

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE _____ PAGE _____ OF _____ PAGES

2. AMENDMENT/MODIFICATION NO. _____ 3. EFFECTIVE DATE _____ 4. REQUISITION/PURCHASE REQ. NO. _____ 5. PROJECT NO. (If applicable) _____

6. ISSUED BY _____ CODE _____ 7. ADMINISTERED BY (If other than Item 6) _____ CODE _____

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) _____ (X) 9A. AMENDMENT OF SOLICIATION NO. _____
 9B. DATED (SEE ITEM 11) _____
 10A. MODIFICATION OF CONTRACT/ORDER NO. _____
 10B. DATED (SEE ITEM 11) _____
 CODE _____ FACILITY CODE _____

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers is extended, is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your 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 ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

CHECK ONE	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.) _____

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

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

Item 14. Continued.

CHANGES TO PROPOSAL RECEIPT DATE

1. Standard Form 1442, First Page, Item No. 13.A.- In the second line, change the proposal receipt date from "17 May 2001, 4 p.m." to "1 June 2001, 4 p.m."

CHANGES TO PRICE PROPOSAL SCHEDULE

2. Replace the Price Proposal Schedule, pages 00010-3 through 00010-9, with the accompanying Price Proposal Schedule bearing the notation "ACCOMPANYING AMENDMENT NO. 0007 TO SOLICITATION NO. DACA63-01-R-0002."

CHANGES TO THE SPECIFICATIONS

3. Replacement Sections - Replace the following section with the accompanying new sections of the same number and title, bearing the footer notation "ACCOMPANYING AMENDMENT NO. 0007 TO SOLICITATION NO. DACA63-01-R-0002:"

01001 STATEMENT OF WORK

END OF AMENDMENT

ACCOMPANYING AMENDMENT NO. 0007 TO SOLICITATION NO. DACA63-01-R-0002

RFP, Design/Build, FY 01 Sgt Maj Academy Family Housing Replacement (Title)
Fort Bliss, Texas (Location)

Solicitation No. DACA63-01-R-0002

PRICE PROPOSAL SCHEDULE
 (To be attached to SF 1442)

BASE BID: All work required by the plans and specifications exclusive of work required by Option Bid Items.

Item No.	Description	Quantity	Unit	Unit Price	Amount
0001	Total cost for complete design and construction of FY01 Family Housing Units (64 units, Aero-Vista Area), and all site improvements within the Building 1500mm lines, except for separately price bid items	Job	Sum	***	\$ _____
0002	Total cost for Construction of all site improvements (outside the Building 1500 mm line) for 64 Family Housing Units, Aero-Vista Area, including grading, paving, utilities, storm drainage system, curbs and gutters, sidewalks, recreation facilities, tot lots, bus stop shelters, bike paths, landscaping, irrigation, exterior lighting, fencing, all other work not separately listed.	Job	Sum	***	\$ _____
0003	Total cost for Hazardous Material Abatement of 64 Family Housing Units, Biggs Airfield, Aero-Vista Area	Job	Sum	***	\$ _____

ACCOMPANYING AMENDMENT NO. 0007 TO SOLICITATION NO. DACA63-01-R-0002

RFP, Design/Build, FY 01 Sgt Maj Academy Family Housing Replacement (Title)
Fort Bliss, Texas (Location)

Solicitation No. DACA63-01-R-0002

PRICE PROPOSAL SCHEDULE (cont)

Item No.	Description	Quantity	Unit	Unit Price	Amount
0004	Total cost for Demolition 64 Family Housing Units, Biggs Airfield, Aero-Vista Area, including site demolition, paving, utilities, storm drainage system, curbs and gutters, sidewalks, recreation facilities, tot lots, bus stop shelters, bike paths, landscaping (except trees), irrigation, exterior lighting, fencing, grading, existing rock fence at West and South boundary of area and all other work not separately listed	Job	Sum	***	\$ _____
0005	(AM#2) _____	_____	_____	***	*****
0006	<u>(AM#7) Total cost for Demolition of transite pipe sewer laterals on east side of Luke Street</u>	878	m	***	\$ _____
0007 (AM#7)	Final Record Drawings	Sum	Job	***	\$ <u>38,000.00</u>
TOTAL BASE BID					\$ _____

ACCOMPANYING AMENDMENT NO. 0007 TO SOLICITATION NO. DACA63-01-R-0002

RFP, Design/Build, FY 01 Sgt Maj Academy Family Housing Replacement (Title)
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PRICE PROPOSAL SCHEDULE (cont)

OPTION NO. 1: Additional cost for all work required by the plans and specifications.

Item No.	Description	Quantity	Unit	Unit Price	Amount
<u>0008</u> (AM#7)	Total cost for complete design and construction of FY02 Family Housing Units (76 units, Aero-Vista Area), and all site improvements within the Building 1500mm lines, except for separately price bid items	Job	Sum	***	\$ _____
<u>0009</u> (AM#7)	Total cost for Construction of all site improvements (outside the Building 1500 mm line) for 76 Family Housing Units, Aero-Vista Area, including grading, paving, utilities, storm drainage system, curbs and gutters, sidewalks, recreation facilities, tot lots, bus stop shelters, bike paths, landscaping, irrigation, exterior lighting, fencing, all other work not separately listed	Job	Sum	***	\$ _____
<u>00010</u> (AM#6) (AM#7)	Construct new 1 830 mm <u>wrought iron fence on north side</u> <u>and 1 830 mm rock fence on west and south sides</u>	Job	Sum	***	\$ _____
<u>0011</u> (AM#7)	Total cost for Hazardous Material Abatement of 86 Family Housing Units, Biggs Airfield, Aero-Vista Area	Job	Sum	***	\$ _____

ACCOMPANYING AMENDMENT NO. 0007 TO SOLICITATION NO. DACA63-01-R-0002

RFP, Design/Build, FY 01 Sgt Maj Academy Family Housing Replacement (Title)
Fort Bliss, Texas (Location)

Solicitation No. DACA63-01-R-0002

PRICE PROPOSAL SCHEDULE (cont)

Item No.	Description	Quantity	Unit	Unit Price	Amount
0012	Total cost for				
(AM#7)	Demolition 86 Family Housing Units, Biggs Airfield, Aero-Vista Area, including site demolition, paving, utilities, storm drainage system, curbs and gutters, sidewalks, recreation facilities, tot lots, bus stop shelters, bike paths, landscaping (except trees), irrigation, exterior lighting, fencing, grading, and all other work not separately listed				
		Job	Sum	***	\$ _____
0013	<u>(AM#7) Total cost for Demolition of transite pipe sewer laterals on east side of Luke Street</u>	<u>1,180</u>	<u>m</u>	<u>***</u>	<u>\$ _____</u>

TOTAL OPTION NO. 1 \$ _____

OPTION NO. 2: Additional cost for all work required by the plans and specifications.

0014	Total cost for				
(AM#7)	Hazardous Material Abatement of 24 Family Housing Units, Biggs Airfield, Aero-Vista Area				
		Job	Sum	***	\$ _____

0015	Total cost for Demolition				
(AM#7)	of an additional 24 Family Housing Units, Biggs Airfield, Aero-Vista Area, including site demolition, paving, utilities, storm drainage system, curbs and gutters, sidewalks, recreation facilities, tot lots, bus stop shelters, bike paths, landscaping (except trees), irrigation, exterior lighting, fencing,				

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RFP, Design/Build, FY 01 Sgt Maj Academy Family Housing Replacement (Title)
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grading, and all other work not separately listed	Job	Sum	***	\$ _____
0016 <u>(AM#7) Total cost for Demolition of transite pipe sewer laterals on east side of Luke Street</u>		329	m	*** \$ _____

TOTAL OPTION NO. 2 \$ _____

PRICE PROPOSAL SCHEDULE (cont)

0017 (AM#7) OPTION NO. 3: All work required by the plans and specifications to replace the main access road located in front of Ben Milan Elementary School. See Section 01001 STATEMENT OF WORK, paragraph 1a(4) Special utilities and supplemental construction.

Job Sum *** \$ _____

TOTAL COST (BASE BID + OPTIONS NO. 1 , NO. 2, and NO. 3) \$ _____

PROJECT COMPLETION TIME:

0018 (AM#7) Completion Time for all work (NOT to exceed the maximum time stated in Section 01000 DESIGN AND CONSTRUCTION SCHEDULE)

BASE BID PROJECT COMPLETION TIME: _____ Calendar days from NTP

OPTION NO. 1 PROJECT COMPLETION TIME: _____ Calendar days **(AM#2) after completion of the Base Bid**

(AM#2) _____

(AM#2) _____

(AM#2) Completion times for Options No. 2 and 3 are stated in Section 01000 DESIGN AND CONSTRUCTION SCHEDULE.

ACCOMPANYING AMENDMENT NO. 0007 TO SOLICITATION NO. DACA63-01-R-0002

RFP, Design/Build, FY 01 Sgt Maj Academy Family Housing Replacement (Title)
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PRICE PROPOSAL SCHEDULE (cont)

NOTES:

1. ARITHMETIC DISCREPANCIES (EFARS 14.407-2)

(a) For the purpose of initial evaluation of bids, the following will be utilized in resolving arithmetic discrepancies found on the face of the bidding schedule as submitted by bidders:

- (1) Obviously misplaced decimal points will be corrected;
- (2) In case of discrepancy between unit price and extended price, the unit price will govern;
- (3) Apparent errors in extension of unit prices will be corrected; and
- (4) Apparent errors in addition of lump-sum and extended prices will be corrected.

(b) For the purpose of bid evaluation, the Government will proceed on the assumption that the bidder intends his bid to be evaluated on the basis of the unit prices, the totals arrived at by resolution of arithmetic discrepancies as provided above and the bid will be so reflected on the abstract of bids.

(c) These correction procedures shall not be used to resolve any ambiguity concerning which bid is low.

2. If a modification to a bid based on unit prices is submitted, which provides for a lump sum adjustment to the total estimated cost, the application of the lump sum adjustment to each unit price in the bid schedule must be stated. If it is not stated, the bidder agrees that the lump sum adjustment shall be applied on a pro rata basis to every unit price in the bid schedule.

3. Bidders must bid on all items.

4. Failure to insert prices for each item in the Bidding Schedule may cause the proposal to be rejected.

NOTES (cont):

5. Costs attributable to Division 01 - General Requirements are assumed to be prorated among bid items listed.

6. Responders are advised that this requirement may be delayed, cancelled or revised at any time during the solicitation, selection, evaluation, negotiation and/or final award process based on decisions related to DOD changes in force structure and disposition of the Armed Forces.

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Solicitation No. DACA63-01-R-0002

PRICE PROPOSAL SCHEDULE (cont)

NOTES (cont):

7. For the purpose of this solicitation, the word "item" shall be considered to mean "schedule" as used in Provision 52.236-28 PREPARATION OF PROPOSALS – CONSTRUCTION (OCT 1997), in Section 00100 INSTRUCTIONS, CONDITIONS, AND NOTICES TO OFFERORS, excluding additives, deductives, or optional items.

8. The Army will procure this housing through a design and cost competition in accordance with the provisions set forth in this Request for Proposals (RFP). When a contract is awarded, it will be a "Firm Fixed Price Contract."

9. The Congress, in authorizing and funding this contract, has established certain cost limitations for the project. The current authorization for the complete design and construction of this project is **\$23,200,000**. Proposals that exceed this funding limit after exercising any options may be rejected. Submission of desirable alternative features exceeding minimum requirements may be considered as long as award can be made within the established funds.

10. Any proposal which is materially unbalanced as to prices for the Base Schedule may be rejected. An unbalanced proposal is one which is based on prices significantly less than the cost for some work and prices which are significantly overstated for other work and can also exist where only overpricing or underpricing exists.

11. EVALUATION OF OPTIONS (JUL 1990) (FAR 52.217-5)

Except when it is determined in accordance with FAR 17.206(b) not to be in the Government's best interests, the Government will evaluate offers for award purposes by adding the total price for all options to the total price for the basic requirement. Evaluation of options will not obligate the Government to exercise the option(s).

12. The Government reserves the right to exercise the option(s) either singularly or in any combination for up to 180 calendar days after award of the Base Bid without an increase in the Offeror's Bid Price.

13. (AM#7) ABBREVIATIONS

For the purpose of this solicitation, the units of measure are represented as follows:

a. m (length in meters)

END OF PROPOSAL SCHEDULE

SECTION 01001

STATEMENT OF WORK

ACCOMPANYING AMENDMENT NO. 0007 TO SOLICITATION NO. DACA63-01-R-0002

STATEMENT OF WORK

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(AM#7) _____

ACCOMPANYING AMENDMENT NO. 0007 TO SOLICITATION NO. DACA63-01-R-0002

SECTION 01001

STATEMENT OF WORK

1. DESIGN OBJECTIVES.

The design and construction shall comply with the specifications and requirements contained in this Request for Proposals (RFP). The design and technical criteria contained and cited in this RFP establish minimum standards for design and construction quality. All housing units constructed in accordance with these standards are “Energy Star Homes”.

This section, Statement of Work, provides the design requirements, scope of work, and design criteria to successfully meet the Government’s technical design requirements for submittal of the proposal and subsequent completion of the project. Any resultant contract will be based on the Request for Proposals documents including amendments, and contractor’s price and technical proposals. After award, the Contracting Officer must approve any proposed changes to the contractor’s technical proposal. **DESIGN-BUILD CONTRACT - ORDER OF PRECEDENCE:** The Statement of work is intended to identify specific project requirements.

1.a. Work Scope. **(AM#7) The objective of this solicitation is to obtain housing complete and adequate for assignment as quarters for the premier Non-commissioned officers (NCOs) in the Army and their families as they attend the highest level of NCO schooling, the Sergeant Majors Academy. The ultimate intent of all proposals will be to provide these soldiers and their families with a world-class neighborhood and environment with the largest homes possible.** This contract shall consist of the design and construction of a total of **64 housing units for Phase 1 FY 01 and 76 housing units for Phase 2 FY 02** on Government-owned land at **Fort Bliss, Texas**, which comply with this RFP. Work shall consist of the following:

1.a.(1) Housing Units. Housing units with patio, garage, exterior storage, ground coupled heat pump system for heating and cooling, passive energy systems, and including the following Contractor-furnished/Contractor-installed (CF/CI) equipment and appliances: range, refrigerator, garbage disposal, dishwasher, water heater, **carbon monoxide alarms** and smoke detectors. Housing units shall be a mix of three-, and four-bedroom housing units as shown in Table 1-1:

TABLE 1-1 - HOUSING UNITS

Pay Grade	Phase	Number of Bedrooms	Number of Units
E-7 through E-9 (SNCO)	1	4	22
	1	3	42
	2	4	28
	2	3	48

Note¹: The number of units shown in Table 1-1 are totals which are to be divided by fiscal year as follows: Phase 1 - 64 units FY 01, Phase 2 - 76 units FY-02 in the Aero-Vista Housing Area. Although only 64 units in Phase 1 and 76 units in Phase 2 are to be constructed in the Aero-Vista Area, the site layout design shall be for 200 units located west of Luke Street. The utility main design shall be capable of handling a total of 400 proposed units within the area located on both sides of Luke Street. Individual utility connections will be for 64 units in Phase 1 and 76 units in Phase 2. See Paragraph 5, Unit Design - Architecture, for specific requirements for floor area and mix of types.

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1.a.(2) Accessible units. **(AM#7) No less than five (5) percent of the units shall be built accessible. (AM#7) _____.** These housing units shall be designed and built in such a way that they may be easily and readily modified to accommodate physically challenged occupants at time of occupancy. See paragraph 5.a.(2)(a). Design of accessible housing units shall conform to the Uniform Federal Accessibility Standards (UFAS) and American Disabilities Act Accessibility Guidelines (ADAAG). Accessible housing units shall be well dispersed throughout the development and shall not be grouped or clustered so as to create segregated pockets within the housing community. The requirement to have an additional two (2) percent of housing units equipped with warning devices for the hearing and visually impaired will be met at the time the unit is assigned to an occupant needing this equipment.

1.a.(3) Site area and density.

1.a.(3).(a) Site area. The **total site area for Phase I, II, and III** is described on the RFP drawings included as part of this solicitation and includes approximately **30 hectares [75 acres]**. **The total site area shall be divided from east to west into 3 equal parts corresponding to Phase I, Phase II and Phase III.** Site work includes all design and construction of the site design to include grading, storm drainage, erosion control, pedestrian and vehicular circulation, utility systems, outdoor lighting, play lots, neighborhood parks, and physical security.

1.a.(3).(b) Site density. This project consists of **64 housing units for Phase 1 and 76 housing units for Phase 2 on 20.3 hectares (50 acres)** of land in the **Aero-Vista Area**. **The project site is approved for low density siting.** Site development shall comply with the minimum requirements for **low density** siting.

1.a.(4) Special utilities and supplementary construction.

1.a.(4).(a) Streets. **The main entrance into the Aero Vista Housing Area shall be Luke Street. Luke Street is to remain a major road through the housing complex, providing access to the elementary school and serving as a collector road for the entire housing development. Luke Street shall be a minimum 7.32m (24 feet) each side with a 910mm (3 ft.) wide center median. Luke Street is to remain open at all times during construction. A traditional street layout is preferred. Although cul-de-sacs are not specifically prohibited, a site plan that will combine security requirements for limited access to the site, with internal street connections and circulation is preferred. A secondary entrance will be provided from the northwest corner, however through traffic is not desired.**

(AM #6) _____ The (AM #5) _____ access road located in front of Ben Milan Elementary will be replaced as Option 3. See Seq. 3 for location of this option, and Attachment 11 for pavement requirements. The access road shall be a minimum 11.0m (36 ft.) wide. It is the Contractor's responsibility to survey this area for Option 3 and demolish the existing road. The work in this area will be required to be coordinated with the installation and the school's schedule to provide the least amount of impact to the school.

1.a.(4).(b) Fencing. **(AM #6) _____ A 1.83 m (6-foot) high wrought iron fence is required for perimeter fencing along the north side (AM #5) of the site. The new wrought iron fence shall be located 6.1m (20 ft.) from back of curb of Sgt. Major Boulevard. A 1.83 m (6-foot) high rock fence is required for perimeter fencing along the west and south side as indicated on the drawings. The east side fence will be provided at a future phase. (AM #5) _____ All gates shall be closeable and lockable. The existing rock fence in the Aero-Vista area shall be demolished (AM#7) with the exception of the 7-foot high rock wall in the northwest corner of the site that extends to Building 10001.** All backyards shall be enclosed with a 1.37m (4-1/2 foot) high rock fence similar to the perimeter fence with a 0.9m (3-foot) wide wrought iron gate. **Spacing of vertical rails shall be less than 100mm (4 inches) apart to prevent a child from squeezing through. Maximum clearance between the bottom**

ACCOMPANYING AMENDMENT NO. 0007 TO SOLICITATION NO. DACA63-01-R-0002

of the gate and finish grade shall be 75mm (3 inches). See the rock fence detail in Attachment 15, and the wrought iron detail in Attachment 9 - IDG EXS. 3.5.1.

1.a.(4).(c) Waste Area. Waste material, except for **regulated** asbestos containing material, shall be disposed of by the contractor off Government property, at the contractor's expense. The Fort Bliss sanitary landfill shall be used for disposal of asbestos **regulated** containing material.

1.a.(4).(d) Haul Routes. See the Project Location Map in the drawings.

1.a.(4).(e) Bench Marks. See the topographic maps in the drawings.

1.a.(4).(f) Contractor's Storage Yard. A contractor's storage yard shall be located within the project boundaries.

1.a.(4).(g) Security Fencing. A 1.83m (6 foot) high chain link security fence shall be provided around the entire project construction site for security and safety of the children, pedestrians and others living nearby. Full height visual screening shall be provided for this fencing on the north and east sides. This fencing shall remain in place for the duration of the project.

1.a.(4).(h) New Utilities. AM #6 AM #5 The utility main design shall be capable of handling a total of 400 proposed units within the area located on both sides of Luke Street. Any utility mains (water, sewer, gas, electric) that run parallel to Luke Street shall provide for future utility connections (to include taps, valves, etc.) **to be located** on the east side of Luke Street. Individual utility connections will be for 64 units in Phase 1 and 76 units in Phase 2.

1.a.(5).(a). Demolition considerations and requirements. **Aero-Vista Housing Area - East Side. Included in this project is the demolition of 174 existing, single family, one-story housing units in the Aero-Vista Housing Area which are shown on Seq. 3. The demolition of these 174 units is to be phased as follows: 64 units in FY-2001 and 110 units in FY-2002 (see the following two tables). The utility systems and streets must be demolished in such a manner as to maintain active utility service and vehicular circulation to the remaining units.** Any new utility lines and/or streets shall be provided as necessary to retain the remaining housing units as a viable housing area. Luke Street must remain open and passable at all times. **Demolition shall comply with the requirements and standards in Section 02220 DEMOLITION.**

AM #5 The existing condition of low flow, debris in the system, age, etc. within the existing sanitary sewer lines for the existing housing units are currently a maintenance concern. Therefore, upon acceptance of the 50 Percent Design Submittal (Section 01015, Par. 1.10.2 50 Percent Design Submittal), the existing sanitary sewer lines shall be connected to the new utility system as soon as possible. Upon acceptance of the 50 Percent Design Submittal, the contractor shall maintain the existing sanitary sewer system until the connection to the new sanitary sewer system is completed.

1.a.(5).(a).1/. Site Demolition. The housing units identified for demolition shall be removed complete, including foundations. House walks, streets, sidewalks, curb and gutter, and driveways shall be removed complete. Wilson Park Road, from the northwest corner of the site to the northwest corner of Luke St., shall be demolished. See Seq. 3 for existing site map. All trees within the housing areas, except trees with trunks 3m [10 feet] or closer to the house wall line, shall remain. Trees within 3m [10 feet] of the house wall line may remain at the contractor's option. **Any dead trees or shrubs shall be removed from the project site. All trees designated to be demolished shall be removed completely.** All trees to remain shall be protected during demolition operations.

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Demolition Requirements for SGT. MAJ. ACAD FAMILY HOUSING RFP				
Fort Bliss, Texas				
FY 01, PHASE 1 - 64 UNITS				
BLDG. #'s				
10514	10569	10591	10709	
AM#5 10518	10571	10592	10710	
10520	10573	10593	10711	
10545	10575	10594	10712	
10546	10577	10595	10713	
10547	10580	10596	10714	
10548	10581	10597	10715	
10551	10582	10598	10716	
10553	10583	10700	10717	
10555	10584	10701	10718	
10557	10585	10702	10719	
10559	10586	10703	10720	
10561	10587	10704	10743	
10563	10588	10705	10745	
10565	10589	10706	10747	
10567	10590	10708	10749	

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Fort Bliss, Texas					
FY 02, PHASE 2- 110 UNITS					
BLDG. #'s					
10549	10604	10627	**10682	10723	10748
10550	10605	10629	10683	10724	10751
10552	10606	10631	**10684	10726	10753
10554	10607	10633	10685	10727	10755
10556	10608	10635	**10686	10728	10759
10558	10609	**10667	**10687	10729	10761
10560	10610	**10668	**10688	10730	10763
10564	10611	**10669	10689	10731	10765
10566	10612	**10670	**10690	10732	10767
10568	10613	**10671	**10691	10733	10769
10570	10614	**10672	10692	10734	
10572	10615	**10673	10693	10735	
10574	10617	**10674	10694	10736	
10576	10619	**10675	10695	10737	
10578	**10620	**10676	10696	10738	
10579	10621	**10677	10697	10740	
10600	**10622	**10678	10698	10741	
10601	10623	**10679	10699	10742	
10602	**10624	**10680	10721	10744	
10603	10625	10681	10722	10746	
NOTE: **PHASE 2 OPTION 2					

1.a.(5).(a).2/. Utility Demolition. **FY-2001 and 2002: All utility service line laterals and appurtenances, including water, gas, and sanitary sewer lines servicing the existing 174 housing units which are to be demolished in Phase 1 and Phase 2, shall be removed to the main or distribution line and capped.** Any existing underground utility lines not previously removed, if within 3-feet of existing or new ground surface or in conflict with new construction, shall be removed complete. **In no case shall gas lines be abandoned in place, but shall be removed completely.** The contractor shall ensure that all utility systems left in place and serving the remaining housing units shall be complete systems providing uninterrupted service of at least the quality of service in place prior to demolition.

1.a.(5).(b) Demolition considerations and requirements. Aero-Vista Housing Area - **West Side**. By previous contract, the houses, foundations and slabs, and driveways from the houses to the sidewalks will have been removed. The utility systems and streets must be demolished in such a manner as to maintain active utility service and vehicular circulation to the remaining units. Any new utility lines and/or streets shall be provided as necessary to retain the remaining housing units as a viable housing area. Luke Street must remain open and passable at all times.

1.a.(5).(b).1/. Site Demolition. Any site features such as sidewalks, streets, and curb and gutters not previously removed shall be demolished and removed complete. All trees within the housing

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areas, except trees with trunks **3m** [10 feet] or closer to the house wall line, shall remain. Trees within **3m** [10 feet] of the house wall line may **remain** at the contractor's option. **Any dead trees or shrubs shall be removed from the project site. All trees designated to be demolished shall be removed completely.** All trees to remain shall be protected during demolition operations.

1.b. Energy Star Homes Program Requirements: The Contractor, at the direction of the USACE Contracting Officer's Representative, shall be required to submit to the EPA the necessary information and certifications to register the units constructed in this project as Energy Star Homes. The contractor constructing housing units in accordance with this Statement of Work is not required to be a registered Energy Star Contractor. The required information can be submitted to EPA in several methods:

1.b.(1) Through the Internet by clicking on the *certificate automation system* icon at the World Wide Website <http://yosemite.epa.gov/appd/eshomes/eshomes.nsf> and following the instructions

1.b.(2) By emailing to certificates@epa.gov

1.b.(3) By mailing to the EPA Customer Service Manager (address & tel. no. below)

The following information needs to be submitted for each home [note: homes can be submitted *individually* (each home individually tested/rated) or in a "*batch*" (for batches of homes, particular unit types). The following data should be provided for each home (note: this can be in the form of a spreadsheet, database, word processing file or email; if the format changes in the future EPA will inform the contractor of the changes):

1.b.(3).(a) Contractor company name (ex. Jones Construction Co.)

1.b.(3).(b) Contractor telephone number (ex. 703-123-4567)

1.b.(3).(c) Name of company/organization performing testing/rating (ex. Jones Construction Co.)

1.b.(3).(d) Telephone number of company/organization performing testing/rating (ex. 703-123-4567)

1.b.(3).(e) Street address of home being submitted, including city, state & zip code (ex. 123 Smith St., City, State 12345)

1.b.(3).(f) Type of verification:

"FEP" --- if this particular home underwent infiltration testing (and possibly duct leakage testing). Please list the tested infiltration value in ACH/nat (natural air changes per hour) and if tested, the duct leakage to nonconditioned spaces in cfm and % of air handler flow at a pressure of 25 pascals.

"SEP" --- if this particular home did *not* undergo infiltration and/or duct leakage testing, but was a member of a batch out of which at least 15% DID; if so, then the address of a home that was a tested member of this batch should also be identified as the tested member of the batch.

1.b.(3).(g) The following statement: "This home qualifies as an EPA Energy Star Home by conforming to the residential energy efficiency specifications and quality control confirmation of **U.S. Army Corps of Engineers TI 801-02, Family Housing, Oct. 2000**, which has been determined by the EPA and USACE to be an **Equivalent Program** to the EPA Energy Star Homes Program." In addition, the "checklist" of home specifications that the USACE Contracting Officer's Representative uses to ascertain if the TI 801-02 specifications and testing results were met should be submitted. The statement and checklist should have the USACE Contracting Officer's Representative's signature affixed.

1.b.(3).(h) The year the house was built (ex. 2000)

1.b.(3).(i) The year the house was submitted for Energy Star certification (ex. 2000)

1.b.(3).(j) The name and title/rank, mailing address, email address, telephone number and fax number of the USACE Contracting Officer's Representative overseeing the contractor's

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adherence to construction specifications, quality control of construction and testing/rating activities.

1.b.(4) The Contractor will make arrangements with the EPA for receipt of the "Energy Star Homes" certificates and unit plaques and shall provide the certificates to the USACE Contracting Officer's Representative and include in the project the installation of the plaques on each of the housing units. Coordination point with the EPA regarding Energy Star certification and plaques shall be as follows:

United States Environmental Protection Agency
Climate Protection Division
US EPA 6202J
Washington DC 20460
ENERGY STAR Homes Customer Service Manager
ATTN: Mr. Brian Ng, Ng.Brian@epa.gov, 202-564-9162, fax: 202-565-2079
<http://www.energystar.gov/homes>

Technical questions on the Energy Star Homes Program in general can be addressed to:

ENERGY STAR Homes Technical Coordinator
ATTN: Mr Glenn T. Chinery, Chinery.Glenn@epa.gov, 202-564-9784, fax: 202-

565-2079

1.c. Design Freedom. Requirements stated in this RFP are minimums. Innovative, creative, or cost-saving proposals which meet or exceed these requirements are encouraged and will receive quality points accordingly. Existing housing plans or modifications thereof that meet the design and construction criteria specified herein, which an offeror has previously constructed and priced, may be submitted. They may include designs incorporating factory fabricated components or modules. Deviations from space and adjacency requirements are discouraged unless the changes result in improvement to the facilities.

1.d. Housing Units. . Site-built, factory-built, and manufactured housing units are acceptable options for this project.

1.e. Definition of Housing Unit Types. Terms for housing unit types used in these criteria are defined as follows:

1.e.(1) Site-built housing. A residential building or housing unit wholly or substantially constructed at the site.

1.e.(2) Factory-built housing. Construction consisting of components, sub-assemblies such as modules, panelized walls, roof trusses, floor joists, and other factory-assembled components, which are transported to the construction site and further assembled into completed housing units. All interior and exterior walls, regardless of whether they are structural (load bearing) or not, are plant fabricated (panelized). Panels must be fabricated to the extent that the structure of the panel or truss is factory-assembled. Finishes such as interior wall board may be site applied.

1.e.(3) Manufactured housing. As defined in Public Law 93-383, Title 24, Chapter XX amended (1977, 1978, 1979, and 1980), a manufactured home is "a structure, transportable in one (1) or more sections which in the traveling mode is eight body feet or more in width, or forty body feet or more in length, or, when erected on site, is built on a permanent foundation when connected to the required utilities, and includes the plumbing, heating, air conditioning and electrical systems contained therein."

1.e.(4) Detached house. A single-family housing unit which is not attached to another housing unit.

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1.f. Design Quality. The objectives are to obtain housing structures and complimentary site development within funds available and to optimize livability. Design quality is achieved through the optimization of interior planning, integration of housing structures to the site, and balancing architectural attractiveness, variety, function, and design for low-cost maintenance and operation. Offerors should consider sustainable design applications in developing proposals, see para 13.

1.g. Installation Real Property Master Plan. The installation real property master plan provides comprehensive documentation of the existing conditions of natural, man-made, and human resources. It also guides the future land-use development. The real property master plan should be consulted as it is the mechanism for ensuring that individual projects are sited to meet overall installation goals and objectives for land use development

1.h. Installation Design Guide. Design of this project shall incorporate the design guidance and criteria contained in the Installation Design Guide, excerpts of which are contained in Attachment 9.

1.i. Energy and Resources Conserving Features. Public Law 102-486, Executive Order 12902, and Federal Regulations 10 CFR 435, require Federal buildings to be designed and constructed to reduce energy consumption in a life-cycle, cost-effective manner using renewable energy sources when economical. Products designed to conserve energy and resources by controlling the amounts of consumed energy or by operating at increased efficiencies should be considered. **Minimum requirements for this project are high-efficiency central air conditioning and/or heating units, and passive energy wing walls for shading windows.** Offerors are required to provide Energy and Resource conserving improvements that at least insure compliance with the Energy Star Homes Program parameters.

1.j. Prototype Housing Units. The purpose of the prototype housing unit is to verify the details of the approved design and material selections, and to establish the quality level against which the remaining work will be judged. At the plant, or at the site, construction connection details shall be exposed for study by authorized Government inspectors for a period of time agreed to by the Contractor and the Contracting Officer. The housing unit or units at the plant and/or the prototype at the site are subject to Contracting Officer's approval. At the site, the complete prototype shall be constructed for each housing unit type. Each stage of work shall be completed and accepted on the prototype prior to starting work on the same stage for similar housing units in the project.

1.j.(1) "Site-Built." A prototype housing unit shall be required for each housing unit type.

1.j.(1)(a) Where multiple prototype units are being constructed, one or two prototype units shall be left in the "rough in" stage (no interior finishes) so that the utility systems and framing construction is exposed. Exteriors of these prototypes shall be completely finished. When the last new units are constructed, these "rough in" stage prototype units shall be completed and turned over to the Government with the last turn-over group.

1.j.(2) "Manufactured" or "Factory-Built." A prototype housing unit shall be required for each housing unit type of each run fabricated at the plant for manufactured or factory-built homes.

1.j.(2)(a) Manufactured. If the housing units are classified as manufactured housing, all interior and exterior systems which form integral parts of the transportable module shall be constructed and assembled for inspection by the Government. This shall include, as a minimum, wall and ceiling construction, interior finishes, utility piping, wiring, and ductwork fastening and assembling of adjacent modules, connection details to sinks, installed kitchen cabinets and countertops. Portions of the work shall be left unfinished or exposed to demonstrate interior construction details.

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1.j.(2).(b) **Factory-Built.** If the housing units are classified as factory-built housing, all wall panels which are fabricated in the plant for shipment to the site shall have prototype units constructed and assembled for in-plant inspection by the Government. This shall include, as a minimum, wall framing, roof and ceiling framing, connection details, utility piping, wiring and ductwork, interior and exterior wall finishes which form part of the factory-built wall. In addition, the Contractor shall construct as part of the factory-built prototype, installed samples of wall insulation, finished siding (if not part of wall assembly), sample installed bathtub and sink and installed kitchen sink and cabinets to demonstrate proper installation and wall connections. Portions of the work shall be left unfinished or exposed to demonstrate interior construction details.

1.j.(2).(c) **One Floor Prototype.** If only one floor of the prototype is manufactured or factory-built, factory assembly of the manufactured or factory-built portion of the prototype is required. In all cases, the factory prototype shall consist of one of each building type. The factory prototype shall be assembled to verify assembly connections, details, construction, and transportation of the finished housing unit.

1.j.(2).(d) **Structural Integrity.** Manufactured and factory-built homes shall be of individual housing units attached to one another in a manner which shall provide a finished structural assembly having an appearance and structural integrity comparable to a site-built single or multi-family residence built to applicable codes.

1.j.(2).(e) **Construction Tolerances.** Assembled housing units shall be true and plumb and all within specified construction tolerances for all alignments represented on the drawings. Adjacent walls shall be attached at roof and floor levels in such a manner as to preclude placing any wood member in cross-grain bending or cross-grain tension, and to avoid putting nails in withdrawal.

1.k. **Force Protection & Anti-Terrorism Considerations.** Project design and construction shall comply with the applicable DoD standards. **AM #5 Specific requirements include: perimeter rock wall on the west and south sides, perimeter lighting and limited access to the housing area.**

ACCOMPANYING AMENDMENT NO. 0007 TO SOLICITATION NO. DACA63-01-R-0002**2. CRITERIA REFERENCES.**

Criteria to be used for design and construction shall be taken from the most current references at the date of issue of the RFP. Administrative, contractual, and procedural features of the contract shall be as described in other sections of the RFP. Referenced codes and standards herein and those listed below are minimum acceptable criteria.

2.a. Local and State Codes or Standards.

2.b. Federal Laws. The Federal laws and regulations listed in Table 2-1 form a part of this document. They are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20401-9325 (202) 512 - 1800

TABLE 2-1 – FEDERAL LAWS & REGULATIONS	
CFR/USC No.	Description
P.L. 102-486	Energy Policy Act of 1992
10 CFR 430	National Appliance Energy Conservation Act (NAECA)
10 CFR 435	Voluntary Performance Standards for New Commercial and Multi-Family High Rise Residential Buildings; Mandatory for Federal Buildings.
10 CFR 436	Methodology and Procedures for Life Cycle Cost Analyses
16 CFR 1630	Standard for Surface Flammability of Carpet and Rugs
40 CFR 247.12	Comprehensive Procurement Guideline for Products Containing Recovered Materials, Construction Products
40 CFR 280	Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks
49 CFR 192	Transportation of Natural Gas and Other Gas by Pipeline: Minimum Federal Safety Standards
49 CFR 195	Transportation of Hazardous Liquids by Pipeline
10 USC 2826	Public Law 97-214, Military Construction and Military Family Housing

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TABLE 2-1 – FEDERAL LAWS & REGULATIONS	
CFR/USC No.	Description
24 USC 5301	Public Law 93-383, Community Development
42 USC 4321-4361	National Environmental Policy Act (NEPA)
42 USC 4901-4918 & 49 USC 1431	Noise Control Act of 1972
42 USC 5401-5426	Federal Manufactured Housing Construction and Safety Standards Act of 1974
Army Regulation 200-1	Environmental Protection and Enhancement, May 1990
E.O. 12902	Energy Efficiency and Water Conservation in Federal Facilities

2.c. Federal Specifications and Standards. The specifications listed form a part of this document to the extent specified herein. Federal Standard 795, Uniform Federal Accessibility Standards, and federal specifications are available from the Commanding Officer, Naval Publications and Forms Center, ATTENTION: NPODS, 5801 Tabor Avenue, Philadelphia, PA 19120-5099.

2.d. Other Government Documents and Publications. The following Government documents and publications form a part of this document to the extent specified herein:

2.d.(1) Americans with Disabilities Act Accessibility Guidelines, are available from U.S. Architectural and Transportation Barriers Compliance Board, 1331 F Street, N.W., Washington, D.C. 20004-1111

2.d.(2) Federal Emergency Management Agency, Mitigation Directorate; 500 C Street, SW; Washington DC 20472: National Performance Criteria for Tornado Shelters and FEMA 320, Taking Shelter from the Storm: Building a Safe Room Inside Your Home. <http://www.fema.gov/>

2.d.(3) NBS Handbook 135, Life-Cycle Costing Manual for the Federal Energy Management Program. Available from the National Institute of Science and Technology, formerly National Bureau of Standards (NBS).

2.d.(4) Standard for the Surface Flammability of Carpets and Rugs; and (Unnumbered) Handbook for Public Playground Safety, CFR 16-1630. Available from the Consumer Product Safety Commission, Directorate for Compliance and Administrative Litigation, Department of Regulatory Development, Washington, DC 20207, (301) 492-0626 or 492-0400.

2.d.(5) United States Environmental Protection Agency criteria are available from National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161, (703) 487-4650: EPA/600/8-88/087, Radon-Resistant Residential New Construction; EPA/625/5-88/024, Application of Radon Reduction Methods; and EPA/625/5-87/019, Radon Reduction Techniques for Detached Houses.

2.e. Non-Government Publications. The following publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are

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Department of Defense (DoD) adopted are those listed in the Department of Defense Index of Specifications and Standards (DODISS).

2.e.(1) Air Conditioning Contractors of America, Inc. (ACCA). 1712 New Hampshire Ave. NW. Washington DC 20009; (202) 483-9370; FAX (202) 588-1217; <http://www.acca.org/>.

2.e.(2) Air-Conditioning and Refrigeration Institute (ARI). Information listed below is available from ARI, 4301 Fairfax Dr., Suite 425, ATTN: Pubs Dept., Arlington, VA 22203, Ph: 703-524-8800, Fax: 703-528-3816, Internet E-Mail: ari@dgsys.com, Directory of Certified Unitary Air Conditioners, Unitary Heat Pumps and Sound Rated Outdoor Unitary Equipment; ARI 210/240, Unitary Air Conditioning and Air-Source Heat Pump Equipment : <http://www.ari.org/>

2.e.(3) AIR MOVEMENT AND CONTROL ASSOCIATION (AMCA), AMCA 210, Laboratory Methods of Testing Fans For Rating, is available from AMCA, 30 West University Drive, Arlington Heights, IL 60004, (312) 394-0150: <http://www.amca.org/>

2.e.(4) American Architectural Manufacturers Association (AAMA). AAMA specifications shown in Table 2-2 are available from AAMA, 1540 East Dundee Rd., Suite 310, Palatine, IL 60067-8321, Ph: 708-202-1350, Fax: 708-202-1480 2700 River Road, Suite 118, Des Plaines, IL 60018, (312) 699-7310.

TABLE 2-2 - AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION SPECIFICATIONS

No.	Description
AAMA 101	Voluntary Specification for Aluminum Prime Windows and Sliding Glass Doors
AAMA 101V	Voluntary Specification for Poly (Vinyl Chloride) (PVC) Prime Windows and Sliding Glass Doors
AAMA 1002.10	Voluntary Specifications for Aluminum Insulating Storm Products for Windows and Sliding Glass Doors
AAMA 1402	Standard Specifications for Aluminum Siding, Soffit, and Fascia

2.e.(5) American Gas Association (AGA). Standards and specifications are available from AGA, 1515 Wilson Blvd., Arlington, VA 22209, Ph: 703-841-8556, Fax: 703-841-8406: <http://www.aga.org/>

2.e.(6) American National Standards Institute, Inc. (ANSI). Copies of the standards listed in Table 2-3 are available from ANSI, 11 West 42nd St., New York, NY 10036, Ph: 212-642-4900, Fax: 212-302-1286: <http://www.ansi.org/>

TABLE 2-3 - AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) STANDARDS

Std. No.	Std. Description
A112.19.1	Enameled Cast Iron Plumbing Fixtures

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STANDARDS**

Std. No.	Std. Description
A112.19.2	Vitreous China Plumbing Fixtures (DoD Adopted)
A112.19.3	Stainless Steel Plumbing Fixtures (Designed for Residential Use)
A112.19.4	Porcelain Enameled Formed Steel Plumbing Fixtures (DoD Adopted)
A112.19.5	Trim for Water-Closet Bowls, Tanks, and Urinals (Dimensional Standards) (DoD Adopted)
A161.1	Recommended Construction and Performance Standards for Kitchen and Vanity Cabinets
B16.5	Steel Pipe Flanges and Flanged Fittings (DoD Adopted)
B16.22	Wrought Copper and Copper Alloy Solder Joint Pressure Fittings (DoD Adopted)
B16.26	Cast Copper Alloy Fittings for Flared Copper Tubes (DoD Adopted)
B31.8	Gas Transmission and Distribution Piping Systems
C2	National Electrical Safety Code
ANSI C105 AWWA A21.5	Polyethylene Encasement for Ductile-Iron Pipe Systems
Z21.10.1	Water Heaters, Gas, Volume I, Storage Type, 75,000 BTUH Input or Less
Z21.45	Flexible Connectors of Other Than All-Metal Construction for Gas Appliances
Z60.1	American Standard for Nursery Stock
Z124.1	Plastic Bathtub Units
Z124.2	Plastic Shower Receptors and Shower Stalls

2.e.(7) American Plywood Association. APA B840-K-88, 303 Siding Manufacturing Specifications, are available from the American Plywood Association, P.O. Box 11700, Tacoma, WA 98411, (206) 565-6600.

2.e.(8) American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) documents, listed in Table 2-4, are available from ASHRAE, 1791 Tullie Cir., NE, Atlanta, GA 30329-2305, Ph: 404-636-8400 Fax: 404-321-5478 1791 Tullie Circle, N.E., Atlanta, GA 30329, (404) 636-8400: <http://www.ashrae.org/>

**TABLE 2-4 – AMERICAN SOCIETY OF HEATING, REFRIGERATION,
AND AIR-CONDITIONING ENGINEERS (ASHRAE)**

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No.	Description
ASHRAE -	Handbook of Fundamentals
ASHRAE -	Residential Cooling Load Calculations
ASHRAE 52	Method of Testing Air Cleaning Devices used in General Ventilation for Removing Particulate Matter
ASHRAE 111	Practices for Measurement, Testing, Adjusting, and Balancing of Building Heating, Ventilation, Air Conditioning, and Refrigeration Systems

2.e.(9) American Society of Mechanical Engineers (ASME). ASME B16.11, Forged Fittings, Socket-Welding and Threaded, and ASME B31.8, Gas Transmission and Distribution Systems, are available from ASME, 22 Law Dr., Box 2300, Fairfield, NJ 07007-2900, Ph: 800-843-2763, Fax: 201-882-1717:
<http://www.asme.org/>

2.e.(10) American Society of Sanitary Engineers (ASSE). ASSE 1006, Residential Use (Household) Dishwashers, and ASSE 1008, Food Waste Disposal Units, Household, are available from ASSE, AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE), P.O. Box 40362, Bay Village, OH 44140, Ph: 216-835-3040, Fax: 216-835-3488:

2.e.(11) American Society for Testing and Materials (ASTM). ASTM specifications listed in Table 2-5 are available from ASTM, AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) 1916 Race St., Philadelphia, PA 19103, Ph: 215-299-5585, Fax: 215-977-9679:
<http://www.astm.org/>

TABLE 2-5 - AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) SPECIFICATIONS

Spec. No.	Spec. Description
A53	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
A526	Specification for Steel Sheet Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality (DoD Adopted)
B117	Method of Salt Spray (Fog) Testing (DoD Adopted)
C90	Specification for Hollow Load-Bearing Concrete Masonry Units (DoD Adopted)
C216	Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale) (DoD Adopted)
D3676	Rubber Cellular Cushion Used for Carpet or Rug Underlay
D1557	Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft 2700kN-m/m)

ACCOMPANYING AMENDMENT NO. 0007 TO SOLICITATION NO. DACA63-01-R-0002**TABLE 2-5 - AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) SPECIFICATIONS**

Spec. No.	Spec. Description
D1785	Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120 (DoD Adopted)
D2513	Standard Specification for Thermoplastic Gas Pressure Piping (DoD Adopted)
D2683	Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing (DoD Adopted)
D2846	Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Hot and Cold-Water Distribution Systems (DoD Adopted)
D3018	Specification for Class A Asphalt Shingles Surfaced with Mineral Granules (DoD Adopted)
D3679	Specification for Rigid Poly (Vinyl Chloride) (PVC) Siding
E84	Standard Test Method for Surface Burning Characteristics of Building Materials (DoD Adopted)
E90	Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions (DoD Adopted)
E108	Standard Methods of Fire Tests of Roof Coverings
E119	Standard Methods of Fire Tests of Building Construction and Materials
E162	Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source (DoD Adopted)
E283	Standard Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors
E330	Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
E336	Standard Test Method for Measurement of Airborne Sound Insulation in Buildings
E547	Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential
E648	Critical Radiant Flux of Floor-Covering Systems Using a Radiant Energy Source
E779	Measuring Air Leakage by the Pressurization Method
E1007	Standard Test Method for Field Measurement of Tapping Machine Impact Sound Transmission Through Floor-Ceiling Assemblies and Associated Support Structures

ACCOMPANYING AMENDMENT NO. 0007 TO SOLICITATION NO. DACA63-01-R-0002**TABLE 2-5 - AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) SPECIFICATIONS**

Spec. No.	Spec. Description
E1465	Standard Guide for Radon Control Options for the Design and Construction of New Low-Rise Residential Buildings
F1292	Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment
E1423	Standard Practice for Determining the Steady State Thermal Transmittance of Fenestration Systems
E 1554	Determining External Air Leakage of Air Distribution Systems by Fan Pressurization.
F1487-98	Standard Consumer Safety Performance Specification for Playground Equipment for Public Use
G90	Standard Practice for Performing Accelerated Outdoor Weathering of Nonmetallic Materials Using Concentrated Natural Sunlight

2.e.(12) American Water Works Association, Inc. (AWWA). Specifications listed below are available from AWWA, 6666 West Quincy, Denver, CO 80235, Ph: 800-926-7337, Fax: 303-795-1989, AWWA C500, Gate Valves for Water and Sewerage Systems (DoD adopted); AWWA C502, Dry-Barrel Fire Hydrants; and AWWA C503, Wet-Barrel Fire Hydrants:
<http://www.awwa.org/>

2.e.(13) Associated Air Balance Council (AABC). AABC MN-1, National Standards for Total System Balance, is available from AABC, 1518 K St., NW, Washington, DC 20005, Ph: 202-737-0202, Fax: 202-638-4833: <http://www.aabchq.com/>

2.e.(14) American Association of Textile Chemists and Colorists (AATCC). AATCC 134, Electrostatic Propensity of Carpets, is available from AATCC, P.O. Box 12215, Research Triangle Park, NC 27709, (919) 549-8141.: <http://www.aatcc.org/>

2.e.(15) Builders Hardware Manufacturers Association, Inc. (BHMA). Specifications shown in Table 2-6 are available from the Builders Hardware Manufacturers Association, Inc. (BHMA), 355 Lexington Ave., New York, NY 10017, Ph: 212-661-4261, FAX: 212-370-9047.

TABLE 2-6 - BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA) SPECIFICATIONS

No.	Description (Specs. are DoD Adopted)
BHMA/ANSI A156.1	Butts and Hinges
BHMA/ANSI A156.4	Door Controls, Closers
BHMA/ANSI A156.5	Auxiliary Locks and Associated Products
BHMA/ANSI A156.2	Bored and Preassembled Locks and Latches

ACCOMPANYING AMENDMENT NO. 0007 TO SOLICITATION NO. DACA63-01-R-0002**TABLE 2-6 - BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA) SPECIFICATIONS**

No.	Description (Specs. are DoD Adopted)
BHMA/ANSI A156.12	Interconnected Locks and Latches

2.e.(16) Building Officials & Code Administrators International, Inc. (BOCA). The BOCA National Building Code is available from Building Officials & Code Administrators International, Inc., (BOCA), 4051 W. Flossmoor Rd., Country Club Hills, IL 60478-5795, Ph: 708-799-2300, Fax: 708-799-4981: <http://www.boca.org/>

2.e.(17) Carpet and Rug Institute (CRI). CRI Standard for Installation of Commercial Textile Floor Covering Materials, CRI 104, is available from the Carpet and Rug Institute, 310 Holiday Ave. P.O. Box 2048, Dalton, GA 30722-2048, Ph: 706-278-0232: <http://www.carpet-rug.com/>

2.e.(18) Council of American Building Officials (CABO). The CABO One (1) and Two (2) Family Dwelling Code and Model Energy Code, are available from the COUNCIL OF AMERICAN BUILDING OFFICIALS (CABO) 5203 Leesburg Pike, Suite 708, Falls Church, VA 22041, Fax: 703-379-1546: <http://www.intlcode.org/>

2.e.(19) Electronic Industries Association Telecommunications Industry Association (EIA/TIA). EIA/TIA Standard EIA/TIA-570, is available from Electronic Industries Association, Engineering Department, Order From: Global Engineering Documents, 7730 Carondelet Ave., Suite 407 Clayton, MO 63105, Ph: 800-854-7179, or 714-979-8135, Fax: 314-726-6418

2.e.(20) Illuminating Engineering Society of North America (IESNA). The IESNA Lighting Handbook, is available from Illuminating Engineering Society of North America, (IESNA), 120 Wall St., 17th Floor, New York, NY 10005-4001, Ph: 212-248-5000, Fax: 212-248-5017: <http://www.iesna.org/>

2.e.(21) International Conference of Building Officials (ICBO). The Uniform Building Code is available from the, INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS (ICBO), 5360 S. Workman Mill Rd., Whittier, CA 90601-2258, Ph: 310-699-0541, Fax: 310-692-3853: <http://www.icbo.org/>

2.e.(22) National Association of Architectural Metal Manufacturers Association (NAAMA). NAAMA Metal Finishes Manual, is available from the NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM), 11 So. LaSalle St., Suite 1400, Chicago, IL 60603, Ph: 312-201-0101, FAX: 312-201-0214:

2.e.(23) National Association of Corrosion Engineers (NACE). NACE RP-0286, The Electrical Isolation of Cathodically Protected Pipelines, is available from NACE, P.O. Box 218340, Houston, TX 77218: <http://www.nace.org/>

2.e.(24) National Association of Plumbing-Heating-Cooling Contractors (NAPHCC). The National Standard Plumbing Code is available from National Association of Plumbing-Heating-Cooling Contractors (NAPHCC), 180 S. Washington Street, P.O. Box 6808, Falls Church, VA 22046, Ph: 800-533-7694, Fax: 703-237-7442: <http://www.naphcc.org/>

2.e.(25) National Electrical Manufacturers Association (NEMA). NEMA standards listed below are available from the National Electrical Manufacturers Association (NEMA), NATIONAL

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ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA), 2101 L St., NW, Suite 300, Washington, DC 20037-1526
 Ph: 202-457-8474 Fax: 202-457-8473 NEMA DC 3, Wall-Mounted Room Thermostats; and NEMA WD 1, General Requirements for Wiring Devices: <http://www.nema.org/>

2.e.(26) NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB), NEBB-01, Procedural Standards for Testing-Adjusting-Balancing of Environmental Systems, is available from NEBB, 875 Grove Mount circle, Gaithersburg, MD 20877-4121, Ph: 301-977-3698, Fax: 301-977-9589: <http://www.nebb.org/>

2.e.(27) National Fenestration Rating Council (NFRC). NFRC 100-91, Procedure for Determining Fenestration Product Thermal Properties, is available from NFRC, 1300 Spring Street, Suite 500, Silver Spring, MD. Telephone: (301) 589-NFRC, <http://www.nfrc.org>

2.e.(28) National Fire Protection Association, Inc. (NFPA). NFPA codes listed in Table 2-7 are available from the National Fire Protection Association, Inc. (NFPA), 1 Battery March Park, P.O. Box 9101, Quincy, MA 02269. Telephone: (617) 770-3000, Fax: (617) 770-0700: <http://www.nfpa.org/>

TABLE 2-7 - NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) CODES

Code No.	Code Description
NFPA 13	Installation of Sprinkler Systems
NFPA 13R	Installation of Sprinkler Systems in Residential Occupancies Up To and Including Four Stories
NFPA 30	Flammable Liquids Code
NFPA 31	Installation of Oil Burning Equipment
NFPA 54	National Fuel Gas Code
NFPA 58	LP-Gas Storage
NFPA 70	National Electrical Code (DoD Adopted)
NFPA 72	National Fire Alarm Code
NFPA 101	Life Safety Code
NFPA 101M	Alternative Approaches to Life Safety
NFPA 255	Method of Test of Surface Burning Characteristics of Building Materials
NFPA 501A	Manufactured Home Installations
NFPA 501D	Recreational Vehicle Parks and Campgrounds
NFPA 701	Standard Methods of Fire Tests for Flame Resistant Textiles and Films

2.e.(29) National Sanitation Foundation, 3475 Plymouth Road, Ann Arbor, MI 48105. Telephone: (313) 769-8010, Fax: (313) 769-8010: <http://www.nsf.org/>.

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2.e.(30) National Wood Window and Door Association (NWWDA) standard, NWWDA I.S.2, Standard for Wood Window Units is available from the National Wood Window and Door Association (NWWDA), 1400 East Touhy Ave., Suite 470, Des Plaines, IL 60018, (847) 299-5200, Fax: (847) 299-1286: <http://www.nwwda.org/>.

2.e.(31) Sheet Metal and Air Conditioning Contractors National Association (SMACNA). SMACNA Installation Standards for Residential Heating and Air Conditioning Systems and SMACNA-07, HVAC Systems, Testing, Adjusting, and Balancing, are available from SMACNA, 4201 Lafayette Center Drive, Chantilly, VA 22180, (703) 803-2980, Fax: (703) 803-3732: <http://www.smacna.org/>

2.e.(32) Southern Building Code Congress International, Inc. The Standard Housing Code is available from Southern Building Code Congress International, Inc., 900 Montclair Road, Birmingham, AL 35213-1206. Telephone: (205) 5921-1853, Fax: (205) 591-9775: <http://www.sbcci.org/>.

2.e.(33) Underwriters Laboratories, Inc. (UL) specifications listed in Table 2-8 are available from the Underwriters Laboratories, Inc. (UL), 333 Pfingston Road, Northbrook, IL 62096. Telephone: (847) 272-8800. Fax: (847) 509-6220: <http://www.ui.com/>.

TABLE 2-8 – UNDERWRITERS LABORATORIES SPECIFICATIONS

No.	Description (Specs. Are DoD Adopted)
UL 58	Steel Underground Tanks for Flammable and Combustible Liquids
UL 174	Water Heaters, Household Electric Storage Tank Type
UL 430	Waste Disposers
UL 507	Electric Fans
UL 555	Fire Dampers
UL 567	Pipe Connectors for Flammable and Combustible Liquids and LP Gas
UL 732	Oil-Fired Storage Tank Water Heaters
UL 746C	Polymeric Materials - Use in Electrical Equipment Evaluations
UL 749	Household Dishwashers
UL 858	Household Electric Ranges
UL 923	Microwave Cooking Appliances
UL 900	Test Performance of Air Filter Units
UL 1316	Glass Fiber – Reinforced Plastic Underground Storage Tanks for Petroleum Products
UL 1746	Standard for Safety External Corrosion Protection Systems for Steel Underground Storage Tanks

ACCOMPANYING AMENDMENT NO. 0007 TO SOLICITATION NO. DACA63-01-R-0002**3. SITE PLANNING AND DESIGN.**

3.a. Scope. This project consists of **64 housing units for Phase I and 76 housing units for Phase 2** on **20.3 hectares (50 acres)** of land area. Imaginative site design is encouraged, however, the site boundaries, project composition, and gross density are fixed. Based on the graphic and narrative description of site opportunities and constraints provided, the offeror shall verify that the site meets the program requirements.

3.b. **AM #5 (DELETED)**

3.c. Area Development Plan. Provide a housing area development plan that shows the spatial and functional arrangement of all housing requirements. The plan should ensure an economical, compatible and functional residential land use development that utilizes the advantages of the site, fosters visual order, and provides a sense of community. The area development plan shows consideration for the site opportunities and constraints, housing program requirements, and specific site design criteria and guidance provided. The recommendations of the Installation Real Property Master Plan and Installation Design Guide should be addressed. **The contractor is responsible for providing a proposed overall site layout for 400 units total; 200 units located on each side of Luke Street. The overall plan shall adhere to the design and technical criteria contained in this RFP.**

3.c.(1) Density. The project site is approved for **LOW DENSITY** siting. Land area for density calculations excludes slopes greater than 10 percent, major highways, flood plains and flood areas, lakes and water courses. Designated major recreation areas greater than 1.2 ha [3 acres] may be excluded from the density calculation.

3.c.(2) Land use. The plan for the area should reflect an optimum balance of housing unit floor area, open space, play lots, neighborhood parks, and pedestrian and vehicular circulation. The plan should show an efficient, organized and economical land use arrangement that is compatible and functional. This plan should show the relationship of the area to adjacent land uses.

3.c.(3) Noise. Use mitigation techniques to moderate predictable noise in accordance with the Installation Compatible Use Zone Program, **see Attachment 14**. All possible methods of mitigating the impact to the site and adjacent areas should be explored.

3.c.(4) Buffer area. Provide appropriate buffer areas to separate and visually isolate the community from undesirable external influences and to separate adjacent officer and enlisted personnel housing areas from each other. The width of a street should be a minimum acceptable buffer zone between officer and enlisted personnel housing areas. **(AM #5) Minimum buffer zones of 30.5m (100-feet) from Sgt. Major Boulevard, 7.62m (25-feet) from Luke St., 9.14m (30-feet) from the western rockwall and 10.68m (35-feet) from the southern rockwall shall be provided. Overhead electrical lines are to be located in the buffer zones and not in the residential backyards. Buffer areas may be used** for recreational facilities such as ball fields, bike and jogging paths, tot lots and trees. All possible methods of mitigating the impact to the site and adjacent areas should be explored.

3.c.(5) Housing unit grouping. Variety in groupings, arrangements, and siting configurations of housing units is encouraged to fit varying terrain conditions and to provide compatible and functional residential layouts and street scapes. Building arrangements should be informal and imaginative with setbacks and orientation to provide for the best view, privacy, and variety. The proper grouping of housing units will provide backyard screening, separation of pedestrian and vehicular traffic, play lots, neighborhood parks, and natural open spaces. **Back yards should be placed back-to-back or side-to-side; eliminating large open spaces between the houses. (AM #5) However, playground areas and a neighborhood park can utilize open spaces**

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between the houses. The layout should reflect simplicity of design and provide a visual sense of community.

3.c.(6) Housing unit variation. Housing unit variation shall afford distinctly different exterior appearances within each housing unit type. Provide stylistic compatibility that will give the neighborhood a sense of order. Housing units shall vary in two or more of the following: Floor plans, massing, elevation, garage location, and exterior materials. One floor plan for each housing unit type is acceptable if sufficient variety is achieved by means of other variations mentioned above. In addition, housing units shall vary in color and siting. A reverse floor plan (mirror-image), although an acceptable means of creating variety, shall not constitute a housing unit change. Offerors shall comply with land-use restraints set forth in this document. The preferred colors are earth tones available in commonly used durable materials. The design should reflect life cycle maintenance and energy efficiency.

3.c.(7) Housing unit orientation. Housing units shall be oriented, to the maximum extent possible within the constraints of the site available, so that the long axis of the building is within 20 degrees east or west of true South, so that a major section of the roof faces within 20 degrees of South. The purpose of proper orientation is to expose a minimum surface area to direct solar gain while allowing the units the potential for passive solar applications. Additional consideration will be given during the quality evaluations with respect to unit orientations and passive solar applications considered and included. For additional passive solar information and considerations, see chapter 11 of this Statement of Work.

3.c.(8) Grading. The grading should maintain existing topography while recognizing standard gradients for the housing units and various functions. There should be a balance of the quantity of cut and fill which would create a smooth transition of graded areas into the existing natural site. The plan should reflect selective site clearing that preserves groups of trees. Grading should manage site runoff. The principles of positive drainage should be applied to control the conditions that remove rainfall away from facilities and functions.

3.c.(8).(a) Turfed Areas. In any turfed area the minimum slope shall be 2%. In housing unit backyards, the maximum slope shall be 3%. In other areas the finished grade should slope away from buildings at 5% for at least 3 meters. In areas outside of housing unit yards, turfed slopes may vary between 2% and a maximum of 25%, however the maximum slope should be avoided if possible. Should slopes in excess of 25% be required, slope protection such as slope paving shall be employed, or retaining walls shall be used to effect grade changes.

3.c.(8).(b) Roads, Streets, Access Drives, and Parking Areas. Longitudinal grade changes in excess of 1% shall be accomplished by vertical curves. Profiles are mandatory for vertical control of centerline gradients.

3.c.(8).(c) Parking Areas. Pavement grades shall provide positive drainage with a 1% minimum slope in the direction of drainage. The maximum slope in the direction of parking shall be 1-1/2%. The slope perpendicular to the direction of parking shall be 5% maximum for bituminous or concrete surfaces, and 3% for other surfaces

3.c.(8).(d) Sidewalks. Sidewalks with a slope gradient equal to or less than 3% are preferred. Sidewalk transverse cross-slope shall be 2% minimum with a maximum no greater than 5%. Any walkway with a slope greater than 4.2% shall be designated as a ramp. Sustained walkway grades greater than 3.3% shall have a level landing at least 1.83m x 1.83m (6 x 6ft.) at 18.3m (60 ft.) intervals for rest and safety. Walks and ramps serving facilities that are to be accessible to and usable by the physically handicapped shall meet the requirements of the Uniform Federal Accessibility Standards.

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3.d. Site Design Criteria. The following specific criteria, based on site density, are to be used as guidance in site design, and proposals will be scored accordingly.

3.d.(1) Housing units per hectare (ha) [acre (ac)] by site density are shown in Table 3-1 on the following page.

TABLE 3-1 - HOUSING UNITS PER HECTARE [ACRE]

Pay Grade	Low Density	
	units/ha	units/ac
E-7 - E-9	7.4-12.4	3-5

3.d.(2) Parking requirements by site density.

3.d.(2).(a) Low density: Two off-street stalls and one guest on-street stall per unit.

3.d.(2).(b) Recreational vehicle (RV) storage: Not required.

3.d.(3) Children's outdoor play areas. Children's outdoor play areas are a requirement per number of housing units. See paragraph 3.g. for size and equipment specifications.

3.d.(4).(a) Play lot: One 325 m² [3,500 ft²] play lot per 30 housing units. The play lot shall be designed to accommodate two age groups; 6 weeks to 5 years age group and 5 to 9 years age group. The play lot shall have a capacity for approximately 15 to 35 children. These play lots should be located within **sight** lines of the housing units.

3.d.(4).(b) Neighborhood park: One 700 m² [7,500 ft²] neighborhood park **in the Aero-Vista Housing Area**. The neighborhood park shall be designed to accommodate two age groups; 5 to 9 years age group and 9 to 15 years age group. The neighborhood park shall have a capacity for approximately 30 to 50 children. **(AM #5) In addition, provide one asphalt basketball court and one sand volleyball court, regulation size each.**

3.e. Building Setbacks and Spacing. Clearances between and adjacent to buildings must consider requirements for fire protection, safety, privacy, and emergency access in addition to the following minimum criteria. Setback or yard dimensions shall be from the building wall to an imaginary lot line around each building measured perpendicular to the building. Wall lengths with horizontal offsets of 1.8 m [6 ft] or more may be measured separately when determining yard depth. Distance between buildings shall be not less than the sum of setbacks or yards, as required.

3.e.(1).(a) Minimum setbacks and spacing for low density sites is shown in Table 3-4.

TABLE 3-4 - MINIMUM SETBACKS AND SPACING, LOW DENSITY SITES

Description	Meters	[Feet]
From front of house to curb of residential street.	7.5	25
From house to major/arterial highway. (Edge of pavement)	45.0	150

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TABLE 3-4 - MINIMUM SETBACKS AND SPACING, LOW DENSITY SITES

Description	Meters	[Feet]
From house to collector street. (Edge of pavement)	30.0	100
Side of carport or garage to curb.	6.0	20
Side of house to curb ¹ .	6.0	20
Between sides of carports or garages and houses ¹ .	1.5	5
Between outside walls of houses ¹ .	6.0	20
Between rear walls of houses.	24.0	80
Between side and rear walls of houses.	12.0	40
Between street face of carport or garage and curb or sidewalk when second off- street parking space is next to garage or carport.	2.4	8
Between street face of carport or garage and curb or sidewalk when second off- street parking space is between carport or garage and street.	8.5	28

Note¹: When patios are located within a yard, separation shall not be less than 12.0 m [40 ft].

3.e.(1).(b) Housing Unit Backyards. Each unit shall be provided with a backyard of **349 square meters [3750 square feet]**. (AM #5) Backyards shall be sited at least **30.5m (100-feet) minimum** from **Sgt. Major Boulevard, 7.62m (25-feet) from Luke St., 9.14m (30-feet) from the western rockwall and 10.68m (35-feet) from the southern rockwall**. Use these buffer areas for recreational facilities such as ball fields, bike and jogging paths, tot lots and trees.

3.e.(2) Setback Notes.

3.e.(2).(a) Where the slope is **6.7:1** or steeper, top and toe of slope shall be a minimum of 4.5 m [15 ft] from the building.

3.e.(2).(b) Courts, outer and inner, shall have dimensions not less than the sum of the required yard distances. An inner court shall have a minimum area of 9.29 m² [100 ft²] for a one-story building.

3.f. Circulation, Parking, and Bus Stops. The vehicular and pedestrian circulation system shall promote safe, efficient movement of vehicles and pedestrians within the housing area. It should maintain the maximum separation of vehicles and pedestrians. Safe circulation systems have a clear hierarchy of movement, lead to a clear destination, and do not interrupt other functions. The following criteria shall be considered for designing streets and drives for vehicles and pedestrians:

3.f.(1) Vehicular circulation. Vehicular circulation layout is determined by applying the design vehicle templates to the site design. The passenger car class includes passenger cars and light

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delivery trucks, such as vans and pick-ups. The passenger car template is equivalent to the non-organizational - privately owned vehicle (POV). The truck class template includes single-unit trucks, recreation vehicles, buses, truck tractor-semitrailer combinations, and trucks or truck tractors with semi-trailers in combination with full trailers. Templates showing the turning movements for design vehicles are provided by the American Association of State Highway and Transportation Officials (AASHTO). Design site entrances, exits, service drives, and special circulation areas to accommodate the largest vehicle that uses the area. In the case of family housing the largest vehicle to use the area on a weekly basis would be the 12 m (40 ft) garbage truck. Provide the vehicle clearances that are required to meet traffic safety for emergency vehicles, service vehicles, and moving vans. Streets shall include required traffic control and street identification signage, maximum spacing between drives, right-angle turns, and limit points of conflicts between traffic.

3.f.(1).(a) Definitions.

3.f.(1).(a).1/ Nonresidential Streets

3.f.(1).(a).1/.a/. Arterial. Major roads and street systems external to the residential area.

3.f.(1).(a).1/.b/. Collector. Feeder street connecting external street system with residential streets in the subdivision and adjoining areas subject to future development. No houses shall be located on collector streets, and no driveway or access shall be from collector streets

3.f.(1).(a).2/ Residential Streets

3.f.(1).(a).2/.a/. Loop. Both ends open to traffic.

3.f.(1).(a).2/.b/. Cul-De-Sac. Only one end open to access street and a turnaround (T, Y, or Circle) at the other end.

3.f.(1).(b) Cul-De-Sac Design. The circulation system may be based on cul-de-sacs a maximum 182.8 m [600 ft] long, measured from the center of the cul-de-sac to the centerline of the access street.

3.f.(1).(c) Intersection Design. Provide "T" intersection offsets of at least 38.1 m [125 ft]. The preferred angle of intersection is right-angle (90 degrees).

3.f.(2).(a) Minimum street dimensions. Streets shall have the minimum dimensions shown in Table 3-5 measured face to face of curb:

TABLE 3-5 MINIMUM STREET DIMENSIONS
(PARKING BOTH SIDES OF STREET)

TYPE OF STREET	M	Ft
Width, Collector Road	12.0	40
Width, Residential Streets	11.0	36
Curb Radius at Intersections	6.0	20

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Minimum Cul-de-sac Radius.	Note ¹	Note ¹
Minimum "T" Turn-around Size	18.3 X 4.5	60 X 15

Note ¹: If a center planting circle is provided in a cul-de-sac, the maximum diameter of the planting circle shall be 8 m [26 ft].

3.f.(2).(b) Street design. Separation, corner clearances, and sight distance are established when the design vehicle templates and speed limits are selected. Streets shall be designed for vehicles with not less than 2721.5 kg [6,000 lb] code wheel load. **Pavement shall be asphaltic concrete. A design for new pavement is furnished in Attachment 11.** Streets shall be provided with **standard barrier type reinforced (with #10M bars)** concrete curbs and gutters. Curbs shall be depressed at entrances to driveways. All gradients shall provide positive drainage with no ponding. **Longitudinal street grades shall vary between 0.3% minimum and 6.0% maximum. Vertical curves shall be provided where longitudinal grade changes equal 1% or more.**

3.f.(3) Housing unit access drive. Access drives should provide traffic safety distances that allow safe entry and exit. Access drives serving more than 8 housing units, or subject to service and emergency truck traffic shall be designed as a street.

3.f.(4) Privately owned vehicle (POV) parking. POV stalls without vehicle overhang shall be a maximum 2.7 m x 5.5 m [9 ft x 18 ft]. The design vehicle template that is used to design this space shall be described. Design on-street parking stalls to be of sufficient length and width to allow safe movement into and out of the stall and to adequately separate the parked vehicle from the traffic flow. **On-street parking will not be allowed along Luke Street.** Provide compact passenger car dimensions only when recommended by a Site Traffic Impact Study.

3.f.(4).(a). Housing unit POV parking. POV parking areas consisting of more than 4 vehicles backing into the street are unacceptable.

3.f.(4).(b). Off-street parking lots. A 90-degree parking layout is preferable. Maintain two-way movement and avoid dead-end parking lots. Provide more than one entrance and exit drive. In large parking lots provide a minimum 10 percent of the total paved area for landscape plant material.

3.f.(5). Bus stops. **One bus stop shall be provided at the northeastern corner of the housing area at the intersection of Luke St. and Sgt. Major Boulevard. (AM #5) A windbreak shall be provided.** Bus stop shall be in compliance with the Installation Design Guide and located with a turnout from the collector street. The design vehicle that is used to design this space shall be **a city bus. See the bus stop detail in Attachment 6.**

3.f.(6). Pedestrian circulation. Pedestrian circulation should be safe, separated from vehicle circulation, and relate to the housing units, parking, and community facilities. Pedestrian circulation should be based on pedestrian desired lines of walking between facilities. Desired lines should be weighted to predict the most traveled routes. These routes would require paving. Topography and vegetation can be used to reinforce a sense of movement. Design pedestrian concentration areas with adequate paved area.

3.f.(7). Sidewalk design. Sidewalks shall be provided on both sides of the street. Walks shall be a minimum of **1.5 m [5 ft]** wide exclusive of curb width, and made of **reinforced (with (AM#7)150 mm x 150 mm – W3 x W3 welded wire fabric) (AM#7)** concrete with a minimum

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thickness of 100 mm [4 in]. **Concrete reinforcement and construction shall also apply to porches, patios, stoops, and walks at unit entries. Sidewalks shall be adjacent to the curb, and the curb width is not to be included as sidewalk. Ramps for handicapped individuals shall be provided at intersections by depressing street curbs and adjacent sidewalk.**

3.f.(8) Bicycle/Jogging Paths. A bicycle/jogging path with exercise stations shall be provided at each new housing area site. Paths shall be a minimum of 2400mm [8-feet] wide with an asphaltic surface, and shall encircle the new houses and access the recreation areas as a minimum.

3.f.(9) Mail Boxes. (AM #5) Mail box clusters containing a minimum of 24 units shall be provided. Their locations shall not be within the circulation path of the sidewalks, and shall be coordinated with and approved by the local post office.

3.f.(10) Trash Receptacle Area. A rock wall screened trash area with concrete pad and gate, located near the backyard gate, shall be provided to accommodate two 114 liters (30-gallon) trash containers at each dwelling unit. A 900mm (3-foot) wide sidewalk shall be provided from the front sidewalk area to the backyard gate and trash area. The rock wall shall match the backyard rock fence.

3.f.(11) Signs. Locate all proposed signs on a site plan of the Aero-Vista Housing Area in accordance with distance and placement guidelines. The signing system should provide consistency and continuity to the overall visual image of the installation. The signs should be coordinated with the design of other site furnishings to minimize the number of streetscape elements and reduce clutter.

3.f.(11)(a) Traffic signs shall be in accordance with the latest edition of the Manual on Uniform Traffic Control Devices for Streets and Highways, U.S. Department of Transportation, Federal Highways Administration.

3.f.(11)(b) An entrance sign to the housing development shall be provided within the median at the entrance of Luke Street. The entrance sign shall be compatible in scale and character with the surrounding architecture and natural setting.

3.g. Children's Outdoor Play Areas. The design of the children's outdoor play areas shall comply with the safety requirements of ASTM F 1487 and ASTM F 1292. The playground equipment shall be equivalent in specifications and color to the equipment used at the Hayes Housing Area. The children's outdoor play areas are unsupervised play areas and do not have a supervised play program for child development. These areas are not part of trained recreation, youth center or child development staff support. Supervised outdoor play areas occur at youth centers and child development centers.

3.g.(1). Child Safety and Accessibility.

3.g.(1).(a). Accessibility to children and adults with disabilities. Play areas shall be accessible to children and adults with disabilities. In addition to wheelchair users, the needs of children and adults who walk with canes, walkers, or crutches; who have limited use of the upper body; who have visual or hearing disabilities, or who have developmental disabilities shall be considered. Design criteria based on child dimensions should be used for the proper functioning of the play area. Every part of a play area may not be accessible to all its users, but the social experience provided should be accessible to everyone. When more than one play activity of the same type is provided, one shall be accessible. When one activity is provided, it shall be accessible. A diverse play area has the greatest potential for meeting the needs of all users. Separate play areas for the physically challenged are not acceptable. Integrating all children in the same play setting will be emphasized. Guidelines available from this design district for accessible routes,

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ramps for wheelchair access, transfer points, wheelchair accessible platforms, and accessible stepped platforms should be followed.

3.g.(1).(b). Age appropriate scale. Age appropriate scale is a term used to describe equipment which will allow safe and successful use by children of a specific chronological age, mental age, and physical ability. Play equipment height and complexity will not exceed the user's ability. The children's outdoor play areas will meet age appropriate scale for the age groups that the areas are designed to accommodate.

3.g.(1).(c). Use zones. In accordance with ASTM F 1487, a use zone is a clear, unobstructed area under and around play equipment where a child would be expected to land when jumping or falling from a piece of play equipment. These zones require a playground safety surface in accordance with ASTM F 1292. Requirements for use zones vary for the age group and for different pieces of equipment. All use zones for play equipment should be shown on the site plan to ensure there is no conflict between play activities on the ground and swinging or jumping from the equipment. Use zones will not overlap except for spring rocking equipment, balance beams, and play houses.

3.g.(1).(d). Playground safety surface. A playground safety surface is constructed of a material that meets the shock absorbency criteria recommended in ASTM F 1292. Playground safety surfaces shall be provided throughout all use zones and under all play equipment as required.

3.g.(1).(e). Inappropriate play events. The following play events are not appropriate for use in unsupervised play areas; Chain walks, chain or tire climbers, fulcrum seesaws, log roles, May poles, merry-go-rounds, rotating equipment, spring rocking equipment intended for standing, swinging exercise bars, trapeze bars, and whirls.

3.g.(2). Play lot. Provide play lots that are located within the site lines of the housing units to be supported. Connect play lots to the units by a walkway system. Provide shade. Each play lot shall be provided with the following age appropriate play events and equipment for the two age groups to be accommodated:

3.g.(2).(a). Pathway. The pathway should encompass the perimeter of the area, accommodate wheeled toys, and consist of different textures, colors, and patterns for games.

3.g.(2).(b). Gathering place. This setting provides an open space for groups of different sizes and people of all ages. Provide an infant crawl area. The seating materials may include boulders, timbers or logs arranged with vegetation to create a room like atmosphere. A shelter may be provided.

3.g.(2).(c). Sand play setting. This setting supports creative play and social interaction. It provides children with a manipulative play environment. The play elements include sand, sand tables, containment barriers and boulders. The sieve size for sand should consist of a fine washed plaster sand. The sand used here is not the same sieve size as the sand used for the use zones. This setting should be located adjacent to the play village.

3.g.(2).(d). Play village. This setting supports a playhouse and a water source. It should be located adjacent to the sand play setting.

3.g.(2).(e). Dramatic play setting. This setting supports dramatic play elements such as playhouses, play platforms, and an open area for seating on the ground.

3.g.(2).(f). Manufactured play equipment setting. This setting includes an age appropriate composite structure consisting of multiple play events for each of the following age groups; 12 months to 2 years of age, 2 to 5 years of age, and 5 to 9 years of age. Other play events include

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free standing equipment such as spring rocking equipment, swing, and balance beam. The swing should be located as a free standing play event on the perimeter.

3.g.(3). Neighborhood park. **(AM #5)** Provide **a neighborhood park that is located within open space of the housing area.** Connect **the** neighborhood park to the housing units by a walkway system. Provide shade. **The** neighborhood park shall be provided with the following age appropriate play events and equipment for the two age groups to be accommodated:

3.g.(3).(a). Pathway. The pathway should encompass the perimeter of the area, accommodate wheeled toys, and consist of different textures, colors, and patterns for games.

3.g.(3).(b). Gathering place. This setting provides an open space for groups of different sizes and people of all ages. The seating materials may include boulders, timbers or logs arranged to create a room like atmosphere. Additional points will be given for providing a picnic shelter.

3.g.(3).(c). Manufactured play equipment setting. This setting includes an age appropriate composite structure consisting of multiple play events for children 5 to 15 years of age. Other play events include free standing equipment such as spring rocking equipment, swing, track ride, and balance beam. The swing should be located as a free standing play event on the perimeter.

3.g.(3).(d). Sports and games setting. This setting includes a turf area as the central element of the park. The turf area should accommodate various sports activities. Locate **one asphalt basketball court and one sand volleyball court on the perimeter.** Other design elements include surfacing, fences, drinking fountains, storage, lighting, seating, and trash receptacles.

3.g.(4). Plant materials. Plants and ground cover should be integrated into play settings. Plants provide a variety of learning opportunities, as they become a source for play material for crafts, dramatic play, and sensory experience. Plants define space and provide shade. Poisonous plants and plants with thorns are not allowed and should be removed from the play areas.

3.h. Landscape Planting Plan. The offeror shall obtain and use the services of a **registered** landscape architect, experienced in **community** site planning and planting design. A complete, integrated landscape planting plan shall be provided for the **entire area encompassed by the project limits.** The design shall reflect appropriate groupings, foundation plantings, and street tree plantings to define the open spaces to ensure a complete landscaped project. **A row of trees shall be provided along the inside of the south perimeter rock wall, the inside of the north wrought iron fence and along both sides of Luke St. to create a visual buffer between the housing area and the adjacent areas. Mondel Pine trees are preferred by the installation for the row of trees along the fences and Luke St. Along the north wrought iron fence, a (AM #6) 6.1m (20-ft.) wide strip of landscape rock will be provided between the back of curb of Sgt. Major Boulevard and the wrought iron fence. The landscape rock for the 6.1m strip north of the wrought iron fence shall meet the requirements of paragraph 3.j. and will not require any plants within this area.** Proposed park areas shall be located in zones where larger, existing trees are established. The plan shall describe all plant material, earth shaping and decorative and perimeter fencing. The landscaping plan shall include a north arrow, graphic scale, legend, existing and proposed buildings, paved areas and walks, plant locations, plant staking details, landscaping plant list, and areas to receive irrigation systems. Choose plant materials on the basis of plant hardiness, climate, soil conditions, low maintenance, and quality **(Reference the Approved Plant List included in this section).** Selected plant materials shall be easily maintained and tolerant of the specific site conditions. Planting or seeding shall occur only during periods when beneficial results can be obtained.

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3.h.(1). Trees, shrubs, and ground cover. Plant varieties shall be nursery grown or plantation grown stock conforming to ANSI/ANLA Z60.1. They shall be grown under climatic conditions similar to those in the locality of the project.

3.h.(1).(a). Quality. Well shaped, well grown, vigorous, healthy plants having healthy and well branched root systems shall be provided. Plants shall be free from disease, harmful insects and insect eggs, sun-scald injury, disfigurement, and abrasion. Plants shall be provided that are typical of the species or variety, and conforming to standards as set forth in ANSI/ANLA Z60.1.

3.h.(1).(a).1/. Shade and flowering trees. A height relationship to caliper shall be provided as recommended by ANSI/ANLA Z60.1. Height of branching should bear a relationship to the size and variety of tree specified, and with the crown in good balance with the trunk. Trees shall not be "poled" or the leader removed.

3.h.(1).(a).1./a/. Single stem. Trunk shall be reasonably straight and symmetrical with crown and have a persistent main leader.

3.h.(1).(a).1./b/. Multi-stem. All countable stems, in aggregate, shall average the size specified. To be considered a stem, there should be no division of the trunk which branches more than 150 mm [6 in] from the ground level.

3.h.(1).(a).1./c/. Specimen. A plant shall be provided that is well branched and pruned naturally according to the species. The form of growth desired, which may not be in accordance with natural growth habit, shall be as indicated.

3.h.(1).(a).2/. Deciduous shrub. Plants shall be provided that have the height and number of primary stems as recommended by ANSI/ANLA Z60.1. An acceptable plant shall be well shaped with sufficient well-spaced side branches recognized by the trade as typical for the variety grown in the region.

3.h.(1).(a).3/. Coniferous evergreen. Trees shall be provided that have the height-to-spread ratio as recommended by ANSI/ANLA Z60.1. Trees shall not be "poled" or the leader removed. An acceptable plant shall be exceptionally heavy, well shaped and trimmed to form a symmetrical and tightly knit plant. The form of growth desired shall be as indicated.

3.h.(1).(a).4/. Broadleaf evergreen. Plants shall be provided that have ratio of height-to-spread as recommended by ANSI/ANLA Z60.1. An acceptable plant shall be well shaped and recognized by the trade as typical for the variety grown in the region.

3.h.(1).(a).5/ Ground cover. Plants shall be provided with the minimum number of runners and length of runner as recommended by ANSI/ANLA Z60.1. Plants shall be furnished that have heavy, well developed, and balanced top with vigorous well developed root system, and shall be furnished in containers.

3.h.(1).(a).6/ Minimal Acceptable Landscaping per Unit. Two large trees (50 mm minimum caliper), 4 small trees (25 mm minimum caliper), 10 shrubs (910 mm- 1520 mm) and 10 shrubs (1830 mm- 2740 mm) per unit. Small trees and medium sized shrubs shall not be planted in front of windows for security reasons. Use 2 large shrubs and 4 trees per unit in "Common" areas, i.e., playgrounds, etc. Provide at least one tree in each backyard. A minimum of 4 trees per 930 square meters shall be planted in the immediate vicinity of each recreational area.

3.h.(1).(a).7/ Approved Plant List**Trees - 9,144 mm and over**

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Scientific name	Common name
Cupressus arizonica	Arizona Cypress
Fraxinus velutina 'Moraine'	Moraine Velvet Ash
Fraxinus velutina 'Modesto'	Modesto Velvet Ash
Washingtonia robusta	Mexican Washington Palm
Juniperus virginiana canaerti	Canaert Eastern Red Cedar
Pinus eldarica	Mondel Pine
Prospis glandulosa	Honey Mesquite

Small Trees - 3,048 - 7,620 mm

Scientific name	Common name
Prunus cerasifera pissardi	Purpleleaf Plum
Chilopsis linearis	Desert Willow
Juniperus scopulorum 'Blue Haven'	Blue Haven juniper
Lagerstroemia indica	Crape Myrtle
Malus hopa	Hopa Flowering Crabapple
Pinus cembroides edulis	Pinyon Pine
Sambucus mexicana	Mexican Elder
Vitex agnuscastus	Lilac Chaste Tree
Yucca elata	Soaptree Yucca

Medium Shrubs - 1,829 - 2,743 mm

Scientific name	Common name
Agave americana	Centuryplant Agave
Buddleia alternifolia	Fountain Butterfly Bush
Cortaderia selloana	Selloa Pampasgrass
Forsythia suspensa	Weeping Forsythia
Hibiscus syriacus	Shrub Althea
Lonicera maacki	Amur Honeysuckle
Punica granatum	Pomegranate

ACCOMPANYING AMENDMENT NO. 0007 TO SOLICITATION NO. DACA63-01-R-0002**Medium Shrubs - 1,829 - 2,743 mm**

<i>Syringa vulgaris</i>	Common Lilac
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Small Shrubs - 914 - 1,524 mm

Scientific name	Common name
<i>Abelia grandiflora</i>	Glossy Abelia
<i>Cotoneaster parneyi</i>	Red Clusterberry
<i>Dasyllirion texanum</i>	Texas Sotol
<i>Juniperus</i> Spp.	Common Juniper
<i>Juniperus chinensis pfitzeriana</i>	Pfitzer Juniper
<i>Larrea tridentata</i>	Coville Creosotebush
<i>Leucophyllum frutescens</i>	Texas Silverleaf
<i>Mahonia aquifolium</i>	Oregon Grape
<i>Pittosporum tobira</i>	Pittosporum
<i>Raphiolepis indica</i>	Indian Hawthorn
<i>Tonkaster horizontalis</i>	Rock Cotoneaster
<i>Yucca recurvifolia</i>	Curveleaf Yucca
<i>Lagerstroemia indica</i>	Crape Myrtle

Dwarf Shrubs - 305 - 915 mm

Scientific name	Common name
<i>Chrysactinia mexicana</i>	Damianita
<i>Hesperaloe parviflora</i>	Red Yucca

Vines and Ground Cover

Scientific name	Common name
<i>Baccharis pilularis</i>	Coyotebush
<i>Campsis radicans</i>	Trumpet Creeper
<i>Centaurea cieneraria</i>	Dusty Miller
<i>Lonicera japonica chinensis</i>	Purpleleaf Honeysuckle

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Vines and Ground Cover

Parthenocissus quinquefolia	Virginia Creeper
Santolina chamaecyparissus	Lavender cotton
Vinca major	Bid Leaf Periwinkle
Verbena rosemarinus	Verbena Rosemary
Hedra helix	Baltie English Ivy

Grass

Scientific name	Common name
Cynodon dactylon	Common Bermudagrass
Bouteloua Spp.	Gramagrass

Native Grasses

Native Grasses shall be a mixture of the following grasses in the amounts listed:

Common name	Kilograms per Hectare
Sand Dropseed	2.26 kg per hectare
Blue Grama	2.26 kg per hectare
Buffalo Grass	8.96 kg per hectare

Do not provide mulberry (*Morus spp.*), cottonwood (*Populus spp.*), or Jerusalem Thorn (*Parkinsonia spp.*) trees. Provide palm trees *Washingtonia robusta* (Mexican Washington Palm) 910 mm- 1520 mm tall, in a 15 gallon container or larger.

3.h.(1).(b). Measurement. Plant measurements shall be in accordance with ANSI/ANLA Z60.1.

3.h.(1).(c). Percolation test. Test for percolation shall be done to determine positive drainage of plant pits and beds. All soil and drainage conditions detrimental to the growth of plant material shall be identified and a proposal correcting the conditions shall be submitted.

3.h.(1).(d). Soil test. A soil test shall be performed for pH, chemical analysis, and mechanical analysis to establish the quantities and type of soil amendments required to meet local growing conditions for the type and variety of plant material specified.

3.h.(1).(e). Installation. Verify the location of underground utilities. When obstructions below ground or poor drainage affect the planting operation, proposed adjustments to plant location, type of plant, and planting method or drainage correction shall be submitted. The plant material shall be installed during appropriate planting times and conditions recommended by the trade for the type and variety of plant material specified. Plant pits shall be excavated and backfilled as

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recommended by the trade and ANSI/ANLA Z60.1. The planting operation shall be performed only during periods when beneficial results can be obtained. When special conditions warrant a variance to the planting operations, proposed planting times shall be submitted. **All trees shall be staked. Tree stakes and cross braces shall be constructed of 50 mm x 100 mm (2 in. X 4 in.) boards. Rubber chafing guards shall be used to protect tree trunks when metal guying material is used. All chafing guards shall be the same color.**

3.h.(1).(f). Pruning. The total amount of foliage shall be pruned by one-fourth to one-third on installed trees and shrubs to compensate for loss of roots and transplanting shock. The typical growth habit of individual plants shall be retained. Trees shall not be poled or the leader removed, nor shall the leader be pruned or "topped off."

3.h.(1).(g). Maintenance during planting operation. Installed plants shall be maintained in a healthy growing condition. Maintenance operations shall begin immediately after each plant is installed and shall continue until the plant establishment period commences.

3.h.(1).(h). Plant establishment period. On completion of the last day of the planting operation, the plant establishment period for maintaining installed plants in a healthy growing condition shall commence and shall be in effect for 12 months. When the planting operation extends over more than one season or there is a variance to the planting times, the plant establishment periods shall be established for the work completed.

3.h.(1).(i). Maintenance during establishment period. The maintenance of plants shall include straightening plants, tightening stakes and guying material, protecting plant areas from erosion, maintaining erosion material, supplementing **landscape rock**, accomplishing wound dressing, removing dead or broken tip growth by pruning, maintaining edging of beds, checking for girdling of plants and maintaining plant labels, watering, weeding, removing and replacing unhealthy plants.

3.h.(1).(j). Unhealthy plant. A plant shall be considered unhealthy or dead when the main leader has died back, or 25 percent of the crown is dead. Determine the cause for an unhealthy plant. Unhealthy or dead plants shall be removed immediately and shall be replaced as soon as seasonal conditions permit in accordance with the following warranty paragraph.

3.h.(1).(k). Warranty. Furnished plant material shall be guaranteed to be in a vigorous growing condition for a period of 12 months regardless of the contract time period. **All plants considered unhealthy or dead shall be replaced under this guarantee. Replacement plants shall be as specified for the original planting at no additional charge to the Government. Maintenance of the replacement plants after the conclusion of the maintenance period (12 months after installation has been completed) will be by the Government.** Transplanting existing plants requires no guarantee.

3.h.(1).(l). Dwelling Unit Yards. Front yards extending from street or curb to the back yard fence of the dwelling units shall have "native to the region" desert landscaping, including landscape rock (not rock blanket), trees and shrubs. Turf shall be established in each dwelling unit's back yard.

3.h.(1).(m). Topsoil. All ground areas to be seeded shall be covered with topsoil to a minimum depth of 100 mm using topsoil stripped at the project site. Topsoil shall be as defined in ASTM D 5268. When available, the topsoil shall be the existing surface soil stripped and stockpiled onsite. When additional topsoil is required beyond the available topsoil from the stripping operation, topsoil shall be delivered and amended as recommended by the soil test and for the seed specified. (AM #5) (DELETED) Topsoil shall be free from slag, cinders, stones, lumps of soil, sticks, root, trash or other material over

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1-1/2 inch diameter. Topsoil shall be free from viable plants and plant parts. Topsoil shall be leveled and brought to proposed grades.

3.h.(1).(n). Landscape Plant List. The Proposer shall submit a complete landscape plant list of all trees, shrubs, and ground covers that will be used in this project. The landscape plant list shall include botanical name, common name, height, caliper or spread, balled and burlapped or container, and ball and container size. Landscape planting shall be accomplished with trees, shrubs and ground covers taken from the Approved Plant List.

3.h.(2). Grasses. Bermuda grass sod shall be provided for dwelling unit backyards. Recreational areas and common areas shall be provided with hydromulch composed of water, fertilizer, common bermuda grass seed, and mulch mechanically placed. Non-irrigated field areas shall be disked, drilled, rolled, and hydroseeded. All areas disturbed by construction activities not otherwise required to be seeded shall be covered with topsoil, tilled, limed, fertilized, seeded with native grasses and maintained for 120 calendar days.

3.h.(2).(a). Seed quality. State approved seed of the latest season's crop shall be provided in the original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, and inert material. Labels shall be in conformance with applicable State seed laws. Seed mixtures shall be proportioned by weight. Weed seed shall not exceed one percent by weight of the total mixture. Common Bermudagrass shall be used for the recreation areas. Hydromulch application is acceptable for seeded areas.

3.h.(2).(b). Sod. State approved sod shall be provided as classified by applicable State laws. Each individual sod section shall be of a size to permit rolling and lifting without breaking. Sod shall be used for dwelling unit yard lawns.

3.h.(2).(b).1/. Quality. The sod shall be relatively free of thatch, diseases, nematodes, soil-borne insects, weeds or undesirable plants, stones larger than 50 mm [2 in] in any dimension, woody plant roots, and other material detrimental to a healthy stand of turf. Sod that has become dry, moldy, or yellow from heating, or has irregular shaped pieces of sod and torn or uneven ends shall be rejected.

3.h.(2).(b).2/. Thickness. Sod shall be machine cut to a uniform thickness of 306 mm [1ft 1/4 in] within a tolerance of 6 mm [1/4 inch] excluding top growth and thatch. Measurement for thickness shall exclude top growth and thatch.

3.h.(2).(b).3/. Time limitation. The limitation of time between harvesting and placing sod shall be 36 hours.

3.h.(2).(c). Sprig quality. The cultivar shall be provided as healthy living stems, stolons, or rhizomes with attached roots, including two or three nodes, and shall be from 100 mm to 150 mm [4 in to 6 in] long, without adhering soil. Sprigs shall be provided which have been grown under climatic conditions similar to those in the locality of the project. Sprigs shall be obtained from heavy and dense sod, free from weeds or other material detrimental to a healthy stand of turf. Sprigs that have been exposed to heat or excessive drying shall be rejected. The time limitation between harvesting and placing sprigs shall be 24 hours.

3.h.(2).(d). Soil test. A soil test shall be performed for pH, chemical analysis, and mechanical analysis to establish the quantities and type of soil amendments required to meet local growing conditions for the type and variety of turf specified.

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3.h.(2).(e). Temporary turf cover. When there are contract delays in the turfing operation or a quick cover is required to prevent erosion, the areas designated for turf shall be seeded with a temporary seed. When no other turfing materials have been applied, the quantity of one-half of the required soil amendments shall be applied and the area tilled.

3.h.(2).(f). Installation. The turf shall be installed during appropriate planting times and conditions recommended by the trade for the type and variety of turf specified. The turf operations shall be performed only during periods when beneficial results can be obtained. Drainage patterns shall be maintained. The turf shall be installed by using the methods as recommended by the trade for the type and variety of turf specified.

3.h.(2).(g). Protection. Immediately after turfing, the area shall be protected against traffic or other use by erecting barricades and providing signage as required.

3.h.(2).(h). Turf establishment period. The turf establishment period for establishing a healthy stand of turf shall begin on the first day of work under the turfing contract and shall end **four** months after the last day of the turfing operation. **Reference paragraph Maintenance During the Turf Establishment Period (below)**. An unsatisfactory stand of turf shall be repaired as soon as turfing conditions permit.

3.h.(2).(i). Satisfactory stand of turf.

3.h.(2).(i).1/. Seeded lawn area. A satisfactory stand of turf from the seeding operation for a lawn area is defined as a minimum of 160 grass plants per square meter. Bare spots shall be no larger than 150 mm [6 in] square. The total bare spots shall not exceed two (2) percent of the total seeded area.

3.h.(2).(i).2/. Seeded field area. A satisfactory stand of turf from the seeding operation for a field area is defined as a minimum of 100 grass plants per square meter. The total bare spots shall not exceed two (2) percent of the total seeded area.

3.h.(2).(i).3/. Sodded area. A satisfactory stand of turf from the sodding operation is defined as living sod uniform in color and texture. Bare spots shall be no larger than 50 mm [2 in] square.

3.h.(2).(i).4/. Sprigged area. A satisfactory stand of turf from the sprigging operation is defined as a minimum of 20 sprigs per square meter. Bare spots shall be no larger than 225 mm [9 in] square. The total bare spots shall not exceed two (2) percent of the total sprigged area.

3.h.(2).(i). Maintenance during establishment period. The maintenance of the turfed areas shall include eradicating weeds, eradicating insects and diseases, protecting embankments and ditches from erosion, maintaining erosion control materials and mulch, protecting turf areas from traffic, mowing, watering, post-fertilization, and replacing unsatisfactory turf areas. **The maintenance period shall begin at the conclusion of all turfing operations and shall be in effect for 120 calendar days.**

3.i. Sprinkler and/or Irrigation system. **All existing living trees and shrubs and newly planted trees, shrubs and ground cover landscaped plant materials installed along roadways, walking paths, jogging trails, front yards and backyards of each dwelling unit, and common areas shall have an automatic drip irrigation system - drip emitters. Irrigation system shall be vandal resistant. An automatic irrigation system shall also be provided to existing live trees and live shrubs. Backflow prevention devices and any other above grade appurtenances shall be placed in a precast or cast-in-place concrete box. Where the irrigation system taps into each dwelling units' domestic water supply, provide a detail of the required backflow prevention. Certified testing and start-up documentation is required. Provide an automatic sprinkler irrigation system for dwelling unit backyards, to**

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recreational and common areas with grass. Each dwelling unit shall have an automatic irrigation system control panel located centrally and in an accessible area. Lockable enclosures shall be provided for all controllers and backflow preventers located within the project limits. Design the system to function with available water pressure. All plants and trees shall have automatic irrigation. Polychloride vinyl piping shall be used for irrigation system.

3.j. Landscape Rock. Native Franklin Mountain crushed rock, or approved equal, shall be placed on areas requiring Landscape Rock (not rock blanket). Crushed rock shall be 25 mm to (AM #5) 37.5 mm in diameter and shall be placed to a depth of 50 mm thick. The top of the Landscape Rock shall be 12 mm below adjacent walks, curbs, patios and other paved surfaces. Landscape Rock shall be placed over a 25 mm deep layer of screening ("chat"). Screening shall be 6 mm in diameter or smaller. Screening shall be placed over weed control mat (geotextile). Geotextile shall be woven or nonwoven; polypropylene, polyester, or fiberglass, mat in accordance with ASTM D 5034 or ASTM D 5035. It shall be made specifically for use as a fabric around plant material. Nominal weight shall be a minimum 120 grams per square meter (4 ounces per square yard). Permeability rate shall be a minimum 1 mm (0.04 inch) per second. An herbicide shall be applied by a certified applicator prior to installing geotextile or plastic.

ACCOMPANYING AMENDMENT NO. 0007 TO SOLICITATION NO. DACA63-01-R-0002**4. SITE ENGINEERING.**

4.a. Soils.

4.a.(1). Soil and Foundation Report (Geotechnical Report). A preliminary Soil and Foundation Report is provided as part of this RFP. A drawing indicating Subsurface Explorations and Geologic Profiles for the proposed site is also provided. The report provides an overview of soils and geologic conditions, and is furnished for informational purposes only. The offeror to whom this contract is awarded shall, with his or her consulting professional geotechnical engineer experienced in geotechnical engineering, be responsible for determining site specific geotechnical conditions.

4.a.(1).(a). The Contractor provided site specific geotechnical conditions report shall include, but not be limited to:

- 4.a.(1).(a).1/. Classification of soil and rock.
- 4.a.(1).(a).2/. Depth to bedrock.
- 4.a.(1).(a).3/. Extent of boulders.
- 4.a.(1).(a).4/. Bearing capacity of soil and rock.
- 4.a.(1).(a).5/. Settlement potential.
- 4.a.(1).(a).6/. Compaction requirements.
- 4.a.(1).(a).7/. Groundwater characteristics.
- 4.a.(1).(a).8/. Infiltration and permeability.
- 4.a.(1).(a).9/. Erosion and siltation.
- 4.a.(1).(a).10/. Surface and subsurface drainage.
- 4.a.(1).(a).11/. Soil resistivity.

4.a.(1).(b). The offeror and his or her professional geotechnical engineer consultant shall certify in writing that the design of the project has been developed consistent with the site specific geotechnical conditions. The certification shall be stamped by the consulting professional geotechnical engineer and shall be submitted with the 50 percent design submission. If revisions are made to the 50 percent design submission, a new certification shall be provided with the final design submission.

4.a.(2). Soil compaction.

4.a.(2).(a). Soil compaction shall be achieved by equipment approved by a professional geotechnical engineer. 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 in Table 4-1, determined in accordance with ASTM D 1557.

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Subgrade Preparation, Fills, Embankments, and Backfills	Compaction Requirements (Percentage of Maximum Density)
Structures & Building Slabs	92
Streets, Paved Areas, Bike Paths	See Attachment 11A
Sidewalks	85
Grassed Areas	80

4.a.(2).(b). The requirements shall be verified or modifications recommended by the consulting professional geotechnical engineer in the report wherever engineering, soils, or climatic factors indicate the necessity. Any modification to the stated compaction requirements shall require the approval of the Contracting Officer.

4.a.(3). Soil treatment. Soil treatment for termites shall be by the chemical method. Methods and extent of protection required are as [outlined in CEGS 2285 or equivalent](#).

4.a.(4). **AM #5 (DELETED)**

4.b. Water Distribution System. Connection to the existing water distribution system shall be made at the locations shown on the RFP drawings.

4.b.(1). Water Mains and Building Service Connections. Mains shall be considered as that part of the distribution system supplying fire hydrants, or fire hydrant laterals. Service connections supply water from the main to the building. Mains shall be looped with no dead ends and be of adequate size to satisfy both domestic and fire flow requirements. Minimum main size is **0.20 m [8 in]**. Sufficient sectional control valves shall be provided so that no more than two fire hydrants will be out of service in the event of a single break in a water main. A copper tracer wire shall be placed directly above all non-metallic mains when plastic marking tape does not provide means of determining alignment of pipe by metal detecting equipment. The pipe, valves, and all other materials shall meet the American Water Works Association (AWWA) standards for a 1,034.2 kPa [150 psi] working pressure system. Provide sacrificial anodes for all valves and metal pipe. Building connections shall be designed and constructed in accordance with the National Standard Plumbing Code.

4.b.(2). Flow requirements. Water must be supplied by mains of appropriate capacity to provide 37.9 L/s [500 gpm] at one-story units, for a flow duration of 1-1/2 hours. This mandatory flow is over and above domestic requirements. Domestic requirements shall be based on 1135.6 liters/day (300 gal/day) per housing unit for single family housing. Mains shall be sized to carry this flow with a 2.5 peak hourly factor. Pressure shall be a minimum of 137.9 kPa [20 psi] at each fire hydrant, and a maximum of 1,034.2 kPa [150 psi] at each outlet after allowing for friction, elevation, and other pressure losses. Pressure at each housing unit shall not exceed 517.1 kPa [75 psi].

4.b.(3). Trenches. Water and gas mains **shall not** be installed in the same trench. Water mains shall have a minimum of 0.9 m [3 ft] of earth cover. Minimum cover above water lines shall be 0.75 m [2 ft 6 in] in grassed areas and 0.9 m [3 ft] in paved areas. Adequate cover must be provided for freeze protection. Where frost penetrates to a depth greater than the minimum above, greater cover will be required. Sufficient cover must also be provided to protect the pipe against structural damage due to superimposed surface loads. Lines laid **higher** than the

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minimums stated shall be concrete encased with a minimum concrete thickness of 0.15 m [6 in]. **Excavation, trenching and backfilling for utilities shall comply with the requirements and standards in Section 02316.**

4.b.(4). Fire hydrants. Hydrants shall conform to AWWA C502, Dry-Barrel Fire Hydrants. Valves shall conform to AWWA C500, Gate Valves for Water and Sewerage Systems. Fire hydrants shall be compatible with those presently in use at the installation, with pump and hose connections **for one 115mm (4-1/2 inch) pumper connection and two 65mm (2-1/2 inch) hose connections.** Fire hydrant spacing shall be no greater than **137 m [450 ft]** apart, by paved road. In addition, a hydrant shall be provided so that all parts of the housing units can be reached by hose lines not over 107 m [350 ft] long. Hydrant laterals shall be 0.15 m [6 in] minimum size, shall not exceed 15.2 m [50 ft] in length, and shall have an underground shutoff valve. Valve box, at each lateral, shall be located within 3 m [10 ft] of the hydrant, and shall not be located where obstructed by parked vehicles, shrubbery, etc. **A minimum 1.5 meter clearance shall be maintained between fire hydrants and poles, trees, shrubs or any other permanent obstructions. Hydrants should not be located less than 900mm (3 feet) from the edge of a paved roadway surface, nor more than 2.1m (7 feet).**

4.b.(5). Shutoff valve. Each building shall be provided with a separate service and main shutoff valve, readily accessible to maintenance and emergency personnel. Shutoff valves in walks are prohibited.

4.b.(6). Valve Boxes. Valve boxes shall be cast iron of approved manufacture. Boxes shall be extension type with slide-type adjustment and with flared base. The word "WATER" shall be cast in the cover. The boxes shall be of such length as will be adapted, without full extension, to the depth of cover required over the pipe at the valve location. Valve boxes shall be suitable for traffic. Cast iron valve boxes shall be bonded with the ferrous valve and cathodically protected. Cast iron valve boxes shall have a protective coating applied using a coal tar epoxy.

4.b.(7). Materials For Water Lines. Acceptable materials for water lines are listed below. The materials used shall comply with the requirements and standards in Section 02510 - WATER DISTRIBUTION SYSTEM.

4.b.(7).(a) Water lines less than 75mm (3-inches) in diameter: Copper tubing or plastic (AM #5) (PVC) are acceptable.

4.b.(7).(b) Water lines 75mm (3-inches) or greater in diameter: ductile iron, PVC, reinforced thermosetting resin (filament wound or centrifugally cast), or reinforced plastic mortar are acceptable.

4.c. Sanitary Sewerage System. **AM #6** Connection to the existing sewage collection system shall be made at the location shown on the RFP drawings. Sewage collection systems shall be designed and constructed in accordance with the National Standard Plumbing Code criteria in this paragraph, and installation requirements. Pipe sizes and slopes shall be calculated using the Manning Formula. ~~Manholes are required at all changes of direction and spaced not more than 152 m [500 ft] apart.~~ Curved sewers are prohibited. Pipes shall be designed to flow full and maintain a minimum velocity of 0.6 m [2 ft] per second. ~~If siphons are used, two lines of equivalent capacity shall be used with cleanouts.~~ Where pumping is required, force mains shall be sized to minimize pumping head, with a 0.9 m to 1.5 m [3 ft to 5 ft] per second velocity.

The installation prefers the use of a gravity wastewater collection system for operation and maintenance purposes. Design of the sanitary sewer system should address adjusting existing topography with additional fill as needed and use of minimum pipe cover if necessary. Justification will be required at the submittal process if a lift station is

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used. However if a lift station is required, the lift station shall be located at the exterior boundaries of the site, not within the housing area or playground areas. The lift station location will be based on topographic considerations and actual sanitary sewer design. A wet pit - dry pit lift station with automatic controls, redundant pump system and back-up generator will be required. Submersible pumps are not acceptable.

4.c.(1). Sewer mains. Design shall be based on an average daily per capita flow of sanitary sewage of 378.5 L [100 GAL] per day with a peak hourly factor of four. Mains shall be a minimum of 0.2 m [8 in] in diameter.

4.c.(2). Sewer Building Laterals. Each new housing unit shall be connected directly to a sewer main by a new lateral line. Combining multiple building laterals is prohibited. Cleanouts shall be provided to allow cleaning of all lines to grade. Cleanouts, in yard areas, shall be set in a box with a hinged cover. Laterals from one building shall not cross under another building. Lines shall be sized in accordance with the National Standard Plumbing Code. Sewer laterals serving a housing unit shall be a minimum of 0.15 m [6 in] in diameter.

4.c.(3). Trenches. Sewer and water lines, mains or laterals, shall be placed in separate trenches. The separate trenches shall maintain a minimum lateral separation of 3.0 m [10 ft].

4.c.(4). **AM #6** Cover. Sewer lines shall be located at a depth greater than the frost penetration. Minimum cover above the top of pipes shall be 0.6 m [2 ft] in **all** areas. ~~not subject to vehicular loads and 0.9 m [3 ft] in all other areas.~~ If the minimum cover can not be met, the length of pipe shall be concrete encased with a minimum 0.08 m [3 in] thickness of concrete

4.c.(5). Manholes. Manholes shall be provided where lateral lines exceed 30 m [100 feet] in length from the housing unit to the sewer main line. Manholes shall also be provided on main lines at all changes in direction and slope, and shall be spaced at a maximum of 120 m [400 feet] apart on lines less than 450mm [18 inches] in diameter. For pipe diameters greater than or equal to 450mm [18 inches], manholes shall be spaced at 180 m [600 feet] maximum. A fixed siderail ladder shall be provided for manholes greater than 3.6 m [12 feet] in depth. The word "SEWER" shall be cast in manhole covers.

4.c.(6). Materials for Sanitary Sewer Lines. Plastic (PVC or HDPE), reinforced plastic mortar, or reinforced thermosetting resin (filament wound or centrifugally cast) or clay pipe are acceptable. These materials shall comply with the criteria and standards in SECTION 02531 - SANITARY SEWERS. Cement used in concrete pipe fittings, manholes and other sanitary sewer structures shall be Type V.

4.c.(7). Design Criteria. Gravity lines shall be sized based upon peak flow and designed to provide a minimum velocity of 2.0 ft per second (fps) at the average daily flow rate and a minimum velocity of 2.5 to 3.5 fps at 1/2 the peak flow rate. The maximum flow velocity shall not exceed 10.0 fps, based on peak flow. For gravity lines Manning's formula shall be used. Manning's "n" values less than 0.013 shall not be permitted despite manufacturer's reports of "n" values between 0.009 and .011. When the required 2.0 fps flow velocity at the average flow rate cannot be met in gravity sewer lines (lateral or main) due to inadequate flow, a minimum slope of 0.60% shall be provided for 150mm [6-inch] lines and 0.40% for 200mm [8-inch] lines.

4.c.(8). Design Flow. Housing units shall be designed for an average of 3.5 persons per unit with 100 gallons per capita per day. Allowances for infiltration for lines located near groundwater shall be 500 gallons per day per inch diameter per mile of pipe, and shall be added to the peak flow rate.

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4. d. Storm Drainage System. **(AM #5)** The storm drainage system shall be properly coordinated with surrounding properties to ensure that runoff does not cause damage to other properties. **The storm drainage system for this project will be overland flow, with minimal use of an underground system. Natural means are preferable because they require less maintenance and fit more easily into the natural landscape. The stormwater drainage from the Aero-Vista housing area only (both sides of Luke Street), shall be directed to a retention pond to be located at the southwest corner of the site, south of the rockwall. The retention pond shall have 1V to 3H maximum side slopes for ease of maintenance purposes. It is the Contractor's responsibility to survey the area required for the location of the retention pond. The retention pond shall be enclosed by a 1.8m (6 ft.) chainlink fence with 3-strand barb wire and a 910mm (3 ft.) wide personnel gate. This gate shall be closeable and lockable.** All drainage lines, if required, shall remain in conduit to stable grade. **The minimum size of pipe shall be 300 mm [12 inches] inside diameter.** The minimum velocity of flow in conduits during a design storm shall be 0.07 m/s [2 ft 6 in/s]. Storm water collection, disposal (and retardation) system shall be designed for a minimum of a **50-year** return frequency. Rainfall intensities for project locations shall be in accordance with local community/locality/State Transportation (Highway) agency design parameters.

4.d.(1). Site specific storm drainage criteria.

4.d.(1).(a) Storm Runoff. The Rational Method as described in Attachment 13 shall be used to calculate storm runoff.

4.d.(1).(b) Storm Drainage System. Runoff from other properties presently directed toward the new project sites shall be incorporated into the new storm drainage system designs to ensure that this runoff does not cause damage to surrounding properties and the new housing areas. Storm drains shall be designed in accordance with criteria in Attachment 13. Storm drain systems shall be designed so that the hydraulic grade line for the computed design discharge is as near optimum depth as practicable, and velocities are not less than 2.5 fps when the drains are one-third or more full. Energy dissipators shall be provided at storm drain outlets where outlet velocities exceed 5.0 fps. Storm drain inlets shall be located so that no collection swales flow across a street or sidewalk to reach a storm drain other than where cross gutters are used. Side opening catch basins are preferable. Where a grating must be used, it shall be of "bicycle proof" design. Sidewalk culverts are not permitted.

4.d.(2). Manholes. Manholes shall be located at intersections and changes in alignment or grade. Intermediate manhole maximum spacing shall be 76.2 m [250 ft] for pipes 0.9 m [3 ft] or less in diameter or box drains with the smallest dimension less than 0.9 m [3 ft]. Maximum spacing for intermediate manholes on larger pipes and drain boxes shall be 152 m [500 ft]. Manholes shall be precast concrete and shall conform to ASTM C 478 or AASHTO M 199. Steel ladders shall be installed where the depth of the manhole exceeds 0.9 m [3 ft]. The ladder shall be galvanized after fabrication in accordance with ASTM A 123. The wall along the ladder shall be vertical. The manhole shall have a 0.6 m [2 ft] minimum opening as measured from the face of the steel ladder.

4.d.(3). Drainage of roads and pavements. Provide a positive crown or sheet drainage to all streets and roads. **(AM #5) Overland flow is preferred, with minimal use of and underground system.** Pavement collectors for storm water shall be by curb inlets and gutters. Open areas shall be drained by field inlets and an underground collection system. No roadside ditches shall be permitted. **The maximum flow in all gutters shall be restricted to the quantity which will cause flooding of 1/2 the adjacent traffic lane at the design storm flow. When this flow is reached, it shall be intercepted and removed to an underground system. Inlets and grated areas in the sag of vertical street curves that act as sumps shall be oversized 100%.**

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Design shall be based on the Rational Formula and other criteria contained in Attachment 13.

4.d.(4). **Materials for Culverts and Storm Drains. Underground storm drainage lines shall be of the following materials: reinforced concrete pipe, reinforced concrete arch culvert and storm drain pipe, non-reinforced concrete pipe, clay pipe, PVC pipe, or PE pipe as applicable. Pipe for culverts and storm drains shall comply with the requirements and standards in SECTION 02630 - STORM DRAINAGE SYSTEM for the materials above. Cement used in concrete pipe, fittings, manholes and other storm drainage structures shall be Type V.**

4.e. Gas Distribution System. Provide a gas distribution system, connected to existing systems and designed in accordance with local codes, utility company requirements, or installation regulations, whichever is more stringent. Gas distribution systems shall comply with the requirements of ASME B31.8. Connection to existing gas distribution system shall be made at the location shown on the enclosed RFP drawings, **and the existing exterior gas loop shall be retained**. When connecting to existing steel piping system, provision shall be made to ensure that the integrity of the cathodic protection is not compromised. Shutoff valves shall be provided on the exterior of each building. A gas regulator and provision for future installation of an individual gas meter to monitor fuel use shall be provided for each housing unit. The building service entrance shall be installed at a height sufficient to allow for future installation of the gas meter. **Existing gas lines that are to be taken out of service and existing gas lines that are not in service shall be removed completely.** Installation of gas piping will be in accordance with ANSI B31.8 and 49 CFR 192, **and Specification 02556.**

4.e.(1). Materials. Materials and appurtenances shall be free of defects and suitable to accomplish the stated objectives of gas distribution systems. Pipe shall be polyethylene or steel as described below.

4.e.(1).(a). Polyethylene pipe shall conform to ASTM D2513, Standard Specification for Thermoplastic Gas Pressure Piping Systems, with fittings complying with either ASTM D2513 or ASTM D2683, Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing. Connections to metal pipe shall comply with ANSI B16.5, Pipe Flanges and Flanged Fittings, or manufacturer's recommended standards.

4.e.(1).(b). Steel pipe shall conform to ASTM A 53, Grade A or B, Type E or S, Schedule 40; or seamless or electric resistance welded, Schedule 40; black, as specified in ASME B31.8. Furnace butt welded pipe may be used in sizes 40 mm [1-1/2 inch] and smaller. Fittings 40 mm [1-1/2 inch] and smaller shall conform to ASME B16.11. Pipe flanges and flanged fittings larger than 40 mm [1-1/2 inch], including bolts, nuts, and bolt patterns shall be in accordance with ASME B16.5, Class 150. Butt weld fittings shall be in accordance with ASME B16.9. Weld neck flanges shall be used.

4.e.(2). Testing. Prove that the entire system of gas mains and service lines is gas-tight by an air test, in accordance with ANSI B31.8. The test shall continue for at least 24 hours between initial and final readings of pressure and temperature.

4.e.(3). Drips. Unless high pressure natural gas is used, drips shall be installed at the low points, immediately following reduction from high pressure to medium pressure (at supply points) and at occasional low points throughout the system to provide for blowing out the lines.

4.e.(4). Valves. Plug valves shall be installed at intersections of mains and other locations so that interruptions to service can be confined to no more than 30 housing units. **AM #5 Valves shall be Kerotest or welded valves.**

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4.e.(5). Mains and service lines. Lines shall not be placed under any buildings. Lines shall be placed with a minimum of 0.6 m [2 ft] of earth cover. Protective casings shall be provided to protect lines from superimposed street or heavy traffic loads.

4.f. Deleted

4.g. Deleted.

4.h. Electrical Distribution. **[Am #5]** Connection to the existing electrical distribution system shall be made at the location shown on the enclosed RFP drawings. **The six position sectionalizing switch shall be placed in the general area shown on the site plan. The normal connection will come from the 13.2kV primary utility line feeding the transformer station on the southwest side with back-up power provided by the utility line at the corner of Sgt. Majors Blvd and Luke St. These two electrical supply lines shall occupy two of the connection points in the 6 position sectionalizer switch. Two of the other connections shall supply the loop feed for all the power to the housing west of Luke St. The other two positions are for future usage.**

4.h.(1). System design. **[Am #5]** **[Am #6]** The electrical on-site distribution system shall be designed in compliance with the rules and recommendations of ANSI C2, National Electrical Safety Code; NFPA 70, National Electrical Code; ANSI C84.1, Electric Power Systems and Equipment – Voltage Ratings; and City of El Paso, Texas, National Electrical Code, Local Amendments, whichever is more stringent. Provide new electrical distribution system as necessary and connect to existing system. System shall be a loop-primary **(AM#7)with sectionalizers feeding primary radial laterals (AM#7)**. Primary feeder cables shall be copper. High voltage conductors shall have protective shielding. All electrical and communications utilities shall be located underground near the streets. For crossings under streets it shall be the Contractor's responsibility to provide proper coordination and obtain all necessary permits, approvals, etc., before installation. **All underground utilities shall not be direct buried and shall utilize sectionalizers instead of a manhole and/or handhole system. Manholes and handholes shall not be permitted. All switchgear shall be pad mounted.** The systems shall be designed so that fault current at unit service entrances will not exceed 10,000 Amperes. This may be accomplished by the appropriate selection of transformer sizes and impedance, current limiting fault interrupting, series rating of distribution pedestals, etc, or by a combination of methods. The primary distribution system shall be a load-balanced 3-phase loop connected system. Loop fed equipment shall consist of pad mounted 3-phase switches and loadbreak elbow sectionalizing terminal cabinets. The systems shall be per ANSI C84.1. The system shall be 13.2/7.6 kV, three phase, four wire, grounded wye connected, with three phase conductors and a grounded neutral conductor. Overcurrent and fault protection devices shall be coordinated with line-side and load-side fuses or circuit breakers to isolate any electrical fault or overload from the rest of the system. **The phase conductors (primary cables) shall be minimum #2 single copper conductor, 15kV, 133% insulated, type V90, with a semiconducting shield, and EPR insulation.** Neutral conductors shall be copper, 600V, type USE insulation, and shall be the same AWG size as the phase conductors. The neutral conductors shall be identified with white markings at all terminations. One neutral conductor shall be pulled in each conduit with each set of phase conductors, and shall be bonded to the ground rod (and to the equipment) at each equipment location. Use of concentric neutral type cable is not allowed. Primary cable ducts shall be non-reinforced concrete encased, non-metallic PVC conduits. Minimum size shall be 103 mm (4 inches). Above ground riser ducts shall be rigid galvanized steel (RGS) conduits. The ducts shall be buried 900 mm (36 inches deep) (minimum) and shall be sloped, 100 mm (4 inches) per 30.5 m (100 feet) (minimum), to drain to gravel seepage pits located at the low points along the duct trench. Underground vaults shall not be used. Concrete markers shall be provided at approximately 61 m (200 feet) intervals and at each change in direction. Metallic/magnetic warning tape buried 300 mm (12 inches) below the surface shall be installed above the ducts. Telephone and cable television may occupy the same

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trench as electrical provided they are located not less than 300 mm (12 inches) to the side, or 150 mm (6 inches) above electrical conduit encasements. A spare conduit with pull cord shall be installed in all ducts. Each spare conduit shall include capped risers into all padmounted equipment and to the base of any poles. At road crossings, an additional two spare conduits (for a total of three) shall be installed, shall be capped, and shall terminate five feet from the edge of the pavement. The ends shall be located with concrete markers. Each transformer shall feed a single secondary underground type distribution panelboard (free standing, padmounted enclosure with enclosed molded case breakers); and each pedestal shall feed underground service laterals, street lighting, etc.

4.h.(2). Underground splices. Underground connection or splices are prohibited, except in boxes or manholes. Splices shall be in a self-draining, rodent-resistant box with a cover.

4.h.(3). Service laterals. Service laterals shall be underground. The length of secondary distribution service laterals from the transformer secondary to the building service entrances shall be minimized. Voltage drop in each service lateral shall not exceed three percent at the calculated maximum demand load. Service laterals shall be sized to supply no less than the largest total demand load as determined by the National Electrical Code, Article 220, Part B or Part C, whichever is greater. However, an additional 88 percent demand factor may be applied to laterals which feed buildings with two or more dwelling units. Service entrance lateral lengths from the transformer secondary to the building service entrance shall be minimized.

4.h.(4). Service entrance. Only one service entrance per building shall be provided. The service entrance conductor shall be buried a minimum of 0.9 m [3 ft] below finished grade with a minimum separation of 0.3 m [1 ft] from telephone or TV cables. System shall be designed such that the fault current available at the service entrance equipment will not exceed 10,000 amps.

4.h.(5). **[Am #5] [Am #6]** Transformers and Pad-Mounted Distribution Panelboards. Transformers shall be padmounted, oil filled, and air cooled. **Single phase transformers shall be loop feed type.** Primary cabinets shall be dead front with load-break elbow terminations, load-break oil-immersed switches, either dry-well current limiting or oil-immersed current limiting bayonet fuses, and with primary surge arresters. The transformer secondary compartment will be live front with NEMA pattern spade terminations. The neutral connections shall be solidly grounded. Transformers shall be furnished with standard accessories including off-load taps, oil fill/sample valves, temperature and pressure gages, etc., as specified. Transformer dielectric cooling fluid shall be mineral oil. Three phase transformers for 3-phase service (at support facilities such as sewage lift stations, etc.) shall have delta-connected primaries and wye-connected secondaries. Single phase transformers shall have 120/240 Volt, three wire secondaries, and shall have two non-fused switches for loop connection. Transformers shall be sized to supply no less than 90% of the largest total demand load as determined by the National Electrical Code, Article 220, Part B or Part C, whichever is greater. **All transformers shall have a commercial use #17 MASTER padlock, keyed alike.** The transformer shall feed directly into a pad mounted panelboard. Each panelboard shall feed the residential street lighting and shall have a breaker for all the houses being supplied. Each panelboard shall feed no more than 9 houses. A ground rod shall be installed in the conduit window of each equipment pad. The pad's counterpoise shall be connected to the ground rod with two runs of # 4/0 copper cable. All underground grounding connections shall be exothermic type connections. All other equipment grounds shall be bounded to this ground rod with bronze saddle clamps. The equipment grounding conductors shall be AWG # 4/0 bare copper. The pedestal shall, as a minimum, be sized to carry the maximum nameplate output of the connected transformer, as a continuous load. The pedestal line terminals and the circuit breaker panel bus shall, as a minimum, be rated for 125% of the maximum nameplate output of the connected transformers.

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4.h.(6). **[Am #5]** Street and area lighting. IES Handbook recommendations, including cutoff fixtures and shields, shall be used to minimize light trespass. Voltage drop on lighting circuits shall not exceed 6 percent at the most distant fixture. Fixtures shall be actuated by an auto-control switch with photoelectric controls at each light fixture, and supplied from multiple circuits originating from the pad-mounted distribution panelboard. Residential street lighting shall be provided at each street intersection, and at a maximum interval of 61 m (200 feet) between intersections. Maintained luminance and illuminance values shall conform to the major, collector and local residential values given in the IES Handbook, and shall not be less than 0.5 foot candles average maintained. Street lighting fixtures and area light fixtures including walks, including all steps in walkways, and open/common parking areas, shall be Corps of Engineers Standard Detail No. 40-06-04, type 401-C as given in attachment 7; rectangular shaped, side mounted, on round metal poles. Poles and fixtures shall have a dark bronze finish. Lamps shall be high pressure sodium, 250 Watt maximum. Bollards, wall packs, etc. may be used for area light fixtures. Sports and recreational areas, tot-lots, playgrounds, etc. shall be illuminated in accordance with IES Handbook recommended values and shall have a hand-off-auto control switch with photocontrolled (no twist timers) switches for auto control. Provide a weatherproof ground fault protected convenience receptacle with a lockable cover in the base of at least one fixture/pole at the playground areas.

4.i. Metering. Metering of utilities shall be provided as follows:

4.i.(1). Master meters. Master meters for electricity, and gas shall be provided for all new and replacement housing units except where new housing units are metered by an existing meter. (AM#7) There is an existing electrical master meter at the substation located at the southwest corner of the site, but the contractor shall provide new electrical master meters for each phase of the housing development as identified in Section 01001, Par. 1.a.(1). (AM #5) Existing water master meters shall remain in place; however, existing steel lids shall be replaced with new lids weighing less than 45.46 kilograms (100 pounds). The lid shall be equipped with a viewing port with cover to allow reading of the meter without removing the lid. The port should be approximately 6-inches by 6-inches.

4.i.(2). (AM #5) (DELETED)

4.j. Telephone. Telephone utilities may occupy the same trench as primary or secondary electrical feeders provided they are located not less than 300 mm (12 inches) to the side or 150 mm (6 inches) above electrical conduits or conduit encasements and provided this is acceptable to the utility companies. If the utilities have other installation standards, those shall be adhered to. The contractor shall provide trenching, conduit, placement, and backfill for the exterior telephone distribution system, including subscriber drops. The contractor shall also provide and install pedestals as specified by the "local telephone company". The contractor shall obtain from the Ft. Bliss Directorate of Information Management (DOIM) the tie-in point for connection to the existing system. The contractor shall provide the local telephone company with a preliminary site plan, and shall coordinate with them in the routing and installation of the telephone system. The local telephone company shall provide and install all cabling, including terminations, and any other equipment required for a complete and functional system. Installation of the cabling shall occur after the installation of other utilities is completed. The contractor shall include the telephone company's material and installation fees as a part of his proposal. The points of contact for the Ft. Bliss DOIM are Mr. Juan E. Garcia, telephone 915-568-5594 and Ms. Eva Jones, telephone 915-568-7081.

4.k. Television. Cable television utilities may occupy the same trench as primary or secondary electrical feeders provided they are located not less than 300 mm (12 inches) to the side or 150

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mm (6 inches) above electrical conduits or conduit encasements and provided this is acceptable to the utility companies. If the utilities have other installation standards, those shall be adhered to. The contractor shall provide trenching, conduit, placement, and backfill for the outside plant cable television distribution system, including subscriber drops. The contractor shall also provide and install pedestals as specified by Time Warner Cable Company ("the CATV company"). The contractor shall obtain from Time Warner Cable Company the tie-in point for connection to the existing system. The contractor shall provide Time Warner Cable Company with a preliminary site plan, and shall coordinate with the CATV company in the routing and installation of the cable television system. All CATV conduit, equipment, and installation shall meet the requirements and specifications of Time Warner Cable Co. Time Warner Cable Co. shall provide and install all cabling, including terminations, and any other equipment required for a complete and functional system.

4.I. Cathodic Protection. Cathodic Protection (CP) is mandatory on buried ferrous metallic structures as described below:

4.I.(1). Department of Transportation guidance as stated in 49 CFR, Part 192, requires that all metallic natural gas piping be coated and cathodically protected regardless of the soil resistivity.

4.I.(2). CP systems must be designed to provide protective potential to meet the requirements of the National Association of Corrosion Engineers (NACE) Standard RP-0169, Control of External Corrosion on Underground or Submerged Metallic Piping Systems, or NACE Standard RP-0185, Control of External Corrosion on Metallic Buried, Partially Buried, as appropriate.

4.I.(3). New or supplemental CP systems shall be compatible with existing CP systems and other adjacent structures or components. New systems should be compatible with existing systems to allow ease of repair and maintenance.

4.I.(4). When plastic pipe is used to extend a steel gas distribution main, an insulated No. 8 AWG copper wire shall be exothermically welded to the existing steel main and run the length of the new plastic main. This wire can be used as a locator tracer wire and to maintain continuity to any future steel gas main extension.

4.I.(5). CP and protective coatings shall be provided for the following buried and submerged ferrous metallic structures regardless of soil or water resistivity:

4.I.(5).(a). Natural gas and propane piping.

4.I.(5).(b). Fire protection piping.

4.I.(5).(c). Ductile or cast iron pressurized piping under floor (slab on grade) in soil.

4.I.(5).(d). Underground heat distribution and chilled water piping in ferrous metallic conduit.

4.I.(6). Cast iron pipe shall be treated as follows:

4.I.(6).(a). For soil resistivity below 10,000 Ohm-cm at pipeline installation depth, provide CP, bonded joints, and protective coatings.

4.I.(6).(b). For soil resistivity between 10,000 and 30,000 Ohm-cm at pipeline installation depth, provide bonded joints only.

4.I.(7). Copper water service lines will be dielectrically isolated from ferrous pipe. Dielectric isolation shall conform with NACE RP-0286.

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4.I.(8). For ductile iron piping systems (except for ductile iron piping under floor in soil) conduct an analysis to determine if CP and/or bonded or unbonded coatings are required. Unbonded coatings are defined in ANSI/AWWA C105/A21.5.

4.I.(9). Conduct an economic analysis to determine if CP and protective coatings should be provided for gravity sewer lines and the following structures in soil resistivity conditions above 10,000 Ohm-cm:

4.I.(9).(a). Potable water lines.

4.I.(9).(b). Concentric neutral cable.

4.I.(9).(c). Other buried and submerged ferrous metallic structures not covered above.

4.I.(10). Ferrous metallic piping passing through concrete shall not be in contact with the concrete.

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5. UNIT DESIGN - ARCHITECTURE.

5.a. Unit Design. Unit design shall be within the net areas authorized for the various type of housing units specified. Public Law 97-214, Title 10 USC, Section 2826, establishes net area limitations for military family housing. The law permits a 5 percent maximum increase in these limitations if such modifications will permit a turnkey offer of "off-the-shelf" designs currently being constructed in the commercial marketplace. Statutory floor area limitations for housing units are as listed in Table 5-1 with allowable area variations.

TABLE 5-1 - SIZE OF HOUSING UNITS BY PAY GRADE

Pay Grade	Number of Bedrooms	Net Floor Area					
		-2% Min. (DA)		Basic (Statutory Limit)		m ²	
		m ²	ft ²			m ²	ft ²
E-7/9 (SNCO)	4	132	1,421	135	1,450	142	1,523
	3	123	1,323	125	1,350	132	1,419

5.a.(1). Net area definition. Net area is defined as the space inside the exterior and party walls. Net area excludes:

5.a.(1).(a). Exterior walls and walls between living units and garages.

5.a.(1).(b). Half thickness of interior walls adjacent to excluded areas.

5.a.(1).(c). Utility and laundry rooms.

5.a.(1).(d). Interior and exterior bulk storage.

5.a.(1).(e). Washer and dryer closet not to exceed 2.8 m² (30 ft²).

5.a.(1).(f). Furnace, domestic water heater, and solar equipment spaces.

5.a.(1).(g). Stairwells.

5.a.(1).(h). Landings.

5.a.(1).(i). Walls and interior spaces specifically designed for passive solar systems (other than required habitable areas).

5.a.(1).(j). Weather vestibules not to exceed 1.5 m² (16 ft²) sheltering the main entry.

5.a.(1)(k). Unfinished attic and basement space.

5.a.(1).(l). Patios or porches.

5.a.(1).(m). Carports and garages.

5.a.(1).(n). Increases required to meet accessibility standards.

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5.a.(1).(o). Open or screened porches without heating, air conditioning, or interior-type finishes. In localities subject to adverse weather conditions, such as wind-driven mist or noxious atmosphere, or both, open porches may be enclosed with appropriate fenestration or screening, or both, and not considered to increase the net area of the housing units, provided that air conditioning or heating, or both, is not added and the basic character of the enclosed area is still that of a porch.

5.a.(2). Allowable net area increases

5.a.(2).(a). Accessible housing units shall be designed in such a way that they may be easily and readily modified to accommodate physically challenged occupants, if necessary, at time of occupancy. This means required access clearances, room sizes, bathroom layout, kitchen layout, doors and hardware, grab bars, plumbing hookups, light switches and outlets, controls, and warning devices must meet requirements at time of construction. Readily modifiable means that requirements for adjustable height cabinets and work surfaces, plumbing fixtures, and the warning devices for the hearing and visually impaired can be made either at time of construction or at time of occupancy.

(Amend 0005)

5.a.(2).(b). Net floor areas **shall** be increased by a maximum of 10 percent above the basic for **two** officers holding special command positions as designated by the Secretary of Defense, commanding officers of military installations, and senior noncommissioned officers of military installations. The increase allowed for the above designations is the maximum allowed regardless of whether the housing units are procured by conventional design-build or turnkey methods.

5.a.(2).(c). The applicable maximum net floor area may be increased by 27.87 m² (300 ft²) of indoor activity room for a housing unit in a harsh climate location. Harsh climates are defined as being in weather regions 1-3, as shown in Table 7-1.

5.b. Functionality. Rooms shall be sized and arranged for efficient use, good circulation, and furniture placement. The distribution of space for food preparation living and dining, sleeping, bathing, halls, closets, and services should be balanced and should enhance the intended functions.

5.b.(1). Habitable rooms shall not be used as halls for entry into a housing unit or for primary circulation within a housing unit.

5.b.(2). Provide convenient access between garage and service area, and between kitchen and service area.

5.b.(3). Do not use a sliding glass doors, sliding glass doors are not permitted.

5.c.(1). Indoor and Outdoor Integration. Emphasize factors that enhance indoor and outdoor living. Consider size, layout and location of patios and yards, and features that encourage family use of outdoor areas.

5.c.(2). Entrances. Front entrances shall be enhanced and protected by a porch.

5.d. Fire Protection and Safety. Housing units will comply with the applicable National Fire Codes, including NFPA 101, Life Safety Code. Construction features will be provided in accordance with the Uniform Building Code (UBC).

5.d.(1). Fire resistance of walls and roof material. Walls between living units and garages shall extend without openings, as a single design assembly, from the ground to the underside of roof

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sheathing. Provide fire stops at floor, and ceiling or roof line. Provide Class A (ASTM E108, Standard Methods of Fire Tests of Roof Coverings) roof covering material throughout. Penetrations in fire rated partitions shall maintain rating integrity. Walls between living units and garages shall have the minimum fire-resistance of one-hour rating. Wall between living unit and garage shall have a door matching the rating of the wall.

5.d(2). Mechanical rooms. Rooms equipped with fuel-fired equipment such as boiler rooms, furnace rooms, and rooms with fuel-fired water heaters, which serve more than one housing unit shall be separated by one-hour fire-rated construction. Direct access to these rooms from the exterior is required. Rooms with fuel-fired equipment that serve only one housing unit shall be lined with 13 mm (1/2-inch) gypsum board or equivalent noncombustible material. Access shall be provided to attic space through the mechanical room. Access shall consist of a finished opening covered with a material to match the surrounding ceiling in composition, color and texture. No ladder access will be provided.

5.d(3). Alarm systems. When a general building alarm system is required by NFPA 101, such as those required for housing units four stories or higher, the required systems shall transmit alarms to the installation fire department. Exceptions are made for housing units not located on military installations and for housing units located on installations without a installation-wide or central fire reporting system. Smoke detectors which are located within the housing unit and which sound an alarm only within the housing unit are not required to be transmitted.

(Amend 0005)

~~5.d(4). Sprinkler systems. Residential units shall be fully sprinkled. Sprinkler systems for houses will comply with NFPA 13R. Sprinkler systems for apartment buildings of over four floors will comply with NFPA 13.~~

5.e. Sound Attenuation.

5.e.(1). Testing. Certified proof-of-performance field tests will be conducted to demonstrate that the floor and wall systems as constructed provide the required sound isolation. Tests for airborne sound shall be made in compliance with ASTM E336. Tests for impact sound shall be made in compliance with ASTM E1007. Testing of 10 percent (minimum) of each type of floor and wall system is required. Location of test sites will be chosen at random by the Contracting Officer.

5.e.(1).(a). Any wall or floor system found to be inadequate shall have the deficiencies corrected and the additional qualifying tests conducted at the Contractor's expense. Testing at the Contractor's expense of greater than 10 percent of each system may be required if the Contracting Officer determines that the quality of construction requires this additional testing.

5.e.(1).(b). Walls and floor ceiling systems shall be designed to meet or exceed the requirements stated below. In cases where the field tested performance of the systems does not meet the designed performance, the maximum acceptable difference between field tests and sound transmission ratings shall be 2 decibels (dB) for airborne sound ratings and 5 dB for impact sound ratings.

5.e.(2). Wall construction between housing units and garages shall be designed to provide the minimum airborne sound transmission ratings and impact isolation ratings stated in Table 5-2.

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(Amend 0005)

TABLE 5-2 - SOUND TRANSMISSION STANDARDS FOR WALL CONSTRUCTION

Area	FSTC ¹	FIC ²
Walls (Separation between habitable units and garages)	39	-
Primary Habitable Areas (Living, Dining, Family Room, Bedrooms, Circulation)	39	65
Habitable Wet Areas (Kitchen, Bath, Utility, Laundry, Equipment)	39	57

Note¹: Field Sound Transmission Class. See ASTM E336.

Note²: Field Impact Isolation Class. See ASTM E1007.

5.e.(3). Plumbing and HVAC equipment. Design of plumbing and Heating, Ventilating, Air-Conditioning (HVAC), and dehumidifying equipment shall include design provisions such as location, enclosure and acoustical treatment, to minimize transmission of noise generated by equipment within each housing unit and to eliminate transmission of noise to other housing units.

5.f. Dimensions and Areas. Minimum areas and dimensions for interior spaces are shown in Table 5-3. Minimum areas and dimensions for exterior spaces are shown in Table 5-4.

TABLE 5-3 - MINIMUM AREAS AND DIMENSIONS - INTERIOR SPACES

(Amend 0005)

(Amend 0006)

Space	Area		Length		Width/Depth		Height ¹
	m ²	ft ²	mm	ft-in	mm	ft-in	mm
Living ²	14.0	150	3550	11-8	3550	11-8	2300
Dining)2/3 BR) ²	8.4	90	2900	9-6	2900	9-6	2300
Dining)4 BR) ²	10.2	110	3200	10-6	3200	10-6	2300
Family Room ²	8.4	90	2900	9-6	2900	9-6	2300
Kitchen ^{3,6}	6.0	64	2450	8-0	2450	8-0	2300
Eating in Kit. ⁴	6.7	72	2600	8-6	2600	8-6	2300
Refrigerator & Freezer	0.5	6	900	3-0	600	2-0	1800
Washer/Dryer ⁵	1.6	54	1800	6-0	900	3-0	2100
BR #1	14.0	150	3550	11-8	3550	11-8	2300

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TABLE 5-3 - MINIMUM AREAS AND DIMENSIONS - INTERIOR SPACES
(Amend 0005)
(Amend 0006)

Space	Area		Length		Width/Depth		Height ¹
	m ²	ft ²	mm	ft-in	mm	ft-in	mm
BR #2	11.1	120	3000	10-0	3000	10-0	2300
BR #3	9.0	100	3000	10-0	3000	10-0	2300
Half Bath ⁶	-	-	-	-	900	3-0	2300
Full Bath ⁶	-	-	-	-	1500	5-0	2300
Vestibule	1.2	13	1000	3-3	1200	4-0	2300
Hall & Stairway ⁷	-	-	-	-	1000	3-3	2300

Note¹: Ceiling heights in habitable rooms shall be a minimum of 2300 mm (7 ft-6 inches). Ceiling heights can be reduced in parts of these rooms to 2100 mm (7 ft) to accommodate ducts.

Note²: Room dimensions are exclusive of circulation. Circulation paths along one side of a room are permitted but add 1000 mm (3 ft-3 inches) to the minimum dimension.

Note³: A minimum of 1200 mm (4 ft) must be maintained in front of and between cabinets.

Note⁴: Minimum area and dimensions are measured from face of cabinets to walls.

Note⁵: Minimum area and dimensions are indicated for a washer and dryer closet. This area may also be provided in a utility room. When so provided, area and dimensions are exclusive of circulation.

Note⁶: Accessible units must conform to UFAS. UFAS requires greater minimum dimensions.

Note⁷: Clear width is measured between railings.

TABLE 5-4 - MINIMUM AREAS AND DIMENSIONS - EXTERIOR SPACES

Spaces	Area		Length		Width/Depth		Height ¹
	m ²	ft ²	mm	ft-in	mm	ft-in	mm
Garage	21.6	240	3650	12-0	6100	20-0	2300
Patio - 4 BR	13.6	144	-	-	3000	10-0	2400
Patio - 3 BR	13.6	144	-	-	3000	10-0	2400

Note¹: Ceiling heights apply when patios and balconies are covered.

5.f.(1). Minimum area requirements for kitchen cabinets, counters, and pantries are shown in Table 5-5. Flat area is shown for countertops and drawers. Combined shelf area is shown for pantry and base, wall and wall cabinets.

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TABLE 5-5 - KITCHEN CABINET, COUNTER, & PANTRY AREA

Type of Housing Unit	Wall		Base		Drawer		Counter		Pantry	
	m ²	ft ₂	m ²	ft ²						
4 BR	2.8	30	3.8	40	1.7	18	1.5	16	1.5	16
3 BR	2.3	24	3.0	32	1.3	14	1.1	12	-	-

5.f.(2). Minimum closet width requirements are stated in Table 5-6.

TABLE 5-6 - MINIMUM CLOSET WIDTHS¹

Type of Closet	Mm	ft
Coat/Entry Hall	900	3
Master ² BR #1	1800	6
BR #2	1200	4
BR #3	1200	4
BR #4	1200	4
Broom	900	3
Linen ³	600	2

(Amend 0005)

5.f.(3). Minimum requirements for interior, exterior, and combined bulk storage are shown in Table 5-7.

TABLE 5-7 - MINIMUM INTERIOR, EXTERIOR, & COMBINED BULK STORAGE¹

Type of Unit	Type of Storage	Area	
		m ²	ft ²
3 BR	Int.	3.0	32
	Ext.	4.0	43
	Comb.	7.9	85
4 BR	Int.	3.7	40
	Ext.	4.5	48
	Comb.	9.3	100

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TABLE 5-7 - MINIMUM INTERIOR, EXTERIOR, & COMBINED BULK STORAGE¹

Type of Unit	Type of Storage	Area	
		m ²	ft ²

Example¹: If interior bulk storage is 2.3 m², then exterior bulk storage must be 4.2 m² to obtain the combined bulk storage requirement of 6.5 m².

5.g. Major Zones. Living and Dining, Kitchen, Family Room, and Bedrooms.

5.g.(1). Living and dining. The living room should have direct access to the front entrance foyer and to the dining area without passing through another room. When circulation is required along the perimeter of the space or between areas in open plans, minimum circulation space of 1000 mm (3 ft-3 inches) shall be added to the required minimum room dimension.

5.g.(1).(a). The dining area may be an extension of, or an "L" off the living room.

5.g.(1).(b). The dining area shall be directly accessible from the kitchen without passing through another room.

5.g.(2). Kitchen and auxiliary dining areas.

5.g.(2).(a). The kitchen shall provide an efficient work triangle. Provide a "Lazy Suzan" type of revolving shelf system in at least one corner of the base cabinet. A base cabinet, minimum 380 mm (15 inches) wide, shall be provided on the handle side of the refrigerator. The range shall not be located adjacent to the refrigerator, in a corner, or adjacent to a passageway. The dishwasher shall be installed adjacent to the kitchen sink. Provide a backsplash behind the range, extending to the underside of the range hood, finished to match the countertop or range and the range hood. Space for a tenant-owned upright freezer shall be provided adjacent to the kitchen or in areas such as the utility room or garage. Space for a tenant-owned microwave oven shall be provided in the kitchen.

5.g. (2).(b). Pantries. In addition to the minimum requirements, pantries and broom closets adjacent to or as an extension of the kitchen, for storage of packaged foods and house cleaning equipment and supplies, are desirable.

5.g.(2).(c). Provide auxiliary dining areas in the form of table space in the kitchen or in a family room adjacent to, or as an extension of, the kitchen. The auxiliary dining area shall not be located in the living or dining rooms.

5.g.(2).(d). In the kitchen, shoe molding (1/4 round) is required at all base cabinets where they meet the floor surface.

5.g.(3). Family room. Provide a separate family room, adjacent to and contiguous with the kitchen, for all three-, four, and five-bedroom units.

5.g.(4) Bedrooms. Bedrooms shall be designed to accommodate king-size beds in master bedrooms and twin beds in the other bedrooms. Window, door, and closet placement should enhance furnishability. Each bedroom shall be accessible without passing through another bedroom.

5.h. Minor Zones. Bathrooms, Laundry, Closets, and Bulk Storage.

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(Amend 00007)

5.h.(1). Bathrooms. Emphasis shall be placed on size, furnishings, layout, and privacy. Direct access to a bathroom from the master bedroom is required for three and four bedroom units. Compartmented bath design, for family and guest use, is encouraged. Provide natural light to all bathrooms. Double glazed, self flashing skylights mounted on raised curbs are acceptable for interior bathrooms. **Also acceptable for interior bathrooms are solar tubes, mounted per manufacturer's instructions.** Determine the number of bathrooms based on Table 5-8.

(Amend 00006)

TABLE 5-8 - BATHROOM REQUIREMENTS

Number of Bedrooms per Unit	Number of Bathrooms Per Unit
3 - 4	2

~~Note: General Officer (GO) units shall have three full bathrooms, with one on the first floor configured for accessibility.~~

5.h.(1).(a). A full bath shall contain a water closet, lavatory, and either a tub with shower assembly or a shower stall. One full bath in each housing unit shall include a tub with shower assembly and shall be directly accessible from the bedroom hall without passing through another room. Showers, and tubs with shower assemblies, shall include tempered glass or plastic enclosures and doors. A half bath contains a lavatory and a water closet.

5.h.(1).(b). Provide lavatories mounted in 610-mm (2-ft wide) minimum countertops, with vanity bases. Countertops shall be high pressure laminated plastic, ceramic tile, marble, or homogeneous, non-porous, solid surface type materials, with minimum 100 mm (4 inches) high back splashes.

5.h.(1).(c). Bathroom accessories may be surface mounted or recessed, of non-corrodible metal or ceramic tile, and shall include a toilet paper holder, soap dish (at sink and at tub/shower), toothbrush and tumbler holder, and grab bar at tub or shower stall, bathrobe hook, and towel bars totaling not less than 1100 mm (42 inches) for a full bath and not less than 750 mm (30 inches) for a half bath.

5.h.(1).(d). A recessed medicine cabinet shall be provided in each bathroom. Cabinets shall be corrosion-resistant with plate glass mirrors, sliding or hinged door type. Do not place recessed medicine cabinets in party walls.

5.h.(1).(e). Tubs and showers shall not be placed under windows.

5.h.(1).(f). Exhaust shall be provided in all baths, shall be ducted directly to the exterior of the building, and shall be a part of an engineered ventilation system (See paragraph 10).

(Amend 0005)

5.h.)2). Laundry. Washer and dryer space in all units shall be in a separate utility room. **Dryer lint vent shall exhaust horizontally to the exterior.**

(Amend 0005)

5.h.(2).(a). The space provided shall have doors that provide full access when open. Two full-length shelves, 250 mm (10 inches) minimum nominal depth, are required above the washer and dryer. **Shelves with exposed corners shall have rounded outside corners, with 1" radius.**

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5.h.(2).(b). Minimum net clear door width to washer and dryer space when open is 1600 mm (5 ft-4 inches) for an enclosed recess and 800 mm (2 ft-8 inches) if located within a utility room.

5.h.(3). Closets. Closets shall provide the minimum widths indicated in Table 5-6. A broom closet shall be provided convenient to the kitchen, and a coat closet shall be located convenient to the housing unit entrance.

5.h.(3).(a). Closet shelving. Closets (except linen closets) shall be equipped with a 305 mm (12 inches) deep shelf and a clothes hanger rod. Linen closets shall be provided with at least four full-depth shelves. Closet shelving and rods in excess of 1200 mm (4 ft) shall have center supports. Shelves and supports shall be capable of carrying 52 kg/m (35 lbs/ft). Closet shelving shall be minimum 19 mm (3/4 inch) thick solid wood, plywood. High density particle board shall not be used. Factory Finished welded wire shelving shall not be used.

(Amend 0005)

5.h.(3).(b). Closet doors. Closet doors should be located to permit placement of furniture in the corners of the rooms by providing a 460-mm (18-inch) return adjacent to a furnishable wall. Closets 1800 mm (6 ft) or more in width shall have sliding doors, maximum 2000 mm (6 ft-8 inches) high. Wall closet width shall not extend beyond either door jamb more than 510 mm (20 inches). Wardrobe closet doors (sliding and bi-fold) shall be provided with both top and bottom door tracks. Accordion doors are not permitted. **Doors shall have luan surface veneer, and hardwood styles and rails.**

5.h.(4). Bulk storage. Provide each housing unit with interior and exterior bulk storage space meeting the minimum requirements of Table 5-7. Provide interior storage in a separate room, or included as an extension of the utility room when one is provided. Provide exterior storage in a garage, a separate exterior enclosure, or within the housing unit with access from the exterior.

(Amend 0005)

5.h.(4).(a). ~~Not Used. Living units shall be provided an enclosed room on the ground floor level for the common storage of bicycles, prams, etc. This storage space (minimum of 1.7 m² (18 ft²) per housing unit) is in addition to the required minimum interior and exterior storage indicated in Table 5-7 for the individual housing units. Exterior storage space shall be lockable.~~

5.h.(4).(b). Bulk storage space should be at least 1200 mm (4 ft) in depth and a minimum clear height of 2000 mm (6 ft-6 inches), except that space under stairs may be counted at 1/2 area if the space is 1200 mm (4 ft) or more in height.

5.h.(4).(c). Provide a minimum of three nominally 305 mm (12 inches) deep shelves with a combined length of 7300 mm (24 ft) within each bulk storage room.

5.h.(4).(d). Common walls and ceilings between adjacent storage areas shall be finished on both sides.

5.h.(5). Mechanical Room. Provide external access to the mechanical room containing the water heater and HVAC equipment for each dwelling. Provide lock, keyed to post engineering key. Mechanical equipment will not be permitted in attic spaces. The mechanical room shall be on either side of each unit.

5.i. Interior Finishes

5.i.(1). Walls and ceilings. As surface material, provide minimum 13 mm (1/2-inch) gypsum wallboard, taped, bedded and smooth finished. Finish shall have orange peel texture and shall be painted in off-white, water base, semi-gloss paint as approved by Contracting Officer

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Representative. Water-resistant wallboard shall be used in wet areas such as bath, powder, and laundry rooms. Cementitious backer board shall be used for ceramic tile applications. Textured ceiling finish may be provided in areas other than kitchen, laundry, or bathrooms. Interior finish shall have a flame-spread rating of 25 or less and a smoke-developed rating of 50 or less when tested in accordance with ASTM E84.

5.i.(2). Kitchen and eating area walls and ceiling. Combined kitchen and eating rooms shall have the same type of wall and ceiling finishes.

5.i.(3). Flooring, base. Kitchen, laundry, and utility flooring shall be sheet, seamless vinyl with wood base. Bedroom, hall, and living-dining area flooring shall be vinyl composition tile with wood base. Bathrooms shall be of ceramic tile flooring with ceramic tile base or seamless sheet vinyl with wood base. Additional consideration will be given to designs which incorporate ceramic tile bathroom floors and bases. This material identification is not justification to exceed the mandatory price limitation set forth in this solicitation.

5.i.(3).(a). Vinyl composition floor tile shall conform to ASTM F1006, Standard Specification for vinyl composition floor tile, and have a minimum thickness of 3 mm (1/8 inch).

5.i.(3).(b). Sheet vinyl shall conform to ASTM F1303, Standard Specification for Sheet Vinyl Floor Covering with Backing, Type II, Grade 2. Flooring shall be installed as a monolithic material with seams welded or bonded for a seamless installation. No seams shall be permitted in spaces less than 12 feet in width. Insure smooth transition from sheet vinyl to the vinyl tile.

5.i.(3).(c). Ceramic tile shall conform to ANSI 137.1, moderate or heavy grade.

5.i.(4). Painting. Primers, paints, and stains shall meet or exceed the requirements of Corps of Engineers Guide Specification 09900, Painting, General, provided in the Technical Specifications. Finishes shall be lead free. All interior surfaces, except factory prefinished material, shall be painted a minimum of one prime coat and one finish coat. Walls and ceilings in kitchen, baths, laundry, utility rooms, and all painted trim shall be painted with semi-gloss enamel. Colors shall be submitted by the Contractor and approved by the Contracting Officer Representative. Blown-on acoustical finish is prohibited.

5.i.(4).(a). Federal specifications. Paints shall meet or exceed the latest issue of the following Federal Specifications as noted below.

Specifications for Primer, Paint and Stain

<u>SURFACE</u>		<u>COAT</u>	<u>FED. SPEC.</u>
Exterior Wood	Primer	TT-P-001984	Primer Coating, Exterior, Lead Pigment-Free (Undercoat for Wood)
	Finish	TT-P-102	Paint, Oil, Alkyd Modified, Exterior, White and Tints
	Stain	TT-S-708	Stain, Oil, Semitransparent, Wood, Exterior
Interior Wood	Primer	TT-P-645	Primer, Paint, Zinc-chromate, Alkyd Type
	Finish	TT-E-489	Enamel, Alkyd, Gloss (For Exterior and Interior Surfaces)
Metal, exterior or interior	Primer	TT-P-645	
	Finish	TT-E-489	
Gypsum Board	Primer	TT-650	Primer Coating, Latex Base, Interior, White (For Gypsum Wallboard)

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Finish TT-P-1511 Paint, Latex, (Gloss) and (gloss) (Semi-gloss, Tints and White) (For Interior use)

Finish TT-E-509 Enamel, Odorless, Alkyd, (semi-gloss) Interior, Semi-gloss, White and Tints

(Amend 0005)

5.i.(5). Offerors shall provide three one interior Color/Finish Schemes. Color scheme shall consist of catalog cuts and samples to depict color, quality and texture of all materials proposed. **From these, one color/finish scheme will be chosen.**

5.j. Garages. Provide a single car garage for each housing unit. Refer to Table 5-4 for minimum dimensions. Set the garage slab elevation a minimum of 100 mm (4 inches) below the level of the housing unit floor and the floor of the adjoining exterior storage. Slope slabs to drain out the garage door. Garage doors shall have hardware that can be opened and locked from inside and outside of the garage.

5.k. Roofing and Drainage. Minimum slopes for roofs shall be as shown in Table 5-9.

TABLE 5-9 – ROOF SLOPES

Roof Types	Rise	Run
Shingle	1	3

5.k.(1). Roof water. Roof water shall be diverted away from entrances and foundations. Provide rain diverters over entrances

5.k.(2). Roof surface. Wood shake or shingle roofs are prohibited. The roof system shall be designed to withstand a wind speed of 435.5 meters/second (80 mph). The contractor shall provide a 2 year warranty for the installation of the roofing system. The roofing shingles shall have an unconditional warranty for 5 years. After 5 years, the roofing shingles shall have a 20 year limited warranty. Roofing shall be limited to the following:

5.k.(2).(a). Minimum of 102 kg (225 lb) Class A wind-resistant fiberglass shingles conforming to ASTM D3018, Specification for Class A Asphalt Shingles Surfaced With Mineral Granules.

5.k.(2).(b). Provide fiberglass asphalt shingles equal to TAMCO Tam-Loc shingles, T-lock type. Provide minimum 19 mm (3/4-inch) horizontal separation between the fascia board and the metal drip flashing at the rakes and eaves. Minimum of 112 kg (248 lb) Class A wind-resistant fiberglass shingles conforming to ASTM D3018, Specification for Class A Asphalt shingles Surfaced With Mineral Granules.

(Amend 0005)

5.l. Exterior Finishes. Emphasis shall be placed on low maintenance and durability for exterior finish materials. Materials shall be residential in size, scale, and texture. Exterior finish materials for exterior bulk storage buildings and garages will match the primary dwelling unit. **The exterior finishes shall be a** mixture of brick houses and stucco houses with brick wainscot. **is preferred. The following siding materials may be used.**

5.l.(1). Brick. Brick shall conform to ASTM C216, Standard Specification for Facing Brick)Solid Masonry Units Made from Clay or Shale). Provide brick cap and flashing for all offset brick

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vener. For grade beam design, the brick shall run a minimum of one course below the finished floor and shall be flashed at that level.

5.1.(2). Exterior Insulation and Finish System. The exterior finish with integral color shall be a standard manufacturer's insulating wall system consisting of insulation, reinforcing mesh or fabric and finish coat applied over solid wall sheathing or standard manufacturer's finish system with insulation provided in stud space. Other exterior finish materials such as fiber reinforced stucco systems with elastomeric finishes are permitted. For all vertical surfaces composed of exterior insulation and finish system or fiber reinforced stucco, provide ultra-high impact resistance of 17 newton-meters (150 inch-pounds). The color and finish shall be submitted by the Contractor and approved by the Contracting Officer.

(Amend 0005)

~~5.1.(3). **Not Used.** Concrete masonry units. Concrete masonry units shall conform to ASTM C90, Specification for Hollow Load-Bearing Concrete Masonry Units, and shall be factory scored, fluted, or striated.~~

(Amend 0005)

~~5.1.(4). **Not Used.** Factory-prefinished siding. Factory-prefinished siding shall have a minimum non-prorated 15-year warranty on the finish. Aluminum or steel siding with or without backing are acceptable only on the second story of a structure or at least 2000 mm (6 ft) above finish grade. Siding shall be kept a minimum of 150 mm (6 inches) above finish grade. Lap siding shall be either single pieces with 203 mm (8 inches) maximum width course or single pieces shaped to simulate 200 mm (8 inches) maximum width courses (double four, double five, triple four sidings are acceptable). Siding shall be installed in accordance with manufacturer's recommendations. A manufacturer's representative shall instruct the installer of the siding, appurtenances, and accessories as to the manufacturer's required installation procedures. The Government construction inspectors responsible for the job shall be included in their instruction. Panel materials in large surfaces shall be avoided unless surfaces are broken with textures or battens. Battens for prefinished materials shall also be factory finished. Requirements for various siding materials are as follows:~~

(Amend 0005)

~~5.1.(4).(a). Aluminum siding shall conform to the requirements of AAMA 1402.3, Standard Specification for Aluminum Siding, Soffit, and Fascia, except aluminum substrate shall be a minimum of 0.6 mm (0.024 inch) thick if it is not fiberboard backed. For fiberboard backed aluminum siding, the aluminum substrate shall be a minimum of 0.5 mm (0.019 inch) thick. Aluminum siding shall not be installed within 1.6 km (1 mile) of open saltwater or in other highly corrosive atmospheres.~~

(Amend 0005)

~~5.1.(4).(b). Steel siding material shall be a minimum of 0.017-inch thick (29 gage), zinc-coated steel conforming to ASTM A526, Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality, and ASTM G90, Standard Practice for Performing Accelerated Outdoor Weathering of Nonmetallic Materials Using Concentrated Natural Sunlight. Siding panels shall be formed to provide full-length edge interlock, so that after installation, fasteners will be concealed from view. Siding shall be pretreated and either factory-primed and finish-painted or factory-laminated with a weather-resistant polymer film. When tested for 500 hours in accordance with ASTM B117, Method of Salt Spray (Fog) Testing, the siding finish shall show no signs of cracking, blistering, peeling or significant color change, and shall show no loss of adhesion from the metal more than 1.6 mm (1/16-inch) beyond a line scratched or scribed through the coating. Steel siding shall not be installed within 1.6 km (1 mile) of open saltwater or in other highly corrosive atmospheres. Steel siding materials shall be separated from aluminum surfaces with a coating of bituminous paint or asphalt varnish.~~

(Amend 0005)

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~~5.1.(4).(c). Vinyl siding shall conform to the requirements of ASTM D3679, Rigid Poly Vinyl Chloride (PVC) Siding and shall be a minimum of 1.16 mm (0.044 inch) thick.~~

5.1.(4).(d). Hardboard and cement asbestos shingle siding are not acceptable.

5.1.(5). Trim elements. Field finished exterior wood shall be minimized to the greatest extent possible; or not allowed at all. However, if it becomes necessary to use exterior exposed wood trim, the following requirements shall apply:

5.1.(5).(a). Fascia and rakes are required and shall be galvanized steel with factory applied coating equal to Kynar 500 by Pennwalt Corporation in the Residential accent trim color or pre-finished aluminum

5.1.(5).(b). Exposed wood, such as window trim, door sills, window sills, railings and wood fencing shall be treated for rot resistance in accordance with NWWDA Industry Standards I.S.4, Water Repellant Preservative Treatment for Millwork.

5.1.(5).(c). Exterior surfaces requiring painting shall receive a minimum of one prime coat and two finish coats of paint. Use semi-gloss paint unless directed otherwise by Contracting officer Representative. Wood trim frames, etc., shall be back primed. Exterior semi-transparent stains, two coats, are acceptable, where appropriate for wood, plywood, etc.

5.1.(6). Exterior ceilings and soffits. Exposure of roof framing and underside of roof/floor decks are not permitted. Exterior ceilings and soffits will be trimmed or otherwise architecturally treated and coordinated with siding. Exterior ceilings and/or soffits may be galvanized steel with factory applied coating equal to Kynar 500 by Pennwalt Corporation in the residential accent trim color or pre-finished aluminum. Cement asbestos ceilings or soffits are not permitted. The color shall match the adjacent exterior wall color.

5.1.(7). Patios/porches. Patios/porches shall be sloped to drain and have a broom-finished concrete floor surface, which provides a waterproof and non-slip surface. Plastic coating or films over concrete decks are not acceptable. Exposed wood decks, stained or painted, are not acceptable. Topping shall have a minimum thickness of 38 mm (1 1/2-inch) with welded-wire mesh reinforcement. All iron bar stock rails shall be painted black with rust-inhibiting paint.

5.m. Glazed Openings. The windows shall be double-glazed, dark bronze anodized fixed or single hung aluminum units with divided lites in a vertical portion. No other types of windows are permitted. A minimum 10 year warranty against defects in materials and construction shall be provided. Individual window openings should not exceed 2.23 square meters (24 square feet per façade). There should be a minimum of windows on the east and west facades. Windows shall be set in at least 100 mm (4 inches) from the building face. **(AM#7)** _____. Weather stripping shall be factory applied. Thermal breaks shall be provided to eliminate condensation. Windows and glazed door (50 percent or more glass) units shall meet the following standards and must be certified by an independent testing laboratory. Single hung windows shall meet the standards for hung units. Standards for casement windows shall apply to all hinged or fixed windows. The Contractor shall provide the manufacturer's certification that the window provided meets the following test requirements:

5.m.(1). Required tests. Hung units will meet a National Fenestration Rating Council (NFRC) design pressure rating of 25. Casement windows will meet NFRC design pressure rating of 40. Evidence of passing the following specific tests and minimum standards are required to achieve these design pressure standards.

5.m.(1).(a). Structural testing. Using ASTM E330 test results shall demonstrate no glass breakage, damage to hardware, or permanent deformation that would cause any malfunction or

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impair the operation of the unit. Residual deflection of any member shall not exceed 0.4 percent of its span. Hung windows shall be tested at pressures of 1796 Pa (37.5 lb/ft²), and casement windows shall be tested at pressures of 2873 Pa (60.0 lb/ft²).

5.m.(1).(b). Operating force. The force necessary to unlatch and open units shall not exceed 13.6 k (30 lb) for hung units and 15.9 k (35 lb) for casements.

5.m.(1).(c). Air infiltration. Using ASTM E283 leakage rate shall not exceed 0.65 l/min/m² (0.25 ft³/min/ft²) for hung units and 0.39 l/min/m² (0.15 ft³/min/ft²) for casements, at a test pressure of 7.66 k/m² (1.57 lb/ft²).

5.m.(1).(d). Water penetration. Using ASTM E547, no leakage shall be evident when tested in three, five-minute cycles with a one-minute rest period between cycles at 18.3 k/m² (3.75 lb/ft²) for hung units and 29.3 k/m² (6.0 lb/ft²) for casements.

5.m.(1).(e). U-Value. Whole window U-values shall comply with Table 7-2. U-values shall be calculated using ASTM E1423 and NFRC 100-91.

5.m.(2). Patio doors. Patio doors shall be fully glazed French Door type of metal or metal clad wood construction. Finish shall be an anodized finish and shall be factory applied and conform to 44-C-22431 in accordance with the requirements of the National Association of Architectural Metal Manufacturers (NAAMM) Metal Finishes Manual. Provide thermal breaks to prevent condensation where required. Door composition shall include one 900 mm (3 feet) wide hinged leaf and one 900 (3 feet) wide fixed leaf. Individual lites shall be glazed with 13 mm (½ inch) insulating glass units constructed of two panes of Low-E glass, 3 mm (1/8 inch) tempered glass with a 6 mm (1/4 inch) air space. Glass shall be sealed in the door and back bedded with bedding compound or glazing beads.

5.m.(3). Glazing. Units shall be double glazed with low E-glass.

5.m.(4). Interior window stools shall be solid-wood, paint-grades with a minimum thickness of 19-mm (3/4-inch).

5.n. Screens. Screens shall be provided at all operable sashes and sliding doors. Screens and frames shall be aluminum, of window manufacturer's standard design, and conform to AAMA 1002.10, Voluntary Specification for Aluminum Insulating Storm Products for Windows. Insect screens shall be secured with interior metal clips.

(Amend 0005) (Amend 0007)

5.n.(1) Solar ~~wings~~ **screens**. Provide for wing wall projections to shade windows. ~~Projection shall extend 370mm (14 1/2 inches) from wall, adjacent to window frame. Offeror shall use design judgment regarding vertical extension of wing on the wall to insure full shading of window. Wing may extend projection from finish floor level to eave. Projection may be sloped at top and bottom to prevent moisture damage. The following passive design parameters shall be incorporated into the design of this project:~~

5.n.(1)(a) Latitude at Fort Bliss: 31.8degrees North.

5.n.(1)(b) True South: Magnetic declination at Fort Bliss is 12 degrees east. That is, a compass reads 12 degrees east of True North or 12 degrees west of True South.

5.n.(1)(c) Prevailing winds at the site: North in winter, South in summer.

5.n.(1)(d) Optimum Direct Gain Aperture Range (percent range of glazed opening to floor area):11.6%.

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5.n.(1)(e) Minimum profile angle for fixed shade design (May Declination): 65.5degrees.

5.n.(1)(f) Recommended shade devices (East and West): Trees and shrubs.

5.n.(1)(g) Optimum orientation of facility for passive solar and topo conditions: within twenty degrees east or west of True South.

5.n.(1)(h) All windows and other glazed areas exposed to the sun, including all glass within twenty degrees east or west of True South, shall be completely shaded on the exterior no less than 50 % of the time between 0900 and 1730 (solar time) daily during the period from 30 April through 1 October. Partial shading all the time is an acceptable alternative, providing the solar gain does not exceed that permitted above, based on actual solar studies. Shading may be achieved by building projections, either horizontal or vertical, by a deep reveal or by any combination of these measures, or by other approved architectural design.

5.o. Window Treatments. Provide 25 mm (1 inch) metal blinds at windows and patio doors. Color shall be manufacturer's standard off white, and shall be coordinated with wall color. Provide traverse drapery rods at all windows 1500 mm (60 inches) in width or greater. Traverse type rods shall be equal to the 25 mm (1 inch) oval section, Kirsch Model No. 9003 (heavy duty). Provide solid wood blocking at all openings to receive blinds and traverse rods. Drapes shall not be provided. Shades are not permitted

5.p. Doors. See Table 7-2 for thermal performance requirements for exterior doors.

5.p.(1). Entrance doors. The housing unit primary entrance door shall be 900 mm (3 ft) in width by 2050 mm (6 ft-8 inches) in height by 45 mm (1-3/4 inch) thick, thermal metal. Other housing unit entrance doors should meet this requirement but may be of lesser width. All exterior door frames shall be painted hollow metal.

(Amend 0005)

5.p.(2). Exterior bulk storage and mechanical room doors shall be a minimum of 900 mm (3 ft) width and 45 mm (1-3/4 inch) thick, painted hollow metal flush type conforming to ASTM E 152, NAPA 252, and UBC 4302. For exterior accessibility to mechanical doors, provide a deadbolt, ~~F1307~~ Function lock keyed to the Fort Bliss engineering keying system. Bulk storage room doors shall be keyed to the unit. Mechanical room doors shall be keyed to the DPW engineering key.

5.p.(3). Aluminum screen and storm doors. Screen and self-storing storm doors shall be provided for all housing unit exterior hinged doors. Frames shall be a minimum of 32-mm (1-1/4-inch) thick and 51 mm (2 inches) wide. Aluminum alloy materials shall be not less than 1.27-mm (0.05-inch) thick and 51 mm (2 inches) wide. Doors shall have solid bottom panels and midsection protective grills. Screening materials shall be aluminum.

(Amend 0007) (Amend 0005)

5.p.(4). Interior doors. Interior doors shall be 2050 mm (6 ft -8 inches) in height by 35 mm (1-3/8 inch) thick, paint grade luan veneer solid hollow core wood construction. Insure solid hardwood styles and rails.

5.p.(5). Door frames. Interior door frames shall be paint grade solid wood construction. Exterior door frames shall be painted hollow metal construction.

5.p.(6). Garage doors. Provide a 2700 mm (9 foot) wide factory primed, field painted non-insulated metal garage door with the manufacturer's standard lockable hardware.

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5.q. Builders Hardware. Interior hinges shall be **ball-bearing** of a base material of brass or bronze (except as required for fire rated doors). Exterior hinges shall be ball bearing of a base material of brass or bronze. Hinges, locks, and latches shall comply with the specifications indicated in Table 5-10, and the following subparagraphs:

TABLE 5-10 – HARDWARE SPECIFICATIONS

Hardware Type/ Specification	Specific Requirements
Hinges BHMA/ANSI A156.1	Hinges shall be 102 mm x 102 mm (4 in x 4 in) at exterior doors, and 90 mm x 90 mm (3-1/2 in x 3-1/2 in) at interior doors. Hinges shall be ball bearing type and have base material of brass or bronze, except as required by fire codes. Finish shall be #626.
Locks & Latches BHMA/ANSI A156.2	Series 4000, Grade 1, at exterior doors. Grade 2 or 3 at interior doors. Provide trim of finish # 626.
Auxiliary Locks BHMA/ANSI A156.5	Series 4000, Grade 2. Provide matching trim of finish #626.
Interconnected Lock & Latches BHMA/ANSI A156.12	Grade 2. Provide matching trim of finish # 626.
Closers BHMA/ANSI A156.4	Series CO2000, Grade 1.

(Amend 0005)

5.q.(1). Locks and keys. Lock cylinders shall have six pin tumblers and interchangeable cores which are removable by a control key. A master keying system will not be provided. Locks for each housing unit, including exterior storage and garage door(s), shall be keyed alike. The Contractor shall provide one extra set of cores for each 50 housing units, four keys for each unit with three keys for each garage. Also provide two control keys. Locks and keys shall conform to the standards and requirements of the Builders Hardware Manufacturers Association (BHMA) listed above. Deadbolts are required on all exterior doors. Provide Best or Arrow interchangeable, removable cores. Locksets for mechanical rooms only shall be keyed to the existing Post utilities ~~master~~ keying system, consisting of Arrow cylinders, 1 1/4 inches, AR-1 keyway, without key removable cores.

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5.q.(2). Weather stripping and exterior thresholds. Provide nonferrous metal or vinyl weather stripping for all housing unit exterior doors. Vinyl magnetic weather stripping is acceptable for metal doors. Exterior thresholds shall be nonferrous metal.

5.q.(3). Applications. Locks and hinges shall be applied as follows:

5.q.(3).(a). Exterior hinged doors shall have 1-1/2 pair of hinges, lockset, and an auxiliary lock or interconnected lock and latch,

5.q.(3).(b). Each windowless entrance door will have a viewer mounted at eye level.

5.q.(3).(c). Exterior bulk storage door shall have 1-1/2 pair of hinges and lockset.

5.q.(3).(d). Interior doors shall have 1-1/2 pair of hinges and latch set or passage set, with BHMA /ANSI A156.2, F75 or F76 operations.

5.q.(3).(e). Doors in fire-rated walls, housing unit to garage, shall have 1-1/2 pair of steel ball-bearing hinges, lockset, auxiliary lock or interconnected lock and latch and closer.

5.q.(3).(f). Garage side exterior doors shall have 1-1/2 pair of hinges and lockset.

5.q.(3).(g). Hardware Trim. Lock trim shall be cast, forged, or heavy wrought construction of commercial plain design. In addition to meeting the test requirements of BHMA/ANSI A156.2 or A156.13, lever, roses and escutcheons shall be a minimum of 1.27mm (0.05 inch) thick. If reinforced, the outer shell shall be a minimum of 0.89mm (0.035 inch) thick and the combined thickness shall be a minimum of 1.78mm (0.07 inch) except the knob/lever shanks which shall be a minimum of 1.52mm (0.06 inch) thick.

5.r. Postal Service, Building Signage and Clothes Drying Umbrellas.

(Amend 0005)

5.r.(1). Postal Service. Coordinate mailbox clusters and concrete pads with local post master for approval. Pads and clusters shall be located out of circulation paths of, and adjacent to the sidewalks. Note: Local post office requires a minimum of 24 boxes per cluster.

5.r.(2). Building Signage. All new units shall be provided with building identification signage in accordance with the Installation Design Guide requirements. Each housing unit with exterior entrance will have a number visible from the vehicular circulation

5.r.(2).(a). House numbers. Provide a five digit house number for each dwelling unit composed of four numbers and one letter. Provide a 100 mm (4 inch) high house identification, including frame, (numbers and letter) in a Helvetica medium font colored black on a reflective white background mounted on 12 gauge aluminum for each dwelling unit. The house identification shall be mounted near each entry. House numbers will be assigned by the Contracting Officer Representative.

(Amend 0005)

5.r.(2).(b). Occupant Identification Signage. Provide occupant identification signage similar to existing family housing signage. Signage shall be interchangeable plastic, in a metal holder, and made of plastic with routed letters. Total sign height shall be 50 mm (2 inches) overall including the frame. Signs shall be mounted 1500 mm (5 feet) above finish grade at side of entry. All signage should conform to the guidelines established by TRADOC sign standards (TRADOC Reg. 420-14) and Fort Bliss sign standards AR420-70, Supplement 1. ~~Names and rank shall be as directed by the Contracting Officer Representative.~~

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5.r.(3). Clothes Drying Umbrellas. Provide for each dwelling unit one heavy duty, rotary type clothes dryer for outdoor clothes drying. Provide sleeves, in a concrete footing, at grade for each dwelling unit but do not install the clothes drying umbrellas. Store the clothes drying umbrellas in the garage (one umbrella per unit).

(Amend 0005)

5.s. Kitchen Cabinets. Cabinets shall be factory manufactured of wood. Wall cabinets shall have adjustable shelves. Cabinets shall have magnetic catches except where spring-loaded self-closing hinges are provided. Cabinets shall include knobs/handles and or pulls and shall conform to ANSI A1.61.1, Recommended Performance and Construction Standards for Kitchen and Vanity Cabinets, except where modified below. Wall and base cabinets shall be essentially of the same construction and appearance. Refer to Table 5-5 for minimum kitchen cabinet area requirements. **NOTE: Pulls may be defined as routed undercuts for finger pulls.**

5.s.(1). Cabinets construction. Construct cabinets with frame fronts and solid ends, or of frame construction throughout. Frame members shall be mortised and tenoned, dove-tailed or doweled, and glued together. Brace the top and bottom corners with hardwood blocks that are glued with water-resistant glue and nailed in place. Wood cabinet materials and dimensions - Materials and minimum dimensions and thicknesses for cabinet construction materials shall comply with Table 5-11.

TABLE 5-11 – KITCHEN CABINET SPECIFICATIONS

Element Description	Specific Requirements
Frame Members	19 mm x 38 mm (3/4 in x 1-1/2 in) kiln-dried hardwood.
Base Cabinet Toe Space	64 mm deep x 102 mm high (2-1/2 in x 4 in).
Cabinet Bottoms, Backs & Tops (Unexposed)	5 mm (3/16 in) hardwood plywood. Provide bottoms in kitchen sink cabinets. Brace bottoms with wood members glued in place.
Cabinet Ends & (Exposed Backs/Bottoms)	Hardwood plywood, 5 ply, good grade for natural finish. Base Cabinets: 13 mm (1/2 in) Wall Cabinets: 10 mm (3/8 in)
Doors	16 mm (5/8 in) hardwood plywood, good grade for natural finish, with hardwood trim. Raised panel or recessed panel.
Drawer Slides/Glides	20 gauge metal. BHMA/ANSI 156.9 Grade 2
Drawer Fronts	16 mm (5/8 in) solid hardwood, matching doors.
Drawer Bottoms	3 mm (1/8 in) softwood plywood, Grade A-B veneer. Bottoms 380 mm (15 in) wide shall be braced and glued in place.

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TABLE 5-11 – KITCHEN CABINET SPECIFICATIONS

Element Description	Specific Requirements
Interior Partitions	13 mm (1/2 in) hardwood or softwood plywood, Grade A-A or comparable veneer.
Shelves	13 mm (1/2 in), softwood plywood (Grade A-B Veneer), hardwood plywood (good grade veneer), or glued-up solid wood. Support shelves on ends and on 610 mm (24 in) centers. Shelf edges exposed to view shall be rounded, filled, sanded, and finished.

5.s.(2). Countertops. Countertops finish: butcher block high pressure laminated plastic 1.1-mm (0.043-inch) thick for post-formed tops or 1.3-mm (0.05-inch) thick for countertops with separate backsplash, and shall be applied with heat-resistive adhesive. Countertops may also be ceramic tile or homogeneous, non-porous, solid surface materials. Minimum backsplash height is 100 mm (4 inches). The substrate for countertops (except solid surface countertops) shall be 19 mm (3/4-inch) thick exterior plywood.

5.t. Appliances. Provide the following equipment in accordance with specifications listed, one each per housing unit. A listing of currently labeled Energy Star appliances is available through the internet at the EPA website: <http://www.energystar.gov/products/appliances.html>.

5.t.(1). Refrigerators. Comply with UL 250, Household Refrigerators and Freezers and shall bear the EPA “Energy Star” certified label. Provide refrigerator with frost proof top freezer, automatic defrosting, and ice maker. Refrigerator shall have two vegetable bottom baskets, at least four adjustable shelves, at least two shelves and egg container in door; freezer compartment shall contain separate interior shelves, multiple door shelves, and ice maker. Provide reversible (left swing and right swing interchangeable) doors. Refrigerators shall conform to the energy compliance standards of 10 CFR 430, including those refrigerators manufactured before the code took effect. The use of refrigerants with an Ozone Depletion Potential (ODP) of .05 or less is required. Minimum refrigerator volume and maximum energy use are as follows:

5.t.(1).(a). Volume: 0.58 CM, 21 CF

5.t.(1).(b). Energy Efficiency: 722 kWh/yr.

5.t.(2). Ranges and ovens. Ranges shall be 760 mm (30 inches) wide and provided with porcelain enamel cook top, oven, clock and timer, oven light, and cooking surface light. Oven shall have black glass window door, broiler pan, and self-lock racks. Use only gas range and oven.

5.t.(2).(a). Gas ranges shall have two, 150 mm (6-inch) and two, 205 mm (8-inch) burners, An oven, and AGA-approved electronic ignition. Gas ranges shall be in accordance with AGA Z21.1, American National Standard for Household Cooking Gas Appliances. Sealed burners **(Amend 00006) and ~~not self-cleaning ovens~~** will not be approved.

5.t.(2).(b). Electric ranges shall have four tubular plug-in surface elements of 4,500 watts minimum, removable reflector bowls, infinite-control switches, and range-indicating lights. Ovens

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shall be equipped with one, 2,000-watt (minimum) tubular broil element and one, 700-watt (minimum) bake element, oven indicating light, thermostatic heat control, utensil drawer. Electric ranges shall conform to UL 858, Household Electric Ranges. Sealed burners will not be approved.

5.t.(3). Range hoods. Provide metal range hoods, the same length and finish as the range, with separately switched light and exhaust fan. The hood shall have a washable filter. The fan shall have a capacity of not less than 78.7 L/s per meter of range hood (50 cubic ft per minute per linear foot of range hood). The sound level shall not exceed 6 sones. Duct the fan to the exterior and provide backdraft protection. No range hood shall be left unfinished and no holes shall be left uncovered.

(Amend 0005)

5.t.(5). Garbage disposals. Garbage disposals shall conform to UL 430; Waste Disposers; continuous feed, **(AM#5) minimum 3/4 HP motor**, stainless steel grinding elements, two 360-degree stainless steel swivel impellers, manual motor reset, and sound insulation. A plug connector is required.

5.t.(6). Dishwashers. Dishwashers shall conform to UL 749, Household Electric Dishwashers, and be UL listed, electric type, with air gap, racks, lift-out utensil holder, spraying arms, and detergent dispenser. Unit shall be listed as "Energy Star" compliant and shall bear the "Energy Star" label. The automatic controls shall cycle through the Wash, Rinse, Dry / Heat, and Stop phases, and shall be capable of rinse and hold cycle as well as a no heat drying feature. The unit shall contain instantaneous, or in-line, water heater booster, with automatic thermostat set for 60 degrees C (140 degrees F). Rated energy use for standard capacity models will not exceed 620 kWh/yr.

5.t.(7). Water heater. See paragraph 8j.

5.t.(8). Ceiling Fans. See paragraph 10k.

5.t.(9). Color. Kitchen appliances, except disposals, shall be white in color.

5.u. Maintainability. The design of housing units including the selection and specifying of exterior and interior finishes, equipment, appliances, and systems shall include consideration of maintenance ease and cost. Avoid products that require continuing maintenance at high cost.

5.v. Materials (AM#1)

5.v.(1). Gypsum Wallboard. Gypsum wallboard shall be asbestos-free. Provide certificate from supplier verifying that the gypsum wallboard is asbestos-free. (AM#1)

ACCOMPANYING AMENDMENT NO. 0007 TO SOLICITATION NO. DACA63-01-R-0002**6. UNIT DESIGN - STRUCTURAL.**

Structural design shall comply with Uniform Building Code and Council of American Building Officials (CABO) One and Two Family Dwelling Code, except as modified herein.

See following sheets for additional Design Criteria and 'APPENDIX – 10 SWD ARCHITECTURAL AND ENGINEERING INSTRUCTIONS MANUAL' for Structural Plates.

6.1 Description.

6.1.1 General. The structural criteria established herein shall be used for structural loading, design and installation of all structural systems and foundations, including manufacturing, erection, supervision, testing, and quality assurance of the completed installation of the housing units. All structural calculations shall be checked and initialed as such by a registered structural engineer other than the original design engineer. Refer to ATTACHMENT 11 Geotechnical Report for Foundation Design Analysis requirements and recommendations. The structural work generally consists of design, using the DESIGN LOADS and DESIGN CRITERIA below, but not limited to:

- (1) Foundations.
- (2) Retaining Walls.
- (3) Load Bearing and Non-Load Bearing Walls
- (4) Vertical Framing Members.
- (5) Horizontal Framing Members, including roof decks and diaphragms, roof beams and joists.
- (6) Interconnection Details including all nailing and fastening requirements.
- (7) Special Conditions, such as expansion, construction, and control joints, and changes in floor levels.
- (8) Attachment provisions for architectural, mechanical, and electrical elements.
- (9) Site fencing structure and foundations.

6.2 References. Design methods and stress allowances or load factors for the various structural materials shall be in accordance with the current editions of the codes and specifications listed below. Recommendations made in the codes, specifications and industry standards in this paragraph are requirements of this RFP, unless specified otherwise in this RFP.

(1) American Concrete Institute (ACI 318M) Building Code Requirements for Reinforced Concrete - latest edition.

(2) American Concrete Institute (ACI 302), Guide for Concrete Floors and Slab Construction.

(3) Uniform Building Code (UBC) of the International conference of Building Officials - latest edition.

(4) American Plywood Association, "APA Design/Construction Guide" "SDI Diaphragm Design Manual latest Edition."

(5) American Institute of Steel Construction (AISC), Manual of Steel Construction, latest edition.

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(6) American Iron and Steel Institute (AISI), Cold Formed Steel Design Manual - latest Edition.

(7) American Welding Society (AWS), Structural Welding Code.

(8) National Forest Products Association, "National Design Specification for Stress Grade Lumber and its Fastening."

(9) American Plywood Association, "APA Design/Construction Guide."

(10) Truss Plate Institute, "Design Specification for Metal Plate Connected Wood Trusses."

(11) Council of American Building Officials (CABO) One and Two Family Dwelling Code – latest edition

6.3 Selection of Structural System.

6.3.1 The overall structural system shall be selected based on durability, maintainability, and cost-effectiveness. The lateral support system shall consist of a horizontal roof diaphragm and shear walls. The horizontal roof diaphragm shall be developed with "Roof Sheathing". The shear walls shall be developed with "Structural Sheathing", "Let-in Bracing" or "Steel Strap Bracing", or a combination of Structural Sheathing and Let-in Bracing, or a combination of Structural Sheathing and Steel Strap Bracing.

6.3.2 **Foundation System.** The foundation system shall be determined by an approved geotechnical firm as required in the Geotechnical Report Section of this RFP.

6.4 Design Loads.

6.4.1 **Dead Loads.** The structural system shall be designed and constructed to safely support all dead loads, permanent or temporary, including but not limited to self weight, partitions, insulation, ceiling, floor covering, and all equipment that is fixed in position. Use ASCE 7-95 for weights of common building materials, or other recognized sources if not in ASCE 7-95.

6.4.2 Vertical Live Loads.

6.4.2.1 As a minimum, design loads shall be as stated in ASCE 7-95 (Minimum design loads for buildings and other structures) code. Design wind uplift loads shall be calculated in accordance with chapter 6 using the basic wind speed of 40 m/s (90 mph) as shown in figure 6-1, using a 3 second gust speed at 10 m (33 ft) above ground for exposure "C" category and associated with an annual probability of 0.02. A plan view of the roof shall be furnished showing all high wind edge zone dimensions and field of roof wind loads. Purlins shall be furnished a maximum of 760 mm (30 in) on center for eave, corner, rake, ridge, hip, and other edge zones and a maximum of 1520 mm (60 in) on center for the remainder of the roof (field of roof). Other criteria is as follows:

Minimum Roof Live Load - 98 K/sq.m (20 psf)

6.4.2.2 Floors shall be designed to support live loads in accordance with the ASCE 7-95 Code except:

Floor Live Load - 195 K/sq.m (40 psf)

Note: Loads may be reduced as permitted by the ASCE code.

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6.4.3 Horizontal Loads (Acting Inward and Outward). The structural system wind design, including components and cladding shall be designed in accordance the ASCE 7-95 code, and the seismic design shall be designed in accordance with the TM 5-809-10 - latest edition. An importance factor of 1.0, an exposure category is "C", the required wind speed and Seismic Zone I are to be used.

6.5 Design Criteria.

6.5.1 Minimum Footing Depth. The minimum footing depth from bottom of footing to finish grade for frost penetration and/or cover shall be 300 mm unless noted otherwise.

6.5.2 Foundation Design. The load used to size the width of the footings shall consist of the full dead load plus that portion of the live load which acts more or less continuously, usually 50 percent. Significant wall loads or column loads shall be distributed to the soil by the ribs. An effective width of slab on each side of the rib, equal to the slab thickness, may be added to the rib width for bearing. The bearing pressure under the ribs shall not exceed the allowable soil bearing pressure. Ribs may be widened locally or thickened integral spot footings may be used to distribute column loads to the soil.

6.5.3 Roof Slope. All housing units shall have a 1 in 3 pitched roof slope or greater.

6.5.4 Serviceability.

6.5.4.1 Foundation Settlement Strength. An adequate level of protection against structural failure due to uniform and/or differential foundation settlement or general shear shall be provided.

6.5.4.2 Vertical Deflection of Suspended Horizontal Framing Members. Building serviceability shall not be impaired by vertical deflections. The sum of the instantaneous vertical deflections due to live load plus long-term sustained load deflections shall not exceed the span divided by:

- (1) 240 at roofs.
- (2) 600 at masonry lintels for masonry walls.

6.5.4.3 Horizontal Deflection. Horizontal deflection shall not exceed the limits set forth in the Uniform Building Code - latest edition when the structure is subjected to the required seismic or wind loads.

6.5.4.4 Ultimate Strength of Structural Elements. An adequate level of protection against structural failure under extreme loads shall be provided. The proposer shall check the usual loading conditions for normal factors of safety and the extreme loading conditions, if present, for appropriate (unusual) factors of safety to provide levels of protection appropriate for the conditions.

6.5.5 Durability - Time Reliability.

6.5.5.1 Structural components shall be protected from condensed moisture that could impair their structural adequacy through deterioration.

6.5.5.2 Special attention shall be given to protection for corrosion or oxidation of metals, decay of wood and wood base materials, spalling of concrete, leaching of mortar, and deterioration of adhesives. Prevention of these hazards shall be especially important. Nonstructural steel (handrails, etc.) embedded in concrete shall be galvanized or painted wrought iron. All damaged galvanized areas shall be repaired prior to embedment.

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6.5.5.3 The materials used in structural elements, components, and assemblies shall be resistant to or protected from damage by exposure to normal climatic conditions.

6.6 General Design Criteria.

6.6.1 The design drawings shall contain General Notes which shall contain a list of the design loading criteria, a list of the strengths of the engineering materials used, the design soil values, a nailing schedule, and any other data that would be pertinent to remodeling and/or future additions.

6.6.2 Walls mostly below grade that are supported laterally by diaphragms at or near the top and bottom, shall be designed using loadings based on at-rest soil pressures.

6.6.3 Free standing earth retaining walls shall be loaded with active soil pressure and surcharge loading if present, and with this loading the vertical resultant shall be in the middle 1/3 of the footing base width. For this design, factors of safety for overturning and sliding shall be at least 1.5. Retaining walls shall be constructed of reinforced concrete only. Weep holes shall be provided in the wall to eliminate saturated soil conditions behind the wall.

6.6.4 Free standing exterior garden walls shall be designed to resist lateral wind and seismic forces, for the minimum requirements set forth in this document, as per the Uniform Building Code - latest edition. **(Amend 00006) Wall designs are to be in accordance with the sketch in the Attachments.**

6.6.5 Diaphragms shall have continuous chord members on all edges and shall have direct positive connection for transferring load to all members of the main lateral force resisting system.

6.6.6 Sheetrock wall covering shall not be used as a lateral resisting element of the lateral design.

6.6.7 The minimum design wind pressure on interior partitions shall be 24 KN/sqm (5psf) normal to the partition. All interior partitions shall be laterally braced.

6.7 Concrete Design.

6.7.1 **General.** All concrete on this project shall have a minimum compressive strength of 21 mpa (3000 psi) at 28 days unless noted otherwise. All foundation walls and footings shall be constructed of reinforced cast-in-place concrete.

6.7.2 **Testing.** Testing of concrete work shall be done at the proposer's expense by an approved independent testing laboratory.

6.7.3 **Forms.** Materials for forms shall be plywood, metal, metal-framed, aluminum, reinforced fiberglass, or plywood-faced, to provide continuous, straight, smooth, exposed surfaces.

6.7.4 **Reinforcing Materials.** Reinforcing Bars: ASTM A 615 M-96a, minimum Grade 300, deformed.

6.7.5 Concrete Materials.

- (1) Cement: ASTM C 150, Type I-II Portland cement low alkali (0.6% or less).
- (2) Fine Aggregate: ASTM C 33.
- (3) Coarse Aggregate: ASTM C 33.
- (4) Air-Entraining Admixture: ASTM C 260.
- (5) Flowing Concrete Admixture: ASTM C 1017, Type 1 or 2.
- (6) Calcium Chloride will not be permitted.

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(7) Fly Ash: ASTM C 618, Class "F"; fly ash content shall not exceed 20% of cement content or 45 kg (100 Lbs) of fly ash per .76 cu m. (Per cubic yard) of concrete, whichever is less.

6.7.6 Curing Compound. Liquid type membrane-forming curing compound complying with ASTM C 309, Type I, Class A or B.

6.7.7 Ready-Mix Concrete. ASTM C 94.

6.7.8 Not used

6.7.9 Slabs and Foundation Systems. The foundation system shall conform to the minimum requirements of a monolithic ribbed mat slab foundation system as per the following criteria:

6.7.9.1 All foundation concrete shall have a minimum 21 Mpa (3,000 psi) 28-day compressive strength with a minimum slab thickness of 100 mm. The slabs shall be reinforced with #10 metric bars (#3 inch-pound bars) or larger and ribs shall be reinforced with #16 metric bars (#5 inch-pound bars) or larger.

6.7.9.2 Ribbed-Mat Slab Foundation System required for bidding purposes. The actual foundation design shall be based on the final geotechnical report. A ribbed-mat slab foundation system consists of a network of continuous exterior and interior rib footings placed to interact monolithically with the floor slab.

6.7.9.2.1 The bottom of the exterior ribs shall be a minimum of 450 mm below finish grade. Interior ribs shall be placed beneath all load bearing and shear walls and be continuous across the slab at intervals not to exceed 7500 mm on center. All load bearing ribs shall be bottomed at the same elevation. The bottom of the non-load bearing ribs shall be at least 450 mm below the top of the floor slab. The minimum rib width shall be 250 mm. Typical plan layouts and sections will be shown in Appendix - 10, SWD ARCHITECTURAL AND ENGINEERING INSTRUCTIONS MANUAL. Ribbed-mat slab foundations shall be designed using conventional reinforcing. Post tensioned reinforcing shall not be used for this foundation system. Basic criteria is as follows:

(1) Rib reinforcing shall be a minimum of 0.25 percent top and 0.25 percent bottom.

(2) Minimum slab reinforcement shall be 0.2 percent in each direction.

6.1.7.9.2.2 Additional criteria is as follows:

(1) Water/Cement ratio shall be less than or equal to 0.42

(2) Slump at placement shall not be greater than the design mix slump. If contractor elects to pump mix, pumping aids will be allowed, provided shrinkage potential does not increase.

(3) 7-day wet mat moist curing will be required.

(4) Reduction of cement content shall be done by using fly ash. The volume of fly ash when combined with portland cement shall be 20% plus/minus 5% of the volume of portland cement plus fly ash.

(5) High range water reducers (HRWR) will be allowed if it is shown that concrete produce with HRWR is not subject to increased shrinkage, segregation, and retarding/flash setting. Testing will be performed on concrete with the proposed HRWR to determine shrinkage potential.

(6) Ribbed mat slab shall be placed in 6 m to 7.6 m (20 to 25 ft) wide lanes using lane placement techniques.

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(7) A mix design shall be required that incorporates a 24 mm to 38 mm (1.0 to 1.5 inches) coarse aggregate maximum with appropriate gradation specification. Follow ACI guidance for use of well graded aggregates.

(8) Use ACI 223 guidelines for the use of shrinking-compensating cements.

6.7.9.3 Not used

6.7.9.4 Conduits and Pipes. Horizontal runs of conduits and pipes will not be embedded in foundation ribs and slabs supported by ground. Vertical penetrations will conform to ACI 318-89. Aluminum conduit and pipes will not be embedded in any concrete structure.

6.7.9.5 Slab Joints. Slabs will be placed in lane fashion. Area of sections bounded by crack control joints will not exceed 54 sq. m (600 square feet), and distance between crack control joints will not exceed 7500 mm.

6.7.9.5.1 Slab crack control joints may be construction joints, expansion joints, or weakened plane joints consisting of plastic insert "T" strips (minimum depth shall be 1/4 depth of slab thickness) placed in the fresh concrete. Saw cut joints will not be allowed. Reinforcement will be interrupted at (50 mm clear each side) crack control joints. Bars shall be located at mid-depth of the slab, and starting 50 mm from edge of slab. The ends of crack control and corners of isolation joints will meet at a common point so far as practical. Stop reinforcing at expansion joints and provide smooth slip dowels (minimum 13 mm diameter) across the joint. Dowels shall be ASTM A 36 material.

6.7.9.5.2 When thickened slabs are employed under column bases or partitions, crack control joints parallel to the thickened slabs shall be offset from the thickened areas.

6.7.9.6 Walls, when used or required for lateral resistance to wind or seismic, shall be founded on a full foundation.

6.7.9.7 Reentrant corners in slabs will be reinforced with a minimum of one No. 13x900 mm bar (metric) at 45 degrees to the corner.

6.8 Masonry Design.

6.8.1 Provide solid brick where cores in cored brick might be exposed.

6.8.2 Joints shall be 10 mm, tooled concave, Type "S" mortar.

6.8.3 Ties shall be corrugated galvanized steel, 22 gage minimum, length to extend to 19 mm from brick face. Space ties a maximum of 600 mm on centers vertically and 400 mm on center horizontally.

6.8.4 Installation of brickwork shall comply with the latest edition of the Brick Institute of America Technical Notes No. 28; Brick Veneer, New Construction.

6.9 Structural Steel Design.

6.9.1 The detailing of structural steel framing, if any, including connections, shall be complete. All weld types, weld sizes, bolt layouts, bolt sizes, connection plates, members sizes and locations, and stiffener plates sizes and locations shall be shown.

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6.9.2 All members, elements and connections that are a part of the main vertical and/or lateral force resisting system must be completely detailed.

6.9.3 Steel columns shall not be embedded over all or part of their height in CMU or concrete walls.

6.10 Cold Formed Steel Structural Framing Design.

6.10.1 Cold formed steel structural framing design shall comply with the American Iron and Steel Institute (AISI), Cold Formed Steel Design manual, Latest Edition, except as herein noted.

6.10.2 The detailing of cold formed steel structural framing, including connections, shall be complete. All welded connections, metal connectors, bolt layouts, bolt sizes, screw fastener patterns, and screw sizes shall be shown in details, notes and calculations. All members that are a part of the main vertical and/or lateral force resisting system must be completely detailed.

6.10.3 Walls, when used or required for lateral resistance to wind or seismic, shall be considered bearing walls.

6.10.4 **Structural Vertical Wall Framing.** Structural vertical load bearing, or non-load bearing wall framing shall be no less than 90 mm (3-5/8") wide, C-shaped metal studs minimum 18-gage thickness at 400 mm on center with minimum 14-gage thickness continuous runner tracks top and bottom of the walls. Vertical studs which are attached to diagonal steel tension strap bracing shall be a minimum 16-gage thickness and have three horizontal rows of equally spaced blocking (blocking shall be the same size member as the vertical studs) between the studs for the horizontal distance of the brace. Wall framing shall be attached to the foundation with minimum 9.5 mm diameter anchor bolts spaced no more than 1200 mm on center. Provide a minimum 50 mm x 50 mm x 3 mm (2"x2"x1/8") washer at each anchor bolt welded to the top surface of the wall bottom runner track. All vertical studs shall be attached by welding or self-tapping screws to the wall top and bottom runner tracks. Welding shall be for the full width of both flanges of the vertical studs or there shall be at least one #12 self-tapping screw through the runner track flange to each flange of the vertical studs.

6.10.5 **Roof Trusses.** Roof trusses shall be designed for the loads indicated. The truss diagonal members shall be no less than 90 mm (3-5/8") wide, C-shaped, minimum 18-gage thickness with minimum 90 mm (3-5/8") wide, 14-gage thickness metal runner track top and bottom chords or a combination of wood combined with a metal unit which is made to adapt with the wood for the top chord outrigger for overhangs. The design of trusses shall be integrated into the vertical and lateral load carrying systems. Truss member connections shall be sized for axial loads and any eccentricity of the members. All diagonal members shall be welded to the truss top and bottom chords for the full width of both flanges of the diagonal members (self-tapping screw connection will not be allowed).

6.10.6 **Sheathing.** No particle board other than grade 2-M-W or fiberboard is to be used in structural applications, including roof sheathing and structural sheathing. The sheathing used shall have adequate and appropriate span rating" per the American Plywood Association (APA) (Design Specifications and Construction Guide) for the application and conditions proposed.

6.10.6.1 **Roof Sheathing.** Roof sheathing shall be APA STRUCTURAL I or II RATED SHEATHING, Exposure 1 or better, 15 mm (19/32-inch) minimum thickness. Joints shall be tongue and grooved or be square edges provide with H clips. All roof sheathing laid shall be covered with felt when a storm is approaching. Roof sheathing damaged due to moisture shall be replaced.

6.10.6.2 **Structural Wall Sheathing.** APA STRUCTURAL II RATED SHEATHING,

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Exposure 1 or better, 12 mm (15/32-inch) minimum thickness, square edges. Solid blocking (the same size as the wall studs) shall be required at all edges.

6.10.6.3 Structural Interior Concealed Sheathing. APA B-D interior, grade 2 or better, 12 mm (15/32-inch) minimum thickness, square edges. Solid blocking (the same size as the wall studs) shall be required at all edges.

6.10.7 Steel Strap Tension Bracing. Straps shall be a minimum 14-gage thickness by a minimum 50 mm wide. Straps shall be welded to each intersecting vertical wall stud and to the wall top and bottom runner track for the full width of the stud and runner track flange.

6.11 Structural Wood Design.

6.11.1 Wood design shall comply with the Uniform Building Code - latest edition except herein noted.

6.11.2 The detailing of structural wood framing, including connections, shall be complete. All metal connectors, bolt layouts, bolt size, nailing patterns and nail size shall be shown in details, notes and calculations. Staples shall not be used for the connections of structural components. All members that are a part of the main vertical and/or lateral force resisting system must be completely detailed.

6.11.3 Exterior wood structural members that are exposed to view such as columns and beams (minimum 100 mm nominal thickness) shall be of lumber that is graded for appearance and decay treated.

6.11.4 Walls, when used or required for lateral resistance to wind or seismic, shall be considered bearing walls.

6.11.5 **Moisture Content.** 19 percent maximum.

6.11.6 **Vertical Wall Framing** (less than 150 mm wide). Studs for walls shall be stud grade lumber. Vertical (load bearing and non-load bearing) wall framing shall be no less than 2X4's at 400 mm on center with single sole and double top plates. Wood may be any species listed in the Uniform Building Code - latest edition which meets the following values:

- (1) Fb (extreme fiber stress in bending):
 - Single Member use: 3.6 Mpa (525 psi) minimum
 - Repetitive member use: 4.1 Mpa (600 psi) minimum
- (2) E (Modulus of elasticity) 6200 Mpa (900,000 psi) minimum

6.11.7 **Structural Framing** (Other than vertical wall framing less than 150 mm wide). Stress Grade lumber. Wood may be any species listed in the Uniform Building Code - latest edition which meets the following values:

- (1) Fb (extreme fiber stress in bending):
 - Single Member use: 6.9 Mpa (1,000 psi) minimum
 - Repetitive member use: 7.9 Mpa (1,150 psi) minimum
- (2) E (Modulus of elasticity): 7,580 Mpa (1,100,000 psi) minimum

6.11.8 **Boards** (less than 50 mm nominal thickness). No. 2 or better per WWPA rules.

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6.11.9 Roof Trusses. Wood trusses shall be designed for the loads indicated and in accordance with the Truss Plate Institute, "Design Specification for Metal Plate Connected Wood Trusses". 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 metal section. A minimum plate size of 9675 sq. mm (15 sq. In) shall be required at any respective connection. The top chord of gable end trusses shall not be notched for the installation of outriggers for a roof overhang of the end of the gable. The outriggers shall be installed on top of the gable end truss top chord.

6.11.10 Sheathing. No particle board other than Grade 2-M-W or fiberboard is to be used in structural applications, including roof sheathing and structural sheathing. 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.

6.11.10.1 Roof Sheathing. Roof sheathing shall be APA STRUCTURAL I or II RATED SHEATHING or Particle board Grade 2-M-W, Exposure 1 or better, 15 mm (19/32-inch) minimum thickness. Joints shall be tongue and grooved or be square edges provided with H clips. All roof sheathing laid shall be covered with felt when a storm is approaching. Roof sheathing damaged due to moisture shall be replaced.

6.11.10.2 Structural Sheathing. APA STRUCTURAL II RATED SHEATHING or Particle board Grade 2-M-W, Exposure 1 or better, 12 mm (15/32-inch) minimum thickness, square edges. Solid blocking (the same size as the vertical studs) shall be required under all edges.

6.11.10.3 Structural Interior Concealed Sheathing. APA B-D interior, Grade 2 or Particle board Grade 2-M-W or better, 12 mm (15/32-inch) minimum thickness, square edges. Solid blocking (the same size as the vertical studs) shall be required under all edges.

6.11.11 Let-in Tension Bracing. Minimum 25 mm nominal thickness by 10 mm actual width "Boards" or "Simpson CWB or TWB" steel strap tension bracing or an approved equivalent (flat steel straps are not acceptable).

6.11.12 Laminated Veneer Lumber. Joints and beams fabricated from laminated veneer lumber may be used. Products must have National Research Board approval.

6.12 Construction Tolerances.

6.12.1 Allowable variations from level, or specified slopes, shall be as follows:

- (1) For overall length, or surface of 3000 mm (10 ft) or less: plus or minus 3-mm (1/8-inch).
- (2) Up to 6100 mm (20 ft): plus or minus 6 mm (1/4-inch)
- (3) Up to 12 000 mm (40 ft): plus or minus 9 mm (3/8-inch).

6.13 Rockwall Design.

6.13.1 New Rockwalls. Rockwalls 6'-0" and under (measured from top of footing) are to be in accordance with the sketch in the Attachments. Rockwalls over 6'-0" (excluding the footing) shall be designed for the applicable wind and seismic loads with a factor of safety not less than 1.5 for both sliding and overturning. As a minimum, thru-bond rocks should be provided at 3'-0" on center, horizontally and vertically. Grading of the site shall be in such a manner as to produce positive drainage away from the wall.

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7. UNIT DESIGN - THERMAL PERFORMANCE.

7.a. Thermal Characteristics. See Table 10-1 for identification of appropriate weather region. Housing unit construction shall provide at least the minimum R values / maximum U values indicated in Table 7-2 for the appropriate weather region. R and U values shall be calculated in accordance with ASHRAE methods.

TABLE 7-1 - WEATHER REGION DEFINITIONS

Weather Region	Cooling Degree Days	Heating Degree Days
11	1397 (2547)	1333 (2432)

NOTES:

1. Include in the solicitation the correct weather data for the project site, taken from TM 5-785, Engineering Weather Data, and indicate the appropriate weather region on this table.
2. Heating Degree Days are formulated on a Range Base of 18C [65F]
3. Cooling Degree Days are formulated on a Range Base of 18C [65F]

(AMEND 0005)

(AMEND 0007) TABLE 7-2 – THERMAL CHARACTERISTIC REQUIREMENTS^{1, 2}

Weather Region	Wall ³ R Value	Ceiling / Roof R Value ⁴	Crawl Space R Value ⁵	Basement R Value ⁶	Door R Value ⁸	Glazed Openings U Value ⁹	
						Window	Door
11	3.2 (19)	6.7 (38)	2.2 (13)	1.8 (10)	.9 (5)	2.9 (.5)	2.2 (.38)

Note¹: Metric R values are in square meter-kelvin (K)/watt. [English R values are bracketed, and are in square foot-degrees F/BTUH]. (R = 1 / U)

Note²: R values listed represent the minimum acceptable insulation values for each construction type. Listed U values represent the maximum thermal conductance allowed for windows and doors.

Note³: Requirements for opaque, exterior walls.

Note⁴: For buildings with ventilated attics, no credit may be taken for the roof construction. R value shall be computed for construction between conditioned space and ventilated attic or building exterior. Insulation for floors which extend over outside air spaces shall conform to the ceiling and roof requirements.

If cathedral ceilings are being used, the effective R-Value of the overall roof area must meet the required "Ceiling/Roof" performance level. The effective R-Value of the overall roof area can be determined by calculating the weighted average of the R-Values of the different areas (based on the percentage of the total roof area each type covers). For example, if the Ceiling/Roof insulation required was R-38 and 25% of the ceiling was cathedral insulated to R-19, and then the required R-Value for the remaining roof would be: (38-0.25*19)/0.75=44.33, or R-45 (min).

Note⁵: Requirements for crawl space exterior walls below uninsulated floors.

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(AMEND 0007) TABLE 7-2 – THERMAL CHARACTERISTIC REQUIREMENTS^{1, 2}

Weather Region	Wall ³ R Value	Ceiling / Roof R Value ⁴	Crawl Space R Value ⁵	Basement R Value ⁶		Door R Value ⁸	Glazed Openings U Value ⁹	
							Window	Door

Note⁶: Requirements for basement wall insulation extending downward 3050 mm [10 ft] from outside finished grade, or downward from outside finished grade to basement floor, whichever is less.

Note⁷: Requirements for perimeter insulation. In Weather Regions 1 through 6, perimeter insulation shall extend 1220 mm [48 inches] down from the top of the slab, or down to the bottom of the slab then horizontally beneath the slab to a total distance of 1220 mm [48 inches]. In Weather Regions 7 through 11, perimeter insulation shall extend downward to a total distance of 610 mm [24 inches] as described above.

Note⁸: Requirements for opaque doors in exterior walls (insulated metal).

Note⁹: Window requirements for double pane, low emissivity glass windows as specified in paragraph 5.m. of this STATEMENT OF WORK. Total Window (including glazing and frame) U values as rated by the National Fenestration Rating Council (NFRC) shall be used. Glazing area in Weather Regions 1 and 2 shall be limited to 12 percent of the heated floor space. Glazing area in Weather Regions 3 through 11 shall be limited to 14 percent of the heated floor space. Solar Heat Gain Coefficient in Weather Regions 1 through 7 shall be limited to 0.55. Solar Heat Gain Coefficient in Weather Regions 8 through 11 shall be limited to 0.40.

7.b. Thermal Insulation.

7.b.(1). Characteristics. Thermal insulation shall have a flame-spread rating of 25 or less and a smoke-development rating of 50 or less, exclusive of the vapor barrier, when tested in accordance with ASTM E84. A vapor barrier shall be provided on the warm-in-winter side of exterior wall and ceiling insulation, except in humid areas as defined below. Polyurethane is allowed as an insulation material for slabs and outside concrete or unit masonry walls. It is prohibited as an injected insulation material in walls or floor cavities or within the building envelope.

7.c. Air Infiltration.

7.c.(1). To limit air infiltration buildings will be sealed with an air infiltration barrier, installed in accordance with the manufacturer's recommendations. The building envelope shall be caulked, gasketed, weather stripped or otherwise sealed: around window and door frames, between wall cavities and frames, between walls and ceiling and roof, between walls and floors, at access doors and panels, at utility penetrations through walls, floors, and roofs, and at any other exterior envelope joint which may be a source of air leakage. These steps, in combination with provision of a continuous vapor barrier and sealed ductwork as specified in paragraph 10. shall constitute tight building construction.

7.c.(2). A blower door test, performed in accordance with ASTM E 779, Measuring Air Leakage by the Pressurization Method, shall be performed on 15 percent of the project buildings, which have been randomly selected by the Contracting Officer. If buildings are to be turned over in phases, the blower door test shall be performed on 15 percent of the buildings completed in each phase (not to exceed 10 buildings per phase). No additional testing will be required if ALL of the tested buildings pass the test requirements. If less than 100 percent of the tested buildings pass

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the test, an additional 10 percent of the project buildings (not to exceed 10 buildings) shall be tested. This process shall continue until 100 percent of the total number of tested buildings pass the blower door test. All proto-type units will be included in the required blower door testing procedures.

7.c.(2).(a). Before beginning the test, all combustion devices shall be turned off, and all intentional openings in the building envelope (dryer vent, bathroom and kitchen exhausts, etc.) shall be sealed. All doors and windows shall be closed and latched.

7.c.(2).(b). To pass the blower door test, the building shall have an air tightness rating within the range of 3 to 4 ACH at 50 Pa (0.2 inch of water) The Contractor shall correct all housing units not found in compliance, and shall be responsible for all labor and materials required to reduce air leakage to within acceptable parameters. All testing shall be performed by a firm certified by the Associated Air Balance Council, the National Environment Balancing Bureau, or State licensed to perform such tests within the state where the project is being constructed.

7.c.(2).(c). Any measures taken to reduce the air leakage to acceptable values shall be permanent, and shall be implemented on all similar housing units.

ACCOMPANYING AMENDMENT NO. 0007 TO SOLICITATION NO. DACA63-01-R-0002**8. UNIT DESIGN - PLUMBING.**

Plumbing system shall be designed and installed in accordance with the National Standard Plumbing Code (PHCC). Inspection and testing of the plumbing system shall be performed as prescribed in the National Standard Plumbing Code. Additional consideration in the technical evaluation will be given to systems which incorporate measures beyond the requirements of this STATEMENT OF WORK which are designed to increase energy conservation, ease of maintenance, or occupant comfort such as water filtration and purification, higher efficiency water heating systems, higher grade plumbing fixture materials (such as enameled cast iron tubs as opposed to enameled steel or plastic), etc.

8.a. Water Piping. Under slab supply piping shall be limited to housing unit service entrance only. Service line to each housing unit shall be no less than 25 mm (1 inch) diameter. All water piping shall be sized in accordance with methods outlined in the National Standard Plumbing Code, to limit water velocity in the pipe to 2440 mm/sec (8 ft/sec) unless a lower velocity is recommended by the plumbing fixture manufacturer(s). An isometric diagram of the water system shall be included in the design submittal. Allowable pipe materials are listed below:

8.a.(1). Copper tubing. Water piping under concrete slabs shall be copper tubing, type K, annealed. Joints under the slabs are prohibited. If copper tubing is selected for interior water piping, it shall be type **(AMEND 0005) K or L** hard-drawn copper. Additional consideration in the technical evaluation shall be given to designs using copper types **(AMEND 0005) K or L**. Fittings for soft copper tubing shall conform to ANSI B16.26, Cast Copper Alloy Fittings for Flared Copper Tubes, and for hard-drawn to ANSI B16.22, Wrought Copper and Copper alloy Solder Joint Pressure Fittings.

8.b. Soil, Waste, Vent, and Drain Piping. Soil, waste, vent, and drain, piping may be cast iron, copper, steel, or **(AMEND 0005) schedule 40** PVC plastic suitable for installation in a residential waste, soil, vent, and drain system. Each fixture and piece of equipment, except water closets, requiring connection to the drainage system, shall be provided with a trap. Provide deep seal trapped drain for cooling coil condensate drain. Soil, waste, and drain piping installed below floor slabs shall be service weight hub and spigot cast iron or plastic pipe. Building waste main lines shall be 102-mm (4-inch) diameter and shall transition to 150-mm (6-inch). All soil, waste, and drain piping shall be sized in accordance with the methods outlined in the National Standard Plumbing Code. An isometric diagram of the sanitary sewer system shall be included in the design submittal.

8.c. Gas Connections. The use of semi-rigid tubing and flexible connectors for gas equipment and appliances is prohibited, except that the final connections to the kitchen ranges shall be made using flexible connectors conforming to ANSI Z21.45, Flexible Connectors of Other Than All Metal Construction for Gas Appliances, not less than 1000 mm (40 inches) long. Provide accessible gas shutoff valve and coupling for each gas equipment item. Comply with UBC or model code seismic requirements. Exposed horizontal piping shall not be installed farther than 150 mm (6 inches) from the nearest parallel wall in laundry areas or areas where clothes hanging could be attempted. See paragraph 4.e. for gas line distribution requirements.

8.d. Plumbing Fixtures. Fixtures shall be provided complete with fittings, and chromium- or nickel-plated brass (polished bright or satin surface) trim. All fixtures, fittings, and trim in a project shall be from the same manufacturer and shall have the same finish.

8.d.(1). Plumbing shall meet the following criteria:

8.d.(1).(a). Exposed traps shall be chromium-plated, adjustable-bent tube, 20-gauge brass. Concealed traps may be **(AMEND 0005) schedule 40** plastic (PVC).

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8.d.(1).(b). Faucets shall be single-control type, with seals and seats combined in one replaceable cartridge designed to be interchangeable among lavatories, bathtubs and kitchen sinks, or having replaceable seals and seats removable either as a seat insert or as a part of a replaceable valve unit. Water flow shall be no more than .158 L/s (2.5 gpm) from any faucet. Kitchen faucet shall be **(AMEND 0005) Delta, Price Pfister, Crane, or approved equal.**

8.d.(1).(c). Shower and bath combination shall be controlled by a diverter valve. Baths and shower and bath combinations shall be provided with waste fitting pop-up, concealed with all parts removable and renewable through the overflow and outlet openings in the tub. Showers and shower and bath combinations shall be equipped with a combination valve and flow control device to limit the flow to 0.158 L/s (2.5 gpm) at pressures between 137.9 to 413.7 kPa (20 and 60 psi).

8.d.(1).(d). Piping shall be concealed. Individual shutoff or stop valves shall be provided on water supply lines to all plumbing fixtures except bathtubs and showers. Shutoff valves shall be provided for each bathroom group. In multi-story units, additional consideration shall be given in the technical evaluation to designs which provide separate shutoff valves for each floor.

8.d.(1).(e). Fixtures shall be water conservation type, in accordance with the National Standard Plumbing Code.

8.d.(1).(f). Vitreous china plumbing fixtures shall conform to ANSI A112.19.2, Vitreous China Plumbing Fixtures. Stainless steel fixtures shall be in accordance with ANSI A112.19.3, Stainless Steel Plumbing Fixtures (residential design). Enameled cast iron plumbing fixtures shall comply with ANSI A112.19.1, and enameled steel fixtures shall comply with ANSI A112.19.4

8.d.(1).(g). Where tubs are installed in an end-to-end configuration in adjacent bathrooms the shower valve faucet end of the tubs shall not be back to back, but shall be located at opposite ends of the tubs to allow for maintenance and repair.

8.d.(2). Water closets. Water closets shall have regular bowl with inclined tank, close coupled siphon jet, floor outlet with wax gasket, closed-front seat and cover, and an anti-siphon float valve. Water consumption shall be no more than 6 L (1.6 gal) per complete flushing cycle. Water closet trim shall conform to ANSI A112.19.5, Trim for Water-Closet Bowls, Tanks, and Urinals (Dimensional Standards). Water closets shall be white.

8.d.(3). Lavatories. Lavatories shall be rectangular counter top type, minimum 508 by 457 mm [20 by 18 inches] in size or oval minimum 480 by 410 mm (19 by 16 inches) in size. Lavatories shall be vitreous china, cast iron rimless type (without rings), or cross-link acrylic molded counter top with integral bowl. Lavatories shall have pop-up drains.

8.d.(4). Bathtubs. Bathtubs shall be slip resistant and shall be constructed of enameled cast iron. Metal bathtubs shall have fiberglass, porcelain-on-steel panels, or ceramic tile wainscot. Provide a 600mm by 600mm access panel to bath tub fixtures. Paint access panel to match wall finish

8.d.(5). Showers. Shower stalls shall be of ceramic tile, floor to ceiling, over membrane waterproofing on a cementitious substrate; or gel-coated, glass-fiber reinforced polyester. Shower receptors shall be slip resistant cast stone or gel-coated, glass-fiber-reinforced polyester. Shower stall wainscots shall be ceramic tile or gel-coated, glass-fiber-reinforced polyester.

8.d.(6). Kitchen sinks. Kitchen sinks shall be Type 302 stainless steel, 20-gauge minimum, seamless drawn, and sound deadened. Sinks shall be double bowl, self-mounting without mounting rings, complete with cup strainer and plug. Food waste disposers, where provided, shall be in accordance with UL 430 and ASSE 1008, and shall have a minimum motor size of 560

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watts (3/4 horse power). Strainer and plug shall be eliminated where food waste disposers are provided.

8.e. Clothes Washer Connections. Drainage and hot and cold water supply shall be provided for automatic clothes washers. Washer connection, complete with 50-mm (2-inch) drain, 20-mm (3/4-inch) hose thread supplies shall be provided in standard manufactured recessed wall box with single-face plate. Boxes shall be constructed of plastic or sheet steel. Steel boxes shall have a corrosion-resistant epoxy enamel finish. Boxes shall be mounted a minimum of 865 mm (2 ft-10 inches) above the finish floor. Electrical outlets for both washer and dryer shall also be provided. Provide water hammer arrestors on the hot and cold water pipe line to washer connections. Arrestor shall be in accordance with PDI WH 201.

8.f. Refrigerator Ice Maker Connection. Cold water supply shall be provided for GF refrigerator ice makers. Ice maker connection shall include an angle valve and a 1/4 inch hose thread supply, and shall be provided in standard manufactured recessed wall box with single-face plate (plastic or steel). Boxes shall be mounted a minimum 2 ft-10 inches above the finish floor.

8.g. Hose Bibbs. Hose bibbs shall be provided at the front, at one side and rear of each building, for each ground level housing unit. Hose bibbs shall be supplied with an integral vacuum breaker.

8.h. Piping Location. Water piping running in crawl spaces and attics shall be installed on the warm side of insulation and shall be wrapped with insulation and a vapor barrier jacket. Determination of the warm side shall be the same as determined for vapor barrier location. No water piping runs in exterior walls shall be allowed, except in climates where the 99 percent dry bulb temperature is 1.7 degrees C [35 degrees F] or higher.

8.i. Cleanouts. Cleanouts shall be provided at each change in direction of sanitary sewer lines, at the intervals specified in the National Standard Plumbing Code, and at the building service entrance. All cleanouts shall be permanently accessible. Ground cleanouts shall be two way in two directions of flow (i.e. two clean out barrels with sweeps to grade), with caps with identification, installed in a 305-mm by 305-mm (12-inch by 12-inch) concrete pad, flush with grade.

8.j. Water Heater. Water heaters shall have round, glass lined tanks, and shall be installed with an integral insulating wrap with a minimum R value of 16. Access shall be provided in the wrap for service and maintenance openings. Storage water heaters that are not equipped with integral heat traps and having vertical pipe risers shall be installed with heat traps directly on both the inlet and outlet. Circulating systems need not have heat traps installed. Hot water piping for the first 3050 mm (10 ft) downstream of the water heater shall be insulated. The water heater relief drain shall be manufacturer approved, and shall be indirectly connected to the building sanitary sewer system. Water heaters shall be sized in accordance with Table 8-1 for a 32 degrees C (90 degrees F) rise. Water heater burner shall not utilize standing gas pilot light, gas burner ignition shall be electronic spark ignition type. Water heater energy factors shall meet or exceed the minimum requirements of 10 CFR 430. **(AMEND 0006)** _____.

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AMEND 0005

TABLE 8-1 - WATER HEATER SIZING

Requirements by Fuel Type	2 BR	3 BR	4 BR		5 BR	
	1 Bath	2 Bath	2 Bath	3 Bath	2 Bath	3 Bath
Gas & Oil:						
Storage (L [gal])	114 [30]	151 [40]	151 [40]	194 [50]	194 [50]	194 [50]
1 hour draw (L [gal])	227 [60]	265 [70]	273 [72]	310 [82]	341 [90]	341 [90]
Recovery (L/h [gph])	114 [30]	114 [30]	121 [32]	121 [32]	151 [40]	151 [40]

Note: Storage capacity, input, and recovery may vary with manufacturer. Any combination of the above which produces the required hour draw will be acceptable.

8.j.(1). (AMEND 0006) Deleted.

8.k.(1). Fire Protection. Provide a wet chemical fire extinguishing unit for each kitchen range. System shall be "The Guardian" as manufactured by Twenty First Century International Fire Equipment and Services Corporation of Irving, Texas or approved equal. The Shut off valve shall be of the pneumatic type. Fire extinguishing unit shall have its own branch circuit from the main electrical panel and (AMEND 0005) **audible horn.**

ACCOMPANYING AMENDMENT NO. 0007 TO SOLICITATION NO. DACA63-01-R-0002**9. UNIT DESIGN - ELECTRICAL.**

9.a. Conformance to Code. The electrical system shall be designed in compliance with the rules and recommendations of ANSI C2, National Electrical Safety Code; NFPA 70, National Electrical Code (NEC); Illumination Engineering Society (IES), Lighting Handbook, Application Volume and Reference Volume; ANSI A117.1, Buildings and Facilities - Providing Accessibility and Usability for Physically Handicapped People; Uniform Federal Accessibility Standards; UL 268, Smoke Detectors for Fire Protective Signaling Systems; City of El Paso, Texas, National Electrical Code, Local Amendments; and applicable model codes, whichever is more stringent.

9.b. Service Entrance. Each dwelling unit shall have a separate meter drop and socket (no meter), and service disconnecting means. Service disconnecting means shall consist of a lockable main circuit breaker in the main distribution panel. See paragraph 9.c for panel location. Meter drops and sockets shall be mounted on the exterior wall of the exterior accessible utility room. Meter drop shall be connected ahead of the main distribution panel. Meter drops and sockets shall be accessible to post personnel and shall not be located in the back yard or enclosed in a fenced area. Services shall be enclosed in built-in cabinets or sight screened.

(1) Service Equipment. Service entrance equipment shall be dead front, recessed, and shall consist of a conduit lateral, concealed riser, and main breaker service disconnect. Each dwelling unit shall have separate service equipment.

(2) Metering. Meters shall not be provided, but the jaws of 4-jaw hot sequence meter sockets shall be jumped with copper shunts; and impact resistant, opaque, insulated meter socket cover plates with sealed screw-type sealing rings shall be installed.

(3) System Ground. The grounding electrode shall be two (2) UL listed copper-clad steel ground rods which shall be installed at the service entrance point. Additional electrodes such as Ufer grounds or metal underground water pipes shall be bonded to the ground rods to make a grounding electrode system, but the required grounding electrode shall be the ground rods. The grounding electrode conductor shall be copper, shall be physically protected, and shall be bonded to the electrode with an exothermic weld.

(4) Panel Boards. Panel boards shall be sized for the service, and furnished with lockable main circuit breakers, full sized plug-in branch breakers, insulated neutral busses, and bonded equipment grounding busses. Panel board minimum size shall be 100 amps. Panel boards shall be recessed, with flush fronts and hinged doors. Back-to-back panel boards shall be horizontally offset a minimum of 400 mm (16 inches) horizontally. Panel boards shall be located at least 400 mm (16 inches) from adjacent right angle walls. A minimum of 915 mm (36 inches) of clear and unobstructed space in front of the panel board shall be provided. In addition, all other requirements of NEC Article 110-16 shall be followed. Tandem circuit breakers shall not be used. Six single pole spaces (minimum) shall be provided for spares. The contractor shall provide and install printed labels, in the panel board, for all installed circuits. No recessed panel boards are to be located in fire walls.

9.c. Panel Locations. Housing unit panels shall be located in the utility or laundry room, attached garage, or hallway.

9.d. Conductors. Branch circuit conductors and over current devices shall be as rated by NEC. All conductors shall be copper, and not smaller than #14 AWG. Conductors #10, #12, and #14 shall be solid. Conductors #8 and larger shall be stranded. In dwelling units, concealed branch circuit conductors through #6 may be in type NM cable with ground wire, not in conduit. Larger concealed branch circuit conductors may be type SE installed in conduit. All exposed (not concealed in wall, ie; in garages) circuits shall be type TW, THW, or THHN/THWN in metal conduit and all associated electrical boxes shall be metal. Romex boxes may be plastic. No

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circuits shall be routed on the interior or exterior surfaces of dwelling units, or on the surfaces of walls in other structures.

9.e. Outlet Circuits. Lighting and convenience outlets shall be on separate circuits. Where half-switched receptacles are installed for auxiliary cord-connected lighting, the entire receptacle shall be fed from the same circuit. Such circuits may be either lighting or receptacle circuits. All general receptacle and lighting circuits shall be 15 ampere circuits, fed by 15 ampere circuit breakers. All branch circuits required by the National Electrical Code shall be provided. Receptacles on opposite sides of fire walls shall be horizontally offset a minimum of 300 MM (12 inches) to maintain the integrity of the fire wall and sound deadening rating of the wall in particular, fire ratings of garage walls shall be maintained when recessed mounted receptacles are installed within such walls. In dwelling occupancies, circuits for lighting or general purpose receptacles shall be limited to a maximum of six (6) current consuming outlets. This requirement shall supersede any others. All equipment, appliances, lighting fixtures, and receptacles shall be grounded by an equipment grounding conductor which shall be terminated at a grounding screw in the outlet box. A grounding jumper shall connect the equipment, appliance, fixture, or receptacle to this grounding screw.

9.f. Exterior Lighting and Outlets. Provide energy efficient high quality lighting for each housing unit. The minimum efficiency standard for lighting is 50 lumens/watt. This efficiency can be achieved with fluorescent and compact fluorescent lighting. Lighting must also be color corrected with a Color Rendering Index (CRI) of 60 or better. Provide a minimum of one lighting fixture and one ground-fault-protected outlet in each housing unit's entry, garage, and patio area(s). Light fixtures at entry and patio areas shall be switched from the housing unit interior. In addition, trash areas shall be lighted. These lights shall be controlled by photocell, activated by minimum light levels of 5.4 Lx [0.5 foot-candle]. Provide a fixture in the patio area, except that the patio area light shall not be provided where the patio is adjacent to an exterior entrance and is adequately served by the lighting fixture required herein before. Exterior receptacles shall be located in the following areas:

9.f.(1). One shall be located in each patio area

9.f.(2). One shall be located on each side, in the front, and in the back of each unit

9.f.(3). A receptacle, fed and switched with the front entrance door light, shall be provided for holiday lighting.

9.f.(4). Exterior receptacles shall be fed by a ground fault interrupting circuit breaker, and shall have weatherproof "Taymac" type covers which are rated NEMA 3R with a plug cord attached.

9.g. Interior Lighting and Switched Outlets.

9.g.(1). Efficiency. Interior lighting will be both efficient and color corrected. Color Rendering Index (CRI) of 85 or better and a standard lighting color of 3500 K are required. Minimum efficiency standard for lighting are as follows:

9.g.(1).(a). Fluorescent tubes 1220 mm [4 ft] and longer: 90 lumens/watt.

9.g.(1).(b). Fluorescent tubes less than 1220 mm [4 ft]: 80 lumens/watt.

9.g.(1).(c). Compact fluorescent and other lamps: 50 lumens/watt.

9.g.(1).(d). Other lamp types: 50 lumens/watt except ceiling fan light kits shall have a minimum of 10 lumens/watt.

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9.g.(2). Locations. Provide light fixtures operated by wall switches for all rooms. Wall-switch operated ceiling lights shall be provided in dining and utility rooms, living rooms, halls, bedrooms, kitchens and dinette areas. Additional light fixtures shall be provided in rooms whose configuration requires them for adequate lighting. Wall-switch operated wall-mounted lights shall be provided in bathrooms and half baths located above the mirror over the lavatory. Walk-in closets and interior and exterior bulk storage rooms shall be provided with ceiling lights, either wall switch or pull-chain operated. A minimum of one lighting fixture, ceiling or wall mounted, as appropriate, shall be provided in the garage or carport. Where exterior bulk storage is located within the enclosed walls of a garage, each space shall be lighted separately. Garage lights shall be controlled by a switch (switches) located at each door opening into the garage.

9.g.(2).(a). Dining room shall have a ceiling fan with an integral light fixture. Fixtures may be designed for incandescent use, and do not have to meet the 50 L/Watt requirement. A Ceiling fan with integral lighting fixture may be substituted for this requirement.

9.g.(2).(b). The general lighting intensity in kitchens shall be 320 to 540 Lx [30 to 50 foot-candles]. Supplementary lighting shall be provided at the sink and under one of the wall cabinets for a work center to produce a composite lighting level of 210 Lx [75 foot-candles] using either down-lights, surface fluorescent fixtures surface-mounted below wall cabinets or wall-mounted fixtures (1520 mm [5 ft] and higher above the floor) as appropriate. Kitchen range hood shall be provided with a light, fan, and switches. All fluorescent light fixtures shall be secured to support studs. Fixture mounting to the wall or ceiling surface is not allowed. Toggle bolts shall not be used to secure fluorescent fixtures or any other fixture that is not box mountable.

9.g.(2).(b).(1). The ceiling light fixtures boxes in the following rooms, living room, dining room, and all bedrooms shall be provided with a metallic fixture box suitably supported from the ceiling structure so that it may support a ceiling fan, and with additional wiring to allow for independent wall switch control of the fan and light.

9.h. Smoke Detectors. Provide hard-wired smoke detectors on a separate circuit in each housing unit in accordance with NFPA 72 and NFPA 101.

9.i. Carbon Monoxide Alarms: Provide carbon monoxide (CO) alarms for new and renovated family housing equipped with a fuel burning appliance inside of the unit, or a fireplace, or an attached garage. CO alarms will be provided as follows:

9.i.(1). One CO alarm shall be located. A required alarm shall be located in vicinity of the bedrooms, such as in the corridor outside of the bedrooms. CO alarms will not be provided in garages, furnace rooms or unfinished attics.

9.i.(2). CO alarms shall be hardwired and wall-mounted at the same height as the thermostat, approximately 52 inches off the floor. Dead air spaces such as corners shall be avoided. CO detectors and smoke detectors shall be on separate circuits. In all cases, manufacturer's guidelines and recommendations shall be followed.

9.i.(3). CO alarms shall be equipped with an audible alarm, continuous digital display, peak level memory, test button, and test reset button and shall be UL listed by passing standard test UL 2034.

9.j. Telephone. Pre-wire housing units in accordance with local telephone company requirements. Provide outlets in kitchen, dining, or family area, living room and bedrooms of each housing unit. Eight position modular jack connectors shall be provided at all outlets. The jacks provided in the kitchen, dining, or family areas shall be for a wall-mounted phone. Wiring methods shall comply with EIA/TIA Standard 570, Residential and Light Commercial Telecommunications Wiring Standard. Cable and jacks shall be Category 5 per TIA/EIA 568A,

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Commercial Building Telecommunications Cabling Standard. All wiring shall terminate in a surface mounted, weatherproof, protected telephone terminal located on an outside wall adjacent to the building meter equipment. ("Demarcation Box"). The protected telephone terminal cover shall be provided with means for padlocking, shall be accessible from the outside, and shall be permanently labeled, "Telephone". Only one protected telephone terminal shall be required for each separate building. A single #10, CU, green equipment grounding conductor shall be run in 1/2-inch non-metallic conduit from the building metering equipment to the protected telephone terminal box. Number of pairs and type of cable, type of modular jacks, and sizes of protected telephone terminals and outlet boxes shall be coordinated with the local telephone company. The contractor shall include the local telephone company's fees for connections and any other work to be provided by the local telephone company in his proposal. The points of contact are Mr. Juan E. Garcia, 915/568-5594 and Eva Jones, 915-568-7081.

9.k. **[Am#5]** Commercial Cable Television. Cable Television (TV) outlets shall be located in the living room, family room, and bedrooms. Units shall be prewired in conformance with all local cable TV company requirements. Each housing unit shall be prewired separately from other housing units. All wiring shall terminate in a surface mounted, weatherproof, protected television terminal ("Demarcation Box") located on an outside wall adjacent to the protected telephone terminal. The protected television terminal cover shall be provided with means for padlocking, shall be accessible from outside and shall be permanently labeled "Television". Only one protected television terminal shall be required for each separate building. A single #10, CU, green equipment grounding conductor shall be run in 1/2-inch non-metallic conduit from the building metering equipment to the protected television terminal box. **Type of cable, type of tapoffs, and sizes of protected television terminals and outlet boxes, shall be coordinated with Time Warner. Some cable and materials may be supplied by Time Warner. The contractor shall include Time Warner's fees for any work done and materials provided by Time Warner in his proposal.** The point of contact is Mr. Ray Mendoza, telephone 915-775-7492. TV antennas shall not be installed.

9.l. Door Bell. The front entrance to each housing unit shall be provided with a low voltage bell or buzzer. Handicapped adaptable dwelling units shall also be provided with hook up provisions for future installed wall-mounted strobe visual annunciators in the entry hallway and kitchen.

9.m. Convenience Outlets. In addition to outlets required by NEC, provide convenience outlets in the following areas:

9.m.(1). Utility Room

9.m.(2). Hallway outside bedrooms

9.m.(3). Garage. Four ground fault protected convenience receptacles shall be provided in each garage; one near the car entry, one on the opposite wall (located for an occupant-installed workbench), and one on each side. Provisions shall be made in garages for tenant-installed garage door openers. Provisions shall include, as a minimum, a centrally located, ceiling surface mounted, 120 volt receptacle; a blanked-off, recessed mounted switch box for interior (inside garage) wall mounted push-button control; a blanked-off, recess mounted switch box for side-mounted photocell detectors; and a blanked-off, surface mounted switch box located adjacent to ceiling receptacle. The blanked-off switch boxes shall be interconnected with tubing or conduit. Tubing or conduit may be flexible-type.

9.m.(4). A switched receptacle shall be provided under the kitchen sink for the garbage disposal unit. The switch shall be located above the kitchen sink.

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9.m.(5). Bathrooms. Bathrooms shall have a ground fault receptacle located adjacent to each sink. Above-sink lighting fixtures shall not have receptacles. Lighting shall be controlled by a wall mounted switch located at the door. An exhaust fan shall be located in the ceiling and controlled by a mechanical twist timer located at the door. Ceiling-mounted supplemental electrical heat shall be provided and shall be controlled by a mechanical twist timer located at the door. Heat lamps and wall heaters shall not be used. Switches shall not be accessible from the tub or shower.

9.n. Special Outlets. Dedicated circuits shall be provided for the following, regardless of whether or not the listed equipment is provided at this time. The circuits shall be 120/240 Volt, 3-wire plus ground branch circuits with ampacities and receptacles as indicated.

9.n.(1) An electric clothes dryer circuit: 30 Ampere, with a NEMA 14-30R, 3-pole, 4-wire receptacle. Provide separate neutral and ground conductors in this circuit. Receptacle shall be located adjacent to the 120 Volt dedicated receptacle for a gas clothes dryer specified above.

9.n.(2) An electric range circuit: 50 Ampere, with NEMA 14-50R, 3-pole, 4-wire receptacle in handicapped units only. Provide separate neutral and ground conductors in this circuit. This circuit shall be installed with a contactor/solenoid cutoff switch and controlled from the range hood fire suppression system (see mechanical sections).

9.n.(3) [Am#5] A heat pump circuit, hard wired, 240 Volt, ampacity as required.

9.o. Wiring. Maximum use shall be made of nonmetallic sheathed cable for branch circuit wiring, and of service entrance cable for heavy-duty interior circuits and for service entrance conductors. Installed conductors in conduit shall be used only where specifically required by the NEC except that all exposed electrical wiring shall be put in steel metal conduit and receptacle boxes..

9.p. **[Am #7] Branch Circuit Conductors.** Branch circuit conductors and over current devices shall be as rated by NEC. A minimum of one spare circuit space in the panel shall be provided per housing unit. **Individual circuits shall be provided for the washer, dryer (with receptacles located behind the washer and dryer), dishwasher, garbage disposal, freezer, refrigerator, electric range, furnace or air handling unit, air conditioning unit, water heater and exterior receptacle circuit for exterior accessible mechanical room. A separate circuit shall be provided for the combination of the following loads: gas range igniter, range hood fan and range hood light.** Two utility circuits (20 amp) shall be provided in the kitchen area for the convenience outlets for small appliances serving the kitchen, dining area, and family room area.

9.q. Handicapped Dwelling Units. In handicapped adaptable dwelling units the heights and accessibility of electrical switches, outlets, controls, etc., shall comply with the criteria in the Uniform Federal Accessibility Standard and ANSI A117.1.10 UNIT DESIGN – HEATING, VENTILATING, AND AIR CONDITIONING.

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10. UNIT DESIGN - HEATING, VENTILATING, AND AIR CONDITIONING.

10.a. Design. Heat gain and loss calculations shall be, as a minimum, in accordance with the current edition of the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals or ACCA Manual J. The cooling load calculations shall be in accordance with ASHRAE Residential Cooling Load Calculations. Computer-generated load calculations shall be provided, and shall include complete input and output summaries. Design shall be based on the weather data shown in Table 10-1.

TABLE 10-1 – WEATHER DATA¹

Type of Design / Design Information	Metric	Inch-pound
Weather Region 11		
Heating		
Indoor Design Temperature	21 deg C	70 deg F
Outdoor Design Temperature	-5 deg C	23 deg F
Annual Heating Degree ³ Days	1333	2432
Largest Number of Monthly Heating Degree Days	388	641
Cooling		
Indoor Design Temperature	24 deg C	75 deg F
Outdoor Design Dry Bulb Temperature	36 deg C	97 deg F
Outdoor Design Wet Bulb Temperature	18 deg C	65 deg F

Note: Metric data are based on Celsius degree days to a base of 18 degrees C. Inch-pound data are based on degree days Fahrenheit to a base of 65 degrees F.

10.a.(1). Load calculations. Computer generated load calculations shall be performed for each possible orientation up to four representative orientations for each building type included in the project. Room air flow requirements shall be computed based on the individual room load. However, the minimum acceptable air flow shall be 2.5 (L/s)/m² (.5 cfm/ft²) for all spaces. The design for each individual housing unit shall be based on the heating and cooling loads as well as room airflow requirements computed for the building type and orientation which it most closely matches. Internal loads shall be included in the computerized load calculations in accordance with ASHRAE recommendations for residential analyses.

10.a.(2). Duct system layout. For a given building type, a single duct layout may be used regardless of orientation, provided that the system is sized to provide the required air flow for each room at its worst case orientation. Balancing dampers shall then be used to reduce air flow to the appropriate level as required. Permanent access to dampers shall be provided.

10.b. Equipment Safety and Efficiency. All materials and equipment shall be the standard cataloged product of manufacturer's regularly engaged in production of such materials and

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equipment, and shall be the manufacturer's latest standard design. Each major component of the heating [and cooling] system[s] shall have the manufacturer's information on a plate secured to the equipment.

10.b.(1). All heating and cooling equipment proposed and installed in this contract shall bear the Energy Star Label.

10.b.(2). Equipment shall comply with the requirements of American Gas Association (AGA), American National Standards Institute (ANSI), Air Conditioning and Refrigeration Institute (ARI), American Society for Testing and Materials (ASTM), Gas Appliance Manufacturers Association (GAMA), National Electric Manufacturers Association (NEMA), National Fire Protection Association (NFPA), Underwriters Laboratories, Inc. (UL) or other national trade associations as applicable and the International Ground Source Heat Pump Association, 490 Cordell South, Stillwater Oklahoma, 74078-8018, Phone 405-744-5175.

10.b.(3). Equipment efficiencies as listed in Table 10-3 below are minimum acceptable levels. Energy conservation as it relates to equipment operating costs will be considered in the evaluation process. Additional consideration in the technical evaluation will be given to designs which include higher than minimum efficiency equipment.

TABLE 10-3 - MINIMUM EQUIPMENT EFFICIENCIES

	Oil fired equip	Natural gas fired equip	LP gas fired equip	Electric heat pump (Ground Coupled)	Electric cooling equip
Combustion Efficiency		80%			
Heating Mode COP				3.8	
SEER				13	

Note: Ground coupled heat pump ratings are based on ARI 330 standard ratings. Multiple or variable speed units must be rated on the high speed.

ACCOMPANYING AMENDMENT NO. 0007 TO SOLICITATION NO. DACA63-01-R-0002**TABLE 10-3A - BIN WEATHER DATA FOR FT BLISS, TEXAS**

TEMPERATURE RANGE, C (F)	ANNUAL OBSERVATION HRS
40/43 (105/109)	1
38/40 (100/104)	30
35/38 (95/99)	159
32/35 (90/94)	404
30/32 (85/89)	570
27/30 (80/84)	720
24/27 (75/79)	896
21/24 (70/74)	967
18/21 (65/69)	844
16/18 (60/64)	778
13/16 (55/59)	731
10/13 (50/54)	672
7/10 (45/49)	614
4/7 (40/44)	502
2/4 (35/39)	396
-1/2 (30/34)	265
-4/-1 (25/29)	135
-7/-4 (20/24)	50
-9/-7 (15/19)	17
-12/-9 (10/14)	6
-15/-12 (5/9)	1
-18/-15 (0/4)	1

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10.c. Heating and Cooling Systems. Each housing unit shall be provided with ground coupled heat pump system . Systems shall be designed, installed, balanced, and adjusted to distribute heat and cooling to all habitable rooms, as well as bathrooms, in proportion to the calculated load requirements of these spaces. Fans in air handlers and furnaces shall be multi-speed, direct drive type. System installation shall conform to SMACNA Installation Standards for Residential Heating and Air Conditioning Systems except as altered by this document. Additional consideration in the technical evaluation will be given to systems utilizing modular components, plugged power, drawer-type burner assemblies, additional space in the mechanical room, and other features which contribute to ease of system maintenance. Additional consideration will also be given to designs which provide measures beyond the requirements of this STATEMENT OF WORK to increase energy conservation or occupant comfort such as division of each housing unit into more than one conditioning zone for increased control.

10.c.(1). Equipment sizes selected for installation shall not oversized more than 125 percent of the calculated loads.

10.c.(2). Mechanical equipment shall be located in an externally accessible **(AMEND 0005) mechanical room**, and shall be arranged to allow for ease of maintenance, and for proper venting if required. This **(AMEND 0005) mechanical room** shall be provided with a light and electrical receptacle. See paragraph 5.d.(3) for additional requirements for mechanical spaces containing fuel-fired heating equipment.

10.c.(3). Ground-Coupled Heat Pumps.

(a) One ground-coupled heat pump shall be provided for each living unit. Units shall be rated in accordance with ARI 330. Units shall have a head loss of not more than 36 kPa (12 feet of water) at the flow rate used to obtain the ARI 330 rating. Units shall have extended range capability to include entering liquid temperature down to 0 degrees C (32 degrees F) in heating and up to 38 degrees C (100 degrees F) in cooling. Units shall be located in the externally accessed mechanical room next or close to the domestic water heater.

(b) The loop piping shall be PE3408 (high density polyethylene) with minimum cell classification 355434C per ASTM D 3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials. The piping shall experience 0 failures after 5,000 hours under condition ? C? (100 percent reagent at 100 degrees C) when tested in accordance with ASTM D 1693, Standard test method for environmental Stress-Cracking of Ethylene Plastics. Piping shall have graduated length marked on pipe wall. A 50 year limited warranty must be issued by the pipe manufacturer. U-type fittings shall be shop fabricated under quality controlled conditions of the same material designation. Joining shall be by the butt fusion or saddle (sidewall) fusion method in accordance with the manufacturer's Heat Fusion Qualification Guide. Ground loops shall be installed by a certified installer, trained by the International Ground Source Heat Pump Association or factory trained. A certified fusion technician will perform all pipe fusions. Bore shall be vertical with a minimum 6 meter (20 feet) separation. Bores shall be fully backfilled with **(AMEND 0006) Bentonite** grout. Metallic tracing wiring and dig tape shall be utilized on all below ground horizontal loop piping runs. This equipment will be used to identify pipe location.

(c) Design of closed-loop ground source heat pump shall conform to ASHRAE publication, Design/Data Manual for Closed-Loop Ground-Coupled Heat Pump Systems. Accurate calculations supporting the units selected, and sizing of pumping modules, shall be provided. Contractor shall base ground source heat pump design on the following information:

- a. Bore depth (meters) per KW* = 26.8 meters / Kw (307 ft / ton).
- b. Minimum bore hole spacing = 6 meters (20 ft).

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- c. Minimum pipe diameter = 25 millimeters (1 inch).
- d. Minimum flow rate = 3 gpm / ton.
- e. Bore holes shall be filled with high conductivity grout.
- f. Minimum number of bore holes in parallel for each A/C unit = 2.
- g. Minimum A/C unit efficiency; See table 10-3 in this chapter.

* Bore depth shall be based on the rated cooling capacity (KW) of each installed unit at condensing temperature of 37.8 deg C and interior design temperatures specified in table 10-1 in this chapter.

10.c.(4).(a). Heat pump system equipment shall consist of an ground coupled condensing unit and evaporator/blower as matched components by the same manufacturer. Refrigerants used shall have an Ozone Depletion Potential (ODP) of .05 or less. The condensing unit shall contain, as a minimum, the features indicated in Table 10-4. Equipment shall be sized to meet the total load determined by computer calculation. Equipment may be oversized to no more than 115 percent of the computer generated load. Evaporator/blower for heat pump systems shall be provided complete with centrifugal fan, disposable filters, controls, and transformer. Fans shall be multi-speed, direct drive type.

TABLE 10-4 – SPLIT SYSTEM HEAT PUMP FEATURES

High and low pressure compressor protection.
Filter-drier.
Hermetically sealed compressor with built-in overloads and locked rotor protection.
Electric crankcase heaters.
Reversing valve. (heat pump only)
Start and run capacitors.
Anti-short-cycle timer. (factory installed)
Testing and charging refrigerant connections.
Compressor guaranteed for a minimum service life of 5 years.

10.c.(4).(b). The evaporator coil shall be provided with a liquid strainer, expansion device, pre-insulated housing, copper or aluminum coil, and insulated condensate drain pan, **(AMEND 0007)** and centrifugal blower. Coil face velocity shall be limited to 2.8 m/s

10.c.(4).(c). The condensing unit and matched coil [evaporator/blower] shall deliver a Seasonal Energy Efficiency Rating (SEER), consistent with the minimum requirements shown in Table 10-3.

10.c.(4).(d). Refrigerant Charge Verification: The contractor shall check, calibrate, and charge the refrigerant system following installation and start-up of the equipment. These tests shall be accomplished on the same 15% of the units which undergo blower door and duct tightness testing. If the tested units show a low or excessive refrigerant charge, all new systems shall be checked after start-up, but prior to acceptance by the Government.

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10.c.(4),. Unacceptable systems. Room unit heaters; space heaters, room (window) air conditioning units; floor furnaces, gravity warm air systems, and electric resistance heaters are not permitted.

10.d. Air Distribution. Provide systems conforming to the recommendations of the ASHRAE Air Distribution Manual or the SMACNA Residential Comfort System Installation Standards Manual. For two-floor housing units with a single air conditioning unit, provide separate, main supply ducts with volume control dampers for each floor. These main ducts shall be run directly from the air handler or furnace to the appropriate building level. As a minimum, provide a separate ducted return for each floor level. Two-floor housing units with 93 m² or greater net floor area on each floor shall be provided with a separate heating and cooling unit and supply and return ducted system for each floor. Additional consideration in the technical evaluation will be given to designs which incorporate air distribution systems totally within the conditioned envelope.

10.d.(1) Supply diffusers. Wall, ceiling, and/or baseboard supply diffusers shall be located to ensure that the air distribution will completely cover all surfaces of exterior walls with a blanket of conditioned air or may be of a compact design so long as 'dead spots' within the units are avoided. At least one diffuser shall be provided in each habitable room. Diffusers shall have louvered faces with individually adjustable blades, and shall be provided with integral opposed blade damper. Diffusers shall be provided with air deflectors as required for proper air flow in the space. Plastic diffusers are prohibited. Core velocity shall be limited to 3 m/sec maximum, with a maximum pressure drop of 0.82 Pa/m [0.1 inch water]. Airflow from any single diffuser shall be limited to 94.4 L/s [200 cfm] maximum. Ceiling mounted units shall have factory finish to match ceiling color, and be installed with rims tight against ceiling. Sponge-rubber gaskets shall be provided between ceiling or wall and surface-mounted diffusers for air leakage control. Diffuser boots shall be sealed tight to the wall or ceiling they penetrate using duct mastic or caulking. Suitable trim shall be provided for flush-mounted diffusers. Duct collar connecting the duct to diffuser shall be airtight and shall not interfere with volume controller. Wall supply registers shall be installed at least 150 mm [6 inches] below the ceiling.

10.d.(2). Return and exhaust grilles. Grilles shall be fixed horizontal or vertical louver type similar in appearance to the supply diffuser face. Plastic units are prohibited. Core velocity shall be limited to 2 m/sec maximum, with a maximum pressure drop of 0.5 Pa/m (06 inch water) Grilles shall be provided with sponge-rubber gasket between flanges and wall or ceiling. Register/grille boots shall be sealed tight to the wall or ceiling they penetrate using duct mastic or caulking. Wall return grilles shall be located at least 150 mm above the floor. Return grilles shall be located in hallways, finished basements, or other normally unoccupied spaces to minimize the sound level in occupied spaces.

10.d.(3). Ductwork. Ductwork shall be externally insulated sheet metal or flexible metal. Length of flexible duct shall be limited to 1.8 m. Flexible ductwork shall not be spliced or joined and shall be a single continuous piece from diffuser boot to trunk/branch duct. Systems composed entirely of flexible ductwork with distribution boxes are prohibited. Sub-slab, intra-slab, or crawlspace ductwork is also prohibited. **(AMEND0006)** _____. No portion of the building construction (such as joist space in a floor or ceiling, wall stud space, etc.) shall be used as a duct. The requirements for ductwork set forth below apply to all ductwork installed in the housing unit, supply systems, return systems, exhaust systems, ventilation systems, and outside air supply ductwork.

10.d.(3).(a). Maximum velocity in supply ducts shall be limited to 4.6 m/s for mains and 3.1 m/s for branches.

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10.d.(3).(b). Ducts shall be airtight with no visible or audible leaks to ensure quiet, economical system performance. Ductwork in conditioned spaces shall be constructed for a 250 Pa static pressure construction class with seal class C, as described in the SMACNA HVAC Duct Construction Standard, unless a higher pressure class and/or seal class is required by actual, system operating conditions. Ductwork in unconditioned spaces shall be constructed for a 500-Pa] static pressure construction class with seal class C, unless a higher pressure class and/or seal class is required by actual, system operating conditions. All duct seams and joints shall be sealed using duct mastic. Tape shall not be used as a means for sealing ductwork.

10.d.(3).(c). For flexible ductwork, the inner core shall be mechanically fastened to all fittings, preferably using drawbands installed directly over the inner core and beaded fitting. If beaded fittings are not used, then the inner core shall be fastened to the fitting using #8 screws equally spaced around the diameter of the duct, and installed to capture the wire coil of the inner liner (3 screws for ducts up to 300 mm [12 inch] in diameter and 5 screws for ducts over 300 mm [12 inch] in diameter). The inner core must be sealed to the fitting using mastic or tape. Tape used for sealing the inner core shall be applied with at least 25 mm of tape on the duct lining and 25 mm] of tape on the fitting, and shall be wrapped at least three times. The outer sleeve (vapor barrier) must be sealed at connections with a drawband and three wraps of approved tape. The vapor barrier must be complete without any holes or rips, and seams shall be sealed with mastic or approved tape. Pressure sensitive tapes used in conjunction with flexible duct connections shall be as recommended by the duct manufacturer and shall be UL 181A listed and so indicated with a UL 181A mark or aluminum-backed butyl adhesive tape (15 mil minimum). Drawbands shall be stainless steel worm drive hose clamps or UV resistant nylon duct ties.

10.d.(3).(d). Provide a minimum of 51-mm thick mineral fiber insulation (or other listed insulation with an equivalent R value) on the exterior of all ducts in unconditioned spaces. Exhaust ductwork does not require insulation. Insulation shall be faced with a vapor barrier material having a performance rating not to exceed 1.0 perm. Insulation, vapor barrier, and closure systems shall be non-combustible as defined in NFPA 255, with a flame-spread rating of not more than 25, and a smoke development rating of not more than 50, as defined in ASTM E-84.

10.d.(3).(e). Return, exhaust, and ventilation air ductwork shall be sized for a maximum velocity of 4.6 m/sec. Short runs of return air duct (1525 mm or less) which directly precede the air handler or furnace shall be acoustically lined to minimize noise.

10.d.(4) Fire dampers shall be located and installed in accordance with NFPA requirements, and shall conform to the requirements of UL 555. Fire dampers shall be automatic operating, and shall be rated for the maximum system velocity and pressure. Fire dampers shall be equipped with a steel sleeve or adequately sized frame installed in such a manner that disruption of the attached ductwork, if any, will not impair the operation of the damper. Dampers shall not reduce the duct or the air transfer opening cross-sectional area. Access doors shall be provided at all fire dampers.

10.d.(5) Filtration. Provide a pleated 25 mm panel filter, sized for and installed in the return air system in accordance with UL 900. Filter shall be rated for 20 percent efficiency as determined by ASHRAE 52, Method of Testing Air Cleaning Devices used in General Ventilation for Removing Particulate Matter. All filters shall be easily accessible for changing and maintenance and shall be installed in the return grilles whenever possible. Additional consideration in the technical evaluation shall be given to designs utilizing electrostatic filters. Kitchen exhaust hoods shall be provided with aluminum grease filters sized to fit the exhaust duct.

10.e. Thermostats. Thermostats shall be located on interior partitions, approximately 1530mm above the finished floor. Locating a thermostat on the wall adjacent to a stairway, on an exterior wall, or where it is subject to unrepresentative temperatures is unacceptable.

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10.e.(1). Heat pump thermostats shall be Energy Star labeled, microprocessor-based, with built-in key pads for scheduling of day and night temperature settings. Thermostats shall be programmable for heating only, cooling only, or heating and cooling as required. When out of the scheduling mode, thermostats shall have continuous display of time, with AM and PM indicator, continuous display of day of week, and either continuous display of room temperature with display of temperature set point on demand, or continuous display of temperature set point with display of room temperature on demand. In the programmable mode, the display shall be used for setting and interrogating time program ON-OFF set points for all 7 days of the week. The time program shall allow two separate temperature-setback intervals per day. Thermostats shall have a means for temporary and manual override of the program schedule, with automatic program restoration on the following day. Thermostats shall have a replaceable battery to maintain the timing and maintain the schedule in memory for one year in the event of a power outage. Maximum differential shall be ± 1 degree C. For a listing of Energy Star labeled thermostats see <http://www.epa.gov/appdstar/hvac/thermostats.html>.

10.g. Exhaust Fans. Bathroom and kitchen range hood exhaust fans shall be ducted to the outside. Exhaust fans shall not discharge near the air conditioning condensing unit, entry doors, patio or balconies, carports, or garages. Fans shall be tested and rated in accordance with AMCA 210, and shall operate with 120-volt, single-phase power supply. Exhaust fans shall be provided with backdraft damper. Bathroom exhaust fans shall be ceiling mounted and shall be sized to provide not less than 10 air changes per hour in the space served. Maximum allowable noise level for bathroom exhaust fans shall be 2 sones as installed. Kitchen range exhaust fans shall be two-speed, and shall be sized for an exhaust rate of 7.6 (L/s)/m^2 [1.5 cfm/ ft^2]. Maximum allowable noise level for range hood exhaust fans shall be 6 sones as installed.

10.h. Dryer Vents. A 100-mm [4-inch] diameter dryer vent shall discharge horizontally through the exterior wall. Provide connection to occupant-owned dryer (one dryer per vent). The vents shall be rigid aluminum with exterior wall cap and backdraft damper. Vent pipes shall be a maximum of 6100 mm [20 ft] long, with no more than three right angle elbows (with minimum radius of 150 mm [6 inches]), and have a maximum vertical run of 3660 mm [12 ft]. Dryer vents shall not exhaust near the air conditioning condensing unit, entry doors, patio or balconies, carports, or garages. Dryer vents shall not run through non-accessible spaces or garages.

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10.j. Piping Requirements. Heat Pump condensate drains shall be insulated with 25 mm (minimum) thick cellular glass or unicellular foam pipe insulation. Condensate lines shall be one size larger than the drain pan connection, be properly trapped, and not directly connected to a sanitary sewer system (air gap fitting required).

10.k. Ceiling Fans. Provision of ceiling fans is encouraged as a means of increasing occupant comfort, and as an aid to improve the performance of heating and cooling systems. Ceiling fans with lights shall be provided in bedrooms and in the dining room. Ceiling fans will be low profile 1050-1350 mm (52inch), four blade type. Motors shall be three speed reversible, with air volume range between 613 and 2832 lps (1300 and 7000 CFM) and speeds between 75 and 225 rpm. Maximum power consumption shall be 80 Watts and 0.7 amps. Manufacturer's 20 year warranty is required.

10.m. **(AMEND0006) Deleted.**

10.m. **(AMEND0006) Deleted.**

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10.n. Duct Tightness Testing Requirements. The installation of the supply and return ductwork within the units is an item of prime concern with respect to the energy efficient operation of the housing unit as a whole. With that consideration in mind, for heating and air conditioning designs which include ductwork outside of the conditioned envelope, the contractor will be required to test the proto-type units and all units which are blower door tested for tightness (see paragraph 7.c.(2)) to ascertain the leakage levels from the ductwork in accordance with the following requirements. For system designs which place all the ductwork within the conditioned envelope of the structure or systems which utilize evaporative cooling, no ductwork testing will be required.

10.n.(1). Duct tightness testing shall ensure that the leakage rate from ductwork (where the ductwork system is not entirely within the conditioned envelop) shall not exceed 0.15 (L/s)/m^2 [0.03 cfm/ft^2]. If the units tested fail to meet this requirement, the ductwork installation shall be examined, corrections made, and the test redone until the installation passes this requirement. No ductwork systems may be installed in other units until the proto-type units ductwork systems have been validated. Several methods to accomplish this testing are acceptable

10.n.(1).(a). Testing may be done in accordance with ASTM Standard E 1554-94, "Determining External Air Leakage of Air Distribution Systems by Fan Pressurization". This method describes the process and methodology required to accomplish basically a 'blower door subtraction' method of duct tightness testing.

10.n.(1).(b). Testing may also be accomplished utilizing "Duct Blaster" methodologies and pressurizing the ductwork to 25 Pascal.

10.n.(2). The contractor is advised that the EPA may test, or hire a consultant to test randomly selected housing units constructed in this project. These tests will be completed without cost to the contractor, however, the contractor will be required to coordinate access to the selected unit. If accomplished, this testing is not expected to interfere or delay the construction contractor in any manner.

ACCOMPANYING AMENDMENT NO. 0007 TO SOLICITATION NO. DACA63-01-R-0002**11. ENERGY CONSERVATION.**

Energy conservation techniques shall be considered as they relate to site design, site engineering, unit design, and unit engineering. Techniques which conserve energy, improve livability, and can be justified by life cycle cost analysis as cost effective are encouraged. Integration of energy conservation systems with the housing unit's design (lighting, structure, mechanical systems, and aesthetics) is essential to facilitate livability and maximum energy savings. If an alternative energy generation method is intended for use as the project's primary energy source, documentation shall be submitted to the Contracting Officer, verifying the system's reliability and ability to meet the project's peak demand. The following paragraphs suggest energy conservation techniques which are considered desirable. The listing is not all inclusive, and the techniques suggested may not be cost effective at a given location or site. Additional consideration in the technical evaluation will be given to designs which incorporate valid energy conservation techniques.

11.a. Passive Solar Applications. Passive solar architectural applications shall routinely be considered as a part of all project designs. Unique applications such as attached sun spaces, earth sheltering, mass trombe walls, solar chimneys, solar dehumidifiers, and other innovations may be considered. Operational controls, such as shading and venting mechanisms, to control the amount of heat admitted into the housing unit during the day, reduce the amount of heat escaping from the housing unit at night, and provide for thermal comfort of the occupants, are parts of this system.

11.a.(1). Additional south glazing. If used as part of the solar energy system, glazing shall be of the commercially available off-the-shelf type and shall face within 15 degrees of solar south. The glazing shall be architecturally compatible with the housing unit and the environment, face directly into the living space so that the walls, floors, ceiling, and other massive objects can absorb the entering solar energy, and shall have a whole-window U value less than 1.6 square meter-kelvin (K)/watt [0.28 ft²-degrees F/BTUH].

11.a.(2). Storage mass. If thermal performance calculations indicate a need for additional mass (beyond that provided by the housing unit structure) substantiating data will be submitted. The storage mass will be well integrated into the housing unit design. The thermal mass surface area in the space must be a minimum of three times the glazing area. Six to nine times the glazing area is recommended to control temperature swings. The surfaces to absorb solar energy must not be more than 10% covered.

11.a.(3). Shading. Movable window treatments are required. These can take the form of heavy draperies to be drawn by the occupants at night and opened in the day. Movable thermal insulation is considered the optimum installation. Cooling season shading of glazed surfaces on the west and south elevations shall be considered.

11.b. Pre-engineered Active Solar Applications. Pre-engineered active solar applications proposed for domestic water heating shall be evaluated for life-cycle-cost effectiveness using a recognized process design program. Whether site-mounted or unit-mounted, systems must be designed for maximum ease of maintenance and for architectural compatibility with the total family housing environment. Systems shall be designed to provide no more than 60 percent of the housing unit's annual water heating load.

11.c. Geothermal. Geothermal energy sources such as wet or dry steam sources, geothermal hot water, hot dry rock, etc., when determined cost effective, may be considered in regions with established geothermal sources. Each design utilizing geothermal sources shall address the project's environmental impact relating to discharge of hazardous, noncondensable gases or other hazardous effluents, noise emission, heat rejection, ground water contamination, land use, etc.

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11.d. Wind. Wind power may be considered in regions where determined cost effective. Factors such as average wind speed, available wind power, and wind variability shall be considered when investigating the annual useful energy production potential.

11.e. Condenser Heat Recovery. In regions authorized for cooling, consideration shall be given to installation of a heat exchanger to recover condenser heat and desuperheat for use in heating domestic water. A standard, domestic water heater shall be provided in conjunction with this system to provide hot water during the heating season. Heat pump water heaters can be considered in hot climates.

11.f. Systems and techniques which take advantage of rebates and incentives offered by utilities are preferred and shall be stated by the government and local utility districts.

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12. CONTRACTOR PREPARED SPECIFICATIONS

12.a. The successful offeror shall prepare a specification for all work included in the scope of work. The specification shall be tailored to this job. Inapplicable materials shall be deleted. Any reference, description, procedure or other matter required to develop a complete, accurate and concise specification shall be provided. The specification shall include but is not limited to:

12.a.(1). A description of the technical requirements

12.a.(2). Criteria for determining whether the requirements are met

12.a.(3). Quality control requirements and procedures

12.b. Specifications for features of the work shall be organized into divisions and sections in accordance with Construction Specifications Institute (CSI), Master List of Titles and Numbers for the Construction Industry, latest edition.

12.c. Individual specification sections shall be in the format of CSI, Section Format, A Recommended Format for Construction Specification Sections, latest edition. Exceptions are:

12.c.(1). Measurement Procedures and Payment Procedures shall only be used in those section(s) where rock excavation is specified. No other sections shall contain these subparagraphs of the paragraph SUMMARY.

12.c.(2). Except as otherwise noted in this paragraph, CONTRACTOR PREPARED SPECIFICATIONS, the paragraph SUMMARY shall not be used.

12.c.(3). Submittal requirements, submittal procedures and quality control procedures, construction operations shall be those contained in attached Sections 01015, 01016, 01310, 01320, 01330 (including the submittal register), 01451, 01500, 01560, and 01770. These specification sections shall be incorporated into the Contractor prepared specification packages without editing and shall be coordinated with all other specification sections prepared by the Contractor.

12.c.(4). Section 09900, Painting, General shall establish a minimum level of quality for paints, stains, and varnishes to be used in this project. The attached section 09900 shall be reviewed, edited, and submitted by the Contractor during the design review process.

12.d. Removal and disposal of asbestos shall be specified in its own section and numbered 13280. The attached section 13280 shall be reviewed, edited, and submitted by the Contractor's Industrial Hygienist during the design review process. Specification shall be edited to suit this particular project's requirements as determined by the Contractor's professional staff.

12.e. Removal and disposal of lead based paint, shall be specified in its own section and numbered 13281. The attached section 13281 shall be reviewed, edited, and submitted by the Contractor's Industrial Hygienist during the design review process. Specification shall be edited to suit this particular project's requirements as determined by the Contractor's professional staff.

12.f. Removal, recycling, and disposal of regulated materials shall be specified in its own section and numbered 13284. The attached section 13284 shall be reviewed, edited, and submitted by the Contractor's Industrial Hygienist during the design review process. Specification shall be edited to suit this particular project's requirements as determined by the Contractor's professional staff.

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12.g. Contractor-prepared specifications will be reviewed by the Contracting Officer or designated representatives during the design portion of the project. Contractor will incorporate all required changes after resolution of comments and prior to work initiation on the next phase of the project.

12.h. See Sections 01015 DESIGN REQUIREMENTS AFTER AWARD and 01016 DESIGN DOCUMENT REQUIREMENTS for additional requirements.

ACCOMPANYING AMENDMENT NO. 0007 TO SOLICITATION NO. DACA63-01-R-0002**13. SUSTAINABLE DESIGN CONSIDERATIONS:**

13.a. Sustainable design techniques shall be considered as they relate to site design, site engineering, unit design, and unit engineering. Techniques which conserve energy, improve livability, and can be justified by life cycle cost analysis as cost effective are encouraged. Integration of energy conservation systems with the housing unit's design (lighting, structure, mechanical systems, and aesthetics) is essential to facilitate livability and maximum energy savings. The following paragraphs define the goals and general objectives for inclusion of sustainable design considerations in this project. This information is taken from US Army Corps of Engineers, ETL 1110-3-491. The listing is not all inclusive, and the techniques suggested may not be cost effective at a given location or site. Additional consideration in the technical evaluation will be given to designs which incorporate and identify Sustainable Design techniques included in the proposal.

13.b. Goals and Objectives of Sustainable Design.

13.b.(1). The overall USACE goal of Sustainable Design is to be environmentally responsible in the delivery of facilities. The key traditional elements for decision making in the facility delivery process are cost, quality and time. These elements need to be expanded to include the ecological and human health impacts of all decisions.

13.b.(2). Each project generates its own set of goals. However, sustainable design goals should apply to all projects. The goals for improving the environmental performance of facilities include: (a) use resources efficiently and minimize raw material resource consumption, including energy, water, land and materials, both during the construction process and throughout the life of the facility, (b) maximize resource reuse, while maintaining financial stewardship, (c) move away from fossil fuels towards renewable energy sources, (d) create a healthy and productive work environment for all who use the facility, (e) build facilities of long-term value, and (f) protect and, where appropriate, restore the natural environment.

13.c. Sustainable Design and Construction of the Built Environment. Design and construction of sustainable buildings should be in accordance with the following concepts:

13.c.(1). Site Work and Planning -- Environmentally sensitive planning looks beyond the boundary of the project site to evaluate linkages to transportation and infrastructure, ecosystems and wildlife habitat and community identification. Site planning evaluates solar and wind orientation, local microclimate, drainage patterns, utilities and existing site features to develop optimal siting and appropriate low maintenance landscape plant material.

13.c.(2). Building Layout and Design -- Optimize building size, and maintain an appropriate building scale for the environment and context of the building or a building component. Layout the rooms of a building for energy performance and comfort, and design for standard sizes to minimize material waste. Pay careful attention to the location of exterior windows. Avoid structural over-design and the resultant waste. Design components of the building environment for durability and for waste recycling.

13.c.(3). Energy -- Building orientation and massing, natural ventilation, day-lighting, shading and other passive strategies, can all lower a building's energy demand and increase the quality of the interior environment and the comfort and productivity of occupants.

13.c.(4). Building Materials -- Environmentally preferable building materials are durable and low maintenance. Within the parameters of performance, cost, aesthetics and availability, careful selection and specification can limit impacts on the environment and occupant health.

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13.c.(5). Indoor Air Quality (IAQ) -- Indoor air quality is most effectively controlled through close coordination of architecture, interiors and mechanical, plumbing, and electrical design strategies that limit sources of contamination before they enter the building. Construction procedures for IAQ and post-occupancy user guides also contribute to good long-term IAQ.

13.c.(6). Water Usage -- Site design strategies that maximize natural filtration of rainwater are desirable. Water conservation is enhanced by the use of low flow plumbing fixtures and water appropriate landscaping.

13.c.(7). Recycling and Waste Management -- Waste and inefficiency can be limited during construction by sorting and recycling demolition and construction waste, reuse of on-site materials and monitoring of material use and packaging. Accommodating recycling into building design reduces waste while generating revenues.

13.c.(8). Building Commissioning, Operations and Management--Effective building commissioning is essential to ensure proper and efficient functioning of systems. Facilities operations benefit from energy and water saving practices, waste reduction and environmentally sensitive maintenance and procurement policies.

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14. ENVIRONMENTAL.

14.a. Cultural And Natural Resources. National Environmental Policy Act (NEPA). An Environmental Assessment (EA), dated July 2000, was completed for the proposed action of demolishing and replacing non-commissioned officer family housing units at the Aero Vista Family Housing Area. There is a FINDING OF NO SIGNIFICANT IMPACT (FONSI) for this proposed action. The proposed new construction site is currently unoccupied. The demolition site is east of the new construction area. This proposed action is in compliance with the National Environmental Policy Act (NEPA) of 1969 (Public Law 91-190) and preparation of an Environmental Impact Statement is not required. A copy of the EA is appended in Section 01420 – Outline Of A Basic Storm Water Pollution Prevention Plan.

14.b. Protection Of Historical Properties And Cultural Resources. The currently vacant site in this contract was occupied by 457 units of Aero Vista housing development demolished in 1997 and 1998. The 1997/1998 demolition had resulted in a determination of No Historic Properties Affected because they were initially constructed in 1951 and were ineligible for listing in the National Register of Historic Places. The 110 housing units to be demolished in this contract are a part of the remaining Aero Vista housing development which becomes 50 years of age. The Texas State Historical and Preservation Office (SHPO) has determined the housing units to be demolished in this contract are eligible for the National Register of Historic Places. A Memorandum of Agreement (MOR) between the U.S. Army Air Defense Artillery Center / Fort Bliss and Texas SHPO was signed in March and April 2000. The MOR indicated that the demolition of remaining Aero Vista housing in the years 2001 and beyond is required to be carried out in accordance with stipulations stated therein. Fort Bliss Directorate of Environment (DOE) has fulfilled these stipulations. A copy of the MOR is appended in Section 01420 – Outline Of A Basic Storm Water Pollution Prevention plan.

14.c. Protection Of Endangered Species. Based on the habitat of the project area, eight threatened or endangered species potentially occur in this area of El Paso County on or near the proposed project area. Suitable unique habitat that may support animal and plant species of threatened or endangered status is not present in the developed urban areas. The northern aplomado falcon, American and Arctic peregrine falcons, interior least tern, zone-tailed hawk, wood stork, and brown pelican may fly over the proposed project area, but these avian species would be transient.

14.d. Protection Of Migratory Birds. Trees at the proposed site shall be removed during late Summer to early Spring (mid-August to beginning of February) to avoid destroying bird nests and in compliance with the Migratory Bird Treaty Act.

14.e. Wetlands and Floodplains. The proposed site for new construction was previously occupied by family housing units and is not located within a floodplain or wetland area.

14.f. Water Quality and Prevention of Water Pollution.

14.f.(1). Water Supply. The pressure, quantity, and quality of the existing water supply system are adequate for the family housing development. New water lines and valves, etc., will be provided by this project. See further discussion of water distribution system in Section 01001 Statement of Work, Part 4 SITE ENGINEERING.

14.f.(2). Municipal Wastewater. The existing sanitary system is adequate for the family housing development. New sewer lines, manholes, etc., will be provided by this project. See further discussion of sanitary sewer system in Section 01001 Statement of Work, Part 4 SITE ENGINEERING.

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14.f.(3). Industrial Wastewater. No industrial wastewater will be generated during construction.

14.f.(4). Protection of Surface And Storm Water. The disturbed area in the Phase I (new 64 housing units) construction is approximately 10.32 hectares (ha) (or 25.50 acres). The disturbed area in the Phase II (new 76 housing units) construction is approximately 10.01 ha (or 24.75 acres). The total disturbed area for all new family housing units is approximately 20.33 ha (or 50.25 acres) and all three phases of construction are adjoining sites. The disturbed area of the Phase I demolition site (64 existing housing units) is approximately 5.32 ha (or 13.15 acres). The disturbed area of the Phase II demolition site (86 existing housing units) is approximately 7.08 ha (or 17.50 acres). The disturbed area of the Phase II, Option 1, demolition site (24 existing housing units) is approximately 1.90 ha (or 4.70 acres). All demolition sites are adjoining and the total disturbed area is approximately 14.30 ha (or 35.35 acres).

Construction sites that are two (2) ha (or 5 acres) in size or larger are required to have a National Pollutant Discharge Elimination System (NPDES) Storm Water Construction Permit. In accordance with Federal Register, Volume 63, Number 128, July 6, 1998, the Contractor/designer shall prepare a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP narrative and the Erosion and Sediment Control Plans shall be prepared and submitted in accordance with specifications Section 01420 – Outline of A Basic Storm Water Pollution Prevention Plan.

14.g. Air Quality and Prevention of Air Pollution

14.g.(1). Burning of debris and waste material at the project site is prohibited during construction and any other time.

14.g.(2). Dust control practices and other particulate emissions during construction shall be in compliance with the Clean Air Act (CAA) and Texas Clean Air Act (TCAA) and in accordance with specification Section 01562 DUST CONTROL.

14.h. Municipal Solid Waste. Waste and demolition debris from construction shall be disposed of by the Contractor off Government property, at the expense of the Contractor/designer.

14.i. Regulated Waste. Regulated material consists of asbestos containing material (ACM), lead-based paint (LBP) containing material, and other regulated materials shall be abated from the family housing units prior to demolition. The presumed quantities of regulated materials on the RFP drawings are based on previous survey for 457 units demolished in 1997 and 1998. The Contractor/designer shall perform environmental surveys, as deemed necessary, to verify abatement items and quantities on each group of floor plans. Environmental surveys shall be performed by qualified inspectors and an independent and an accredited analytical laboratory in accordance with the respective specification sections for ACM and LBP. The Contractor shall coordinate all environmental survey effort with the Fort Bliss DOE, POC Mr. David Felix .

14.i.(1). Revised Abatement Plan. The revised regulated materials abatement plan for each Floor Plan Group shall present abatement quantities, description and locations, **(Am#7) ACM conditions**, analytical test results, inspector and analytical laboratory certification number and expiration date. These drawings shall be submitted for review and acceptance. Environmental survey results (including field data and laboratory analytical results) performed for this contract shall be provided with the revised abatement plans for reference.

14.i.(2). Section 13280 ASBESTOS ABATEMENT. This section shall be edited to identify OSHA and EPA classifications, descriptions of asbestos containing material (ACM), conditions and locations of regulated asbestos quantities, abatement protocol, applicable regulations for protection of workers and

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environment, and disposal requirements for each phase of demolition in this contract. The Contractor shall conduct structure inspection, perform asbestos bulk sample analysis by PLM and PLM Point Count with EPA Method 600/ R-63/ 116, if necessary.

14.i.(2).(a). ACM (**Am#7**) **Management** and Disposal. All regulated asbestos containing material shall be disposed of at the Fort Bliss sanitary landfill.

(Am#7) Based on the previous Aero Vista housing demolition contract, the regulated asbestos containing material (RACM) consists of linoleum floor covers (30 % chrysotile) with mastic (5 to 10 % chrysotile) and vinyl floor tiles (3%) with mastic (10 to 15% chrysotile). The linoleum floor covers are in poor conditions and could become pulverized during demolition. In compliance with NESHAP, they shall be abated prior to demolishing structures. The potentially contaminated vinyl floor tiles with the linoleum floor covers shall also be abated.

The other ACM in good conditions, shall be left in-place and demolished with the structures by wet method and area monitoring. The construction debris with asbestos shall be disposed of by the contractor at a landfill off post. For information purposes, the closest landfill is in SUNLAND PARK, New Mexico (phone: 505/589-9440). It is about 30 miles from Fort Bliss. The asbestos Contractor shall provide waste profile of the disposed construction debris with asbestos.

14.i.(2).(b). Transite Pipes. Section 13280 shall also include discussion of transite pipes encountered during utility demolition (**Am#7**) _____. **The transite pipes west of Luke Street are removed by Fort Bliss in May 2001.**

14.i.(2).(c). Presumed Exterior Applied Wall Texture. (**Am#7**) **In addition to the asbestos survey data provided below, bulk samples were obtained and analyzed on the exterior applied wall texture during execution of the previous Aero Vista housing demolition contract. Results indicated that the applied wall texture has less than 1% asbestos.** The Contractor shall verify the presumed ACM abatement quantities on the RFP drawings. If necessary, the exterior applied wall texture shall be verified by PLM point Count.

14.i.(2).(d). Other Presumed ACM. There are other presumed ACM that are not listed in the RFP drawings. Approximately 56 to 64 % of the demolished 1997/1998 housing units had ACM roofing material (with roof tar & felt) and they were units that have no new roof replacement. The previous survey has also reported kitchen twin sink unit with ACM asphalt under coating, ACM flexible duct connectors, and transite panel placed under the hot water tank (no samples of these items were obtained for analysis). (**Am#7**) _____.

14.i.(3) Section 013281 LEAD HAZARD CONTROL ACTIVITIES. This section shall be edited to determine disposal of debris from total demolition of structures in this contract that have previously received paint containing lead. Lead surveys by X-ray Fluorescent Lead Screening or Total Lead Analysis (EPA 6010), and waste characterization with TCLP Lead (EPA Method 1311/6010A) shall be utilized during investigation, if necessary. As a minimum, the Contractor shall obtain a composite sample of several structures to simulate demolition debris and perform waste characterization to determine waste classification. Applicable regulations and practices for protection of workers and environment during demolition and disposal requirements shall be discussed.

14.i.(3).(a). Painted Exterior Door. Total lead concentration of exterior door paint on units demolished in 1997/1998 are LBP per HUD guidelines (see Total Lead Analysis data below). The Contractor shall perform adequate TCLP analysis on exterior door units of houses to be demolished in this contract, and

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determine if it is necessary to segregate the exterior doors for disposal.

14.i.(4). Section 13284 REMOVAL, RECYCLING AND DISPOSAL OF REGULATED MATERIALS. This section shall be edited to identify items containing regulated materials in housing units under each phase of demolition. Applicable Federal, State and local regulations and appropriate final disposal protocol shall be discussed. In addition to the other regulated materials abatement quantities shown on the RFP drawings for each housing unit, the Contractor shall identify utility poles and transformers to be excised in the Phase I and II demolition. The Contractor shall coordinate with the Directorate of Public Works and Logistics (DPWL) at Fort Bliss for removal of site utilities.

14.i.(5). Previous Environmental Survey. The housing units to be demolished in this contract were constructed in the same period of time as those units demolished during 1997 and 1998. The demolished Floor Plan Groups in 1997/1998 includes 68, 69, 70, 71, 75, 77, 78, 79, 80, 81, 82, 84, and 88.5. **(Am#7) Approximately 10 percent (%) of each model were surveyed.**

14.i.(5).(a). Previous Survey Data of ACM and LBP. The following tables only present the positive findings. Floor Plan Groups to be demolished in this contract for the Phase I & II demolition includes 79, 80, 81, 84, 85, 86, 87, 88, 89, 90, and 91. No data is available from previous surveys on Floor Plan Groups 85, 86, 87, 88 89, 90 and 91 which include 9 housing units in Phase I demolition and 25 units in Phase II demolition. Presumed abatement quantities shown on RFP drawing for Floor Plan Group 85 are extrapolated from Floor Plan Group 71 because they are the same size but different in layout orientation.

TABLE 14-1 - Asbestos Analytical Test Results, 1997 Survey

(housing units demolished in 1997/1998, locations not shown, Floor Plan Groups **are** in this contract)

<u>SAMPLE NO.</u>	<u>DESCRIPTION - GROUP 79</u>	<u>RESULTS</u>
10393-A01	Linoleum Floor Cover Mastic 10393 Luke Street	10% Chrysotile
<u>SAMPLE NO.</u>	<u>DESCRIPTION - GROUP 80</u>	<u>RESULTS</u>
10306-A01	Linoleum Floor Cover 10306 Luke Street	30% Chrysotile
10306-A02	12-in. by 12-in. Floor Tile Tile Mastic 10306 Luke Street	3% Chrysotile 15% Chrysotile
10306-A03	Ext. Wall Joint Sealant 10306 Luke Street	5% Chrysotile
10505-A01	12-in. by 12-in. Floor Tile Tile Mastic 10505 Wilson Park	3% Chrysotile 10% Chrysotile
10505-A02	Linoleum Floor Cover Floor Cover Mastic	30% Chrysotile 3% Chrysotile

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	10505 Wilson Park	
10542-A02	12-in. by 12-in. Floor Tile Tile Mastic 10542 Arnold Drive	3% Chrysotile 10% Chrysotile

<u>SAMPLE NO.</u>	<u>DESCRIPTION - GROUP 81</u>	<u>RESULTS</u>
10527-A01	12-in. by 12-in. Floor Tile Tile Mastic 10527 Arnold Drive	3% Chrysotile 10% Chrysotile
10527-A02	Ext. Applied Wall Texture	5% Chrysotile

<u>SAMPLE NO.</u>	<u>DESCRIPTION - GROUP 84</u>	<u>RESULTS</u>
10536-A01	12-in. by 12-in. Floor Tile Tile Mastic 10536 Arnold Drive	3% Chrysotile 10% Chrysotile

TABLE 14-2 - Total Lead Analysis, 1997 Survey

(housing units demolished in 1997/1998, locations not shown, and Floor Plan Groups are in this contract)

<u>SAMPLE NO.</u>	<u>DESCRIPTION – GROUP 80</u>	<u>RESULTS</u>
10505-L03	Utility Room Door Paint 10505 Wilson Park	1,240 mg/Kg

<u>SAMPLE NO.</u>	<u>DESCRIPTION – GROUP 81</u>	<u>RESULTS</u>
10534-L02	Living Room Door Paint 10534 Arnold Drive	72,900 mg/Kg

TABLE 14-3 - Asbestos Analytical Test Results, 1997 Survey

(housing units demolished in 1997/1998, Floor Plan Groups are **not** in this contract)

<u>SAMPLE NO.</u>	<u>DESCRIPTION - GROUP 68</u>	<u>RESULTS</u>
10006-A01	12-in. by 12-in. Floor Tile Tile Mastic 10006 Carswell Drive	3% Chrysotile 10% Chrysotile
10006-A03	Roof Vent Flashing Sealant 10006 Carswell Drive	10% Chrysotile

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10019-A02	12-in. by 12-in. Floor Tile Tile Mastic 10019 Carswell Drive	3% Chrysotile 15% Chrysotile
10075-A01	Floor Tile Mastic 10075 Carswell Drive	10% Chrysotile
10075-A03	Ext. Wall Joint Sealant 10075 Carswell Drive	5% Chrysotile
10077-A02	12-in. by 12-in. Floor Tile Tile Mastic 10077 Carswell Drive	3% Chrysotile 10% Chrysotile
10077-A03	Ext. Applied Wall Texture 10077 Carswell Drive	5% Chrysotile
10261-A06	12-in. by 12-in. Floor Tile Tile Mastic 10261 Fairchild Street	3% Chrysotile 10% Chrysotile
10261-A07	Ext. Wall Joint Sealant 10261 Fairchild Street	5% Chrysotile
10282-A01	2-ft by 2-ft Hot Water Tank Panel 10282 Fairchild Street	30% Chrysotile
10368-A08	Floor Tile Mastic 10368 Aero vista Blvd	10% Chrysotile
10368-A09	Ext. Wall Joint Sealant 10368 Aero vista Blvd	5% Chrysotile
10404-A20	Ext. Wall Joint Sealant 10404 Luke Street	5% Chrysotile
10446-A02	12-in. by 12-in. Floor Tile Tile Mastic 10446 Macdill Street	3% Chrysotile 10% Chrysotile
10455-A34	Ext. Wall Joint Sealant 10455 Carwell Drive	5% Chrysotile
10455-A36	Roof Vent Flashing Sealant 10455 Carwell Drive	10% Chrysotile
10461-A30	12-in. by 12-in. Floor Tile Tile Mastic 10461 Carwell Drive	3% Chrysotile 15% Chrysotile

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10461-A32	Roof Vent Flashing Sealant 10461 Carwell Drive	10% Chrysotile
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<u>SAMPLE NO.</u>	<u>DESCRIPTION - GROUP 70</u>	<u>RESULTS</u>
10119-A46	12-in. by 12-in. Floor Tile Tile Mastic 10119 Forbes Drive	3% Chrysotile 15% Chrysotile
10127-A01	Linoleum Floor Cover 10127 Arnold Drive	30% Chrysotile
10127-A02	Ext. Applied Wall Texture 10127 Arnold Drive	5% Chrysotile
10173-A50	12-in. by 12-in. Floor Tile Tile Mastic 10173 Wilson Park	3% Chrysotile 15% Chrysotile
10314-A01	12-in. by 12-in. Floor Tile Tile Mastic 10314 Offutt Circle	5% Chrysotile 5% Chrysotile
10314-A02	Linoleum Floor Cover Cover Mastic 10314 Offutt Circle	30% Chrysotile 5% Chrysotile

<u>SAMPLE NO.</u>	<u>DESCRIPTION - GROUP 71</u>	<u>RESULTS</u>
10291-A01	12-in. by 12-in. Floor Tile Tile Mastic 10291 Aero Vista Blvd	3% Chrysotile 15% Chrysotile
10473-A02	Floor Tile Mastic 10473 Carwell Drive	10% Chrysotile
10473-A05	Roof Vent Flashing Sealant 10473 Carwell Drive	15% Chrysotile

<u>SAMPLE NO.</u>	<u>DESCRIPTION - GROUP 75</u>	<u>RESULTS</u>
10145-A01	12-in. by 12-in. Floor Tile Tile Mastic 10145 Arnold Drive	3% Chrysotile 10% Chrysotile

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10145-A02	Linoleum Floor Cover 10145 Arnold Drive	30% Chrysotile
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<u>SAMPLE NO.</u>	<u>DESCRIPTION - GROUP 77</u>	<u>RESULTS</u>
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10350-A01	12-in. by 12-in. Floor Tile Tile Mastic 10350 Ramey Circle	3% Chrysotile 10% Chrysotile
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10350-A03	Ext. Applied Wall Texture 10350 Ramey Circle	5% Chrysotile
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<u>SAMPLE NO.</u>	<u>DESCRIPTION - GROUP 78</u>	<u>RESULTS</u>
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10061-A02	12-in. by 12-in. Floor Tile Tile Mastic 10061 Arnold Drive	3% Chrysotile 10% Chrysotile
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10091-A01	12-in. by 12-in. Floor Tile Tile Mastic 10091 Aero Vista Blvd	3% Chrysotile 10% Chrysotile
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10366-A42	Ext. Applied Wall Texture 10366 Aero Vista Blvd	5% Chrysotile
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10462-A01	12-in. by 12-in. Floor Tile Tile Mastic 10462 Carwell Drive	3% Chrysotile 10% Chrysotile
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10481-A21	2-ft by 2-ft Hot Water Tank Panel 10481 Carwell Drive	30% Chrysotile
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10481-A25	Linoleum Floor Cover 10481 Carwell Drive	30% Chrysotile
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<u>SAMPLE NO.</u>	<u>DESCRIPTION - GROUP 82</u>	<u>RESULTS</u>
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10225-A01	Furnace Flex. Duct Connector 10225 Bergstrom Street	10% Chrysotile
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10225-A04	Roof Vent Flashing Sealant 10225 Bergstrom Street	15% Chrysotile
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<u>SAMPLE NO.</u>	<u>DESCRIPTION - GROUP 88.5</u>	<u>RESULTS</u>
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10015-A02	Linoleum Floor Cover Mastic 10015 Carswell Drive	10% Chrysotile
10033-A02	12-in by 12-in. Floor Tile Tile Mastic 10033 Forbes Drive	3% Chrysotile 10% Chrysotile
10058-A03	Tile Mastic 10058 Arnold Drive	5% Chrysotile
10058-A04	Ext. Applied Wall Texture 10058 Arnold Drive	5% Chrysotile

TABLE 14-4 - Total Lead Analysis, 1997 Survey(housing units demolished in 1997/98, Floor Plan Groups are **not** in this contract)

<u>SAMPLE NO.</u>	<u>DESCRIPTION – GROUP 68</u>	<u>RESULTS</u>
10019-L05	Storage Room Door Paint 10019 Carswell Drive	91,400 mg/Kg
10077-L01	Exterior Wall Paint 10077 Carswell Drive	1,880 mg/Kg
10261-L02	Exterior Wall Paint 10261 Fairchild Street	1,070 mg/Kg
10368-L03	Exterior Wall Paint 10368 Aero Vista Blvd	2,560 mg/Kg
10461-L11	Kitchen Window Sill Paint 10461 Carswell Drive	2,360 mg/Kg
10461-L12	Kitchen Duct Chase Paint 10461 Carswell Drive	227 mg/Kg
10461-L13	Utility Room Door Paint 10461 Carswell Drive	337 mg/Kg
10461-L14	Bedroom Door Frame Paint 10461 Carswell Drive	663 mg/Kg
10461-L15	Bedroom Door Frame Paint 10461 Carswell Drive	< 22 mg/Kg (not sufficient sample available)
10461-L16	Exterior Duct Paint 10461 Carswell Drive	219 mg/Kg

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<u>SAMPLE NO.</u>	<u>DESCRIPTION – GROUP 69</u>	<u>RESULTS</u>
10171-L19	Kitchen Cabinet Varnish 10171 Wilson Park	450 mg/Kg
10171-L20	Ext. Eave Paint 10171 Wilson Park	518 mg/Kg

<u>SAMPLE NO.</u>	<u>DESCRIPTION – GROUP 70</u>	<u>RESULTS</u>
10173-L17	Bathroom Wall Paint 10173 Wilson Park	1,800 mg/Kg
10173-L18	Closet Door Paint 10173 Wilson Park	360 mg/Kg
10314-L04	Living Room Window Sill Paint 10314 Offutt Circle	36,200 mg/Kg

<u>SAMPLE NO.</u>	<u>DESCRIPTION – GROUP 78</u>	<u>RESULTS</u>
10481-L04	Living Room Door Paint 10481 Carswell Drive	59,100 mg/Kg
10481-L05	Closer Wall Paint 10481 Carswell Drive	37.9 mg/Kg
10481-L06	Bathroom Wall Paint 10481 Carswell Drive	1,180 mg/Kg

TABLE 14-5 - Toxicity Characteristic Leaching Procedures (TCLP) Lead Analysis, 1997 Survey (housing units demolished in 1997/1998, Floor Plan Groups are **not** in this contract)

<u>SAMPLE NO.</u>	<u>DESCRIPTION</u>	<u>TCLP RESULTS</u>
CWT-1 Group 70	Composite Sample of Exterior Applied Texture, 10314 Offutt Circle	0.271 mg/l
COMP-B Group 70	Composite Sample of Total Structural, 10119 Forbes Drive	0.15 mg/l

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<u>SAMPLE NO.</u>	<u>DESCRIPTION</u>	<u>RESULTS</u>
10481-S1 Group 78	Composite Soil Sample at Entry 10481 Carswell Drive	417.4 mg/Kg (Total Lead)
10483-S2 Group 71	Composite Soil Sample at Entry 10483 Carswell Drive	52.2 mg/Kg (Total Lead)
COMPL-S3 Group 70	Composite Soil Sample at Drip Line 10314 Offutt Circle 10119 Forbes Drive	31.3 mg/Kg (Total Lead)
COMPA-S4 Group 70	Soil Sample Composite at Drip Line 10314 Offutt Circle 10119 Forbes Drive	Non-Detect (Asbestos)

14.j. Recycling and Reuse. Stipulated by the Waste Reduction Policy Act (WRPA) 1991, Senate Bill 1051, the Clean Texas Star program is offered by Texas Natural Resource Conservation Commission (TNRCC) to encourage a non-regulatory approach toward achieving CLEAN TEXAS goals of reducing waste to landfills. The Contractor/designer shall work with the Directorate of Environment at Fort Bliss to salvage, to the maximum extent possible, both non-hazardous and hazardous waste through recycling and reuse, and to avoid disposal of items in their entirety to a landfill without reclamation. Contact TNRCC, RENEW, Office of Pollution Prevention & Recycling/MC 112, PO Box 13087, Austin, Texas 78711-3087 (phone 512/239-3171) or internet address: <http://www.tnrcc.state.tx.us/admin/topdoc/pd/002/> to obtain the publication, The Renew Catalog. Information for resource exchange network for recycling/reuse (i.e. utility poles, fluorescent light tubes, etc.) is available in the publication. The TNRCC Publication, RG-79, Recycle Texas, a reuse and recycling directory, is also available from the same address above. The Contractor shall ensure that no potential hazardous or regulated material is disposed at recycling facilities that resell or reuse these items at any low-income or self-help family housing projects.

14.k. Construction Material for New Housing Units.

14.k.(1) Construction material shall not contain any asbestos.

14.k.(2) Potable water supply system shall have lead free pipes and joints.

14.k.(3) Paint to be used for the new housing units shall have a certificate stating that the paint does not contain more than 0.06 percent lead by weight of the total non-volatile compounds, mercury containing mildewcide, insecticide, and it meets the Federal Volatile Organic Compound (VOC) regulations and state air pollution requirements.

14.l. Federal, State, Local Permits and Notifications.

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14.I.(1) EPA's NPDES Storm Water Construction Permit. This permit is required for storm discharges in each phase of construction. All submittals shall be in accordance with Section 01420 – Outline Of A Basic Storm Water Pollution Prevention Plan.

14.I.(1).(a) Notice of Intent (NOI). The Contractor shall submit NOI prior to initiation of the demolition activity for each phase of construction. NOI shall be submitted no later than 48 hours before start of construction.

14.I.(1).(b) Inspection Report. The Contractor shall submit Inspection Report during construction.

14.I.(1).(c) Notice of Termination (NOT). NOT shall be submitted upon completion of each phase of the construction.