the MAJCOM, the project must be validated by Headquarters Air Force Housing (AF/CEH) before design can begin. After validation, AF/CEH authorizes the design by issuing an Air Force Planning Instruction (PI).

In the sequence of events in FH design, a determination is made whether to use in-house design resources for all or a portion of the program. Some DAs elect to prepare a portion of their design program with in-house personnel. This is the DA's decision, but it should be based on the in-house staff expertise and workload. This allows their technical personnel to stay in better contact with current criteria, codes, materials, etc. Using in-house staff usually will allow design to start much sooner than when using an A-E firm, because the time

required for public notice, A-E selection, audit, and negotiation is saved. However, the overall design time is normally longer. If a DA or the base will act as execution manager, then a Field Design Instruction (DI) is issued to authorize the start of the design process (A-E selection, etc.).

After receiving funds from Congress through OSD, AF/CEH normally issues design funds (P-714) up front so that MAJCOMs can budget their program priorities. The distribution of design funds is based on 2.8 percent of the FY programmed amount.

Design funds are tracked at the Air Staff only by MAJCOM and year-of- funds appropriation.

- Funds are initially issued against a Budget Authorization Account Number (BAAN). For example, 94-ACC, 94-AMC, 94-ATC, etc., denotes FY 94 design funds for design of FH projects at HQ ACC, AMC, AETC, etc.
- This BAAN usage provides the MAJCOMs with greater flexibility in designing their FH construction and improvement programs.
- MAJCOMs must carefully track FH design funds for any potential audits and to justify future requests. FH design funds reports must be submitted in the format shown in Figures 5.1 and 5.2.

Figure 5.1: P-714 $ Issued

BAAN	($K)	
92-092	$XXX	List Total $$$
92-093	$XXX	Issued for each
93-094	$XXX	FY by BAAN
Total	$X,XXX	

Figure 5.2: P-714 $ Requirements

FY	Base	Project #	714$ Reqmt ($K)	Design Status	Obligation Date	Comment
XX	List all current or future design requirements up to and including FYXX projects with a BAAN for which you have or may use the above funds. If your % of PA exceeds 4%, justify.					
XX	XYZ	1234567890	$YYY	10%	930705	BAAN, % of PA
Total Requirement $Y,YYY						
Additional P-714 Funds Required: $Y,YYY K - $X,XXX K = +/- $Z,ZZZ K						

In most cases, an A-E firm is used for the design. A project design announcement is placed in the Commerce Business Daily (CBD) or other appropriate medium as determined by the CO. A 30-day period is allowed for response to the project announcement. Exceptions to this requirement are discussed in the *Federal Acquisition Regulation* (FAR) but generally include services with fees under $100,000, work orders on indefinite quantity/delivery (Open-End) contracts, small business (8a) contracts, and certain emergency projects. The announcement provides a synopsis of the project, special qualifications, delivery method, expertise and special requirements needed of the designer, selection criteria, and specific submittal requirements. Firms desiring to be considered must respond to the announcement on or before the closing date. The DA establishes formally constituted A-E preselection and final selection boards. The boards should be made up of licensed, experienced design professionals.

The DA should provide the shortest realistic design schedule possible within 30 days of receipt of the Field DI. The MAJCOM's DM should develop a preliminary design schedule within 10 days of issuing the Field DI for initial input into the Program, Design, and Construction (PDC) system. This schedule will be used to evaluate the DA schedule. The PDC will be revised as necessary, after the DA schedule has been accepted.

In the process of selecting a designer, there are specific protocols and procedures associated with audits, negotiations and funding (see AFI 32-1023, *Design and Construction Standards and Execution of Facility Construction Projects*). The contents of the scope of work and methods of quality assurance are also considered in the design contract phase. Design fees exceeding $300,000 per contract require notification to Congress. The A-E proposes fees based on guidance from a pre-definition conference held at this stage of the process.

A-E firms that are selected to design FH projects must be knowledgeable and experienced in residential design and construction practices and in cost estimating that is directly related to the type of work involved in the proposed project. The firm should be able to demonstrate that it has successfully completed one or more housing projects comparable to the quality of housing that meets Air Force FH requirements and standards of quality.

Once the designer has been selected, the design criteria and requirements are discussed at a negotiation conference. It is crucial to the negotiations that the project

objectives be accurately communicated to the design team.

The design statement of work (SOW) must clearly identify project design submittals (deliverables) and government review schedules. Once the DM approves project definition (preliminary) design, the DA can then proceed to design completion. Through continuing dialogue and project reviews, schematics are developed into working drawings and specifications, and finally, contract documents. The design effort culminates with the advertisement for a construction contract.

Note that the above process is typical of the "Design-Bid-Build" process (see Figure 5.3). "Design-Build" and "Turnkey" processes are discussed in Section 5.3.

5.2.2 Family Housing Design Program Sequence

Figure 5.3 provides a timeline of tasks for a typical Design-Bid-Build process and Invitation for Bid (IFB) delivery method.

The timeline of tasks for 35 percent design in Figure 5.3 also applies to Design-Build and Design-Bid-Build processes using the Request for Proposal (RFP) delivery method.

A Turnkey process using the RFP delivery method is considered 35 percent designed when an A-E contract to prepare the RFP is awarded and the installation has a Housing Community Plan at least 65 percent complete.

All RFPs for housing projects are considered 100 percent designed when the RFP is complete and Ready to Advertise.

Figure 5.3: Family Housing Design Program Sequence of Events (Design-Bid-Build)

%	Task	Office of Responsible Party	Comp Date
3%	■ Issue initial Design Instruction (DI) to Design Manager (DM). ■ Input estimated design schedule into PDC. ■ Issue Field Design Instruction (FDI) to Design Agent (DA) authorizing Architect-Engineer (A-E) selection. ■ Select A-E firm to do Project Definition (PD), with option to design to 100%. ■ Pre-negotiation conference (Air Force representatives only). ■ Hold pre-design conference (with A-E). ■ Negotiate A-E design fees.	HQ AF/CEHIE DM DM DA DA DA DA	May FY-2 Apr FY-2 May FY-2
4%	■ Issue 100% DI to DM. ■ Send design funds to DA and authorize award of A-E contract; issue 35% DI. ■ Award A-E contract.	HQ AF/CEHIE DM DA	Sep FY-2
30%	■ Complete PD (30%).	DA	Dec FY-2
35%	■ PD review completed; comments sent to DA. ■ Arrange review conference. ■ Approve 30% and issue 100% FDI.	DM DA DM	Feb FY-1
90%	■ Incorporate 30% review comments. ■ Complete advance final design (90%).	DA DA	
95%	■ 90% review completed; comments sent. Arrange review conference.	DM	Apr FY-1
100%	■ Incorporate 90% review comments. ■ Project Ready to Advertise (RTA). ■ Request advanced authority to advertise. ■ Issue advanced authority to advertise. ■ Issue authority to advertise to DA.	DA DA DM HQAF/CEHIE DM	May FY-1 Jun FY-1 Aug FY-1
Advertise	■ Issue Invitation for Bid (IFB) or Request for Proposal (RFP). ■ Report bid opening to DM.	DA DA	Oct FY
BID	■ Post bid opening report in PDC and request authority to award construction contract. ■ Issue authority to award and provide initial funding through FM channels. ■ Issue authority to award and send funds through FM channels to DA.	DM HQAF/CEHIE DM	Nov FY
AWD	■ Award construction contract. ■ Project documents to DM.	DA DM	Dec FY

5.2.3 Design Conferences

Pre-Negotiation Conference

Depending on the size and complexity of the project, a pre-negotiation conference between the Air Force project design managers, including the user (FH office representative), a base's project engineer or architect, and MAJCOM design manager, may be warranted since it is important that the design requirements are conveyed clearly and accurately to the A-E.

The Predefinition Conference

The purpose of the Predefinition Conference is to clearly and accurately convey the specifics of the design requirements to the A-E in order for the A-E to prepare a responsible and reliable cost proposal for the scope of services. If the A-E is uncertain about aspects of the Air Force's requirements, and consequently, the level of effort required to satisfy poorly defined requirements, these uncertainties will be reflected in inflated cost proposals to cover potential increases in scope due to the present uncertainties. This can adversely impact project fee negotiations and potentially stifle the entire design process.

5.2.4 Project Design Submittal Requirements (Deliverables)

Figure 5.4 provides an outline of basic deliverable requirements for FH projects. (Note that the requirements are cumulative; if an electrical plan is required at 30%, it is also required at 90%.)

Figure 5.4: Project Design Submittal Requirements (Deliverables)

%	Submittal
30%	***Site Drawings*** ■ Location, site, and utility plans. ■ Site plan, including locations of exterior mechanical equipment, sidewalks, driveways, fencing, and landscaping. ■ Concept landscape plan. ***Architectural/Structural Drawings*** ■ Demolition plans. ■ Floor plans. ■ Major wall sections. ■ Exterior elevations. ■ Interior elevations for kitchens and bathrooms (all views).

Figure 5.4: Project Design Submittal Requirements (Deliverables) (continued)

%	Submittal (continued)
30% (cont.)	***Civil Structural Drawings*** ■ Rough grading plans and details, if applicable. ■ Foundation plans. ■ Framing plans (floor and roof). ■ Critical structural details. ***Mechanical Drawings*** ■ Proposed utility modifications. ■ Unit floor plans for plumbing and HVAC (include ductwork, plumbing, and fire sprinklers). ***Electrical Drawings*** ■ Proposed site utilities modifications. ■ Unit floor plans. ***Engineering Analyses*** ■ Verify and update asbestos and lead-based paint removal and radon mitigation scope and techniques. ***Cost Estimate*** ■ Provide costs for labor and materials separately and add relevant burdens to labor and materials bare costs. ■ Do not allow line item costs combining labor and materials as well as overhead and profit. ***Outline Construction Specifications*** ■ Include all applicable divisions (or sections depending on the specification system being used). ■ Outline specifications may be "marked up" versions of a previous, similar housing project. ■ Markups must clearly indicate design intent and current governing standards.
60%	***Submittal (optional)*** ■ Incorporate as required by the size and complexity of the project.
90%	In addition to the 30% submittal items, the following must be included: ***Architectural Drawings*** ■ Door and window schedules and details. ■ Cabinet schedules and details. ■ Additional interior elevations as required.

Figure 5.4: Project Design Submittal Requirements (Deliverables) (continued)

%	Submittal (continued)

90% (cont.)	***Landscape Architectural Drawings***
	■ Area plan.
	■ Shrub and flower bed plan for units.
	■ Irrigation plan for common areas.
	Mechanical Drawings
	■ Complete HVAC plans and details.
	■ Asbestos removal if applicable.
	■ Complete plumbing plans and riser diagram.
	■ Complete automatic residential sprinkler plans.
	Electrical Drawings
	■ Complete installation plan and details to include:
	  ■ Light fixture/circuits/light fixture schedule.
	  ■ Receptacles/circuits (note: keep receptacle/light circuits separate).
	  ■ Telephone outlets.
	  ■ Television outlets.
	  ■ Doorbell connections.
	  ■ HVAC power circuits.
	  ■ Smoke detector/circuits.
	Engineering Analyses
	■ Structural calculations.
	■ Mechanical: Complete HVAC and hydraulic (sprinkler) calculations.
	■ Site and unit electrical: Voltage drop calculations for site distribution.
	■ Stormwater management (drainage) calculations.
	Cost Estimate
	■ Must be completely developed with unit prices for all components.
	■ Adjust costs for economies of scale with repetitive units and quantity purchases.
	■ SIOH and contingency listed after contractor overhead.
	Construction Specifications
	■ Complete specifications set for Divisions 1 through 16.
	■ Summary of required submittals and submittal schedule.

Figure 5.4: Project Design Submittal Requirements (Deliverables) (continued)

%	Submittal (continued)

90% (cont.)	***Bid Schedule***
	■ By unit type to determine unit costs when statutory limits are involved for improvement projects.
	Finishes
	■ Exterior
	  ■ Wall finish/color.
	  ■ Trim finish/color.
	  ■ Roofing finish/color.
	■ Interior
	  ■ Interior paint/finish colors.
	  ■ All floor coverings.
	  ■ Tile and grout color for bathroom.
	  ■ Miscellaneous bathroom colors (cultured marble, acrylic, porcelain, etc.).
	  ■ Kitchen and bathroom laminates.
	  ■ Cabinetry wood finish color (and laminate color if applicable).
	  ■ Stained wood trim on required wood species (if any).
	  ■ Blinds.
	Hardware Finish Schedule
	■ Consider door knobs and hinges, cabinet pulls and hinges, mirror mounts, doorstops, peepholes, window hardware, mailboxes, nameplates, house numbers, and exterior gate hardware.
	Description of Visible Electrical and Mechanical Equipment
	■ Consider diffusers and return air grills, switch plate and receptacle covers, and electrical panel box on interior.
	■ Consider electric service, panel boxes, street lighting, pad-mounted transformers, condensing units, gas regulators, and telephone and cable TV service boxes on exterior.
	Rendering
	■ Optional for PAIP with minimal exterior renovation, but required for construction of new FH units.

5.2.5 Design for Constructibility

The design process culminates in the preparation of the documents necessary to solicit bids for the construction of the project.

Although the following issues pertain to the construction and contracting process, they can impact the outcome of the project. It is important that the design managers are familiar with the following issues:

Constructibility Reviews

Begin the reviews at the earliest design review stages. Use experienced inspectors and others with multi-discipline knowledge about how a project is built. Take the plans into each unit type to verify existing conditions and design logic. Check carefully for conflicts between architectural, mechanical, electrical, and structural systems.

Materials Submittals

These submittals are required as part of the construction process and are normally called for in the construction specifications. Different specification systems (AIA Master Spec, CSI, DoD, etc.) use different formats but the intent is for the user/design engineer to inspect parts, materials, or equipment that the construction contractor is proposing to use on the project, and to make a decision as to whether the contractor-proposed materials meet the construction specifications standards.

Include a summary of required submittals, based on the specifications sections, as a part of the contract documents. Do not request submittals over and above those requested in the specifications sections unless truly unique circumstances (e.g., critical component affecting mission, such as security system in a GOQ) so dictate.

Schedule Control

Normally, the construction contractor is responsible for schedule control within the time parameters given by the Air Force. Construction contractors use various scheduling methods [Critical Path (CPM), GANT (Bar) Chart, and Program Evaluation and Review (PERT)].

It is not necessary that the design manager be intimately familiar with the details of each scheduling method. However, the DM should understand the project timeline from the Air Force's requirement's perspective. Discuss the timeline with the Air Force construction contract administrator to understand how common events affecting construction (e.g., poor weather, unforeseen conditions, change orders, etc.) will be handled, in terms of time extensions, according to the contract.

Poor Performance Protection

Include a clause in the specifications to release the government of the responsibility to turn over previously scheduled or additional units when the contractor is behind schedule.

Liquidated Damages (LDs)

Liquidated damages are penalties paid by the contractor when the construction schedule is not met through no fault of the Air Force. LDs are normally deducted from final payments.

Establish LDs on a per unit basis when the construction project involves phased turnover as well as end of construction performance period.

Progress Reporting and Payments

Do not require progress reports on more than a monthly basis. Progress reports are normally the responsibility of the contract inspector. They facilitate progress payments to the contractor; however, the frequency of progress reports specified in

the contract can put unnecessary burden on the contract inspector and can cause bottlenecks in the flow of information, possibly resulting in a stalled project.

Consider payments for delivered materials. Payments are normally made for materials put in place. In some cases, the contractor can be paid for critically needed materials that have been delivered and stored on site to ensure availability when they are needed. If a “Payments for Delivered Materials” clause is needed, explicitly define what materials are covered under this clause to protect the Air Force against payment claims.

5.2.6 Value Engineering

The Air Force uses Value Engineering (VE) to ensure the most essential functions of systems, subsystems, equipment, products, and facilities meet customer requirements and are obtained at the lowest cost. VE focuses on program essentials and analyzes systems, facilities, products, and processes to determine the lowest life-cycle cost without degrading performance, reliability, maintainability, and safety.

The Air Force will apply a VE analysis, via Value Engineering Study Proposals (VESP), during the project planning and design phase of all military construction projects estimated to cost $10 million or more, and to such projects estimated to cost $2 million or more with a potential return on investment of 10 to 1 or greater. Air Force Policy Directive 63-8 contains complete Air Force guidance on Value Engineering.

5.3 Alternate Delivery Methods: Design-Build and Turnkey

Design-Build/Turnkey

Currently, the Design-Build/Turnkey approval authority lies with the MAJCOMs in accordance with Secretary of the Air Force Order (SAFO) 700.12, *Delegation of Approval Authority for Design-Build Delivery Methods of Construction.*

In this method, the contractor, rather than the Air Force, prepares the final design documents in response to an RFP. Pages A-3 and A-4 of the *U.S. Air Force Project Manager's Guide to Design and Construction,* September 1991 provide variations to the design-build process. In Turnkey, the RFP contains a very general description of the project, and proposals are technical and detailed. In the Design-Build method, the Air Force provides preliminary design drawings and specifications, leaving the design-build contractor latitude in developing the final, detailed designs and working drawings.

The Air Force selects the contractor (and consequently the design solution) from all proposals submitted for the project based on the combination of design and cost that is most beneficial to the Air Force. This contrasts with procurement by sealed bidding or "conventional method" in which all contractors bid on a single design that was prepared by the Air Force and the selection of the successful contractor is based on the lowest responsible bid for the project.

Complete the Design-Build/Turnkey procurement of FH projects in accordance with guidance provided in Air Force Federal Acquisition Regulations (AFFARS) Appendix BB.

When the Air Force is the Agent, the list of personnel below describes the recommended composition of the organization responsible for the execution of source selection for FH projects. All personnel associated with source selection must be familiar with AFFARS Appendix BB and the conflict of interest provisions of the *Joint Ethics Regulation*:

- Source Selection Authority (SSA). Usually, the commander of the contracting activity is the SSA, unless it has been formally delegated to another position. This may be the MAJCOM commander or designated representative.

- Source Selection Evaluation Team (SSET):

  - Contract Team. The team will be responsible for price analysis of the proposals, contract definition, and negotiation:

    a. Team Chief: Senior contracting official.

    b. Contracting Representatives: Contracting buyer and contracting price (cost) analysts.

  - Technical Team. The team will be responsible for reviewing the technical proposals and shall call on experts in applicable fields when necessary. The size of the technical team depends on the complexity of the project:

    a. Team Chief: MAJCOM project manager or a senior technical manager knowledgeable in source selection and MFH design and construction.

    b. Facilities Planner: MAJCOM staff.

    c. Civil Engineer: Architect-Engineer from the MAJCOM housing staff.

    d. Installation Technical Representative: Base CEC/CEH/CEP.

NOTE: When deemed appropriate for a particular project, representatives of HQ USAF may be appointed to serve on the SSET.

  - Source Selection Evaluation Team Chairperson. The senior technical person who has experience in source selection and FH projects. Oversees all SSET teams and advisors.

  - Performance Risk Assessment Group (PRAG). The team checks the references and past performance of offerors and assigns a performance risk assessment.

    a. Team Chief. Contract buyer or technical member.

    b. Contracting Representative. Contract buyer or analyst.

    c. Technical Member. MAJCOM CEH or BCE appointee.

  - Advisors and consultants (specialists as required). When required, assign advisors and consultants representing the various technical, contracting, and legal disciplines pertinent to the project to assist the SSET in evaluating particular aspects of proposals or to assist in defining the contract.

On a project-by-project basis, as required, MAJCOMs or AFCEE may be requested to provide technical assistance to include:

- A model RFP that includes a typical statement of work (SOW) and technical requirements appropriate for the particular project.

- A Technical Evaluation Guide for source selection which includes specific procedural guidance for evaluation and source selection, as well as a typical evaluation plan that identifies areas, items, factors, and subfactors to be evaluated.

- Draft RFP boiler plate.
- Draft SSP.
- Technical Team or advisor assistance.

A Source Selection Plan (SSP) will be jointly developed by the contracting and requiring activity. The SSP is a key document for initiating and conducting the source selection. It must be approved by the SSA before the RFP is released.

The DA prepares the final SOW for each project and provides it to the CO for contracting action. In-house forces, or in-house forces supplemented by A-E services as necessary, normally will prepare the SOW:

- The DA completes the generic SOW provided by the MAJCOM or AFCEE to include the specific requirements of the project.
- On projects for which the Air Force has identified a specific site, the SOW must include comprehensive site information for use by the proposers in designing the project. Required information includes:
  - Metes and bounds of the property or project site limits.
  - Topographic survey.
  - Results of subsoil investigation and analysis.
  - Layout of existing roads and streets.
  - Existing facilities or features on the site to be removed or retained and protected, if any.
  - Capacities, characteristics, and allowable points of connection to utility systems.
  - Access to site, haul routes, disposal areas, available transportation facilities, and other pertinent data.
  - Lead-Based Paint (LBP) and Asbestos survey data.
  - Base and MAJCOM standards.
  - Excerpts from BCP/HCP.
  - Residential Energy Evaluation Manual (REEM) study, if applicable.

5.4 Construction Management

The physical construction phase begins only after a notice to proceed has been issued to the construction contractor. Management actions provide cost control, schedule control, and quality control. This section covers the process and procedures that are necessary to achieve the objective of delivering quality housing on time and within budget.

5.4.1 Construction Funds

Construction funds (P-711 and P-713) are authorized and appropriated annually to cover the funded costs of construction of new or replacement housing (P-711) and the revitalization of existing facilities (P-713).

Before issuing an Invitation for Bids (IFB) or a Request for Proposal (RFP), the DM requests the authority to advertise, as well as a reservation of construction funds from HQ AF/CEH. This is done through the Program, Design, and Construction (PDC) System. HQ AF/CEH confirms the reservation of funds by entering the authority to advertise in the PDC. When the actual amount of the construction funds required is known, after receipt of bids or proposals, the DM enters a bid report and award CWE in the PDC. HQ AF/CEH then

issues the construction funds through comptroller channels and enters the authority to award in the PDC upon receipt of a budget authorization number from SAF/FMBIC.

The award CWE for each project includes the contract amount for construction (total amount if more than one contract); design funds in turnkey and design-build projects; land costs, if any; cost of government-furnished equipment, if any; an allowance for contingencies; and an allowance for supervision, inspection, and overhead (SIOH), including the cost of A-E Title II services, if applicable.

Use contingency funds to fund contract modifications after contract award. If an increase in construction funds, above the projected funding amount, is required to complete a project, the CM requests additional funds from HQ AF/CEH. The CM provides, with the request, a revised CWE and justification for the increase.

Fiscally close a project within four (4) months of physical completion to permit withdrawal of any surplus funds by HQ AF/CEH. Pending claims not settled within this 120-day period should not preclude fiscal close-out. HQ AF/CEH will reopen the account for any project on which a claim or other funding action develops after fiscal close-out.

In June, before the end of each FY, the CM should identify all surplus funds that will expire at the end of the FY. These funds will be withdrawn by HQ AF/CEH.

Although the acquisition process may be similar, the funding procedures outlined above do not apply to build-lease, rental-guarantee, installment-purchase, or land out-lease projects, since construction of these projects is not funded with appropriated construction funds (P-711 or P-713):

- Do not use appropriated funds for the construction and maintenance of rental-guarantee or land out-lease projects. The owner recovers the cost of the project from rental charges paid directly by the occupant.
- Use funds from the FH Operations and Maintenance Account to pay the lease costs (and maintenance costs, where applicable) of build-lease housing. Such payments do not start until after the housing has been accepted by the Air Force.

5.4.2 Construction Management Procedures

Options

Several options exist for construction management and the inspection of large FH projects. These include in-house inspections, Title II inspection services, and inspection by the COE or NAVFAC field office. Typical considerations in using outside construction management services are the cost of the services, the extent of services, and past performance. Use of the COE or NAVFAC typically includes contract administration, which eliminates base contracting from the construction phase. This option would normally be used only if the COE or NAVFAC also advertised and awarded the project.

Notification and Approval

The base's preferred option must be included in the Project Management Plan (PMP) and approved prior to the start of the design process. If the base wants to use Title II, it should be included in the Title I CBD announcement. If the COE or NAVFAC is to be used, then they should be a part of the review process from the beginning. Make this request simultaneously with the proposed method for advertising and award, as this may also influence the development of the plans and specifications.

Project Management Plan

Past experience has demonstrated the need for a comprehensive project management plan for the exclusive use of the government and that is separate from the plans and specifications. This plan should be drafted before beginning the design phase and modified as necessary as the project progresses. The completed plan should include the following:

- Organizational plan (line diagram) and manning levels.
- The roles and responsibilities of each key organization and office. Initially, these include: Construction Management Section, Engineering and Design Section, Housing Manager, Financial Management, Base Civil Engineering Operations, CO and Administrators, Design Construction Agent, Project Manager and Inspectors (if applicable), Contractor's Project Manager, Quality Control, and Field Representative. As listed, the PMP would only show base personnel. Note that some of these functions/people cannot be identified until after construction contract award. At that time, the PMP should be amended to include members of the construction contractor's team.
- A description of the process and responsibilities for change orders; progress reporting; quality control; financial management; submittals; daily inspections; special tests and inspections; schedule changes, turnover of units; removal, storage, and installation of appliances; post-construction warranty documentation, etc.
- Supplementary schedules, consistent with the construction phasing plan and covering significant actions required by the government, such as vacating quarters before removal of asbestos by in-house personnel, etc.
- "Prototype" requirements.

Use of the COE or NAVFAC

If the COE or NAVFAC is chosen for construction contract administration and inspection, negotiate the cost and extent of services and include this with the project management plan. Specify the length of time and the number of qualified inspectors.

Weekly Job Meetings

The construction agent (CA) holds periodic project meetings to discuss and resolve job problems. The CA should encourage the housing manager and the contractor, subcontractors, and A-E (if performing Title II services) representatives to attend. These informal meetings provide improved coordination, better understanding, and faster handling of changes, discrepancies, and submissions. They also provide good opportunities to recognize and deal with potential problems before they develop.

5.4.3 Preconstruction Conference

The Preconstruction (sometimes referred to by the DA as pre-performance) conference is a meeting held at the job site to establish local ground rules, both those covered by the contract (such as labor standards' clauses) and those not covered by the contract (such as base regulations) that are directly related to contractor actions and interactions on base. Air Force personnel representing the Fire Department, Bioenvironmental office, Security Police, Housing Manager, the Base Civil Engineering, Safety, Communications, and the MAJCOM are invited. The meeting is conducted by the Construction Agent or Contract Administrator (CA). A government team meeting is held beforehand, if necessary, to clarify issues such as phasing, Government Furnished Equipment (GFE), Government Furnished Materials (GFM) items, and coordination for work in restricted

areas. Resolve such issues before the Preconstruction Conference and present a unified government position in the contractor's presence.

Also essential at this stage is the development of an effective Partnering Agreement with the contractor. This agreement will establish certain guidelines and goals by which construction/contract problems are addressed and solved in an expeditious manner. Effective partnering shall lead to higher contractor efficiency, virtually eliminating cost overruns resulting from unresolved contract disputes and unnecessary work.

■ 5.4.4 Notice to Proceed

The Notice to Proceed (NTP) is the instruction from the CO to the contractor to start work on the project. This notice authorizes the contractor to spend money, and establishes the start date for the contract performance period. This date is important to ensure that Base Civil Engineering and the Housing Manager are ready for the contractor to start, and the start date is consistent with any critical need dates and schedules that are important to project success. Most contractors will work with the CO and the base to minimize user disruption. The CO will normally issue the NTP between 15 to 30 days after contract award. Minor adjustments to that time frame can be made if it is in the best interest of the government. However, excessive delays in issuing the NTP may result in a claim, unless the intent to delay NTP issuance was specified in the bid documents.

■ 5.4.5 Submittals

The construction contract will require the contractor to submit materials and equipment data, samples, and shop drawings prior to the start of any segment of work related to the items involved. The government has a responsibility to provide timely review and prompt return of the submittals to the contractor; otherwise, delays and claims may result. Those items reserved for Air Force approval need special attention because of the number of organizations involved in the review process. Reviews must be thorough, accurate, and timely. The CO and government inspector should maintain a submittal log and monitor it closely. Be sure to return rejected submittals quickly to the contractor for correction and resubmittal, as appropriate.

Late, incorrect, or incomplete submittals from the contractor can adversely affect the job. Just as importantly, the CA's review must be timely and responsive to critical items in the contract schedule.

■ 5.4.6 Quality Control

Contractor Quality Control

The contractor is responsible for inspecting, testing, and documenting those tests and inspections that are required by the contract to analyze material quality and workmanship. The contractor is also required by the terms of the contract to employ a Quality Control (QC) representative. The contract specifications spell out in detail what inspections and tests are to be performed and to the detail of reporting. When the QC representative's purpose is not in alignment with the contractor's objective of protecting profit, you can expect shortcuts for tests, inspections, safety, materials acquisition and handling, and workmanship.

Although over-inspection can reduce cooperation and result in changes, the CA must be effective in controlling quality. It is difficult to make corrections to appearance-related work when the construction nears completion, so bring these issues to the

CO's attention immediately. The CA, through the Quality Assurance (QA) program, oversees the contractor's QC program. Quality cannot be "inspected" into the project; rather, the individual instances of workmanship and overall job quality are directly related to the contractor's reputation and pride of accomplishment.

Government inspection is the responsibility of the CA. In general, the CA confines work relationships to the prime contractor and contractor's superintendent or authorized representative. Government inspection should be thorough enough to provide assurance that the performance of the contractor fulfills the terms of the contract, but should be relevant, reasonable, and fair. Repeated inspections and rejection of relatively minor details, insistence on unrealistic standards, or demands for work that exceed the requirements of the contract usually result in increased project costs and claims against the government with no appreciable improvement to the end product. Quality must be incorporated into the design phase. Inspection serves only to make sure that the government receives the quality of work required by the contract documents.

Encourage the CA's QA effort to aim at enhancing the contractor's pride if you are to receive the desired project quality. This may include quizzing QC personnel, holding frequent meetings with the contractor's superintendent or project executive on quality issues, and checking preparatory inspection work.

Normally, government CA personnel perform construction QA of Air Force projects. If this is not possible because of workload or lack of qualified personnel, use Title II A-E services for the inspection. When Title II A-E services are used, the responsibility for government inspection remains with the CA, who will monitor the work of A-E personnel. Select A-E firms and contract for Title II A-E services in accordance with AFI 32-1023, *Design and Construction Standards and Execution of Facility Construction Projects*.

Construction Inspection

Continuous construction inspection is the responsibility of the contractor. Federal and Air Force acquisition regulations require the contractor to maintain an adequate inspection system and to perform inspections that will ensure that the work performed under the contract conforms to contract requirements. The contractor will also maintain inspection and test records and make them available to the government. The government reserves the right to inspect and test any phase of the work at all reasonable times without relieving the contractor of any responsibility for contract compliance.

Construction Surveillance

The CM should perform construction surveillance on the job site and at off-site locations (fabrications or stored materials) when necessary. Construction surveillance differs from inspection in that specific technical inspection and tests are not performed on a continuing basis. These items are the responsibility of the contractor. Note and discuss discrepancies with the CO or his representative. Notify the CA and the CO, in writing, of those job site, schedule, cost, or quality problems needing prompt attention and resolution.

The government reserves the right to inspect the contractor's work as necessary to determine the acceptability of materials and workmanship as well as compliance with contract requirements. Government inspectors should not provide an inspection service for the contractor or relieve the contractor of the responsibility for acceptable execution of the work.

Quality Assurance by the construction Agent

The CO is the government's legal contact with the contractor. The CA's responsibilities for the project from start of construction to completion include:

- Acting as the technical representative of the CO.
- Being the single point-of-contact between the contractor and the government.
- Performing Quality Assurance (QA) of the work; reviewing and approving submittals.
- Scheduling; administering the contract.
- Modifying the contract when necessary.
- Protecting the government's interests.
- Authorizing progress payments.
- Accepting finished products/facilities.

Require the CA to maintain good communications with the contractor's superintendent and QC person; this will improve project management effectiveness.

Under the QA/QC system, the contractor is required to control quality. The CA has the responsibility, in a QA role, to ensure that the contractor performs the QC provisions required by the contract. The level of quality of the completed project must be accurately reflected in the contract documents.

Testing and Approving Materials, Equipment, and Systems

Two of the principal methods of assuring compliance with the terms of the contract are material submittals and testing. The contract documents must establish requirements for submittals and tests, and procedures for approvals.

Materials and items of equipment used in a project are approved based on samples submitted by the contractor. These materials must be accompanied by the manufacturer's literature, certifications of compliance, and manufacturer's warranties.

As stated in the contract documents, the required tests may be among the following:

- Laboratory tests performed on a manufactured product for the manufacturer of the product under a recognized test program, such as fire retardancy tests or sound attenuation tests of materials of assemblies.
- Laboratory tests performed on samples collected in the field, such as concrete compression tests or soil compaction tests.
- Field tests of work in place, such as utility system tests, infiltration tests, or equipment operating tests.
- The CO or authorized representative will approve material submittals and test results based on technical input from a representative of the CA. The contractor will perform field tests and will collect field samples for laboratory tests in the presence of the CO or authorized representative.

Prototype Units

For the on-site construction of most multi-unit projects, whether for new construction or for the revitalization of existing units, consider the use of prototype units as an aid to construction inspection and acceptance. Also consider the use of prototypes when substantial construction or assembly takes place off-site, such as for manufactured or factory-built housing.

In general, try to designate only one prototype unit, unless unit types differ significantly (e.g., one-story or two-story, detached or attached, two-bedroom or four-bedroom). Complete each stage of work on the prototype unit before starting work on

the same stage for like units in the project. Leave construction details exposed for study by authorized inspectors and workers. Each stage of the prototype unit should be left exposed until that stage has been completed in all units in the construction contract, unless otherwise specified in the contract, including any options of the contract. Use this work to verify details of the approved design and material selections and to establish the standards of construction and workmanship against which the rest of the work will be judged. Start work on each successive stage of the prototype units immediately after the approval of the preceding stage. However, retain a representative sample of the work of each stage of construction for examination (not worked over, covered, or concealed in any way) until completion of that stage of work throughout the project, unless otherwise authorized by the CO. As a minimum, the CO approves the following stages of work in a prototype unit (as applicable):

- Masonry work (foundations, walls).
- Concrete work.
- Rough framing (floors, walls, partitions, roofs).
- Wall and roof sheathing, subflooring.
- Plumbing, mechanical, electrical rough-in.
- Insulation (under-slab, floor, wall, ceiling, or roof).
- Roofing.
- Exterior finishes (siding, masonry veneer, stucco) and trim.
- Drywall installation.
- Drywall finishing.
- Interior finishes and trim.
- Installation of fixtures and equipment (plumbing, mechanical, and electrical).
- Landscape elements (trees, shrubs, turf headers, etc.)

5.4.7 Schedule Control

The construction schedule is the plan prepared by the contractor that details how the contract completion date(s) will be met. Network schedules are used by Air Force CAs to schedule work and to track the progress of the contractor using the Critical Path Method (CPM). CPM network scheduling allows for the analysis of the impact of critical activities on overall completion.

The advantages of this type of schedule are that complex construction activities and phasing can be broken down into simpler tasks and analyzed. This approach can make the most complicated project a series of simple jobs. Analyzing and hypothesizing (playing "what if" games) is simplified when the network schedule is on a computer. Compare the schedule with actual construction progress, as the contractor should be paid for only the work accomplished. Review the status of pending modifications and their potential effect on the schedule. Insist that actions be taken to meet the schedule when the contractor falls behind in construction. Extended overhead can add considerable cost to a project when construction completion is delayed through no fault of the contractor.

The CO is responsible for the review and approval of the schedule. A network schedule, properly administered by the CA, provides an accurate means of measuring the time impact of potential changes.

Project managers are cautioned that contractors have a tendency to delay the submission and approval of schedules. This tends to dilute the advantage of being

able to estimate the impact of changes during the early period of construction.

Changes in the work and time extensions due the contractor must be included in the network concurrent with the performance of the change or immediately after a delay. Otherwise, the critical path network and schedule will not reflect the current status of work performed or progress being attained.

5.4.8 Cost Control

An important cost control element deals with staying informed of changes as the project progresses. Good cost forecasting, like updating a current working estimate (CWE) during construction, involves knowing costs to date, project status, and the history of changes so that a "cost-to-finish-construction" can be communicated and compared with the budget and funds available.

Strive to maintain project cost within the PA or original cost of contract (whichever is higher). When cost overruns become apparent, MAJCOMs must contact HQ USAF/CEH to assure that funds will be available as necessary within the 25 percent flex of the project.

Cost Status Analysis

This financial status analysis is a conglomeration of information compiled by the CM and the Funds Manager from the project information contained in the PDC system, and from job site observations. The goal of the analysis is not only to reflect the current financial health of the project, but to forecast the future financial needs as well. Proper cost forecasting should allow the Funds Manager sufficient notice for locating and transferring the needed funds to the CA before they are actually required. Poor cost forecasting has resulted in either stop work orders or work deletion modifications.

This analysis compares the latest estimate to finish a project (CWE) with the programmed amount (PA), the funded amount, and other financial limits, such as the apportioned amount and the threshold. The analysis will also include other pertinent financial data, such as contract price, executed modifications, E&D (engineering and design during construction), SIOH (Supervision, Inspection, and Overhead), available contingency funds, and other associated costs. The most important inputs to this analysis, and probably the most difficult to assess, are the estimated costs for potential changes, and undecided claims. The CM, along with the CA, must observe the interaction between the contract documents, the contractor, and the CO, so future costs can be analyzed. Keep in mind that the last and most current information is at the job site. Not knowing the scope and cost of pending items has caused jobs to stop or needed work to be deleted because sufficient notice could not be given to the funding agency to obtain additional funds or authority. The cost status analyses should be revised at least monthly or every time there is a change. The following two cost status items should be updated in the PDC:

- The current cash position. Are you currently funded to execute validated pending modifications?

- Forecast to completion. Are you funded to execute validated pending modifications and finish the job within available contingencies?

Progress Payment Estimates

Procedures described below do not apply to build-lease, rental-guarantee, installment-purchase, or land out-lease projects.

As provided in the contract documents, make progress payments as the work progresses. The CA prepares an estimate of the progress payment due the contractor for work performed during the preceding

payment period. Payment may be made for work in place.

The CA makes sure that payment is authorized only for work actually completed. As a general rule, retain at all times enough funds to accomplish the remaining work with other contractors if the prime contractor defaults. As noted in section 5.2.4, payments can also be made for materials delivered.

Change and Claim Management

Cost control requires that each change or claim be separately identifiable, otherwise control is lost. Potential or anticipated change requests must be scoped, validated, designed, and estimated before the CO can negotiate. A pre-validation cost estimate, as part of scoping, should be used to develop total cost exposure. To know the cost exposure for unresolved claims (which have the potential to become contract modifications), a Construction Agent should provide the status detail of each claim (description, claimed amount and associated performance time, and number of days since received by the CO). Stay on top of the Construction Agent to ensure that claims are resolved in a timely manner.

Modifications are sometimes negotiated by the CA without negotiating the time and its cost. The additional time and associated cost are often lumped into a "time extension" modification to be negotiated and executed later. Modifications that ignore time should be considered a "bomb ready to explode," because the final time and associated cost settlements are often considerably higher than anticipated. You must press the CA to negotiate time with each modification or unilaterally add time when appropriate to force the discussion with the contractor. Do not let the CA execute modifications which invite the contractor to re-open negotiations on the modification at a later time.

5.4.9 Construction Contract Modifications

Modifications are negotiated "mini-contracts" formalized within the context of the original contract. Modifications allow equitable adjustments to the contract requirements so as to accommodate differing site conditions, unforeseen conditions, changes in code and criteria, corrections of errors and omissions (design deficiencies), delays and impacts to the work, administrative changes, weather delays, work suspensions, additions, and deletions. Within this list fall the various CA changes and user-requested changes.

Modifications are expensive; they are not usually competitively bid; and they frequently add time to the schedule of construction. Always question the requirement for the modification, and consider a competitive contract as an alternate method of implementation. The MAJCOMs determine the change requirements. CA changes (changed conditions, design errors, etc.) must be reviewed and questioned, particularly where time extensions are involved. The AF DM must maintain close coordination with the CA, since these changes are usually exercised by the CA without prior AF approval when contingency funds exist at the CA office. To keep on top of the modifications, track their status and urge them along at every possible opportunity. The CA should respond to initiate modification within two days. Review the outstanding modifications regularly, including the length of time to execute and those modifications that were negotiated without time limits.

One of your more important tasks as a construction manager is to ensure that the user is not left out of the modification process. Each modification has the potential to affect the user's operation or planned occupancy date. If modifications are executed by the CA with little or no coordination with the user, the customer's plans may be adversely impacted.

Change orders and change requests must be limited to those circumstances that would render that facility unusable from a functional standpoint, or are required, due to a major mission change that renders the original design inadequate. Process each contract modification in accordance with applicable FARs.

Normally, modifications are the result of:

- Unforeseen conditions.
- Design ambiguities, deficiencies, or omissions.
- Changes in user requirements.
- Defective or unsuitable GFM or GFE.
- Excusable delays.
- Emergencies requiring immediate action to protect government property, personnel, or interest.
- Benefits or savings such as value engineering proposals.

Minor and Major Classification of Contract Modifications

A minor contract modification is any change which requires no adjustment in price, or an adjustment in price not exceeding the approval level delegated by the MAJCOM, and which does not result in the acceptance of materials, equipment, or systems of significantly greater or lesser quality than specified in the contract. Minor contract modifications, as defined above, may be approved at the installation level if they do not result in an increase in project cost above the approved maximum project cost.

Major contract modifications are all changes that are not classified as a minor change.

The MAJCOM must approve the modifications prior to their execution.

Special Approval

HQ AF/CEH must approve the changes listed below. Forward all requests for approvals through MAJCOM channels with a proposed, revised current working estimate reflecting the proposed change, as well as a justification and description of the required change in sufficient detail to permit full evaluation without a need to request additional information. Such changes are those that:

- Result in an increase or decrease in the scope of work, such as increasing or decreasing the number of units.
- Result in an increase above the authorized high unit cost.
- Result in an increase in obligational authority or approved maximum cost.
- Result in an increase in funding.

5.4.10 A-E Liability

The means for establishing A-E responsibility based on FARs are routinely included in the A-E's design contract. The government will pursue A-E liability in cases where a modification was necessary due to an error or omission (design deficiency by the A-E), and the error or omission caused the government damages. Notification to the A-E must be quick to minimize damages, and to allow the A-E an opportunity to propose corrections. The A-E, even if not negligent, must correct the design error(s) or omission(s) in the plans and specifications at no additional cost to the government. The A-E can work directly with the contractor to minimize the cost to the government.

To determine A-E liability, all of the following must be answered "Yes":

- Is the construction modification attributable to design error or omission?
- Does the design deficiency stem from an error or omission by the A-E?
- Does the error or omission result from the A-E's negligent failure to meet the standard of care reasonably associated with the A-E profession or from a breach of contractual duty?
- Has the government suffered damage as a result of the error or omission?

Costs caused by an A-E firm's failure to perform contractual obligations can be recovered. The following paragraphs address A-E responsibilities, the extent of A-E liability, and the efforts of A-E liability by DAs and COs to recover funds when unnecessary costs can be attributed to an A-E firm.

When the A-E is found liable for the error or omission, the A-E is only responsible to correct the design and the contract documents, and to pay those costs that the government would not have paid had the design been correct.

A-E Responsibilities

The FAR outlines the responsibilities of an A-E contractor. The A-E is also responsible for:

- The professional quality, technical accuracy, and coordination of all designs, drawings, specifications, and other services furnished by the contract.
- Corrections and revisions of any design deficiency.
- Added cost incurred by the government caused by negligent performance of any service under the contract.

Extent of A-E Liability

The extent of A-E liability must be evaluated against either document errors or damages:

- Liability for Document Errors. The A-E is liable for correcting any error or omission in drawings, specifications, design, or other services furnished by the firm. Corrections are at no cost to the government. This liability is not absolved by government reviews, approvals, acceptance of work, or payments for work.

- Liability for Damages. When the government incurs additional costs resulting from design deficiencies (errors or omissions), such as a contract modification, the CO uses his or her professional judgment (with the advice of technical personnel and legal counsel) to determine the extent of A-E liability and evaluates the liability against four conditions. All four conditions must be met:

  - The construction modification must be attributable to the design error or omission.

  - The design error or omission must stem from an act or omission by the A-E.

  - The act or omission on the A-E's behalf must result from the firm's failure to meet reasonable professional standards.

  - The government must have been damaged. The A-E liability is for only the additional cost over and above the cost of the requirement if it had been included in the original design. Examples of over and above costs include tear-out costs resulting from project delays.

- Pursuit of A-E Liability. The DA, through the CO, has the responsibility to pursue A-E liability. Usually, correcting design errors or omissions does not present a problem since the A-E's professional reputation is at stake and because the FAR clearly states the legal ramifications. Pursuing A-E liability to recover damages resulting from a construction contract modification presents more of a problem. If the CO establishes A-E liability, he or she must determine the actual damages and estimate administrative costs to recover the damages. If the estimated recoverable costs for damages exceed the administrative costs, or it is otherwise in the government's best interest, the CO is obligated by the FAR to pursue A-E liability. Once the CO determines that there may be A-E liability, he or she must document the decision either to pursue or not pursue recoverable damages.

- Civil Engineering Responsibilities. Project managers, during design and construction, must be sensitive to change orders that may be the result of an A-E's failure to perform. When a change order appears to be the result of a design deficiency on the A-E's behalf, the project manager, along with the design manager (DM), should evaluate the change order against the four conditions listed above. When the results of this evaluation support the position that the A-E may be liable, the DM prepares and provides documentation to the CO for review and determination and files the results in the project folder.

Field Relationships

The contractor is obligated to provide the end item on the date specified in the contract documents. Air Force personnel should not dictate how the contractor proceeds in complying with the contract requirements; day-to-day scheduling of personnel and materials is the contractor's responsibility. The contractor must have a representative who is authorized to deal with Air Force and subcontractor personnel

on the job site any time work is being performed.

The CO is the only individual authorized to make changes to the contract. Changes to the contract are executed through a modification document, signed by the CO if it is a change order, and signed by the contractor and CO if it is a supplemental agreement. Directions provided by other persons are not binding and may result in personal liability for any additional costs the contractor incurs.

■ 5.4.11 Inspections and Close-Out

Although the CA performs continuous inspection of the work throughout construction and finds the work of the various trades acceptable, an overall final inspection of the work is required. This inspection ensures that all finish items have been completed satisfactorily in accordance with the contract documents.

As project completion approaches, so does the point at which the government will "inherit" the new facility and all of those "hidden" problems. You should strive to ensure that all appropriate personnel are notified about the date, time, and location of the prefinal and final inspections, as these are the last times for them to ask questions and find those "hidden" problems before the contractor's level of interest drops significantly (when he's paid the final payment of the contract). The CA will prepare a list of defects, known as the "punch list," that were identified during the prefinal inspection, and will direct the contractor to correct these defects before the final inspection. The team members should inspect punch list items at the final inspection to ensure that they have been properly corrected. Judgment will often be required while reviewing the corrections made, since perfection is not contracted; rather, what was contracted for and the standards of the industry are the "yardstick."

Always note design deficiencies separately from construction deficiencies so that separate action for the CA can be identified and pursued independent of the close-out of the contract.

Normally, divide the acceptance inspection into two phases: prefinal and final.

Accept no work without a final inspection. Make the final inspection of the work at the completion of the project or, when provisions allow for incremental acceptance, at the completion of each successive portion as it reaches the appropriate stage. A successful final inspection should find no deficiencies other than punch list items or items awaiting a seasonal opportunity to complete.

Design Deficiencies

The contractor is contractually required to build according to the plans and specifications; however, he is not responsible for deficiencies caused by errors or omissions in the design or contract documents. The designer and design/construction agent are responsible for the correction of the design deficiencies within the scope of the project. Normally these deficiencies will be identified during the course of construction and corrected by modification to the construction contract. However, if these items are not identified until near contract completion or later, it may be best to correct these through a separate contract or other purchasing action.

Construction Deficiencies

Construction deficiencies are the result of poor workmanship, inadequate inspection or QA/QC, incomplete construction, inferior or damaged materials, unacceptable substitution of material, and for the failure to construct according to the contract plans and specifications. If the construction does not comply with the contract specifications and drawings, the contractor is responsible

for correcting the deficiencies. The CA should follow up with the contractor to ensure those construction deficiencies are properly corrected. The contractor is responsible for latent deficiencies, those that become apparent after construction completion, even if the final release has been issued. Good craftsmanship and correct engineering practices are always the key to good construction. When responsibility is not quickly determined, the CA unilaterally directs the contractor and designer to correct the deficiency and establish responsibility and payment later.

Prefinal Inspection

When the contractor indicates that a group of houses is ready for acceptance, the CA and the inspection team will inspect all exterior and interior phases of work. Note on the checklist the items that require correction or that have been omitted by the contractor. Consolidate the deficiencies on the individual checklists into a "punch list" and forward this through the CO to the contractor for correction before the final inspection. Unless otherwise agreed to by the CO, the contractor must correct all punch list items before final acceptance. In general, it is best to have all interior punch list items corrected before acceptance of the unit. This will minimize disruption of the new occupant and simplify coordination.

The development of successive lists of deficiencies due to prior oversight or variation in standards among inspectors is improper practice. Limit additions to deficiency lists to:

- Damage to other work resulting from correction of work reported on the deficiency list.
- Damage or deterioration resulting from the failure to protect work from exposure to the weather.
- Loss or damage due to theft or vandalism.
- Deficiencies previously overlooked that would be detrimental to the health and safety of the occupants if not corrected.
- Latent deficiencies not readily apparent in an unoccupied unit but which appear after occupancy in previously accepted units (for example, malfunctioning equipment).

Scheduling of Final Acceptance Inspection

To ensure that the housing units and projects are ready for inspection before a final acceptance inspection is scheduled, the CA should complete the following:

- Prefinal inspection on all units in question.
- Lists of discrepancies, forwarded to the contractor for correction.
- Follow-up inspections made to determine that the contractor has corrected discrepancies discovered in prefinal inspection.

The CA's inspection team should not provide an inspection service for the contractor. If, at any time during the prefinal or final inspection, the listed deficiencies become so numerous that they indicate inadequate inspection and supervision on the part of the construction contractor, terminate the inspection and notify the contractor.

Final Acceptance of Completed Units

Completed Project:

- Upon the satisfactory completion of the construction of an entire project, a final acceptance takes place and the project is judged physically complete. At this time, the Air Force assumes complete control and accountability of all the units on projects constructed with P-711 or P-713 funds and on installment-purchase projects.

- The acceptance of housing units into the Air Force inventory is accomplished by completing DD Form 1354, Transfer and Acceptance of Military Real Property, in accordance with AFI 32-9005, *Establishing, Accounting, and Reporting Real Property.*

Incremental Acceptance:

- When the contractor completes individual housing units within a given area and the units pass a final inspection under the terms of the contract, the Air Force may accept these units. On P-711, P-713, and installment-purchase projects, after the Air Force accepts the units it takes control of, the Air Force assumes accountability for those units by completing DD Form 1354.

- The Air Force obtains permission to occupy these units before the completion and acceptance of the entire project by written agreement with the contractor. The agreement should ensure that suitable ingress and egress is provided and that occupancy will not interfere with the contractor's operations.

- The inspection performed on individual units proposed for incremental acceptance is a final inspection. On P-711, P-713, build-lease, and installment-purchase projects, upon accepting individual units, the Air Force becomes responsible for the maintenance and operation of the units, even though the final acceptance of the remainder of the project takes place much later. Although the Air Force has accepted the units, the contractor is responsible for the correction of defects listed at time of final inspection, incomplete items, latent defects, and items that are covered by the warranty provisions of the contract. The warranty period begins on the day a substantial completion agreement becomes effective for each unit.

Final Settlement:

- If, at the time of final settlement, some corrections have not been made because of seasonal considerations, lack of materials, or other reasons, the CO withholds from final payment an estimated amount sufficient to correct such items, until all outstanding items are corrected or resolved.

Facility Acceptance/BOD

After the final inspection acceptance, the Air Force may accept the facility from the CA. This point marks the date that the facility is ready for occupancy by the user, and is referred to as the Beneficial Occupancy Date (BOD). Although BOD normally occurs after all the construction and the final inspection have been completed, a partial BOD can take place in order to allow the user to vacate other space scheduled for construction, or to begin performing part of the user's mission immediately. Partial BOD's should be discouraged if the partial occupancy serves no real advantage for the performance of the user's mission, as it clouds the issues of warranties' expirations.

Warranty

The typical construction contract requires the contractor to warrant his workmanship, materials, and equipment for a period of one year from the date of substantial completion or beneficial occupancy, whichever occurs first. In addition, the contract may specify that some work or equipment be warranted

for longer periods and may contain specific response times. Also, there are specific manufacturer's warranties not required by specifications but available due to the contractor's choice of materials allowed in submittals. Examples of contract-specific warranty items are window systems, roof systems, and HVAC equipment. The FAR clause for construction warranties is 52.246-21. The Base Civil Engineer should receive a composite listing of all warranties in effect as a result of the construction work.

As-Builts

The contractor is required to mark one set of the contract drawings and specifications with the differences between what was required and how he actually built the project. These differences should include not only the contract modifications, but any differences due to the contractor's selection of materials and installation technique. These marked up documents are used to incorporate the noted differences onto the original drawings and are known as “as-builts.” You will have to check to ensure drawings have been annotated by the required time and that the as-builts have been filed with the BCE. On some installations, the base drawings are being "digitized" for storage and retrieval through a Computer Aided Design/Drafting (CADD) system. For these situations, the original designer has usually been retained to take the contractor's marked documents and incorporate the changes into the original documents before digitizing. The CA and the DA should work together to accomplish the updating and digitizing in a timely manner and to follow through to see that the digitized records were turned over to the BCE.

5.5 The Post-Construction Process

The project management role in the post-construction process includes addressing warranty support, claims, financial close out, post-occupancy evaluation, and the documentation of lessons learned.

Post-Acceptance Responsibilities:

- Contracting Officer. The CO makes sure that the contractor has corrected all deficiencies listed at final acceptance inspections and that all incomplete items are complete. The CO also enforces the provisions of the contract on latent defects and warranties.

- Construction Agent. When construction is complete, the CA:

  - Accepts from the contractor and transfers to the BCE all door keys, operating manuals, parts lists, spare parts, catalogs, and guarantees or warranties, as required by the contract. This requirement is not applicable to rental guarantee and land out-lease projects.

  - Certifies the accuracy of the "as-built" prints prepared and submitted by the contractor.

5.5.1 Warranty and Guarantee Program

After the Base Civil Engineer accepts the facility and its construction, he becomes responsible for document-ing and verifying that all warranty items are annotated using the checklist in Construction Technical Letter (CTL) 88-2, *DD Form 1354 Checklist*. Base Civil Engineering will advise the designated CO when to have the contractor return and correct any work under warranty. The BCE must also ensure that the problems identified are warranty problems, and not due to abuse or a lack of proper maintenance. The list of activities below provides general guidance on the Warranty and Guarantee Program per CTL 89-3, *Warranty and Guarantee Program*.

Warranties and Latent Defects

Manufacturers' Warranties. Normally, the contract will require warranties for such items as ranges, refrigerators, dishwashers, air conditioning components, and other installed appliances and equipment.

Latent Defects. A latent defect is one which could not reasonably have been discovered during inspections but which appears after occupancy and use of the house or project.

Repair of Latent Defects. The Air Force expects and requires reasonable service from the contractor to correct latent defects. This includes providing labor and material necessary to replace or repair defective items.

Damage Due to Latent Defects. If a latent defect results in a fire, explosion, or other damage to a unit or units of a project, the Air Force will require the contractor to repair both the defect and the damage that arose from it. The CO for the project:

- Ensures that competent authorities, such as engineers and fire inspectors, determine the nature, cause, and extent of the damage and loss to the housing unit or units.
- Ensures that a detailed analysis, photographs, and other evidence bearing on the cause of the incident are secured and held for inspection and possible presentation in court.
- Ensures that property is protected from future damage that might be caused by weather or vandalism.
- Permits the contractor free access to the area for inspection and analysis purposes, but does not permit the removal of any evidence of the damage without prior approval of the base legal officer.
- Takes appropriate action under provisions of the contract and the FAR to restore the project to the condition described in the plans and specifications.
- Furnishes to the bonding company copies of all correspondence to the contractor.

The Construction Manager (CM) Responsibilities:

The CM ensures inclusion of the FAR warranty clause(s) in the contract (Ref. FAR clauses 52.246-17 through 52.246-25).

The CM also ensures the CO advises the contractor that the expected response time on a warranty call will be three days or reasonably parallels the BCE's response time for a service call of a similar nature and urgency, whichever is less. A listing of these types of calls and the nominal response time (which would be considered the "within a reasonable time" guideline) should be included in the project contract and identified at the pre-construction conference.

The CM also ensures the CA provides the following to the BCE: a written memorandum of understanding (MOU) that defines responsibilities and procedures during the warranty periods following the transfer of facilities to the Air Force. Subject areas which should be covered are:

- A copy of the warranty and guarantee documents identifying the contract number and the dates during which the warranties and guarantees are in effect.
- The specific contact point at the prime contractor with complete address and telephone number(s). The specific procedure and contractual conditions for contact if the contact for warranty action is other than the prime contractor.

Written verification, where applicable, that the prime contractor notified the subcontractors and equipment suppliers in writing that the BCE is authorized to directly contact them for warranty and guarantee support.

- A list of all components and systems, such as roofing, that are covered by separate guarantee periods under the terms and conditions of the contract.

- A copy of a letter from the CA to the prime contractor informing the contractor that the appropriate BCE (or other Air Force Official) represents the government in implementing the guarantee and warranty contract clauses.

The construction manager ensures that the CA assumes the responsibility to evaluate and obtain the correction of defects if notified by the BCE that the contractor will not meet the warranty and guarantee responsibility of his contract. In this case, the CA maintains primary responsibility for warranty and guarantee action until the BCE can reassume it or until the warranty or guarantee periods expire, whichever comes first.

In coordination with the CA, the construction manager schedules a post-occupancy inspection 9 to 11 months after construction completion, or at other times at the request of the CA, to identify warranty and guarantee deficiencies before the expiration of the one-year construction warranty (ref. COE ER 415-345-38, *Warranty,* paragraph 7). BCE personnel perform the physical inspection work and provide a history of service calls to the inspection team. (NOTE: When the MAJCOM authorizes a formal post-occupancy evaluation team (POET), the CM represents the Air Force in the post-occupancy inspection.)

The BCE Responsibilities:

The BCE uses the above procedures provided by the construction agent for the enforcement of warranty provisions and in accordance with the MOU cited previously.

The BCE implements the warranty and guarantee provisions of the contract. The BCE ensures that operations and maintenance personnel operate, service, and perform preventive maintenance in accordance with the manufacturer's maintenance and operating instructions and follow procedures identified in specialty areas, such as ETL 90-1 (*Roofing*), ETL 87-9 (*Pre-wiring*), etc. The BCE ensures that maintenance personnel keep appropriate records of their actions in servicing components and equipment in conjunction with the above.

The BCE examines failed components to determine whether the failure is covered by the warranty or guarantee. When needed, the BCE requests technical assistance from the CA to assist in determining the nature and extent of the deficiency. Normally, BCE personnel should not dismantle a component covered by a warranty or guarantee, nor attempt to make repairs to it, as this action may void the warranty or guarantee.

The BCE requests the contractor to investigate and dismantle the item to determine the cause of the failure. The BCE makes the appropriate provisions beforehand with contracting and finance to cover the cost of dismantling the component. This is required to prevent the occurrence of an unauthorized obligation should the deficiency later be determined to be not covered by the warranty or guarantee. He also ensures that technically qualified BCE personnel observe the dismantling, and where deemed appropriate, the use of video equipment and cameras is used to document the dismantling by the contractor.

The BCE obtains an agreement from the contractor to complete the repairs or to

replace the faulty component within the time required at no cost to the government. This is required when the component failure is found to be the direct result of faulty materials and/or workmanship. This is confirmed in writing to the contractor.

The BCE assesses the urgency of the problem when the contractor fails to agree that the deficiency exists under the terms of the component warranty or guarantee. The BCE has the following options:

- If Base Civil Engineering decides it is necessary to repair or replace a defective component to prevent serious interruption of functional activities, the BCE requests the CA to act immediately under the terms of the MOU as outlined above. Should the CA not agree with the BCE's decision, the CA should inform the BCE who then proceeds with repairs using Air Force resources.

- If the urgency is insufficient, the BCE will ensure that the CO takes the necessary contractual actions to gain the contractor's compliance under the terms of the contract.

The BCE repairs the component using Air Force resources when the BCE determines:

- After investigation and inspection, that the defect is not covered under the warranty or guarantee.

- That project isolation renders it impossible to comply with the procedures for implementing warranty and guarantee contract provisions stated above or that the contractor response will be too slow to prevent a serious interruption of functional activities.

- That the contractor refuses to perform after trying the procedures listed above.

- The following order of priority applies in component replacement or repair:

- Remove the component as a unit and replace it with a spare.

- Repair it, using available or obtainable spare parts.

- Thorough documentation is essential. When possible, video equipment or a camera shall be used to record BCE repair/replacement activities.

- Make a report of the failure to the CA with a complete record of all labor hours and material involved in the repair/replacement for potential reimbursement.

5.5.2 Claims Management

Modifications to a contract after the award have the potential for claims from the contractor. The CO must represent the government in executing these changes. It is important to remember that once a contract is awarded, the contract terms and requirements are binding on both the government and the contractor.

Claims can be minimized with proper planning, early problem recognition and resolution, and the use of claims avoidance techniques. Many of the problems that arise during the construction of a project come from indecision and poor planning early on in the project. The following provide insight and guidance on claims mitigation and avoidance:

- Have a pre-acquisition strategy. Your delivery method, type and number of contracts, delivery organization, and project scope should be established before design begins. The quality and type of contract documents may vary substantially with the acquisition strategy chosen and the scope definition. Conflicting specification sections most frequently occur when the acquisition strategy, scope, or building system selection changes and the

design or construction reviews do not correct the conflict.

- Use particular care in obtaining information from the various users concerning specialty equipment and functions. Users often request contract modifications to have the most up-to-date equipment in the project. Those equipment changes usually result in easy-to-show delay claims because of their close association with the previously completed or planned contract work. When the risk of change for technical improvements is very high, then include language in the contract to cost those modifications on the basis of time and materials.

- Grant all justifiable requests by the contractor for extensions of time, unless there is some substantial reason for not doing so. Failure to issue time extensions will seldom result in an earlier job completion. Rather, it is more likely to result in claims for accelerated performance of the work. The extension of time due to weather, strikes, and other delays for which the government does not have to compensate the contractor, should be granted when warranted.

- At the start of the job, require the contractor to commit in advance the dates when the government's input will be needed on items such as GFE delivery dates and "rough-in" data. Require the contractor to include this information in the project schedule. This action may preclude later claims that you failed to fulfill responsibilities assigned under the contract.

- Resolve claims in a timely manner. The CO should normally render a decision within 60 days for claims less than $50,000. In claims for errors and omissions, be cautious that the A-E is not unduly protecting his own position at the expense of the government. Claims resolution includes a prompt investigation of the situation, and a prompt response to all contractor notices (notification of changed contract conditions) and claim letters (intent to file a request for time or compensation).

- Resolve modifications and claims as they occur. At the end of the project, the government has little leverage over the contractor, since most of the work has been completed and most of the payments have been made to the contractor. Also, the contractor can more easily develop impact and delay claims on a "ripple effect" from multiple changes (wrap arounds) when resolution is delayed to the conclusion of the project.

- Keep good records, particularly about contractor manpower levels, days or part days worked, and areas where work is performed. Those records may be useful in the event that a delay, acceleration, or loss-of-efficiency claim is submitted. Those records should also document errors and filings by the contractor, and should contain letters that place the contractor formally on notice of defects. The use of dated photographs and videos can really make a difference as a supplement to your documentation.

- Modifications executed with the contractor for additional work or as compensation for design errors and omissions should expressly state that the contract time is not extended because of the work within the modification, if that is the case. Avoid situations where the contractor is paid labor and material costs, but reserves the right to claim additional compensation later for delay, disruption, and loss of efficiency. Make every reasonable effort to negotiate such costs as part of the modification. There may even be projects where you must ask the CO to unilaterally determine the time

and compensation associated with a modification, because of an uncooperative contractor.

- Project managers should be instructed that when claims come in:
  - Treat them in a businesslike manner. Do not get hostile and close communication channels with the CO or the contractor. This might hinder subsequent negotiations.
  - Insist that the CO meet face-to-face with the contractor if you do not understand the claim or think it is not valid.
  - Make sure the government's attorney is involved immediately.
  - Don't pay invalid claims just to get rid of them.

5.5.3 Financial Close-Out

A project becomes physically complete when the CA certifies that the project is construction complete and all deficiencies have been corrected. A project is defined as financially closed when:

- Costs applicable to the project are recorded and those costs are included in the final CWE.
- Project obligations have either been liquidated or canceled.
- Accounts receivable pertinent to the project are collected.

The target close-out period is 120 days after physical completion of the line item. This period starts on the date that the facility is accepted by the BCE and ends on the date the CA initiates the revocation directive certifying payment of all outstanding bills. Although the Air Force goal is to reduce the close-out time, you should not financially close a project with outstanding construction or design deficiencies.

Within 120 days from the physical completion of the project, surplus funds can be withdrawn allowing the Air Force to complete the processing of the new units into the Real Property Records in a timely manner. Do not let pending claims that cannot be settled within the 120-day period preclude financial close-out. Neither should you let the CA retain at field level, after the facility is accepted, any payments for pending claims to be acted upon by an appeals board. When a facility is physically complete, but not financially closed out due to a pending or unresolved claim, funds may be held by the agent based on the CO's written statement that a settlement and obligation of funds is expected within 90 days. Monitor closely any remaining deficiencies to ensure that any cause for close-out delay is resolved promptly.

Submit financial close-out reports of completed P-711 and P-713 projects. Report all obligations. Submit the report to the MAJCOM within 120 days after contract completion. It should include:

1. Contract Number
2. Award Amount and Date
3. Final Cost
4. Other (GFE, In-house, etc.) list
5. SIOH (Reimbursable, Funded)
6. Telephone Reconnection
7. Environmental Exclusions
8. Contingency Funds
9. Total Requirements
10. Amount Funded
11. Excess Funds.

5.5.4 Post Occupancy Evaluation

The contractor is required by contract to warrant the workmanship and material for 1 year. Perform a post- occupancy evaluation 9 to 11 months after beneficial occupancy, noting any and all defective work. Report all

construction deficiencies to the CO for correction by the contractor. Document problems or mistakes that were made during the design and give this information to the DA to review for other projects that are similar.

APPENDIX 1

GLOSSARY OF ACRONYMS AND TERMS

Area Cost Factor (ACF): A numerical index that reflects the statistical differences in construction costs for similar facilities constructed in different geographical areas. The base for these indices is 1.0 which represents the national average of costs for all locations surveyed within CONUS.

Base Civil Engineer (BCE): Installation engineer, and his or her representatives, responsible for planning, programming, design, and construction of FH.

BOCA: Building Officials and Code Administrators International, Inc.

CABO: Council of American Building Officials.

Construction Agent (CA): Organization responsible for the technical execution of construction of a project. Usually the BCE for FH unless otherwise designated by the MAJCOM.

Construction Manager (CM): Organization designated by HQ USAF/CEH to manage the construction phase of a project and report status to HQ USAF. Responsible for monitoring and reporting construction execution of a project, including estimated and actual dates for major schedule milestones, award information, change orders, cost information, and status of project funds.

Design Agent (DA): Organization responsible for technical execution of project design. Usually the BCE for FH unless otherwise designated by the MAJCOM.

Design Authorization: Authorization issued to DM by HQ USAF/CEH to proceed to a specified milestone in the design process, including the use of Architect-Engineer services (Title I), if required. Design authorization is an element of the Design Instruction.

Design-Build (D-B): The construction project delivery method that uses competitive negotiation for contract award based on conformance with RFP and contractor qualification criteria. Design-Build has several variations in detail of the design requirements contained in the RFP. In all cases, final design and construction are integrated under a single contractor.

Design Instruction (DI): Authorization issued by HQ USAF/CEH by means of the PDC system to the DM/CM to initiate design procedures on a specific project. The DI contains relevant project information as applicable, such as project scope and composition, and funding level. Also used to issue HQ USAF/CEH authority to advertise and to award contracts.

Design Manager (DM): Organization designated by HQ USAF/CEH to manage the design phase of a project and report status to HQ USAF/CEH. Responsible for monitoring and reporting design execution of a project including estimated and actual dates for major schedule milestones, current working estimates, and bid results.

Ground Fault Circuit Interrupting (GFCI) Outlets: Shuts down circuit if short circuit occurs (e.g., damaged appliance, appliance in contact with water, etc.).

Habitable Room: A room designed and used for living, sleeping, eating, cooking, or a combination thereof. Bathrooms, toilet compartments, closets, halls, storage spaces, laundry and utility rooms, mechanical equipment rooms, and similar areas are not considered habitable rooms.

HAC: U.S. House (of Representatives) Appropriations Committee.

HASC: U.S. House (of Representatives) Armed Services Committee.

Historic Housing Facilities: Facilities currently on, or eligible for nomination to, the National Register of Historic Places; or facilities that figure significantly in state or local history.

Housing Area: An identifiable grouping of family housing facilities planned, developed, and maintained in a residential character.

Housing Community Plan (HCP): A long-range planning and programming document, consistent with land use as defined in the Base Comprehensive Plan, which maps out development of the entire housing area to incorporate whole house and whole neighborhood concepts. A comprehensive revitalization plan to bring Family Housing areas up to contemporary standards and make the units and neighborhoods livable for the next 25+ years.

Housing Market Analysis (HMA): A formalized method used to estimate current and projected housing deficits or surpluses at any given installation. Professionals trained in social sciences and familiar with principal data sources and analysis techniques conduct these analyses working as independent consultants. They justify the need for the Air Force to acquire or construct new family housing units, replace existing family housing units, or undertake whole house or whole neighborhood improvement projects.

ICBO: International Conference of Building Officials.

Military Construction (MILCON): The program approved annually by Congress via the Military Construction Authorization Act and the Military Construction Appropriation Act.

Modular Housing: Consists of two or more modules, or "boxes" which are shipped complete from the factory and connected to each other at the site to form a complete and usable housing unit. While modular housing may be constructed on a mobile chassis, the modules more commonly are constructed without a chassis, transported to the site on separate carriers, and installed on permanent foundations. Modules are shipped to the site in a complete and fully finished condition with all equipment, fixtures, and utility systems installed, and require a minimum of connection, hook-up, or assembly prior to occupancy.

Net Floor Area: Space within the interior faces of exterior walls and party walls of living units, with the following exclusions (also see Figure 4.2):

a. Utility rooms.

b. Laundry rooms.

c. Interior bulk storage.

d. Exterior bulk storage.

e. Washer and dryer space, if not located in separate utility or laundry room (not to exceed 30 square feet).

f. Furnace or boiler equipment, domestic water heater, heat pump, and solar equipment if any, if not located in a separate utility room.

g. Stairways on each floor (including intermediate landings between floors).

h. Stair landing at each floor level above the first floor (not to exceed 10 square feet per floor).

i. Finished space under stairs with headroom less than 4 feet 6 inches.

j. Unfinished attic space.

k. Unfinished basement space.

l. Porches, open or enclosed, which are not heated or cooled and which retain the basic characteristics of a porch.

m. Arctic entries (not to exceed 20 square feet) in northern climates.

n. Terraces, patios, and balconies.

o. Carports and garages.

p. Common stairways, halls, and entries in multifamily dwellings.

q. Areas required solely for installed solar energy systems, including collection and storage equipment and mass walls as well as interior spaces required by and designed specifically for passive solar energy systems.

r. Increases required to meet accessibility standards (not to exceed 75 SF).

NFPA: National Fire Protection Association.

Program Amount (PA): The total project cost, including construction, contingencies, supervision, inspection, and overhead.

Program, Design, and Construction (PDC) System: Information management and communication system for recording project parameters and data, transmitting requests and authorities between HQ USAF/CEH and field offices, and reporting schedules and project status.

Project Definition: The requirements validation and schematic design phase of the design process defined in CTL 90-1.

Prototype Unit: A housing unit, representative of a type of design and/or construction prevalent in a project, which is constructed in advance of similar work in the rest of the project. During construction of the prototype unit, specific items of work are inspected and approved and become the standards against which similar work in the rest of the project is judged.

Replacement Cost: The cost to replace an existing family housing unit built to authorized size and whole house standards. MAJCOMs and bases estimate the unit cost together with the cost to replace supporting facilities using DoD Tri-Service Cost Model. Calculate unit cost per net square foot according to the DoD pricing guide, multiply this by authorized net square feet and adjust the total by the area cost factor, project size, and unit size. For supporting facilities, calculate cost based on a specifically proposed site, using engineering cost estimates for site preparations, road and pavement, utilities, landscaping, recreation, and any other features, such as demolition or environmental hazard remediation.

Request For Proposal (RFP): The solicitation in a negotiated contracting action in which proposers submit technical and cost proposals and negotiate with the Air Force to arrive at a mutually acceptable project design and cost.

SAC: U.S. Senate Appropriations Committee.

SASC: U.S. Senate Armed Services Committee.

SBCC: Southern Building Code Congress International, Inc.

Site-Built Housing: The residential structures which are wholly or substantially constructed at the site (commonly referred to as stick-built).

Statement of Work (SOW): Description of work on services to be performed by a contractor along with the level of performance expected.

Statutory Space Limit: The limit on net floor areas based on the number of bedrooms and rank. For maximum net floor areas, see Section 4.3.

Substandard Housing: Inadequate family housing designated as such, by Congress in 1973, because of condition. Occupants in substandard housing forfeit only 75 percent of their Basic Allowance for Quarters and Variable Housing Allowance.

Surplus Housing: Housing no longer needed to support that base's family housing requirements as determined by the Housing Market Analysis.

Turnkey: One method of design-build contracting for construction projects in which the successful contractor provides the design and construction; selection of a contractor is based on a quality evaluation of design and negotiation of price.

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APPENDIX 2

RELATED DIRECTIVES AND DOCUMENTS

The directives and documents in Appendix 2 are grouped under two sections. Section One contains those directives and documents that are directly referred to in the text. Section Two contains those directives and documents that are not directly referred to in the text but which may be useful references.

Section One

Federal Guidance

- Title 10 U.S. Constitution (10 U.S.C.) 2822*, Requirement for Authorization of Number of Family Housing Units*, October 23, 1992
- 10 U.S.C. 2825, *Improvement to Family Housing Units*, October 23, 1992
- 10 U.S.C. 2826, *Limitations on Space by Pay Grade*, December 5, 1991
- 10 U.S.C. 2828a, *Leasing of Military Family Housing*, December 5, 1991
- *Americans with Disabilities Act* (ADA) Accessibility Guidelines of 1990
- Department of Commerce (DOC) (FF 1-70 *Pill Test*)
- Department of Energy (DOE*), Conservation Optimization Standard for Saving in Federal Residences* (COSTSAFR)
- Environmental Protection Agency (EPA) 40 CFR Parts 141 and 142, *Drinking Water Regulations, Maximum Contaminant Level Goals and National Primary Drinking Water Regulations for Lead and Copper*, Proposed Rule, 18 August 1988
- EPA 86-004, *Citizens Guide to Radon*, 1986
- EPA 520/1-90-001*, National Radon Measurement Proficiency Program Cumulative Proficiency Report*, January 1990
- EPA 520/1-90-017, *The National Radon Contractor Proficiency Program*, July 1990
- EPA 560/5.83-624*, Guidelines for Controlling Asbestos Containing Materials in Buildings*
- EPA *Asbestos Hazardous Emergency Response Act* (AHERA)
- EPA *Indoor Radon and Radon Decay Product Measurement Protocols*
- EPA *Model Standards and Techniques for Control of Radon in New Residential Buildings*
- Executive Memorandum, *Environmentally and Economically Beneficial Practices on Federal Landscaped Grounds*, 26 April 1994
- Executive Order 12770, *Metric Usage in Federal Government Programs*, July 1991
- Executive Order 12902, *Energy Efficiency and Water Conservation at Federal Facilities*, 8 March 1994
- Federal Highway Administration's *Manual of Uniform Traffic Control Devices*
- Federal Specification L-F-475a(3) Grade B or C, Refers to Sheet Vinyl

- Housing and Urban Development (HUD) Use of Material Bulletin 72A, *HUD Building Product Standard and Certification Program for Carpet Cushion*
- HUD 4940.2*, Minimum Design Standards for Community Water Supply Systems*
- HUD 4940.3, *Minimum Design Standards for Community Sewage Systems*
- HUD CPD 1269, *Energy in Housing and Community Development/Guide to Performing Energy Retrofit During National Multi-family Property Rehabilitation*, October 1990
- HUD, *Lead-Based Paint; Interim Guidelines for hazard Identification and Abatement in Public and Indian Housing*, April 18, 1990
- *Joint Ethics Regulation*
- *Manual of Uniform Traffic Control Devices*
- *National Environmental Policy Act of 1969* (NEPA)
- *National Historic Preservation Act of 1966* (NHPA)
- *Occupational Safety and Health Act* (OSHA)
- Public Law 102-522, *Fire Administration Act of 1992*
- *Safe Drinking Water Act*
- *The Clean Air Act Amendment of 1990*
- *The Federal Acquisition Regulation* (FAR)
- *The Montreal Protocol*
- *Uniform Federal Accessibility Standard* (UFAS)
- U.S. Department of Health and Human Services, Public Health Service, *The Nature and Extent of Lead Poisoning in Children in the United States: A Report to Congress*, July 1988

DoD Guidance

- DoDI 6055.6, Refers to Response Time and Distance to Local Fire Company
- Military Handbook (MIL-HDBK) 1008 , *Fire Protection for Facilities Engineering, Design, and Construction*
- MIL-HDBK 1190, *Facility Planning and Design Guide*

Air Force Guidance

- AFI 32-1023, *Design and Construction Standards and Execution of Facility Construction Projects*
- AFI 32-6002, *Family Housing Planning, Programming, Design, and Construction*
- AFI 32-7061, *The Environmental Impact Analysis Process*
- AFI 32-7080, *Pollution Prevention Program*
- AFI 32-9005, *Establishing, Accounting, and Reporting Real Property*
- AFI 64-101, *Cable Television Systems on Air Force Bases*, 3 June 1994
- AFM 88-29, *Engineering Weather Data*
- AFMAN 32-7067, *Planning in the Noise Environment* (AFM 19-10)
- AFMAN 32-8008V3, *Airfield and Heliport Planning and Design Criteria*
- AFR 88-25, *Military Family Housing Design and Construction Management*

- Air Force Federal Acquisition Regulations (AFFARs), *Appendix B*
- *Air Force Housing Economic Analysis Guidance Manual*, February 1994
- *Air Force Housing Market Analysis Guidance Manual*, October 1993
- *Air Force Housing Support Facilities Guide*, April 1994
- Air Force Pamphlet (AFP) 88-40, *Sign Standard*
- *Air Force Policy and Guidance on Lead-Based Paint in Facilities*, 24 May 1993
- Air Force Policy Letter, *Policy on Kitchen Range Hood Fire Protection in Military Family Housing* (MFH), 30 June 1993
- Construction Technical Letter (CTL) 88-2, *DD Form 1354 Checklist*, 6 January 1988
- CTL 89-3, *Warranty and Guarantee Program*, 22 September 1989
- *Design Guide for Energy Efficient Revitalization of Military Family Housing*
- Engineering Technical Letters (ETL) 87-1*, Lead Ban Requirements of Drinking Water*, 15 January 1987
- ETL 84-10, *Air Force Building Construction and the Use of Termiticides*, 1 August 1984
- ETL 87-9, *Pre-wiring*, 21 October 1987
- ETL 89-9, *Radon Reduction in New Facility Construction*, 7 October 1988
- ETL 90-1, *Built-Up Roof (BUR) Repair/Replacement Guide Specification*, 23 January 1990
- ETL 91-6, *Cathodic Protection*, 3 July 1991
- ETL 93-4, *Fire Protection Engineering Criteria - Automatic Sprinkler Systems in Military Family Housing (MFH),* 18 August 1993
- *Lead-Based Paint Cost Estimating Guide for Military Family Housing and Child Care Facilities*, (HQ AFCESA)
- Residential Energy Evaluation Manual (REEM)
- SAFO 700.12, *Delegation of Approval Authority for Design-Build Delivery Methods of Construction*
- *U.S. Air Force Landscape Design Guide* (HQ AFCEE)
- *U.S. Air Force Project Manager's Guide to Design and Construction*, September 1991

Corps of Engineers Guidance

- Engineering Regulation (ER) 415-345-38, *Warranty*

Codes and Standards

- Air Conditioning and Refrigeration Institute (ARI*) Directory of Certified Unitary Air Conditioners and Heat Pumps*
- American National Standard Institute (ANSI) A117.1, *Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People*
- ANSI B31.8 and B31.8b, *Gas Transmission and Distribution Piping Systems*
- ANSI C2, *National Electrical Safety Code*

- ANSI Z124.1, *Plastic Bathtub Unit,* 1987
- American Society for Heating, Refrigeration, Air Conditioning, and Electrical (ASHRAE), *Handbook of Fundamentals*
- ASHRAE 90.1, *Energy Efficient Design of New Buildings Except New Low-Rise Residential Buildings*
- ASHRAE 90.2P, *Energy Efficient Design of New Low-Rise Residential Buildings*
- American Society for Testing Materials (ASTM) E-84, Refers to Flame Spread and Smoke Development Ratings Test
- ASTM E90, *Standard Test Methods for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions,* 1990
- ASTM E413, *Classification for Rating Sound Insulation,* 1987
- ASTM E492, *Standard Test Methods for Laboratory Measurements of Impact Sound Transmission Through Floor Ceiling Assemblies Using the Tapping Machine,* 1990
- *Code for the Installation of Heat Producing Appliances*
- Council of American Building Officials (CABO), *One and Two Family Dwelling Code*
- National Association of Home Builders (NAHB), *Asbestos Handbook for Remodeling,* 1989
- NAHB Research Center, *Insulation Handbook*
- NAHB Research Center, *Moisture in Homes Handbook*
- NAHB and Oak Ridge National Laboratory, *The Design guide for energy Efficient Revitalization of Military Family Housing for Improvement and New Construction*
- *National Building Code* (BOCA)
- National Fire Protection Association (NFPA) Standard 13, *Installation of Sprinkler Systems*
- NFPA Standard 13D, *Installation of Sprinkler Systems in One and Two Family Dwellings and Mobile Homes*
- NFPA Standard 13R, *Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*
- NFPA Standard 70, *National Electrical Code*
- NFPA Standard 72, *National Fire Alarm Code*
- NFPA Standard 74, *Standard for Installation, Maintenance, and Use of Household Fire Warning Equipment*
- NFPA Standard 101, *Code for Safety to Life From Fire in Buildings and Structures* (Life Safety Code)
- NFPA 913, *Recommended Practice for the Protection of Historic Structures and Sites*
- *National Kitchen Cabinet Association Standards*
- *National Mechanical Code* (BOCA)
- *National Plumbing Code* (BOCA)
- *Standard Building Code*, Southern Building Code Congress International, Inc. (SBCCI)
- *Standard Gas Code*
- *Standard Mechanical Code* (SBCCI)
- *Standard Plumbing Code* (SBCCI)
- *Uniform Building Code*, International Conference of Building Officials (ICBO)
- *Uniform Mechanical Code* (ICBO)

- *Uniform Plumbing Code* (ICBO)

Section Two

Federal Guidance

- 10 U.S.C. 2304, *Exceptions to Formal Advertisement*, November 30, 1993
- 10 U.S.C. 2571, *Interchange of Property and Services*, December 3, 1985
- 10 U.S.C. 2667, *Lease: Non-excess Property*, October 23, 1992
- 10 U.S.C. 2821, *Requirement for Authorization of Appropriations for Construction and Acquisition of Military Family Housing*, November 29, 1989
- 10 U.S.C. 2823, *Determination of Availability of Suitable Alternative Housing for Acquisition in lieu of Construction of New Family Housing*, July 12, 1982
- 10 U.S.C. 2824*, Authorization for Acquisition of Existing Family Housing in Lieu of Construction*, July 12, 1982
- 10 U.S.C. 2827, *Relocation of Military Family Housing Units*, July 12, 1982
- 10 U.S.C. 2833, *Family Housing Support*, December 3, 1985
- 10 U.S.C. 2834, *Participation in Department of State Housing Pools*, November 5, 1990
- 10 U.S.C. 2835, *Long-term Leasing of Military Family Housing to be Constructed*, December 5, 1991
- 10 U.S.C. 2836, *Military Housing Rental Guarantee Program*, December 5, 1991
- 10 U.S.C. 2853, *Authorized Cost Variations,* November 29, 1989
- 10 U.S.C. 2854, *Restoration or Replacement of Damaged or Destroyed Facilities*, December 5, 1991
- 10 U.S.C. 2857, *Use of Renewable Forms of Energy in New Facilities*
- 10 U.S.C. 9540, *Architectural and Engineering Services*, December 12, 1980
- 42 U.S.C 4822 as amended, *Lead-Based Paint Poisoning Prevention Act* (LBPPPA) of 1971
- 42 U.S.C. 2834, *Energy Conservation Standards for Existing Buildings*
- HUD 3280, *Federal Manufactured Housing Construction and Safety Standards* (FMHSCC)
- Public Law 102-550, *Residential Lead-Based Paint Hazard Reduction Act*
- U.S. Consumer Product Safety Commission *Handbook for Public Playground Safety*

DoD Guidance

- DoD Directive 4710.1 (DoDD 4710.1*), Archaeological and Historic Resources Management*, June 21, 1984
- DoD Instruction 4270.36 (DoDI 4270.36*), DoD Emergency, Contingency, and Other Unprogrammed Construction*, May 16, 1991
- DoDI 4165.63-M, *DoD Housing Management*, September 1993
- DoDI 7000.14-M, Volume 32, *DoD Financial Management Regulation*, June 1993

Air Force Guidance

- AFI 32-1021, *Planning and Programming of Facility Construction Projects*

- AFI 32-1022, *Planning and Programming of Nonappropriated Fund Facility Construction Projects*
- AFI 32-1024, *Standard Facility Requirements*
- AFI 32-1031, *Engineering Management*
- AFI 32-1032, *Planning and Programming of Real Property Maintenance Projects*
- AFI 32-1052, *Air Force Occupational Safety and Health* (AFOSH)
- AFI 32-6001, *Family Housing Management and Operations*
- AFI 32-6003, *General Officer Quarters*
- AFI 32-6004, *Furnishings Management*
- AFI 32-7001, *Environmental Budgeting*
- AFI 32-7060, *Interagency Intergovernmental Cooperation*
- AFI 32-7062, *Base Comprehensive Planning*
- AFI 32-7065, *Natural Resources Management*
- AFI 32-9001, *Acquisition of Real Property*
- AFI 32-9002, *Use of Real Property Facilities*
- AFI 32-9004, *Disposal of Real Property*
- AFI 65-501, *Economic Analysis and Program Evaluation for Resource Management*
- AFI 65-601, Volume 1, *U.S. Air Force Budget Policies and Procedures*
- AFI 65-601, Volume 4, *Appropriation Symbols and Budget Codes*
- AFI 65-601, Volume 5, *U.S. Air Force Budget Investment Appropriation*
- AFI 65-603, *Civil Engineering Financial Management*
- AFI 91-301, *The U.S. Air Force Occupational Safety, Fire Prevention, and Health Program*
- Air Force Manual (AFM) 85-3, *Paint and Protective Coating*
- AFM 88-30, *Children's Outdoor Play Areas*
- AFM 88-43, *Installation Design*
- AFM 88-45, *Civil Engineering Corrosion Control Cathodic Protection Design*
- Air Force Manual (AFMAN) 64-108, *Service Contracts*
- AFMAN 65-506, *Economic Analysis Procedures Handbook*
- Air Force Policy Document (AFPD) 32-10, *Air Force Installations and Facilities*
- AFPD 32-60, *Housing*, July 9, 1993
- AFPD 32-70, *Environmental Quality*
- AFPD 65-5, *Cost and Economics*
- AFPD 65-6, *Budget*
- AFR 70-30, *Streamlined Source Selection Procedures*
- Secretary of the Air Force Order (SAFO) 700.8, *Delegation of Authority to Approve Cost Variations in Construction Projects Pursuant to 10 U.S.C. 2853*, October 15, 1991
- SAFO 700.17, *Delegation of Authority to Approve Restoration or Replacement of Damaged or Destroyed Facilities Pursuant to 10 U.S.C*. 2854, April 20, 1992
- SAFO 700.51, *Delegation of Authority to Approve Relocation of Military Family Housing Units Pursuant to 10 U.S.C. 2827*, September 18, 1991

- SAFO 700.52, *Delegation of Authority to Approve Leases of Military Family Housing Pursuant to 10 U.S.C*. 2828, August 3, 1992
- *The U.S. Air Force Project Manager's Guide to Project Definition*

Corps of Engineers Guidance

- EM 385-1-1, *Safety and Health Requirements Manual*
- Engineering Regulation (ER) 415-1-261, Vol. 1 through 4, *Construction Inspector's Guide*

Additional References

- *Architectural Graphic Standards*; Ramsey-Sleeper
- *Building Construction Illustrated*; Francis D. Ching
- *Cost Effective Site Planning*; National Association of Home Builders
- *Time Saver Standards*: Housing; McGraw-Hill

Figure 4.30: Bathrooms (continued)

Considerations (continued)	*Hardware* (continued) ■ Provide water-saving type water closets requiring a maximum of 1.6 gallons per flush. ■ Provide bathtubs of the following types: enameled cast iron; porcelain enameled steel; acrylic or gel-coated, and glass fiber reinforced. ■ Install shower stalls of the following types: ceramic tile walls with ceramic tile floors; precast, cast in place, or pressure molded receptors; or gel-coated, glass fiber reinforced, polyester resin (ANSI Z124.1) with integral molded receptor and walls. ■ Provide flow-control devices on shower heads to limit water flow to a maximum of 2.5 gallons per minute at pressures between 20 and 60 pound per square inch (PSI). ■ Provide adequate hardware: shower curtain rods, shower doors, towel bars, soap dish, robe hook, toothbrush holder, medicine cabinet, toilet paper holder, and mirror. Do not provide soap dishes and toothbrush holders if countertop space is provided. ■ Provide recessed medicine cabinets with adjustable shelves. ■ Use integral ceramic accessories as much as possible and ensure finish coordination between fixtures and tile. ■ In full baths, install lavatories in countertops on vanity bases, with a maximum width of 30 inches. Countertops may be molded acrylic or cultured marble with integral bowl, or neutrally colored laminated plastic surface with lavatory bowls of vitreous china or of porcelain enamel on cast-iron or steel. ■ Provide full-height wall or door mirrors. ■ In half baths, provide lavatories in vanities as above (preferred) or of vitreous china or porcelain enamel on cast-iron or steel (pedestal type). Do not use wall-hung lavatories. ■ Provide the maximum amount of cabinetry/storage space possible within the bathroom. ■ Provide water-impervious wainscot, to a minimum of 6 feet above the finished floor, around all bathtubs and showers. *Construction* ■ Collocate baths/wet (plumbing) walls as much as possible without degrading/sacrificing livability or quality of living spaces. ■ Provide proper mechanical/active ventilation. Do not vent bathrooms into attic spaces. Provide air backflow dampers for when fans are not operating. ■ Provide water and slip-resistant floor covering including ceramic tile, terrazzo, or seamless sheet vinyl.

Figure 4.30: Bathrooms (continued)

Considerations (continued)	*Construction* (continued) ■ Do not use particle-board floor sheathing. ■ Provide wall bases that match the chosen flooring (e.g., ceramic floor/ceramic base, etc.). ■ Use water-resistant gypsum wall board on all bathroom walls and ceilings. ■ Use semi-gloss latex or alkyd-based paint on wall board and painted doors, windows, and trims in bathrooms. ■ Vinyl wall covering is acceptable. Ensure proper pre-treatment of walls to account for high moisture levels. ■ Provide good ambient light throughout; task lighting over the vanity is critical. ■ Provide ceiling-mounted supplemental heating, if necessary. ■ Provide a quad-plex GFCI above the vanity countertop, but no higher than 5 feet above the floor. *General* ■ Provide durable, dependable, and simple fixtures and fittings. Ensure replacement parts are available through the Family Housing Maintenance Shop. ■ Emphasize durability and simplicity of design, materials, and finishes. For example, ensure all wood, metal, or ceramic finishes match and complement each other. For example, do not use brushed stainless steel towel hooks with polished stainless steel toilet paper holders.

■ 4.8.9 Laundry Room/Area

The laundry area provides space for clothes washers and dryers and, in general, gives occupants an organized utility/work station for miscellaneous housekeeping and maintenance tasks.

Figure 4.31: Laundry Room/Area

Common Problems	■ Poor location with respect to the garage/carport, kitchen, and service entry. ■ Poor configuration. ■ Deficient plumbing or electrical connections for the washer and dryer. ■ Lack of protected convenience outlets.