AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
	1 of 15

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. *(If applicable)*
1	26-Jul-2002		

6. ISSUED BY	CODE	7. ADMINISTERED BY *(If other than item 6)*	CODE
US Army Corps of Engineers, Kansas City District 760 Federal Building, 601 East 12th Street Kansas City, Missouri 64106-2896			

8. NAME AND ADDRESS OF CONTRACTOR *(No.,street, county, State and ZIP Code)*	(x)	9a. AMENDMENT OF SOLICITATION NO.
	X	DACA41-02-R-0007
		9B. DATED *(SEE ITEM 11)* 6/27/2002
		10A. MODIFICATION OF CONTRACT/ORDER NO.
		10B. DATED *(SEE ITEM 13)*
CODE FACILITY CODE		

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

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

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitaiton 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 telegraph which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA *(If required)*

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

(x) 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 NUMBER 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:

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.)*

Whole Neighborhood Revitalization
Fort Leavenworth, Kansas

The Solicitation is amended in accordance with the attached pages.

RECEIPT OF PROPOSALS IS DELAYED UNTIL 2:00 P.M., LOCAL TIME, 6 AUGUST 2002, RM 760 FEDERAL BUILDING, 601 E. 12TH STREET, KANSAS CITY, MISSOURI 64106-2896.

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)*	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY _____ *(Signature of Contracting Officer)*	16C. DATE SIGNED

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

Changes in Section 00010

CLIN 0010 - The CLIN extended description has changed to

Provide nine-foot (9') ceiling height throughout the first floor of all new residences, including design costs and all incidental work as required by the statement of work.

Changes in Section 00110

Section 00110 has been revised and is reissued in its entirety (see attached). For clarity, deleted material is indicated with ~~**strikethrough**~~ characters, and added material is indicated with **underlined** characters.

Changes in Section 00700

The following clauses which are incorporated by full text have been added or modified:

52.236-14 AVAILABILITY AND USE OF UTILITY SERVICES (APR 1984)

(a) The Government shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed shall be charged to or paid for by the Contractor at prevailing rates charged to the Government or, where the utility is produced by the Government, at reasonable rates determined by the Contracting Officer. The Contractor shall carefully conserve any utilities furnished without charge.

(b) The Contractor, at its expense and in a workmanlike manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of each utility used for the purpose of determining charges. Before final acceptance of the work by the Government, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia.

(End of clause)

Changes in Section 00800

The following clauses which are incorporated by full text have been added or modified:

SCR-DB-008 SEQUENCE OF DESIGN -CONSTRUCTION (FAST TRACK) – AUG 1997

(a) After receipt of the Contract Notice to Proceed (NTP) the Contractor shall initiate design, comply with all design submission requirements as covered under Division 01 General Requirements, and obtain Government review of each submission. The Contractor may begin construction on portions of the work for which the Government has reviewed the final design submission and has determined satisfactory for purposes of beginning construction. The ACO or COR will notify the Contractor when the design is cleared for construction. The Government will not grant any time extension for any design resubmittal required when, in the opinion of the ACO or COR, the initial submission failed to meet the minimum quality requirements as set forth in the Contract.

(b) If the Government allows the Contractor to proceed with limited construction based on pending minor revisions to the reviewed Final Design submission, no payment will be made for any in-place construction related to the pending revisions until they are completed, resubmitted and are satisfactory to the Government.

(c) No payment will be made for any in-place construction until all required Submittals have been made, reviewed and are satisfactory to the Government.

(End of Clause)

(Revised) SECTION 00110

PROPOSAL SUBMISSION REQUIREMENTS AND INSTRUCTIONS

Section 00110 has been revised and is reissued in its entirety. For clarity, deleted material is indicated with **~~strikethrough~~** characters, and added material is indicated with **underlined** characters.

SECTION 00110

PROPOSAL SUBMISSION REQUIREMENTS AND INSTRUCTIONS

1.00 GENERAL PROPOSAL INFORMATION.

General. The proposal should be prepared simply and economically, providing straightforward, concise delineation of capabilities to perform the contract. The proposal should be practical, legible, clear and coherent.

2.00 GENERAL PROPOSAL SUBMISSION INSTRUCTIONS

a. Who May Submit.

(1) Proposals may be submitted by firms formally organized as design/build entities, or by design firms and construction contractors that have associated specifically for this project. In the latter case, a single design firm or construction contractor may offer more than one proposal by entering into more than one such association. For the purpose of this solicitation, no distinction is made between formally organized design/build entities and project-specific design/build associations. Both are referred to as the design/build offeror, (or simply "offeror"), or the design/build contractor, (or simply "Contractor"), after award of a contract.

(2) Any legally organized offeror may submit a proposal, provided that the offeror, or offeror's subcontractor, has on its permanent staff professional architects and engineers registered in the appropriate technical disciplines and provided that the requirements specified in the solicitation are met. All designs must be accomplished under the direct supervision of appropriately licensed professionals.

b. General Requirements.

(1) All offerors shall be required to submit a proposal with the minimum content as specified herein. Proposals without the minimum content may be rejected. Proposals will be received until the date and time indicated on Standard form 1442 at the following address:

U.S. Army Engineer District, Kansas City
757 Federal Building
ATTN: CENWK-CT-C/Marks
601 East 12th Street
Kansas City, Missouri 64106-2896

(2) PREPROPOSAL CONFERENCE

There will be a preproposal conference held at the Frontier Conference Center, on **10 July 2002** at Fort Leavenworth, Kansas. Written questions need to be submitted to Mr. Perry Marks at the address above **no later than 03 July 2002** to ensure that they can be answered at the preproposal conference.

(3) PROPOSAL FORMAT AND SUBMITTAL REQUIREMENTS

a. In order to be considered for award of a contract for the requirements of this solicitation, the offeror must submit a proposal with its offer. Failure to submit a complete proposal will result in the entire offer being rejected. The proposal shall consist of 2 parts:

(1) TECHNICAL/MANAGEMENT PROPOSAL.

(2) PRICE PROPOSAL consists of the original signed Standard Form 1442 "solicitation, Offer, and Award"; providing a price for all line items in the bid schedule; and acknowledgment of all amendments to the solicitation.

b. Proposal Characteristics

(1) All text must be legible and easily read. The page size of the offeror's proposal shall not exceed 8-1/2 by 11 inches. Diagrams, charts and tables shall conform to the paper size. All text shall be typed single-spaced. Margins (1-inch) shall be clean and clear. If fold-out charts are unavoidable, and are to be utilized, all sheets shall be reproduced on 11 by 17 inch, and folded to 8-1/2 by 11 inch size with the title clearly visible at the bottom right corner. Each volume shall be contained within a 3-ring loose leaf binder and submitted in the following quantities (no heat or spiral bound volumes).

NOTE: Limit the technical/management portion of the proposal to a maximum of 100 pages. If more than 100 pages are submitted, only the first 100 pages will be evaluated.

VOLUME I	Technical/Management Proposal	Original & 6 copies
VOLUME II	Price Proposal	Original & ~~6 copies~~ **1 copy**

(2) The Offeror's name, address, signature and telephone number shall appear on any document submitted to be evaluated. Each Volume of the proposal shall be identified by the Solicitation number, Volume number, name, address, and telephone number of the offeror on the cover page. Each Volume shall also contain a table of contents, list of tables, list of figures, list of appendices, list of acronyms and at the bottom left side of each page the volume number shall be included. The list of acronyms should include all acronyms appearing in that volume. The cover page of each part shall be properly printed with: (i) the solicitation number; (ii) the project title - **"WHOLE NEIGHBORHOOD REVITALIZATION, FORT LEAVENWORTH, KANSAS",** (iii) the name, address, and telephone number of the firm submitting the proposal, and the name of the firm's point of contact; and one of the following on each volume in bold letters. Mark the original copy as "**ORIGINAL**" and the copies as "**COPY**."

VOLUME I: TECHNICAL/MANAGEMENT PROPOSAL

VOLUME II: PRICE PROPOSAL

(3) The Proposal's clarity, organization and cross referencing is mandatory. No material shall be incorporated by reference. General cross-references or cross referencing guides will not be considered appropriate cross-references.

(4) The Proposal shall be organized by factors and subfactors. They shall be described in separate sections, appropriately tabbed in a report form. All pages of each factor/subfactor shall be sequentially numbered. Elaborate or lengthy presentations are not necessary or desirable.

(5) The Technical/Management narrative shall be written in a way to demonstrate a clear understanding of the requirements, but should not parrot the specifications. The Technical/Management proposal shall not refer the reviewer to information contained in the Price proposal.

3.00 PART I - TECHNICAL /MANAGEMENT PROPOSAL SUBMISSION INSTRUCTIONS:

a. The Technical/Management proposal shall address the offeror's proposed approach to fully perform the requirements of the RFP. Offerors are discouraged from providing information not required by the solicitation.

b. The offeror shall address each of the following Factors and Sub factors, in sufficient detail to permit a complete and comprehensive evaluation: The Offeror must submit a written statement certifying that all items of his proposal complies with the requirements of this solicitation. The compliance statement will be signed by the Offeror and provided with the contractual/financial information as required in paragraph 4.00.

c. Any deviation from the solicitation requirements may result in non-consideration of its proposal. If deviations are included, they must be clearly indicated in the Offeror's Statement of Compliance. After award, the solicitation requirements will govern in the event of a conflict between these requirements and the Offeror's proposal.

FACTOR 1 - Offeror Relevant Experience. The Offeror shall provide a minimum of three (3) project examples that are similar in terms of project size and scope. These examples must have been completed in the ~~three (3)~~ **six (6)** year period preceding the date of this solicitation. If the Offeror represents the combining of two or more companies, state if this project represents a joint venture of the listed parties. The offeror should address past performance separately, for projects as general contractor and as Architect/Engineer

SUB FACTOR A Similar Projects: Each example will provide a general description of the project scope, location, cost, date of completion, solicitation and contract type, and Owner/Architect references (names and telephone numbers).
SUB FACTOR B All projects within the last five years: The Offeror will also provide a list of all projects **over the Simplified Acquisition Threashold of $100,000** completed within the five (5) year period preceding the date of this solicitation, including Owner/Architect references.

SUB FACTOR C Safety Record: Provide a list of OSHA citations in which you were a party during the last 5 years. Provide a brief synopsis of the outcome for each citation, including the dollar amount of any fines assessed. Additionally, provide the number of reportable workplace accidents expressed as a percentage of man-hours worked, for each of the last 3 years.

FACTOR 2 - Offeror Past Performance Information.*:* The Offeror will provide a "Past Performance Evaluation Questionnaire" to the point of contact for each of the project examples required in item 3.00(1). The project point of contact must complete the questionnaire and mail, fax, or email it directly to Mr. Perry D. Marks, Contract Specialist, at Perry.D.Marks@nwk02.usace.army.mil no later than the closing date on the RFP. The Offeror is responsible for ensuring that the completed questionnaires are provided by the closing date. Questionnaires that arrive after the solicitation closing date and time will not be considered. A copy of the questionnaire is included at the end of paragraph 3.00. (NOTE: the Offeror should complete items 1-4 in the questionnaire in order to help the respondent identify the particular project they will be evaluating.)

FACTOR 3 - Offeror's Proposed Betterments: The Offeror shall provide a list of proposed betterments included in its proposal. Include only those betterments that will be provided within the specified price range of this project. A list of the Government desired betterments can be found in the bid schedule provided with this RFP. The Offeror's pricing shall be provided on the bid schedule, but must not be included with this list of betterments.

FACTOR 4 - Project Management Plan, and sub factors: The Offeror will provide a project management plan that addresses sub factor items ~~a thru e~~ **A thru D** below.

SUB FACTOR A - Quality Control: The Offeror must provide a complete and comprehensive quality control plan to support the performance requirements of Section 01451 of this RFP. Describe the process by which the QC staff will monitor work in the field and how action is to be taken to correct deficiencies. Describe the process by which the QC staff will work with government quality assurance personnel and the Contracting Officer to insure timely action is taken on deficiencies or quality problems in the field. The Quality Control Plan shall be a rational, workable plan, and shall stand alone for easy monitoring by the Contracting Officer and the Contracting Officer's Representative. It shall not be dependent on the contractor's other internal management plans. The Offeror must indicate how it intends to incorporate the Corps Three Phase Inspection process to provide seamless integration with the Quality Assurance Operations performed by the Government.

SUB FACTOR B - Proposed Staffing: The Offeror will provide a project management-staffing sub-plan. This sub-plan will include an organizational chart indicating the positions of all key personnel, their primary duties, and state whether the person is an employee, a subcontractor, or a consultant. At a minimum the Offer shall provide a resume, including level of authority, for the Project Manager, Project Architect, Landscape Architect, Civil Engineer, Mechanical Engineer, Electrical Engineer, QC Manager and the Job Superintendent and should reflect each individual's involvement, if any, in the project examples provided. If reassignment of personnel is possible, the names and resumes of the alternative professionals for each should be submitted. Additionally, each resume must list at least two professional references. The Government has a right to rereview the Contractor's key personnel if

they should change or be replaced for any reason once the contract has been awarded. The organizational chart must also indicate whether key personnel are full or part time, and the geographic location where they are currently based.

SUB FACTOR C Design & Construction Scheduling: The Offeror will provide a project management sub-plan for integrated design and construction scheduling to support the requirements of Section 01320. This schedule will be graphically represented, and must indicate specific dates for completion of all critical tasks. The Offeror must clearly indicate any activities that are being "Fast Tracked."

SUB FACTOR D - Construction Closeout: The Offeror will provide a plan specifically developed for project closeout activities for individual residences or groups of residences, and how he will incorporate this system to complete the project. The project closeout schedule will be graphically represented, and must indicate the number of calendar days required for completion of required closeout tasks. These elements include:

ELEMENT (1) Testing of equipment and systems with schedules and reports
ELEMENT (2) Prefinal inspection date
ELEMENT (3) Time required for correction of deficiencies
ELEMENT (4) Anticipated transfer to the Government The plan must indicate specific dates for final project closeout tasks. These include:

SUB ELEMENT (a) Completion of personnel training requirements
SUB ELEMENT (b) Date O&M manuals and as-builts will be provided
SUB ELEMENT (c) Date Offeror intends to move off-site

SAMPLE TRANSMITTAL LETTER
AND
PAST PERFORMANCE EVALUATION QUESTIONNAIRE
WHOLE NEIGHBORHOOD REVITALIZATION – DACA41-02-R-0007

Date: _____

To: _____
_____
_____

We have listed your firm as a reference for work we have performed for you as listed below. Our firm has submitted a proposal under a project advertised by the U.S. Army Corps of Engineers, Kansas City District. In accordance with Federal Acquisition Regulations (FAR), an evaluation of our firm's past performance will be completed by the Corps of Engineers. Your candid response to the attached questionnaire will assist the evaluation team in this process.

We understand that you have a busy schedule and your participation in this evaluation is greatly appreciated. Please complete the enclosed questionnaire as thoroughly as possible. Space is provided for comments. Understand that while the responses to this questionnaire may be released to the offeror, FAR 15.306 (e)(4) prohibits the release of the names of the persons providing the responses. Complete confidentiality will be maintained. Furthermore, a questionnaire has also been sent to _____ of your organization. Only one response from each office is required. If at all possible, we suggest that you individually answer this questionnaire and then coordinate your responses with that of _____, to forge a consensus on one overall response from your organization.

Please send your completed questionnaire to the following address:

U.S. Army Engineer District, Kansas City
ATTN: CENWK-CT-C/Marks
760 Federal Building
601 East 12th Street
Kansas City, Missouri 640106-2896

The questionnaires can also be e-mailed to Perry.D.Marks@nwk02.usace.army.mil or faxed to 816-426-5169

If you have questions regarding the attached questionnaire, or require assistance, please contact Mr. Marks at (816) 983-3850.

[NOTE: Offeror should complete items 1-4 in the questionnaire in order to help the respondent identify the particular project they will be evaluating.)]

DACA41-02-R-0007
PAST PERFORMANCE EVALUATION QUESTIONNAIRE

Upon completion of this form please send directly to the U.S. Army Corps of Engineers in the enclosed addressed envelope or fax to 815-426-5169, ATTN: Perry D. Marks. Do not return this form to our offices. Thank you.

1. Contractor/Name & Address (City and State):

2. Type of Contract: Fixed Price _____ Cost Reimbursement _____
Other (Specify) _____

3. Title of Project/Contract Number:
_____
_____

4. Description of Work: (Attach additional pages as necessary)

5. Complexity of Work: High _____ Mid _____ Routine _____

6. Location of Work:_____

7. Date of Award: _____

8. Status: Active _____ (provide percent complete)
Complete _____ (provide completion date)

9. Name, address and telephone number of Contracting Officer's Technical Representative:

QUALITY OF PRODUCT/SERVICE:

10. Evaluate the contractor's performance in complying with contract requirements, quality achieved and overall technical expertise demonstrated.

Excellent Quality	
Above Average Quality	
Average Quality	
Below Average Quality	
Unsuccessful or Experienced Significant Quality Problems	

Remarks: _____
_____

11. To what extent were the contractor's reports and documentation accurate, complete and submitted in a timely manner?

Excellent Quality	
Above Average Quality	
Average Quality	
Below Average Quality	
Unsuccessful or Experienced Significant Quality Problems	

Remarks: _____
_____

12. To what extent was the contractor able to solve contract performance problems without extensive guidance from government/owner counterparts?

Excellent	
Above Average	
Average	
Below Average	
Unsuccessful	

Remarks: _____
_____

13. How well did the contractor manage and coordinate subcontractors, suppliers, and the labor force?

Excellent	
Above Average	
Average	
Below Average	
Unsuccessful	

Remarks: _____
_____

CUSTOMER SATISFACTION:

14. To what extent were the end users satisfied with:

	Quality?	Cost?	Schedule?
Exceptionally Satisfied			
Highly Satisfied			
Satisfied			
Somewhat Dissatisfied			
Highly Dissatisfied			

Remarks: _____
_____

15. If given the opportunity, would you work with this contractor again?

Yes _____ No _____ Not Sure _____

TIMELINESS OF PERFORMANCE:

16. To what extent did the contractor meet the task order schedules?

Completed Substantially Ahead of Schedule	
Completed on Schedule with no Time Delays	
Completed on Schedule with Minor Delays Under Extenuating Circumstances	
Experienced Significant Delays without Justification	

Remarks: _____
_____

CONTRACTORS SAFETY RECORD:

17. How would you rate the contractors overall safety record? What OSHA violations and fines were assessed. Were the number of accidents excessive as a percentage of man-hours worked.

Excellent	
Above Average	
Average	
Below Average	
Unsuccessful or Experienced Significant Problems	

Remarks: _____
_____

OTHER REMARKS:

18. Use the space below to provide other information related to the contractor's performance. This may include the contractor's selection and management of subcontractors, flexibility in dealing with contract challenges, their overall concern for the Government's interest (if applicable), project awards received, etc.

_____
_____
_____

[End of sample]

4.00 PART II - PRICE PROPOSAL & CONTRACTUAL/FINANCIAL PROPOSAL SUBMISSION INSTRUCTIONS

The Price proposal will not be scored but will be evaluated subjectively. In selecting the best overall proposal, the Government will consider the value of each proposal in terms of the quality offered for the price. The price proposal section of the proposal shall refer directly to items of the proposal schedule and shall be identified as such. The price proposal shall be evaluated for realism, reasonableness, and completeness as described in Section 00120.

Contract documents. This information shall be submitted in a separate tabbed section within Volume II. The information in this section shall contain the following, one original and ~~six (6) copies~~ **one (1) copy**.

1)Completed Standard Form 1442
2) Representations and Certifications
3) Proposal bonds
4) Statement of Compliance

b. Price Proposal Information. Offeror shall complete all portions of the Price Proposal Schedule and furnish in a separate tabbed section of Volume II, one original and ~~six (6) copies~~ **one (1) copy**.

Changes in Section 01010: The section has been revised and is re-issued in its entirety. The section is attached. The following paragraphs are changed as indicated.

1-2.4
2-2.1
3-2.1
3-3.3
3-3.3.2
3-4.2
3-4.3
3-4.4
3-4.5
3-5.12.2.1
3-5.17.2
4-2.1
4-2.3
4-2.5
4-3.2
4-3.4
4-5
4-6.4
5-8
5-8/4/1
5-9.1
5-13
5-13.2
5-13.3
5-13.3
5-13.4
5-13.5
5-17.5
6-1
8-1
8-5
9-7.2.1
9-19

Changes in Section 01012: Three paragraphs have been revised. The section is being re-issued in its entirety due to repagination caused by the changes. The section is attached. The three revised paragraphs are listed below.

1.5
10.1.2
1.1.1 (Appendix A)

Changes in Section 02921: Page 02921-13 is revised. The revised page is attached. The two revised paragraphs are listed below.

3.8
3.9.2.1

Changes in Section 02922: Page 02922-5 is revised. The revised page is attached. The two revised paragraphs are listed below.

2.1.1
2.1.3

For Information Only: Three files are being issued for information only. The files listed below may be accessed under "Specs" on the button bar.

Phase 1A Geotechnical Report Appendices
Phase 1B Geotechnical Report Appendices
Phase 1D Geotechnical Report Appendices

Narrative Changes and Clarifications in Drawings: The following drawings are changed as indicated.

Sheet CU101: The buffer zones shown on the drawing have no specific meaning or relevance to the contract requirements.

Sheet CU102: At the D-B Contractor's discretion, he can tie into the existing sewer lines if he believes it is technically feasible, or he may choose the tie-in point for the new sanitary sewer as the sanitary sewer manhole directly south of the fire station and located in the middle of the new road.

Sheets CS101, CS102, CS103, CD101, CD102, ASD1, CG101, CG102, CG103, CU101, CU103: The Note 1" = 100.0' is not correct. The scale is correct.

Offerors are required to acknowledge receipt of this amendment on the Bidding Form, in the space provided, or by separate letter or telegram prior to opening of bids. Failure to acknowledge all amendments may cause rejection of the proposal.

Proposals will be received until 2:00 p.m., local time, 6 August 2002, in Room 760 Federal Building, 601 E. 12th Street, Kansas City, Missouri 64106-2896.

STATEMENT OF WORK

TABLE OF CONTENTS

LISTING OF TABLES

Paragraph 10.

STATEMENT OF WORK

1. DESIGN OBJECTIVES.

1-1 The design and construction shall comply with the minimum requirements contained in this Request for Proposals (RFP).

1-1.1 Primary Consideration. All proposals received MUST include must include a price for all items in the base bid as a minimum. Failure to meet this requirement may result in non-consideration of the Offeror's proposal. Betterments will only be considered upon verification that the primary consideration requirements have been met.

1-2. Work Scope. This contract shall consist of the design and construction of a total of 42 duplexes, supportive infrastructure, and landscape at Fort Leavenworth, Kansas, in accordance with the requirements of this RFP.

1-2.1 Residences: For the purposes of this RFP, a duplex is defined as a one- or two-story structure divided by a common party wall into two separate residences, each with separate exterior entrances. The required number, type, and location of individual residences are as shown on the RFP documents.

1-2.2 Sitework.

1-2.2.1 Sitework. Sitework 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, and physical security.

1-2.2.2 Development for this Project is planned in three separate noncontiguous sites. As indicated in the drawings, these sites have been subdivided into lots. The number of lots per site may not be changed; however, the lot configuration may be slightly altered to fit the proposer's specific design assuming that it complies with other requirements of this RFP. Approximate distribution of the housing on the three sites is as follows:

Site 1A – 30.84 acres; 46 residences
Site 1B – 17.47 acres; 18 residences
Site 1D – 9.88 acres; 20 residences

1-2.3 Special utilities and supplementary construction. At Site 1B, there are 2 water lines (12 inches and 20 inches) between Biddle Boulevard and Hancock Avenue at the back side (northeast) of the existing housing development. These lines cannot be removed.

1-2.4 Demolition considerations and requirements. Demolition of 86 housing residences located in 17 buildings will be required as a part of this Project. Above ground demolition of Delaware Village residences **is** part of the base bid. Existing Concrete foundations will not be removed. However, protrusions from the foundations, including anchor bolts, pipes, conduits, ducts, etc., will be removed flush with the foundation surface as part of the base bid. Additionally any openings in the foundation created as a result of demolition operations will be capped with materials acceptable to the contracting officer as part of the base bid. In general the offeror's responsibility to ensure that any inherently unsafe condition are not left behind after demolition operations are completed. Cap and install shut off valves on underground utilities. Remove all power, poles, conductors and transformers for housing units removed. Contractor shall grade and seed only areas disturbed by the contractor during demolition. These residences have asbestos containing materials that must be abated prior to demolition. Refer to the asbestos specification and survey included as

attachments to this RFP. There is no lead paint in the buildings to be demolished.

1-3 (NOT USED)

1-4 Design Freedom. The attached floor plans, elevations, roof plans, and site plans will not be modified. Any change or deviation must be approved by the Contracting Officer.

1-5 Method of Duplex Unit Construction. The Offeror may utilize the following construction methods: Site-built, factory-built components/modules, or manufactured housing. Use of factory-built or manufactured housing methods must not result in alteration of the RFP Floor Plans.

1-6 Definition of housing construction methods. Terms for housing construction methods used in these criteria are defined as follows:

1-6.1 Site- or stick-built housing. Residences are wholly constructed at the site.

1-6.2 Factory-built components and modules. 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 residences.

1-6.3 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."

2. CRITERIA REFERENCES.

2-1 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.

2-2 Local and State Codes or Standards. The following specifications, standards, bulletins, and handbooks form a part of this document to the extent specified herein.

2-2.1 Uniform Mechanical Code (UMC), National Plumbing Code (NPC), and Uniform Building Code, 1997 Edition.

2-3 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
10 CFR 430	National Appliance Energy Conservation Act (NAECA)
16 CFR 1630	Standard for Surface Flammability of Carpet and Rugs
29 CFR 1926	Occupational Safety and Health Administration (OSHA) Standards and Regulations
40 CFR 247.12	Comprehensive Procurement Guideline for Products Containing Recovered Materials, Construction Products
49 CFR 192	Transportation of Natural Gas and Other Gas by Pipeline: Minimum Federal Safety Standards
42 USC 4321-4361	National Environmental Policy Act (NEPA)
Army Regulation 200-1	Environmental Protection and Enhancement, May 1990
E.O. 13123	Energy Efficiency and Water Conservation in Federal Facilities

2-4 Other Government Documents and Publications. The following Government documents and publications form a part of this document to the extent specified herein:

2-4.1 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

2-4.2 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/

2-5 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 Department of Defense (DoD) adopted are those listed in the Department of Defense Index of Specifications and Standards (DODISS).

2-5.1 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/

2-5.2 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/

2-5.3 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 1002.10	Voluntary Specifications for Aluminum Insulating Storm Products for Windows and Sliding Glass Doors

2-5.4 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/

2-5.5 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
A112.19.2	Vitreous China Plumbing Fixtures (DoD Adopted)
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

2-5.6 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)

No.	Description
ASHRAE -	Handbook of Fundamentals
ASHRAE -	Residential Cooling Load Calculations
ASHRAE 62	Ventilation for Acceptable Indoor Air Quality
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

2-5.7 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/

2-5.8 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

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

Spec. No.	Spec. Description
D1557	Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft 2700kN-m/m)
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)
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

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

Spec. No.	Spec. Description
E1007	Standard Test Method for Field Measurement of Tapping Machine Impact Sound Transmission Through Floor-Ceiling Assemblies and Associated Support Structures
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.
F 1066	Standard Specification for Sheet Vinyl Composition Floor Covering
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

2-5.9 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/

2-5.10 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/

2-5.11 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/

2-5.12 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)

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

No.	Description (Specs. are DoD Adopted)
BHMA 101	Butts and Hinges
BHMA 301	Door Controls, Closers
BHMA 501	Auxiliary Locks and Associated Products
BHMA 601	Bored and Preassembled Locks and Latches
BHMA 611	Interconnected Locks and Latches

2-5.13 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/

2-5.14 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

2-5.15 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/

2-5.16 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/

2-5.17 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/.

2-5.18 National Electrical Manufacturers Association (NEMA). NEMA standards listed below are available from the National Electrical Manufacturers Association (NEMA), NATIONAL 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/

2-5.19 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/

2-5.20 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.nrfc.org

2-5.21 National Fire Protection Association, Inc. (NFPA). NFPA codes listed in Table 2-7 are available from the National Fire Protection

Association, Inc. (NFPA), 1Battery 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 30	Flammable Liquids Code
NFPA 31	Installation of Oil Burning Equipment
NFPA 54	National Fuel Gas Code
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 701	Standard Methods of Fire Tests for Flame Resistant Textiles and Films

2-5.22 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/.

2-5.23 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/

2-5.24 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 430	Waste Disposers
UL 507	Electric Fans
UL 555	Fire Dampers
UL 567	Pipe Connectors for Flammable and Combustible Liquids and LP Gas
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

3. SITE PLANNING AND DESIGN.

3-1 Scope. This Project consists of the construction of 42 duplexes (84 residences) on 3 sites of approximately 48.7 acres of total land area. The site design, project composition, and gross density are fixed and shall not be altered except as required to accommodate site constraints such as grading limitations and utility routing.

3-2 Buffer area. Provide a berm and landscape buffer to visually separate the new housing area at Site 1D from the cemetery to the southwest, as shown in the RFP Drawings.

3-2.1 Spoilage area. The RFP Drawings indicate an area on the south side of Site 1A to be used for placing excess soil resulting from sitework in this Project. Spoilage (if any) shall be placed evenly along the designated area in quantities shown on the Drawings. There is no borrow or spoils area on the installation any spoil over the 4600 cyd must be removed from the installation. NO METAL, WOOD, CONCRETE, BRICK, PLASTIC or Trash will be placed in the berm area. Only soil and pieces of rock (one cubic foot or less in volume) excavated on site will be allowed in the berm/spoils area. This soil and rock will be dumped uniformly along and within the limits of the entire length of the Berm as depicted. No compaction will be required. After the final load of soil / rocks has been dumped. The entire top surface of the berm will be graded to a roughly level condition.

3-2.2 Residence grouping and orientation. The residence grouping layout is indicated on the drawings and is fixed. The final grouping layout shall not vary significantly from this layout except as required for utility routing and accommodations for topography.

3-2.3 Grading. The grading will maintain existing topography to the extent possible, but must incorporate the specific grading requirements indicated below. The successful offeror’s final grading design must manage site runoff, ensure drainage away from the residences and other site features and provide a smooth transition between graded and natural areas.

3-2.3.1 Grading within 15 feet of the building shall not be less than 4 percent away from the building.

3-2.3.2 Site grading in turfed areas between 15 feet and 50 feet from a building shall maintain existing topography to the extent possible, but must incorporate the specific grading requirements indicated below. The successful Offeror’s proposed grading must manage all site runoff, ensure drainage away from residences and other site features, and provide a smooth transition between graded and natural areas.

3-2.3.3 Grading slopes over 3:1 shall not occur within the project boundaries.

3-2.3.4 All drainage swales shall have flat bottoms lined with sod or erosion control material to prevent erosion.

3-2.3.5 Driveways shall not be steeper than 5 percent slope.

3-3. Cul-de-sac Design. The diameter of the cul-de-sacs shall be a minimum of 100 feet to accommodate the turning radius of moving vans and fire trucks.

3-3.1 Intersection Design. Provide intersections as indicated on the drawings.

3-3.2 Street design. Curbs shall be depressed at entrances to driveways unless the rolled types of curbs are provided throughout. All gradients shall provide positive drainage with no ponding, 1 percent minimum slope, 6 percent maximum slope parallel to traffic.

3-3.2.1 Residential street widths shall have two 10-foot moving lanes, two 2-foot curb and gutter sections, and one 7-foot parking lane for a total street width of 31 feet back-to-back of curb. Curb width is assumed to be 6 inches.

3-3.2.2 Curb and gutters shall be concrete, roll type, 2′-0″ wide.

3-3.2.3 Street Construction: Street paving shall be 3.5-inch thick asphalt KDOT BM-2, on 16.5 inches of graded-crushed-aggregate base course equal to KDOT AB-3. KDOT refers to the Kansas Department of Transportation Standard Specifications for Road and Bridge Construction. Subgrade for streets shall be compacted to 95 percent maximum density as described in the Geotechnical Report attached. The graded-crushed-aggregate base course shall be compacted to 95 percent maximum density as described in the Geotechnical Report.

3-3.2.4 Street Signs: Provide street signs at all intersections. Signs shall comply with the Manual on Uniform Traffic Control Devices (http://mutcd.fhwa.dot.gov) for size and location. Street names will be provided by the installation. Signage letters shall be dark brown characters (FED-STD-595-A-#20059) on a standard buff white background (FED-STD-595-A-#33690). Posts shall be galvanized steel painted dark brown (FED-STD-595-A-#20059).

3-3.2.5 Residence Driveway. Driveways shall be a minimum of 20 feet wide with a maximum gradient of 5 percent away from the garage. Pavement for driveways shall be portland cement concrete, 6 inches thick, 650 psi flexural strength at 28 days with 6x6/w2.9xw2.9 WWF on a 4-inch graded-crushed-aggregate base course (KDOT AB-3) compacted to 95 percent maximum density. Provide control joints at a maximum spacing of 12 feet.

3-3.3 Dumpster Pads. Provide portland cement concrete pad, 10′-6″ wide x 20′ long, 6″ thick, 650-psi flexural strength at 28 days with 6x6/w2.9xw2.9 WWF on a 6″ graded-crushed-aggregate base course (KDOT AB-3) compacted to 95 percent maximum density. Provide an anchored concrete wheel stop at the rear of the pad to protect the landscaping fencing. Provide vinyl fence enclosure (7'-6" wide x 7'-6" long x 8'-0" high), with a pair of 3-6" wide gates. Fencing will be Lifetime Fencing's "Galveston Fence" or equal. Provide landscaping to further screen the dumpster and improve the appearance of the dumpster pad area.

3-3.3.1 Sidewalk design. Sidewalks shall be provided on one side of any street within the Project limits. Walks shall be a minimum of 5 feet wide and made of non-reinforced concrete with a minimum thickness of 4 inches. Walks along the street shall have a 5-foot-wide grassed space maintained between the sidewalk and the back of the curb. Ramps for handicapped individuals shall be provided at intersections by depressing street curbs and adjacent sidewalk.

3-3.3.2 Jogging Paths. As a betterment, provide 8-foot-wide asphalt jogging paths where indicated. Jogging path paving shall be 2-inch-thick asphalt KDOT BM-2, on 4 inches of graded-crushed-aggregate base course equal to KDOT AB-3. Connect jogging paths to existing pedestrian circulation as indicated. Landscape plantings for the jogging trails are part of the betterments.

3-4 Outdoor Play Areas. The design of the children's outdoor play areas (playgrounds) shall comply with the safety requirements of ASTM F 1487 and ASTM F 1292. Playground grading shall be well-drained and should be sloped between 2% and 4%.

3-4.1 Child Safety and Accessibility.

3-4.1.1 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.

3-4.1.2 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.

3-4.1.3 Playground equipment made of lumber treated with arsenic, such as CCA, is not acceptable.

3-4.2 Manufactured play equipment. As part of the Government requested betterment provide the following play equipment:

3-4.2.1 Site 1A: The existing play lot at site 1A shall remain in use. Provide a new combination play unit as follows:

Combination Play Unit: Short plastic slide, spiral slide, hop-scotch climber, deck-to-deck climber (climber equal to Playworld Systems Superdome 0400), pipe wall with steering wall, Tic-Tac-Toe, transition station with step, and 6-foot horizontal spiral ladder with access ladder, equal to Playworld Systems - Challengers 350-0007.

3-4.2.2 Site 1B: Provide one new playground with one each of the following equipment:

Swing Set: 4-swing set, 10-feet high, 2 rigid molded rubber adult seats, 2 pliable rubber (over stainless steel core) slash-proof infant seats, 4/0 straight link galvanized swing chain with hanger with bearings, equal to Playworld Systems - Standard Swing 0253.

Double Large Slide: Two 60-inch plastic slides, vinyl-coated steel ladder and deck, 3½-inch galvanized steel powder-coated posts, full-length handrails on ladder, equal to Playworld Systems - Double-Lightning, CH3982.

Jungle Gym: Geodesic dome structure, 17-foot diameter, 7-foot high, 1-1/16-inch OD powder-coated galvanized pipe, walk-in adult access, equal to Playworld Systems - Super Dome 0400.

Combination Play Unit: Short plastic slide, spiral slide, hop-scotch climber, deck-to-deck climber, pipe wall with steering wall, Tic-Tac-Toe, transition station with step, and 6-foot horizontal spiral ladder with access ladder, equal to Playworld Systems - Challengers 350-0007.

Park Bench: 8-foot-long, angle-leg, pressure-treated pine planks for seat and back, 2-3/8-inch painted galvanized steel pipe frame with end caps, equal to Playworld Systems – Bench 1372.

3-4.2.3 Site 1C: All existing play lot equipment shall remain in use and shall not be demolished or salvaged.

3-4.2.4 Site 1D: Provide one new playground with one each (except as noted) of the following equipment:

Swing Set: 6-swing set, 10 feet high, 4 rigid molded rubber adult seats, 2 pliable rubber (over stainless steel core) slash-proof infant seats, 4/0 straight link galvanized swing chain with hanger with

bearings, equal to Playworld Systems - Standard Swing 0255.

Double Large Slide: Two 60-inch plastic slides, vinyl-coated steel ladder and deck, 3½-inch galvanized steel powder-coated posts, full-length handrails on ladder, equal to Playworld Systems - Double-Lightning, CH3982.

Jungle Gym: Geodesic dome structure, 17-foot diameter, 7-foot high, 1-1/16-inch OD powder-coated galvanized pipe, walk-in adult access, equal to Playworld Systems - Super Dome 0400.

Combination Play Unit: Short plastic slide, spiral slide, hop-scotch climber, deck-to-deck climber, pipe wall with steering wall, Tic-Tac-Toe, transition station with step, and 6-foot horizontal spiral ladder with access ladder, equal to Playworld Systems - Challengers 350-0007.

(2) Park Bench: 8-foot long, angle-leg, pressure-treated pine planks for seat and back, 2-3/8-inch painted galvanized steel pipe frame with end caps equal to Playworld System – Bench 1372.

Picnic Table: 8-foot long, portable, perforated steel top and seats, 2-3/8-inch galvanized steel pipe frame, powder-coated top and frame, equal to Playworld Systems – 1403.

3-4.3 Site 1D: Picnic Pavilion. As part of the Government requested betterment provide and install a 30' Single Tier Victorian Gazebo, Series VK-30A, manufactured by Vixen Hill Manufacturing Company, Main Street, Eleverson, PA 19520 (610) 286-0909, or equal. Includes T&G roof deck, cedar floor, and 12" trellis skirts. Gazebo and foundations to be constructed in accordance with the attached plans (visit: http://www.vixenhill.com/TechDocs/PV-30A.PDF to obtain a copy of the plans). Piers must extend a minimum of 36" below grade. Provide and install Tamko Elite Glass-Seal shingles, color: "Rustic Black," on #15 building felt." TEXT DELETED. Provide four (4) cedar picnic tables measuring 84″ L x 48″ W x 33″ H (min), for use in the picnic pavilion. The table legs, built-in bench seats and tabletop will be 1-1/2″ min. western red cedar. Frame components will be through-bolted using galvanized nuts, bolts and washers. Seating and tabletop planks will be attached with galvanized screws. This item is included as part of Betterment Item No. 0015.

3-4.4 Site 1D: Basketball court. As a betterment Provide 45′ x 45′ concrete pad with painted court markings for half-court basketball. Provide a permanent basketball goal. Goal shall consist of a galvanized steel post, Poly-type fan-shaped backboard, heavy-duty steel goal with chain net. Concrete floor shall be 4 inches thick, have 650-psi flexural strength at 28 days with 6x6/w2.9xw2.9 WWF on a 4-inch graded-crushed-aggregate base course (KDOT AB-3) compacted to 95 percent maximum density.

3-4.5 Soccer Field: As a betterment Provide space for a soccer playing field where indicated at Site 1B. Space shall be graded to drain at a 2% uniform slope. Soccer field shall remain unfenced at this time. Salvage soccer goals from Site 1A and deliver/install as indicated at Site 1B. Provide turf and sidewalks as indicated.

3-4.6 Plant materials in play areas. Trees shall be integrated into play settings, which may vary from designs shown on the Site Plans, and shall be selected from Table 3-1 below. The intent is to furnish play lots with as much shade as possible (as trees mature) without compromising fall zone and other safety requirements.

3-5 Landscape Planting Plan. The Offeror shall obtain and use the services of a registered landscape architect, experienced in site planning and planting

design. A complete, integrated landscape planting plan shall be provided for the overall housing Project. The design shall reflect appropriate groupings, foundation plantings, and street tree plantings to define the open spaces to ensure a completely landscaped Project. Choose plant materials from the list indicated on Table 3-1. 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.

TABLE 3-1: SUITABLE PLANTS FOR USE IN FORT LEAVENWORTH HOUSING AREAS

Botanical Name	Common Name
LARGE TO MEDIUM TREES	
Acer x freemanii ‘Autumn Blaze’	‘Autumn Blaze’ Maple
Taxodium distichum	Bald Cypress
Ginkgo biloba	Ginkgo, Maidenhair Tree
Sophora japonica	Japanese Pagodatree
Tilia cordata ‘Greenspire’	‘Greenspire’ Littleleaf Linden
Acer saccharum ‘Legacy’	‘Legacy’ Sugar Maple
Quercus rubra	Northern Red Oak
Fraxinus americana ‘Rosehill’	‘Rosehill’ Ash
Betula nigra (3-5 stem clump form)	River Birch (3-5 stem clump form)
Acer rubrum ‘Red Sunset’	‘Red Sunset’ Red Maple
Gleditsia triacanthos var. inermis ‘Skyline’	‘Skyline’ Thornless Honeylocust
Pinus strobes	Eastern White Pine
SMALL TREES	
Acer ginnala (3-5 stem clump form)	Amur Maple (3-5 stem clump form)
Cersis canadensis (3-5 stem clump)	Eastern Redbud (3-5 stem clump form)
Malus ‘Prairiefire’	‘Prairiefire’ Flowering Crab
Malus ‘Sugar Tyme’	‘Sugar Tyme’ Flowering Crab

TABLE 3-1: SUITABLE PLANTS FOR USE IN FORT LEAVENWORTH HOUSING AREAS

SHRUBS, GROUND COVERS AND UPRIGHT JUNIPERS	
Spiraea x bumalda 'Anthony Waterer'	Anthony Waterer Spirea
Juniperus horizontalis 'Blue Chip'	'Blue Chip' Juniper
Ilex x meserveae 'Blue Prince'	'Blue Prince' Holly
Viburnum x burkwoodii	Burkwood Viburnum
Euonymus alatus 'Compactus'	Compact Burning Bush (Dwarf Winged Euonymus)
Cotoneaster apiculatus	Cranberry Cotoneaster
Euonymus fortunei 'Canadale Gold'	'Canadale Gold' Euonymus
Juniperus virginiana 'Canaertii'	'Canaert' Juniper (Eastern Redcedar)
Berberis thunbergii var. atropurpurea 'Crimson Pygmy'	'Crimson Pygmy' Barberry
Picea glauca 'Conica'	Dwarf Alberta Spruce
Picea pungens 'Glauca Globosa'	'Globosa' Blue Spruce
Spiraea japonica 'Goldmound'	'Goldmound' Spirea
Pyracantha coccinea 'Gnome'	'Gnome' Pyracantha (Firethorn)
Juniperus procumbens 'Greenmound'	'Greenmound' Japgarden Juniper
Berberis thunbergii var. atropurpurea	Japanese Red Barberry
Viburnum x rhytidophylloides 'Willowwood'	Leatherleaf ('Willowwood') Viburnum
Spiraea x bumalda 'Limemound'	'Limemound' Spirea
Berberis x mentorensis	Mentor Barberry
Viburnum x burkwoodii 'Mohawk'	'Mohawk' Viburnum
Euonymus kiautschovicus 'Paulii'	'Pauli' Euonymus
Ribes sanguineum 'Red Lake'	'Red Lake' Currant
Cotoneaster divaricatus	Spreading Cotoneaster
Viburnum plicatum var. Tomentosum 'Shasta'	'Shasta' Doublefile Viburnum
Vinca minor	Common Periwinkle, Vinca
Buxus microphylla kor. 'Winter Gem'	'Winter Gem' Boxwood
Berberis thunbergii var. atropurpurea 'Rose Glow'	'Rose Glow' (Rosy Glow) Barberry
Hibiscus syriacus 'Helene'	'Helene' Rose of Sharon

3-5.1 Required Quantities and Minimum Sizes:

3-5.1.1 Each duplex unit shall receive a minimum of the following plantings per unit

4 large deciduous trees (coniferous evergreen trees may be used in lieu of deciduous trees)
4 flowering trees

In addition, duplex units shall receive a minimum of the number of deciduous or evergreen shrubs and ground covers shown in typical Landscape Plans on Sheet LP1.

3-5.1.2 Minimum Sizes:

Large deciduous trees – 1¾"–2" caliper (8–10 feet)
Flowering tree – 5-6 feet
Coniferous evergreen tree – 5-6 feet
Deciduous or evergreen shrubs – 2-gallon
Evergreen dumpster screening shrubs – 5-gallon
Ground covers – 3-inch pots

3-5.3 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.

3-5.3.1 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. Poisonous plants and plants with thorns are not allowed and should be removed from the play areas. Refer to the U.S Army Center for Health Promotion and Preventative Medicine, Guide to Poisonous and Toxic Plants: chppm-www.apgea.army.mil/ento/default. htm.

3-5.3.2 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.

3-5.3.2.1 Single stem. Trunk shall be reasonably straight and symmetrical with crown and have a persistent main leader.

3-5.3.2.2 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.

3-5.3.2.3 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.

3-5.3.3 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.

3-5.3.4 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.

3-5.3.5 Broadleaf evergreen. Plants shall be provided that have ration 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.

3-5.3.6 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.

3-5.3.7 Measurement. Plant measurements shall be in accordance with ANSI/ANLA Z60.1.

3-5.3.8 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.

3-5.4 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.

3-5.5 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 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.

3-5.6 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."

3-5.7 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.

3-5.8 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 the remaining contract time period not to exceed 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.

3-5.9 Maintenance during establishment period. The maintenance of plants shall include straightening plants, tightening stakes and guying material, repairing tree wrap, protecting plant areas from erosion, maintaining erosion material, supplementing mulch, 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.

3-5.10 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.

3-5.11 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. A plant shall be replaced one time under this guarantee. Transplanting existing plants requires no guarantee but shall be done with care according to ANSI/ASLA standards.

3-5.12 Turf. Turf consists of seed or sod.

3-5.12.1 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. Use the following seed mixture:

30% Fine Blade Rye (Imagine or equal)
35% Fine Blade Bluegrass (Kentucky or equal)
35% Fine Blade Fescue (Hound Dog 5, Brandy or equal)

3-5.12.2 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. Grass type shall be a blend of rye, bluegrass and fescue to match the seed noted above.

3-5.12.2.1 Quality. The sod shall be relatively free of thatch, diseases, nematodes, soil-borne insects, weeds or undesirable plants, stones larger than 16 mm (5/8 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.

3-5.12.2.2 Time limitation. The limitation of time between harvesting and placing sod shall be 36 hours.

3-5.12.3 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.

3-5.13 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.

3-5.14 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.

3-5.15 Protection. Immediately after turfing, the area shall be protected against traffic or other use by erecting barricades and providing signage as required.

3-5.16 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 three months after the last day of the turfing operation. An unsatisfactory stand of turf shall be repaired as soon as turfing conditions permit.

3-5.17 Satisfactory stand of turf. Turf shall be established and satisfactory prior to final acceptance.

3-5.17.1 Seeded lawn area. A satisfactory stand of turf from the seeding operation for a lawn area is defined as a minimum 225 grass plants per square

foot (2025 grass plants per square yard). Bare spots shall be no larger than 6 inches square. The total bare spots shall not exceed 2 percent of the total seeded area.

3-5.17.2. Seeded field area. A satisfactory stand of turf from the seeding operation for a field area is defined as a minimum of 225 grass plants per square foot (2025 grass plants per square meter). The total bare spots shall not exceed two (2) percent of the total seeded area. Maximum bare spot size must not be larger than 6 inches square.

3-5.17.3 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 2 inches (50 mm) square.

3-5.17.4 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 9 inches (225 mm) square. The total bare spots shall not exceed two (2) percent of the total sprigged area.

3-5.18 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.

3-5.19 Existing trees less than 50 feet from new buildings. Existing trees located beyond 50 feet from the buildings should be protected and saved except where substantial cut or fill is expected. Where existing trees can be saved, a construction fence should be placed at the drip line of the tree(s) and construction activities and storage should be prohibited from that area.

3.6 Fencing. As a part of betterment, all back yards of dwelling units shall be fenced. Fence shall be 42 inches high to match the existing post standard. Provide a 5-foot wide single gate to each yard. Fences between buildings (duplex units) shall have a double fence with a 6-foot wide minimum path to allow passage from the street to the space in back of the fenced area. If utilities are located behind the unit, allow a 10-foot wide path. Back line of fence will be as shown on Site Plans, with a minimum of 35 feet from the back of the quarters.

3-6.1 Chain link fence fabric shall be double-dipped galvanized or chromate coated steel, not less than 11-1/2 gauge, and be installed with the barb ends pointed down. Chain link fabric shall be stretched taut, and secured using tension bars, tension bands, and tie wires in accordance with industry standards. Top rail shall be 1-3/8" galvanized tubular steel. Line posts shall be 1-5/8" galvanized tubular steel.. Corner posts shall be 1-7/8" galvanized tubular steel. Posts will not to exceed 10' apart. At locations of excessive grade, a post will be installed both at the top of the slope and at the toe of slope. All posts shall be capped with the appropriate sized galvanized steel cap. Fence shall be 3-1/2' (42") in height. Each fenced yard will have a minimum of one 5' (60") wide single gate, constructed of the same quality material as the fencing, be the same height as the fencing, and be equipped with a standard gate latch to allow the gate to be secured in a closed position. Tension bands shall be 1-3/8" galvanized steel with galvanized nuts and bolts. Tension bars shall be 3/4" galvanized steel. Tie wires shall be 9 gauge and galvanized. All posts will be plumb, and encased with a minimum 6" diameter cylindrical concrete footing, poured in place to a depth of a minimum of 24". The contractor shall make reasonable efforts to ensure that the installed fencing components are free of edges or points which could cause a safety hazard. If during the construction or demolition process it is necessary to remove or relocate any of the existing Fence Service Program (FSP) rental fencing adjacent to the construction or demolition areas, the

contractor will notify Fort Leavenworth’s Fencing Contractor, American Overhead Door, & Fencing, at 913-682-4640 a minimum of one month prior to the needed date, so the fencing contractor may move his fencing. The contractor will be responsible for any charges related to the removal, relocation, lost monthly revenues, or damage done to the Fencing contractors existing fencing. FSP fences within the unoccupied demolition area will be removed by the Fence Service Program contractor at no cost to the demolition contractor.

3-7 Postal Service. Provide cluster-type mailboxes where indicated on the drawings. At each location, provide 2 boxes set 90 degrees from the street on a 6-foot x 8-foot concrete pad. Mailboxes shall be plastic construction and designed for loading and unloading from the same side.

4. SITE ENGINEERING

4-0 General: It shall be the Contractor's responsibility to protect all existing utility lines from damage during excavation. Any damage resulting to existing utility lines and systems shall be repaired by the Contractor, to the satisfaction of the Contracting Officer, at no additional cost to the Government, except as noted in Item 4-0.1 below.

4-0.1 The Contractor shall be required to locate and mark underground utilities for Fort Leavenworth owned gas, water, sanitary sewer, storm sewer, and electrical, but excluding fiber/telephone and communications. The Contractor will have use of Fort Leavenworth DIS utility drawings to aid in their location. The Contractor shall be responsible for the location of the electric lines and all other utilities listed above that are of metal or have tracer wires available for locating. The utilities that are of nonconductive construction such as plastic or Transite and have no tracer wire or other means of applying a signal are to be located from the utility maps to the best of the Contractor's ability. The utilities that are located from maps that appear to be in the vicinity of the excavation are to be hand-dug for location purposes. If a line is damaged that is within 10 feet of that shown on the utility maps, the Contractor will be held responsible for its repair. The Contractor shall contact Kansas One-Call for utility checks for gas lines owned by Williams Natural Gas, Sprint, Southwestern Bell, and American Cablevision.

4-0.2 Fort Leavenworth personnel will locate underground Post telephone and communications lines. The contractor shall deliver to the DIS work order desk at building 85, 820 McClellan, or transmit via fax 913-684-8950, a diagram showing the approximate area that the posts telephone and communication lines need to be located. The Contractor shall mark the proposed route or limits of the excavation in white prior to the request so that the Government personnel will know where to mark for utilities. The Contractor should allow a minimum of ten (10) working days for the utility locates to be conducted. If the Contractor damages any marked lines during excavation, the Contractor shall contact the Government QA Representative immediately to determine whether the Contractor will perform repairs or reimburse the Government for repairs.

4-1 Soils.

4-1.1 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.

4-1.1.1 The Contractor provided site specific geotechnical conditions report shall include, but not be limited to:

4-1.1.1.1 Classification of soil and rock.

4-1.1.1.2 Depth to bedrock.

4-1.1.1.3 Extent of boulders.

4-1.1.1.4 Bearing capacity of soil and rock.

4-1.1.1.5 Settlement potential.

4-1.1.1.6 Compaction requirements.

4-1.1.1.7 Groundwater characteristics.

4-1.1.1.8 Infiltration and permeability.

4-1.1.1.9 Erosion and siltation.

4-1.1.1.10 Surface and subsurface drainage.

4-1.1.1.11 Soil resistivity.

4-1.1.1.12 Foundation Types

4-1.1.1.13 Swell Potential

4-1.1.1.14 Soil Modification Techniques

4-1.1.1.15 Lateral Earth Pressure Coefficient

4-1.1.2 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.

4-1.2 Soil compaction.

4-1.2.1 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 Method D.

TABLE 4-1 – SOIL COMPACTION

Subgrade Preparation, Fills, Embankments, and Backfills	Compaction Requirements (Percentage of Maximum Density)
Structures & Building Slabs	95
Streets, Paved Areas, Bike Paths	95
Sidewalks	95
Grassed Areas	90

4-1.2.2 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.

4-1.3 Capillary water barrier. A capillary water barrier is required for all

interior slabs on grade, including garages, carports and storage rooms.

4-1.4 Soil treatment. Soil treatment for termites shall be by the chemical method. Methods and extent of protection required are as follows:

4-1.4.1 Soil treatment shall comply with the attached Specification Section 02364 Termiticide Treatment Measures for Subterranean Termite Control.

4-1.5 Radon mitigation. The design and construction of foundation walls, slabs, and crawl spaces shall include provisions for the reduction of radon entry and facilitate its removal. Radon mitigation shall comply with the requirements of ASTM E1465. Refer to figure 4-1 at the end of this section.

4-2 Water Distribution System. Connection to the existing water distribution system shall be made at the locations shown on the RFP drawings.

4-2.1 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 residence. 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 6 inches. 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. The tracer wire will be a 12 gauge, solid copper, coated wire. The tracer wire will run the entire length of the buried utility line. In addition, a standard grade, non-magnetic, warning Tape will be installed above all underground utility lines. The tape will be buried 1 foot below the surface, running the entire length of the buried utility. The color of the tape will correspond to the utility it is protecting (see Section 02222 for specific requirements. The pipe, valves, and all other materials shall meet the American Water Works Association (AWWA) standards for a 150 psi working pressure system. Provide sacrificial anodes for all valves and metal pipe as directed by the Contractor's Cathodic Protection Engineer. Building connections shall be designed and constructed in accordance with the National Standard Plumbing Code.

4-2.2 Flow requirements. Water must be supplied by mains of appropriate capacity to provide 500 gpm at one-story units, 750 gpm at two-story structures, and 1,000 gpm at structures which are three or more stories high, for a flow duration of 1-1/2 hours. This mandatory flow is over and above domestic requirements. Domestic requirements shall be based on 300 gal/day per residence for single-family housing, and 250 gal/day per residence for multi-family housing. Mains shall be sized to carry this flow with a 2.5 peak hourly factor. Pressure shall be a minimum of 20 psi at each fire hydrant, and a maximum of 150 psi at each outlet after allowing for friction, elevation, and other pressure losses. Pressure at each residence shall not exceed 75 psi. Design shall be based in the Flow data in Table 4-2 below.

TABLE 4-2: FIRE FLOW DATA

Hydrant Location	Static Pressure (psi)	Residual Pressure (psi)	Flow (gpm)
550' east of the intersection of Williams Road & Hunt Road	90	50	1,300
Intersection of Hunt Road and Hunt Court	110	65	1,353

200’ North of Rose Loop and Pick Avenue	100	60	1,244
450’ North of Pick Avenue and Biddle Boulevard	88	66	1,300
700’ North and 800 feet West of the Intersection of Pick Avenue and Biddle Boulevard	86	50	1,061
150’ West of the Intersection of Biddle Boulevard and Hancock Avenue	90	50	1,126*

* Record information only. Fire Hydrant no longer exists.

4-2.3 Trenches. Water and gas mains may be installed in the same trench, with the gas main placed on a shelf at least 12 inches above and to one side of the water mains. (Coordinate with the local gas utility supplier to determine system acceptability). Water mains shall have a minimum of 5 ft of earth cover. Sufficient cover must also be provided to protect the pipe against structural damage due to superimposed surface loads.

4-2.4 Fire hydrants. Hydrants shall conform to AWWA C502, Dry-Barrel Fire Hydrants, except as required by the local utility supplier. 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 similar pump and hose connections. Fire hydrant spacing shall be no greater than 350 feet apart, by paved road. In addition, a hydrant shall be provided so that all parts of the residences can be reached by hose lines not over 350 feet long. Hydrant laterals shall be 6 inches minimum size, shall not exceed 50 feet in length, and shall have an underground shutoff valve. Valve box, at each lateral, shall be located within 10 feet of the hydrant, and shall not be located where obstructed by parked vehicles, shrubbery, etc. Guard post barriers shall be provided where hydrant locations are subject to vehicle damage.

4-2.5 Shutoff valve. Each residence shall be provided with a separate service and main shutoff valve, readily accessible to maintenance and emergency personnel. Shutoff valves in walks are prohibited. Plastic shutoff valves are prohibited.

4-3 Sanitary Sewerage System. 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 400 ft apart. Curved sewers are prohibited. Pipes shall be designed to flow full and maintain a minimum velocity of 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 3 ft to 5 ft per second velocity.

4-3.1 Sewer mains. Design shall be based on an average daily per capita flow of sanitary sewage of 100 GAL per day with a 4.0 peak hourly factor. Mains shall be a minimum of 8 inch in diameter.

4-3.2 Sewer Building Laterals. Each residence lateral shall be connected directly to a sewer main. Combining multiple 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 and allow for two-way cleanout capability, both toward the house and toward the sewer main. 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 one residences shall be a minimum of 6" in diameter.

4-3.3 Trenches. Sewer and water lines, mains or laterals, shall be placed in separate trenches. The separate trenches shall maintain a minimum lateral separation of 10 ft.

4-3.4 Cover. Sewer lines shall be located at a minimum depth of 3 ft. TEXT DELETED.

4-4 Storm Drainage System. The storm drainage system shall be properly coordinated with surrounding properties to ensure that runoff does not cause damage to other properties. All drainage lines, if required, shall remain in conduit to stable grade. The minimum velocity of flow in conduits during a design storm shall be 2 ft 6 in/s. Storm water collection, disposal (and retardation) system shall be designed for a minimum of a 10-year return frequency. Rainfall intensities for Project locations shall be in accordance with local community/locality/State Transportation (Highway) agency design parameters.

4-4.1 Site specific storm drainage criteria. The Contractor shall comply with all NPDES requirements and be responsible for all permits and applications.

4-4.2 Manholes. Manholes shall be located at intersections and changes in alignment or grade. Intermediate manhole maximum spacing shall be 250 ft for pipes 3 ft or less in diameter or box drains with the smallest dimension less than 3 ft. Maximum spacing for intermediate manholes on larger pipes and drain boxes shall be 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 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 2 ft minimum opening as measured from the face of the steel ladder.

4-4.3 Drainage of roads and pavements. Provide a positive crown or sheet drainage to all streets and roads. 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. Overland flow shall be held to a minimum.

4-4.4 Pipe for culverts and storm drains shall be of RCP Class IV, PVC profile pipe.

4-5 Gas Distribution System. Provide a gas distribution system, connected to existing systems and designed in accordance with local codes or utility company requirements, 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. 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 residence. A gas regulator and provision for future installation of an individual gas meter to monitor fuel use shall be provided for each residence. The residence service entrance shall be installed at a height sufficient to allow for future installation of the gas meter. Existing lines that are to be abandoned shall be either removed or physically disconnected from all gas sources and purged. Abandoning existing gas piping shall be done in accordance with ANSI B31.8, Gas Transmission and Distribution Piping Systems. Installation of gas piping will be in accordance

with ANSI B31.8 and 49 CFR 192.

4-5.1 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.

4-5.1.1 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.

4-5.1.2 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 1-1/2 inches and smaller shall conform to ASME B16.11. Pipe flanges and flanged fittings larger than 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.

4-5.2 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.

4-5.3 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.

4-5.4 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 residences.

4-5.5 Mains and service lines. Lines shall not be placed under any buildings. Lines shall be placed with a minimum of 2 ft of earth cover. Protective casings shall be provided to protect lines from superimposed street or heavy traffic loads.

4-6 Electrical Distribution. The main feed consists of overhead lines routed along the western reservation boundary into Substation No. 3, which provides all electrical service to the CGSC MFH area. Connection to the existing electrical distribution system shall be made at the location shown on the enclosed RFP drawings (Site 1A: Near Hunt Road; Site 1B: Near Pick Avenue; Site 1D: Near Hancock Avenue). These lines have adequate capacity to provide electrical service for this Project. Pad-mounted transformers shall be fed from these lines using underground feeders. The distribution level voltage is 12.47 kV from Substation No. 3.

4-6.1 System design. Provide new electrical distribution system as necessary and connect to existing system. Provide pad-mounted switch at each tie-in point. Coordinate utility interruptions in advance with Contracting Officer. System shall be a loop-primary radial system. Primary feeder cables shall be copper and concrete encased. High voltage conductors shall have protective shielding. Cable shall be buried a minimum of 3 ft below the finished grade to the top of the concrete encasement with continuous cable marker tape and tracer wire 6 inches below grade. Cable markers shall be installed along the length of direct-burial cable runs to identify their routes from the surface. Markers will be provided at changes of direction and at intervals not to exceed 500 ft. The

electrical on-site distribution system shall be designed in compliance with the rules and recommendations of ANSI C2, National Electrical Safety Code, and NFPA 70, National Electrical Code, whichever is more stringent. Underground direct-burial distribution is required unless otherwise directed. The distribution system and transformers shall be routed at the rear of the housing area. Provide tracer wire and warning tape over all electrical underground utilities (See Section 02222).

4-6.1.1 Provide three 15-kV primary conductors and one 600V insulated neutral. All primary conductor insulation shall be 133 percent and cross-linked polyethylene (NEMA WC7) or ethylene propylene rubber (NEMA WC8). Loading at connections shall be balanced between all three phases. Distribution of primary feeders shall be loop fed so that if power is lost at any location, power can be supplied from another direction until the problem is corrected. Distribution system includes conductors, pad-mounted switches, pad-mounted transformers and pads. Coordinate the installation of the electrical system with the telephone and cable TV system companies.

4-6.2 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.

4-6.3 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. Secondary service laterals shall be copper and may be direct-buried.

4-6.4 Service entrance. Only one service entrance per residence shall be provided. The service entrance conductors shall be buried a minimum of 3 ft below finished grade with a minimum separation of 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.

4-6.5 Transformers. Transformers shall be Contractor furnished and installed. Transformers shall be pad-mounted and have two non-fused switches for the loop connection. The high voltage compartment of the transformer shall include a load break switch with fused circuit for the transformer. The primary voltage shall be 7,200V, single-phase. The transformed secondary voltages shall be 120/240V, single-phase, three-wire, solid neutral service to residences. In selecting a transformer, the name plate rating shall not be less than 90 percent of the kilovolt/amperes (kVA) demand load calculated for the transformer. The demand load shall be calculated per NFPA 70, National Electrical Code. Transformers shall be low profile, pad mounted type, mineral oil insulated, with tamperproof enclosure. Transformers shall be certified non-PCB and shall contain less than 50 parts per million PCB.

4-6.6 Street and area lighting. Residential roadway lighting, including collector streets, shall be provided in accordance with the IES Lighting Handbook. Provide lighting at roadway intersections, and at intervals not exceeding 200 ft between intersections. Area lighting shall be provided at intervals not exceeding 200 ft. along area walkways not otherwise illuminated, common area walks connecting playgrounds, and at all steps in area walkways. Area lighting shall be provided in accordance with the IES Lighting Handbook. Luminaries shall be actuated by photoelectric control, one photocell per circuit, and supplied from multiple circuits originating from a pad-mounted transformer. Street lighting poles shall be uniformly spaced and set back from the curb edge a minimum of 4 feet and between sidewalk and curb. Street and parking area light fixtures shall be high pressure sodium. Traditional gaslight-style, 240-volt luminaires shall be used for street and area lighting as indicated in Attachment 7. Luminaire finish shall be black. Poles shall be round aluminum with black anodized finish.

4-7 Metering. Metering of utilities shall be provided as follows:

4-7.1 Master Meters. Master meters for water, electricity, and gas shall be provided for all three sites. Individual residential meters are not required. Contractor is to provide proper rough-ins with shutoff valves of main disconnects for future installation of meters (gas, water, electric) for each individual residence.

4-7.2 Individual or main disconnects meter drops. Individual utility meter drops shall be provided for all residences. Provide sockets for electric watt-hour meters at each residence. Provide manual by-pass jumper plates for each socket. Locate utility meter drops in an area readily accessible by service personnel. Meters and meter bases shall be sight screened, and located to provide convenient access while not distracting from building appearance.

4-7.3 Gas metering. Provide for future individual residence metering devices. Comply with local requirements. Meter and regulator location shall be sight screened, and located to provide convenient access while not distracting from building appearance.

4-8 Telephone. The telephone company will furnish and install distribution cables. Conduit required between underground terminal boxes and the buildings will also be furnished and installed by the telephone company. Contractor shall coordinate with the telephone company for the location, type, and installation of the required telephone system. Telephone company distribution cables and above-ground enclosures shall be routed at the rear of the housing area.

4-9 Television. The cable TV service provider will provide all site distribution systems for this project. The Contractor shall coordinate with the cable TV service provider who is responsible for all trenching, conduit, boxes, and backfilling required to install the distribution systems. Cable TV distribution cables and above-ground enclosures shall be routed at the rear of the housing area.

4-10 Cathodic Protection. Cathodic Protection (CP) is mandatory on buried ferrous metallic structures as described below:

4-10.1 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.

4-10.2 Corrosion control is mandated for all metallic underground storage tanks storing petroleum or hazardous substance by 40 CFR, Part 280 and AR 200-1 and on hazardous liquid pipelines (e.g., liquid fuel) by 49 CFR, Part 195.

4-10.3 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, or Submerged Liquid Storage Systems, as appropriate.

4-10.4 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.

4-10.5 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 (See Section 02222 for additional requirements. This wire can be used as a locator tracer wire and to

maintain continuity to any future steel gas main extension.

4-10.6 CP and protective coatings shall be provided for the following buried and submerged ferrous metallic structures regardless of soil or water resistively:

4-10.6.1 Natural gas piping.

4-10.6.2 Liquid fuel piping.

4-10.6.3 Ductile or cast iron pressurized piping.

4-10.6.4 Other structures with hazardous products as identified by the installation.

4-10.7 Cast iron pipe shall be treated as follows:

4-10.7.1 For soil resistivity below 10,000 Ohm-cm at pipeline installation depth, provide CP, bonded joints, and protective coatings.

4-10.7.2 For soil resistivity between 10,000 and 30,000 Ohm-cm at pipeline installation depth, provide bonded joints only.

4-10.8 Copper water service lines will be dielectrically isolated from ferrous pipe. Dielectric isolation shall conform with NACE RP-0286.

4-10.9 Ferrous metallic piping passing through concrete shall not be in contact with the concrete.

4-10.10 Tracer Wire: All non-conductive underground utilities will have a tracer wire buried directly above, and immediately adjacent to each line. The tracer wire will be a 12 gauge, solid copper, coated wire. The tracer wire will run the entire length of the buried utility line. The tracer wire will run on primary and secondary feeders from manhole to manhole (or valve box), and be terminated within each manhole, or valve box at a point easily reachable from the surface. On lateral lines, the tracer wire will run the entire length of the lateral and be terminated, next to the house above ground, at the point where the utility comes out of the ground. The wire will be snuggly wrapped around the pipe a minimum of three times. If the lateral line enters the house below grade, the tracer wire will be terminated above the utility line, immediately next to the exterior of the foundation, in a standard non-waterproof exterior junction box attached to a vertical piece of 1/2" plastic PVC pipe buried a minimum of one foot below the surface. Within the junction box the continuous tracer wire
will be left coiled, a minimum of one foot long, with the interior of the box labeled with a permanent marking pen, (i.e. Gas Line Tracer).

Warning Tape: Standard grade, non-magnetic, Warning Tape will be installed above all underground utility lines. The tape will be buried 1 foot below the surface, running the entire length of the buried utility. The color of the tape will correspond to the utility it is protecting, as shown in SECTION 02222.

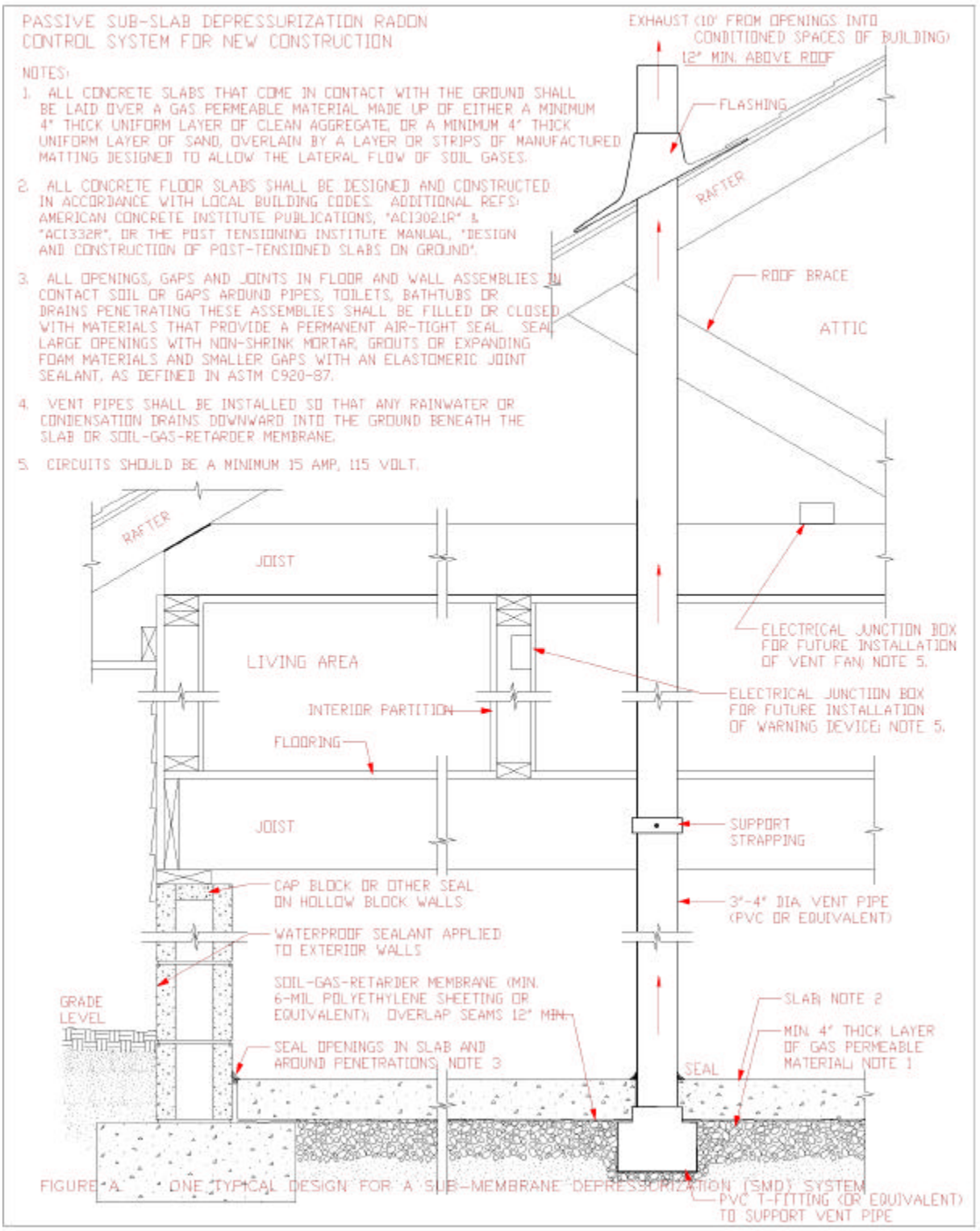

FIGURE A ONE TYPICAL DESIGN FOR A SUB-MEMBRANE DEPRESSURIZATION (SMD) SYSTEM

Figure 4- 1

5. ARCHITECTURAL DESIGN

5-1 Architectural Design. Designs shall conform to the plans as shown in the RFP drawings. Only minor variations are permitted to accommodate ductwork, piping, and other similar requirements. All residences, except the single-story accessible units, shall be designed with full basements.

5-1.2 Design of accessible residences shall conform to the Uniform Federal Accessibility Standards (UFAS) and Americans With Disabilities Act Accessibility Guidelines (ADAAG). This means required access clearances, room sizes, bathroom layout, kitchen layout, doors and hardware, grab bars, plumbing hookups, light switches and outlets and controls must meet requirements at time of construction. The requirements for adjustable height cabinets and work surfaces and plumbing fixtures for the hearing and visually impaired must also be made at time of construction.

5-1.3 Housing unit variation. The goal is to provide distinctly different exterior appearances for each duplex. All adjacent structures will vary in two or more of the following: Floor plan (combination of different residence types), elevation and orientation, and exterior materials. Refer to paragraph on exterior materials for permissible variations in exterior materials. Duplexes shall also vary in color, in a random pattern, with no two adjacent structures being the same color. Elevations of the duplexes indicated in this RFP are included to indicate required form, massing and material usage. Final material placement may vary between adjacent units to enhance unit variation.

5-1.4 Maintainability. The design of residences, 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.

5-2 Basements. Full basements shall be provided at all new residences, except at the handicapped accessible units. There shall be a minimum of 8 units with walk-out basements under the Base Bid.

5-2.1 All basements shall have foundation drains on the exterior and interior side of the basement foundation wall. Drains shall be perforated plastic pipe with geotextile fabric to filter fines. Route foundation drains to a sump pit in the basement utility room.

5-3 Materials. All materials used shall be new and shall not be discontinued.

5-4 Fire Protection and Safety. Residences 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), 1997 edition. The Design/Builder shall furnish a complete code analysis.

5-4.1 Fire resistance of party walls and roof material. Party walls shall extend without openings, from ground to the underside of roof sheathing. Provide firestops at floor, and ceiling or roof line. Provide Class A (ASTM E108, Standard Methods of Fire Tests of Roof Coverings) roof covering material throughout. Party walls (walls separating residences) shall have the minimum fire-resistance rating of one hour.

5-4.2 Alarm systems. Smoke detectors are required to sound an alarm only within the residence are not required to be transmitted to the installation fire department.

5-5 Sound Attenuation.

5-5.1 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.

5-5.2 Party walls construction between residences shall be designed to provide the minimum airborne sound transmission ratings and impact isolation ratings stated in Table 5-1.

TABLE 5-1 - SOUND TRANSMISSION STANDARDS FOR PARTY WALLS AND FLOOR/CEILING CONSTRUCTION

Area	FSTC[1]	FIIC[2]
Party Walls (Unit Separation)	52	-
Habitable Areas Over Garages	52	-

Note[1]: Field Sound Transmission Class. See ASTM E336.

Note[2]: Field Impact Isolation Class. See ASTM E1007.

5-5.3 Testing. Certified proof-of-performance field tests will be conducted by the Contractor to demonstrate that the floor and wall systems as constructed provide the required sound isolation. Tests for air-borne sound shall be made in compliance with ASTM E336. Tests for impact sound shall be made in compliance with ASTM E1007. Testing will take place on 4 units randomly selected by the Contracting Officer.

5-5.3.1 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 additional units beyond the initial 4 units, of each system, may be required if the Contracting Officer determines that the quality of construction requires this additional testing.

5-5.4 Plumbing and HVAC equipment. Design of plumbing and Heating, Ventilating, Air-Conditioning (HVAC) shall include design provisions such as location, enclosure and acoustical treatment, to minimize transmission of noise generated by equipment within each residence, particularly the single-story units, and to eliminate transmission of noise to other residences.

5-6 Dimensions and Areas. The floor plans in the RFP indicate the dimensions for interior room and exterior spaces.

5-6.1 Ceiling heights in habitable rooms shall be a minimum of 2440 mm (8 ft). Ceiling height in part or all of the basement study room may be reduced to 2100 mm (7 ft) to accommodate ductwork. As a part of the betterments, provide 9-foot ceilings on the first floor of all residences, except those that are handicapped accessible.

5-7 Kitchen. The dishwasher shall be installed adjacent to the kitchen sink. A full-height pantry with a minimum of six 12-inch deep adjustable shelves shall be provided. In addition, as part of the residence upgrade betterment, the contractor shall provide a backsplash behind the range, extending to the underside of the range hood, finished to match the backsplash above the countertop.

5-8 Provide a combination tub with shower enclosure for the typical common bathrooms in the hall. The tub will be enameled steel. The enclosure will be a single- or multiple-piece unit with integral soap dish. All bathtubs except those in the master bedroom shall be furnished with a curtain rod. The master bathrooms shall have an enameled steel bathtub with a ceramic tile backsplash enclosure extending **2** feet above the tub. Master bathroom bathtubs shall have a recessed ceramic tile soap dish and a curtain rod. The towel bar holder and the toilet paper holder arms shall be ceramic with a plastic spring-loaded rod for the towel bar. Provide one 24-inch-long towel bar for each half-bath and two 24-inch-long towel bars for each full bath. All bathroom accessories shall be rigidly attached to studs or blocking. Bathtubs in handicapped accessible units shall be ADA-compliant and incorporate grab bars and a seating bench within the tub. Master bathrooms shall also have a single-or multiple-piece shower unit made of molded acrylic. Shower units shall incorporate a tempered glass door except that shower curtains shall be used at the accessible units. Roll-in type showers are not required at accessible units. Molded acrylic shower units shall be capable of accommodating a person of 250 pounds without damage.

5-8.1 A recessed medicine cabinet shall be provided in master bathroom only. Cabinets shall be corrosion-resistant with plate glass mirrors, hinged door type. Medicine cabinets shall be placed on a sidewall of the bathroom. Do not place recessed medicine cabinets in party walls. Medicine cabinet is in addition to mirror in all bathrooms. A single continuous length of corrosion-resistant plate glass mirror measuring the width of the vanity by 42 inches high shall be furnished in all bathrooms.

5-8.2 Two full-length shelves, 250 mm (10 inches) minimum nominal depth, are required above the washer and dryer in all locations.

5-8.3 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 have 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, or high density particle board. In walk-in closets, provide one full height drawer or open shelf storage unit for each 6 feet of clothes hanger rod. Factory Finished welded wire shelving and closet organizers meeting the capacity requirements is also permitted. Intermediate supports must be anchored to studs.

5-8.3.1 Closet doors. All closet doors shall be swinging. Sliding and bifold doors are not permitted.

5-8.4 Provide a minimum of three nominally 305 mm (12 inches) deep shelves with a combined length of 7300 mm (24 ft) within each interior storage room in single-story units.

5-8.4.1 Provide and install 4' x 6' wood framed storage shed with James Hardie "Hardiplank" siding, or equal, and Tamko Elite Glass Seal shingles, color: "Rustic Black," or equal. Door width to be a minimum of 36" wide, with a padlock hasp. Roof pitch to be 4/12 minimum pitch. Storage sheds will be securely anchored to a concrete pad, 4" thick, with 6x6/w2.9xw2.9 WWF on 4" crushed aggregate base (KDOT AB-3), compacted to 95% maximum density."

5-8.5 Study. Constructing and finishing the Study rooms in the basement of all two-story units as indicated in the RFP Floor Plans shall be provided as a Government requested Betterment to the base bid. Under the Base Bid, the entire basement shall be unfinished, with no ceiling or floor finish material, with the exception of the stairwell area. Also, provide surface-mounted electrical power outlets, lighting, cable TV connections, and telephone outlet as shown on the RFP drawings (one for data and one for communications). As a Betterment, the Contractor shall furnish and install the interior stud walls, the furring to the perimeter walls, with gypsum board walls and paint, sheet vinyl flooring, and suspended acoustical ceiling tile for the study rooms in the basement. Study rooms in the handicap-accessible units shall be completely finished under the Base Bid.

5-9 Interior Finishes

5-9.1 Walls and ceilings. Provide 1/2-inch gypsum wallboard, walls shall be taped and smooth finished. All ceilings, except basement study rooms, shall receive an off-white blown-on acoustical finish. Water-resistant wallboard shall be used in wet areas such as bath, powder, and laundry rooms. Ceiling board TEXT DELETED must be rated for ceiling use by the manufacturer. Cementitious backer board shall be used for ceramic tile applications. 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.

5-9.1.1 Gypsum Board Construction: All gypsum board shall be installed with screws, shall be manufactured in the United States and shall not contain asbestos. Provide metal corner beads on all gypsum board exterior corners.

5-9.1.2 As a part of the Base Bid, the stairwells shall be finished in their entirety.

5-9.1.3 As a part of the Government requested betterments, provide raised ceiling areas where indicated on the drawings.

5.9.2 Flooring. Flooring in all areas of the first and second floors of all residences, except garages and mechanical rooms, entry, entry closet, basement study, kitchen, mudroom, mudroom closet and toilet/bathrooms, shall be carpet. Entry, entry closet, basement studies, kitchen, mudroom, mudroom closet and toilet/bathrooms shall have sheet vinyl with wood base. The remainder of the basement shall be sealed concrete. As a betterment, flooring shall be hardwood flooring with wood base in areas indicated. Also in the betterment, a ceramic porcelain tile shall be used in the entry foyer, entry closet, master and full bathrooms, mud room, and mud room closet for all residences. The handicapped accessible residences will also have tile in the laundry room.

5-9.2.1 Stairs. Interior stairs shall be softwood with carpeted treads and risers.

5-9.2.2 Sheet vinyl shall conform to ASTM F1303, Standard Specification for Sheet Vinyl Floor Covering with Backing, Type I, Grade 1, Class B. Wear layer shall be urethane/PVC containing 90% binder. Flooring shall be installed as a monolithic material with seams heat welded. Provide material equal to the following:

Congoleum “Ovations” 12-foot width, 10-year limited warranty.

5-9.2.3 Ceramic tile shall conform to ANSI 137.1, moderate grade and shall be lead-free. Ceramic tile shall be installed on bathroom walls on master bathroom tubs to a minimum height of 2 feet including walls around tubs in non-accessible master baths. As a part of the betterments, ceramic tile shall also installed

above all kitchen counters and below the wall cabinets and behind ranges from the counter height to the bottom of the range hood.

5-9.2.3.1 Ceramic Porcelain Tile. As a part of the bid betterments, provide ceramic porcelain floor tile where shown on the drawings. Tile shall be a stone pattern, 15″ x 15″ in size. Install in a thin-set mortar to match the level of the laminate flooring. Tile shall have the following characteristics:

Water Absorption: ASTM C373 0.1% max.
Abrasive Wear: ASTM C501 200 min.
Breaking Strength: ASTM C648 300 lbs. min.
Bond Strength: ASTM C482 200 psi min.
Coefficient of Friction: ASTM C 1028 0.6 dry (min.); 0.5 wet (min.)

5-9.2.4 Carpet. As part of the base bid, Carpet shall be Mohawk Aladdin Saxony, solid color, 100 percent polyester, with polyester primary and secondary backing, heatset, yarn weight of 38 ounces per square yard, 0.125-gauge, 3500 minimum density, with 10-year limited lifetime warranty or equal.

5.9.2.4.1 Carpet pad shall be ½-inch bonded urethane, minimum 6-pound density. Urethane pad will conform to ASTM.D.3676.

5-9.2.4.2 Carpet edging shall be 1-1/2-inch minimum width floor flange and minimum 5/8-inch wide face.

5-9.2.4.3 Tackless strip shall be exterior grade Douglas Fir plywood, with minimum dimensions of 1-1/8 inches wide suitable for the cushion thickness specified. Tackless strips with two or three rows of staggered pins shall be used. For areas over 20 feet long, tackless strip with three rows of pins shall be used. Pins of the proper length shall be provided to penetrate through carpet backing, but shall not be a safety hazard.

5-9.2.5 Hardwood Flooring: Furnish and install, under a betterment, hardwood flooring as indicated on the Drawings, complete with all required trim and accessories in accordance with the manufacturer’s installation instructions, including wood base, base shoe molding, and reducer strips as required. All edges against dissimilar materials must incorporate a matching hardwood transition strip.

5-9.2.5.1 Hardwood flooring shall comply with NOFMA grading rules for species, grade, and cut. All materials shall carry NOFMA grade stamp. All materials shall be from one source and shall be of consistent quality, appearance and physical properties.

5-9.2.5.2 Products:

1. Provide one of the following manufacturers:

   a. Harris Tarkett
   b. Robbins
   c. Bowen

2. Species: Red oak.
3. Grade: No. 1 clear.
4. Cut: Plain sawn.
5. Thickness: ¾-inch (19 mm).
6. Width: 2-1/4 inches.
7. Length: Manufacturer’s standard random.
8. Edges: Square tongue and groove.
9. Matching: End matched.
10. Finish: Unfinished, for field-applied finish.

11. Backs: Channeled (kerfed).
12. Random Lengths: Standard random-length strips.

5-9.2.5.3 Finishing Materials:

1. Urethane Finish System: Complete system of compatible components that is recommended by finish manufacturer for application indicated.

    a. Type: Water-based.
    b. Stain: Penetrating and nonfading type, ultraviolet (UV) stable as recommended by urethane finish manufacturer for compatibility. Color: light oak.
    c. Floor Sealer: Pliable, oil-based, penetrating type, as recommended by urethane finish manufacturer for compatibility.
    d. Clear Finish Coats: Formulated for multicoat application on wood flooring.

2. Application: Minimum of 3 coats, 4 mil D.F.T. each.
3. Wood Filler: Formulated to fill and repair seams, defects, and open-grain hardwood floors; compatible with finish system components and recommended by filler and finish manufacturers for use indicated. If required to match approved samples, provide pigmented filler.

5-9.2.5.4 Felt Underlayment: Where strip or plank flooring is nailed to solid-wood subfloor, install flooring over a layer of asphalt-saturated felt stapled in place with minimum 3-inch overlaps. Run underlayment tight to stud partitions, as detailed on Drawings.

5-9.3 Painting. 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.

5-9.3.1 Walls in all rooms and all painted trim shall be painted with eggshell enamel. Colors shall be Post standard colors. All interior wall surfaces shall be painted with off-white paint equal to Sherwin Williams SW-1018. All ceilings, except basement study rooms, shall receive an off-white blown-on acoustical finish.

5-9.4 Trim. As a part of the base bid, provide colonial-style painted wood door casing, floor bases and other trim as required. All base shall be colonial-style painted solid wood, 3 inches high with quarter-round base shoe. As a part of the betterments, provide painted wood chair rail moulding and 6-inch painted wood crown moulding in the dining rooms and the great rooms.

5-9.5 Basement Finishes. Basements walls shall be unpainted concrete except where interior drywall partitions are indicated. In those cases, the drywall shall be painted and a wood base provided. As a betterment, the concrete walls of the basement study shall have furring and drywall and a lay-in acoustical ceiling. The floor shall be sealed concrete except that the study shall have sheet vinyl as indicated above.

5-10 Garages. Provide a double car garage for each residence. Slope slabs to drain out the garage door. Garages shall be uninsulated except on walls and ceiling areas adjacent to heated spaces. Garage doors shall have hardware that can be opened and locked from inside and outside of the garage. Under the Base Bid, the garage interior is unfinished exposed structure, without gypsum board walls. The garage ceilings shall receive gypsum board with mud and tape, but no

paint. Under the Betterment, the garage walls shall receive gypsum board with mud and tape, but no paint. The ceilings shall be completely finished with acoustical texture blown-on finish.

5-11 Roofing and Drainage. Minimum slopes for roofs shall be 1:3.

5-11.1 Roof water. Seamless guttering and downspouts shall be provided for all roof areas. Downspouts draining onto a lower roof shall have metal or plastic splash deflectors. Concrete splash blocks shall be provided under downspouts. No downspouts shall be drained across sidewalks or driveways. Provide 4-inch PVC drainage sleeves under walks if downspouts are unavoidable.

5-11.2 Roof surface. Roofing shall be limited to the following:

5-11.2.1 Minimum of 225-pound Class A wind-resistant fiberglass shingles conforming to ASTM D3018, Specification for Class A Asphalt Shingles Surfaced With Mineral Granules. Provide a 25-year warranty on roofing shingles. Roofing shingles shall be Tamko Elite Glass-Seal or equal. Color shall be “Rustic Black.”

5-11.3 Roof Construction.

5-11.3.1 Roof shingles shall be nailed (pneumatic nailing is permitted). Staples are not allowed.

5-11.3.2 Roof shingles must be installed per manufacturer’s recommendations.

5-11.3.3 Do not install shingles when it is too windy.

5-11.3.4 Do not install shingles when temperature will not allow self-stick surfaces to adhere.

5-12 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 screen walls, and garages will match the primary dwelling unit. In order to create variety in the appearance of the neighborhood, a variety of exterior color schemes for the units shall be incorporated. Stucco, concrete, masonry, vinyl or aluminum siding are not permitted. The following siding materials are the only materials permitted for use.

5-12.1 Brick. Brick may be furnished as a betterment to the Base Bid, and when provided 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 veneer. Brick shall start three courses above the finished grade.

5-12.1.1 Brick color, finish and hue shall vary between adjacent units, but all brick shall be generally red in color. Provide a minimum of two different brick colors for this Project.

5-12.2 Fiber-Cement board siding. Siding shall have a minimum non-prorated 35-year warranty on the finish. Siding shall be kept a minimum of 6 inches above finish grade. 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.

5-12.2.1 siding. Under the Base Bid, furnish fiber-cement siding having a smooth surface, 8-inch exposure, and equal to “James Hardie, Hardiplank.”

5-12.2.2 Vinyl-coated steel siding. As a Betterment, the Contractor may furnish steel siding in lieu of fiber-cement siding to comply with the following: 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 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 materials shall be separated from aluminum surfaces with a coating of bituminous paint or asphalt varnish.

5-12.3 Trim elements. Provide prefinished trim to match siding as recommended by the siding manufacturer. All exposed wood is to be primed and painted.

5-12.3.1 Wood fascia and rakes shall be 1-inch nominal boards with solid blocking or 2-inch nominal boards without blocking. Plywood, hardboard, or gypsum board is required on the base bid. Cover fascia, rakes, and soffits with prefinished steel to match siding when the betterment is provided.

5-12.3.2 Miscellaneous trim such as window trim, door sills and window sills shall be covered with prefinished steel to match siding of the betterment only.

5.12.3.3 Provide fixed decorative shutters on prominent front windows as indicated.

5.12.3.4 Front porch and step railings and balusters shall be prefinished aluminum, steel, or composite plastic. Finish shall carry a 10-year warranty. The Offeror will select a railing style appropriate to the character of the residence. The style may vary between duplexes and this variation may be used to develop variation in the exterior appearance.

5.12.3.5 Ornamental Columns at Porch. Column shall be manufactured from aluminum, cast stone, fiberglass, or composite material with minimum 8-inch size. 10-year warranty on the finish. Column shall be self-supporting and load-bearing. The style of the column, base and capitol shall be the contractor’s option but shall be compatible with the porch railing. The style may vary between duplexes and this variation may be used to develop variation in the exterior appearance.

5-12.4 Exterior ceilings and soffits. Exposure of roof framing and underside of roof/floor decks is not permitted. Exterior porch ceilings and roof eave soffits will be hardboard or exterior plywood of the appropriate grade for the base bid, and prefinished metal to match siding for the betterment.

5-12.5 Rear patios. Concrete patios shall be provided and shall be sloped to drain away from the unit, with a broom-finished concrete floor surface. Concrete steps integral to the patio shall be furnished as shown on the Drawings. Provide railings at steps to match front porch.

5-12-5.1 Units with walk-out basements shall incorporate a rear wood deck with a stair as shown on the RFP Drawings. Deck, structure, railings, and stair shall be made of cedar. Pressure-treated (CCA) pine is not acceptable. Walk-out basement shall also incorporate a concrete landing area as shown on the RFP Drawings.

5-12.5.2 The rear patios shall be screened from each other and other units by a portion of the house or by a privacy screen wall as indicated. The privacy screen wall shall be included in the base bid and shall be constructed of the same materials as the main structure. A wood fence is not permitted. Units with walk-out basements do not require screens.

5-12.6 Porches floors shall be sloped to drain away from the unit and have a concrete floor surface which provides a waterproof and non-slip surface. Plastic coating or films over concrete decks are not acceptable. Exposed wood (cedar) decks, where indicated on the drawings should be sealed not stained or painted. Steps shall be integral to the porch and shall be concrete and have railings and shall be a minimum of 48 inches wide. Porches shall be covered with roofs.

5-13 Windows. Window units shall be equal to: Capitol 7500 Series, double-hung, thermally broken extruded aluminum frame with tilt-in sashes, simulated divided lite, insulated glass, and insect screen. The window specified meets the following industry standards: AAMA/NWWDA 101/I.S.2-97 and ASTM F 588-97. The following specific criteria were met: NFRC overall design pressure testing (25), ASTM E330 structural testing (less than 0.4 residual deflection at a test pressure of 37.5 lb/sq ft), operating force (less than 30 lbs), ASTM E547 air infiltration testing (leakage not to exceed 0.25 cu ft/min/sq ft at a test pressure of 1.57 lbs/sq ft), ASTM E547 water resistance testing (no leakage when tested in three cycles of five minutes ea, with a one minute rest period between cycles at a test pressure of 3.75 lbs/sq ft), ASTM F 588-97 forced entry testing (passed), and ASTM 588-97 deglazing testing in operating direction at 70 lbs and remaining direction at 50 lbs. The Government will allow aluminum-clad wood, vinyl-clad wood, and solid-vinyl windows provided they meet all of the above salient characteristics.

5-13.1 Interior window trim and stools shall be solid-wood, paint-grades with a minimum thickness of 3/4-inch. Contractor to furnish wood blocking above the window heads for attachment of curtain rods.

5-13.2 All duplexes shall incorporate windows on the front and back elevations as shown on the RFP Drawings. Windows shall not be placed on the side elevations of the buildings. Windows must be sized equal to, or larger than those shown on the Drawings, and must always comply with the requirements of the Uniform Building Code.

5-13.3 In addition, windows shall be furnished for the entry vestibule areas, the stairwells, the hallways, and the general basement area, as indicated on the RFP Drawings.

5-13.4 Windows in basements and sleeping rooms shall incorporate one operable window for emergency escape or rescue, in accordance with the Uniform Building Code. Escape or rescue windows shall have a minimum net clear openable area of 5.7 square feet. The sill height of the openable escape or rescue window shall not be more than 44 inches above finished floor.

5-13.5 Windows installed in the handicap accessible units shall also comply with the following ADA requirements:

- Operating heights for hardware accessible to the handicapped.
- Hardware specifically designed for use by the handicapped.
- Amount of force required to operate sashes and ventilators.
- Clear space in front of windows to accommodate wheelchairs and permit access to hardware and operable sashes and ventilators for users with disabilities.

5-14 Basement Window Wells: Provide a basement window well and egress window. The window wells shall be a premanufactured galvanized steel unit attached to the foundation per the manufacturer's instructions, with six inches of granular fill and a drain piped to the foundation drain system. The window egress well may be a prefabricated unit or be site constructed of reinforced concrete, sized as indicated on the Floor Plans, with steps, six inches of granular fill, and a drain piped to the foundation drain system.

5-15 (not used)

5-16 Window Treatments. Provide 1-inch metal blinds at windows and glazed hung doors. Color shall be manufacturer's standard off white, and shall be coordinated with wall color.

5-17 Doors. See Table 7-1 for thermal performance requirements for exterior doors.

5-17.1 Entrance doors. The residence primary entrance door shall be 3 ft-6 inches in width by 6 ft-8 inches in height by 1-3/4 inch thick, thermal metal. Other residence entrance doors should meet this requirement but may be of 3-foot width. Sliding glass doors are not permitted. Incorporate a small insulated-glass area in each exterior door with curtain rods.

5-17.1.1 Entry doors. Main entry doors shall be equal to: Responsive Door "Energy-Building" steel door, 42 inches wide, prehung, 6-panel, 26-gauge with solid polyurethane core, primed and ready for field painting.

5-17.1.2 Storm doors. Storm doors shall be equal to: Columbia "New Crown" storm door, 42 inches wide, self-storing, 11-1/4-inch master frame. Marine glazed tempered glass with solar tint.

5-17.1.3 Patio doors. Patio doors shall be equal to: Therma-tru "Smooth Star" flush glazed, Model S2010, compression-molded fiberglass on solid urethane foam core.

5-17.2 Garage door. Garage doors shall be painted 24-gauge galvanized steel with embossed finish and stamped raised-panel design. Provide manufacturer's standard full-view glazed panels. Doors on non-accessible units shall be manually operated and complete with tracks, bottom seal, counterbalance and lock. Doors on accessible units shall have a power-operated opener. Provide two remote operators per door. Finish on door shall have a "lifetime" finish warranty.

5-17.2.1 Garage doors shall be equal to: Overhead Door Corp. 281 Series, white.

5-17.3 Aluminum screen and storm doors. Screen and self-storing storm doors shall be provided for all residence exterior hinged doors. Frames shall be a minimum of 1-1/4 inches thick and 2 inches wide. Aluminum alloy materials shall be not less than 0.05-inch thick and 2 inches wide. Doors shall have solid bottom panels and midsection protective grills. Screening materials shall be nonferrous.

5-17.4 Interior doors. Interior doors shall be a minimum of 3 feet wide, except that closet and bathroom doors may be 2 ft – 6 inches wide. Interior doors shall be a minimum of 6 ft - 8 inches in height by 1-3/8-inch thick, six-panel pressboard. All doors will be painted.

5-17.5 Attic Access. In a hallway, provide a 3-foot x 3-foot attic access hatch. Opening shall be for maintenance access only and shall have an insulated,

removable painted plywood panel. Gypboard is prohibited

5-18 Builders Hardware. All provided hardware shall have the same finish. Hinges, locks, and latches will comply with the specifications indicated in Table 5-2, and the following subparagraphs:

TABLE 5-2 – HARDWARE SPECIFICATIONS

Hardware Type/ Specification	Specific Requirements
Hinges BHMA 101	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. Minimum 3 per door.
Locks & Latches BHMA 601	Series 4000, Grade 2. Provide trim of wrought brass, aluminum, or stainless steel.
Auxiliary Locks BHMA 501	Series 4000, Grade 2. Provide matching trim of wrought brass, aluminum, or stainless steel.
Interconnected Lock & Latches BHMA 611	Grade 2. Provide matching trim of wrought brass, aluminum, or stainless steel.
Closers BHMA 301	Series CO2000, Grade 2.

5-18.1 Locks and keys. Provide a master keying system. Locks for each residence, including garage door, shall be keyed alike. The Contractor shall provide one extra set of cores for each 50 residences and furnish four keys for each key change and for master key system and control key. Locks and keys shall conform to the standards and requirements of the Builders Hardware Manufacturers Association (BHMA) listed above. Exterior storage units shall have a hasp. Padlocks will be provided by the occupants.

5-18.1.1 Front and back door locks, interior garage door, and garage door cylinders must be Best Lock Corporation’s Model 62K7AB4D-STK-612-RH, Brass Finish, M-keyway, interchangeable core, entrance locks. Key locks so that one key operates all locks in a unit. Prior to purchase, contact Mike Richey, DIS locksmith, at (913)684-7798 for make and model numbers.

5-18.2 Weatherstripping and exterior thresholds. Provide nonferrous metal or vinyl weatherstripping for all residence exterior doors. Vinyl magnetic weatherstripping is acceptable for metal doors. Exterior thresholds shall be nonferrous metal. Low-rise thresholds shall be furnished for the accessible units.

5-18.3 Applications. Locks and hinges shall be applied as follows:

5-18.3.1 Exterior hinged doors shall have 1-1/2 pair of hinges, lockset, and an auxiliary lock or interconnected lock and latch,

5-18.3.2 Interior doors shall have three hinges and latchset with BHMA 601, F75 or F76 operations.

5-18.3.3 Doors in fire-rated walls, residence to garage, shall have 1-1/2 pair of ball-bearing hinges, lockset, auxiliary lock or interconnected lock.

5-19 Building Signage.

5-19.1 Building Signage. All new units shall be provided with an address sign located beside the front door so that it is well illuminated by the porch light. The sign shall have four digits and 3-inch high reflective numbers on a colored background to match the unit's exterior trim color.

5-20 Cabinets. Kitchen and vanity 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 handles pulls and shall conform to ANSI A161.1, Recommended Performance and Construction Standards for Kitchen and Vanity Cabinets, except where modified below. Wall and base cabinets and vanities shall be essentially of the same construction and appearance.

5-20.1 Cabinets construction: Cabinets shall be equal to: Merillat Deluxe "Whitebay II Arch." With white laminate surface.

5-20.1.1 Wall cabinets shall be standard depth.

5-20.1.2 Provide 12-inch deep, floor-to-ceiling pantry cabinet in each kitchen with five (5) adjustable shelves.

5-20.1.3 In the kitchen, provide glass panels in one upper cabinet (one pair of doors). Also shoe molding (1/4 round) is required at all base cabinets where they meet the floor surface.

5-20.2 Countertops. Countertops finish may be high pressure laminated plastic 0.043-inch thick with post-formed tops. Minimum backsplash height is 4 inches. Provide lavatories mounted in 2-foot-wide (minimum) countertops, with vanity bases. Vanity sinks/tops are specified in paragraph 8.

5-21 Appliances. Provide the following equipment in accordance with specifications listed, one each per residence. A listing of currently labeled Energy Star appliances is available through the internet at the EPA Website: http://www.energystar.gov/products/appliances.html.

5-21.1 Refrigerators. Comply with UL 250, Household Refrigerators and Freezers and shall bear the EPA "Energy Star" certified label. Provide refrigerators 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. Provide baked enamel finish. 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. Connect the icemaker to the building water service. Minimum refrigerator volume and maximum energy use are as follows:

5-21.1.1 Volume: 0.58 CM, 21 CF

5-21.1.2 Energy Efficiency: 722 kWh/yr.

5-21.1.3 Contractor shall furnish refrigerator a GE Model GTS22KCMWW, 21.7-cubic-foot top freezer with factory-installed icemaker, color white or equal.

5-21.2 Ranges and ovens. Ranges shall be gas-fired, 760 mm (30 inches) wide and provided with porcelain enamel cooktop, oven, clock and timer, oven light, and cooking surface light. Oven shall have black glass window door, broiler pan, and self-lock racks.

5-21.2.1 Gas ranges shall have two, 150 mm (6-inch) and two, 205 mm (8-inch) burners, a self-cleaning oven, and AGA-approved electronic ignition. Gas ranges shall be in accordance with AGA Z21.1, American National Standard for Household Cooking Gas Appliances. Furnish GE Spectra 30 freestanding XL44, Model JGBP28WEAWW, gas, self-cleaning, with sealed burners, electronic clock and timer, or equal.

5-21.3 Microwave ovens. “User-furnished”

5-21.4 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 and be vented directly to the outside, not the attic. The fan shall be two-speed and shall have a capacity of not less than 78.7 L/s per meter of range hood (50 cfm per linear foot of range hood). The sound level shall not exceed 6 sones. Duct the fan to the exterior and provide backdraft protection. GE Profile 30, Model JV535CWW, white.

5-21.4.1 Provide fire extinguishing system in each kitchen range hood. System shall be UL listed, complying with NFPA 17A for residential kitchen hoods. Chemical storage containers shall be concealed in kitchen cabinets over the range hood, but shall be readily accessible for maintenance. Interconnection of the range hood extinguishing system and the fire alarm system is not required. Twenty First Century International Fire Equipment and Services Corp. Guardian 1, Model 1384-A, dry system.

5-21.5 Garbage disposals. Garbage disposals shall conform to UL 430 and ASSE 1008; Waste Disposers; continuous feed, minimum 1/2 HP motor, stainless steel grinding elements, two 360-degree stainless steel swivel impellers, manual motor reset, and sound insulation. Furnish Insinkerator Model Badger 5, or equal.

5-21.6 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. Furnish GE Model GSD4500GWW, white, or equal.

5-21.7 Color. Kitchen appliances, except disposals, shall be of matching finish, white in color.

5-22 Fireplaces. As a betterment, provide a gas fireplace in each residence. Fireplaces shall comply with ANSI Z21.50 and have the following features:

- Firebox shall be at least 36 inches wide and 15 inches deep.
- Zero-clearance to combustible surfaces.
- 22,000 Btu/h natural gas log set with electronic ignition.
- Remote wall switch.
- Glass doors with brass finish.

- Direct vent flue through the roof. Separate outside air intake.
- Install per National Fuel Gas Code Z2223.1.
- Painted wood fireplace surround with mantle.
- Stone, brick or tile hearth. Full width of surround x 1 foot deep.
- Enclose exterior flue in a brick chimney or wood framed enclosure with siding.

5-22.1 Fireplaces shall be equal to: Majestic DV580, direct6 vent, AGA/CGA wall furnace, AFUE rating, 38,000 Btu’s, Insta-Flame Ceramic Burner System, 7-piece ceramic fiber split oak log set with steel grate, millivolt ignition system, tempered glass panel, manual flame adjustment, wall switch kit, electrical junction box, flex connector with shut-off, 20-inch termination pipe with wall firestop, zero clearance, limited lifetime warranty.

6. UNIT DESIGN - STRUCTURAL.

6-1 SELECTION OF STRUCTURAL SYSTEMS AND MATERIALS. The structural systems and materials to be selected for the design of the residences will be suitable for permanent-type construction; capable of carrying the required loads; and compatible with fire protection requirements, and architectural and functional concepts. Materials may be of any of those listed in table 6-1, or any combination, selected for desirability, economy, general availability, low maintenance costs over the design life of the residences, and resistance to fire.

a. Design Considerations. It is required at the inception of the design that the structural system layout be properly coordinated with the architect to develop an overall effective plan. Installation of water lines, soil, waste, vent and drain lines may have ramifications for the selection of structural members by the designer, however relocation of plumbing fixtures from the locations depicted on the RFP drawings will not be allowed. Columns will be allowed in the garages. However, if columns are provided, the contractor shall provide and install two standard 8'-0" width garage doors. No columns will be allowed in the great room to reduce the span required.

b. The Design-Build Contractor will establish the type of structure and construction used. In selecting the type of structural system, the total facility should be considered, since the choice will influence such features as heating, ventilation or air-conditioning, as well as architectural, lighting, and utility requirements.

c. Structural Materials. When choosing structural materials for a specific Project, consideration will be given to:
(1) Availability of labor and materials.
(2) Design life of the facility and maintenance costs over this period.
(3) Feasibility of preassembling or precasting major structural elements.
(4) Site environment, including accessibility, climate, seismic hazard, subsurface conditions, and wind velocity.

6-2 DESIGN REQUIREMENTS.

a. Design Codes. Design methods and stress allowances or load factors for the various structural materials will be according to the current editions of the codes and specifications listed below.

TABLE 6-1 STRUCTURAL DESIGN METHODS AND STRESS ALLOWANCES

Materials	Codes or Specifications
Aluminum	The Aluminum Association (AA), "Specifications for Aluminum Structures"
Concrete	American Concrete Institute (ACI), "Building Code Requirements for Reinforced Concrete"
Masonry	American National Standards Institute (ANSI), "American Standard Building Code Requirements for Reinforced Masonry" Brick Institute of America (BOA), "Recommended Building Code Requirements for Engineering Brick Masonry" National Concrete Masonry Association (NCMA), Specifications For the Design and Construction of Load Bearing Concrete Masonry"

Precast-Prestressed Concrete	Prestressed Concrete Manuals
Steel	American Institute of Steel Construction (AISC), "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings" Steel Deck Institute (SDI), “SDI Design Manual for Composite Decks, Form Decks, and Roof Decks”
Steel Joists	Steel Joists Institute (SJI), "Standard Specifications and Load Tables, Open Web Steel Joists and Longspan Steel Joists," and similar publications covering deep longspan steel joists
Steel, Light Gage	American Iron and Steel Institute (AISI), "Specifications for the Design of Cold-Formed Steel Structural Members" “Design of Cold–formed Load-bearing Steel Systems and Masonry Veneer/Steel Stud Walls,” TI 809-07
Welding	American Welding Society Codes, Standards and Specifications
Wood	National Forest Products Association, "National Design Specifications for Stress Grade Lumber and its Fastenings" Truss Plate Institute (TPI), “Design Specification for Metal Plate Connected Wood Trusses” American Plywood Association (APA), “APA Design/Construction Guide “

b. Design Dead, Live, Snow and Wind Loads. The load assumptions for the design of buildings and other structures will conform to ASCE 7-98, “Minimum Design Loads for Buildings and Other Structures.”

c. Seismic Design. The seismic design of the new residences will be according to FEMA 302, “NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures”. Use site class “D”, Ss = 0.13, S1 = 0.06 for seismic calculations. Acceptable lateral force resisting systems will be any of those listed in table 5.2.2 of FEMA 302. Wood framed structures with panel diaphragms and shear walls will be classified as light frame walls with shear panels. Light gage metal framing which uses tensioned diagonal bracing will be classified as ordinary steel concentrically braced frames.

d. Design Dead Loads. Use actual weights of materials. For mechanical equipment, use weight of actual equipment plus a ten percent increase for future replacements.

e. Design Live Loads. Use 40 psf for the floor live load. Use 60 psf for the floor live load at exterior cantilevered balconies if used. Uninhabitable attics will be designed for a live load of 10 psf. A minimum roof live load of 20 psf for maintenance and construction will be used.

f. Climatic Considerations. Use a 20-psf ground snow load for determining snow loads. Use 90-mph design wind speed for determining wind loads. Foundations and utilities shall be located below the depth of maximum frost penetration. Minimum depth for heated structures is 34 inches. Minimum depth for unheated structures is 45 inches.

g. Tornado Shelter Design. The one story, handicapped units will not have basements and as such will be designed to include the provision for a tornado shelter to protect the occupants during severe wind events. The shelter will be located in the master bedroom closet and will meet the

requirements of FEMA 320, “Taking Shelter From the Storm: Building a Safe Room Inside Your House.” The walls will consist of 6-inch solid grouted and reinforced concrete masonry walls as a minimum. The ceiling will consist of a minimum of two layers of ¾-inch plywood and 14 gage continuous steel sheathing on 2x6 joists at 16 inches o.c. Design and detailing shall be in accordance with drawings AG-1 through AG-5 of FEMA 320.

6-3 DESIGN DEVELOPMENT

a. Building Design. Lateral structural design and siting considerations may conflict with functional considerations in building design. For instance, shear walls may limit horizontal flexibility and diaphragms may limit vertical circulation.

b. Building Configuration. Lateral loading considerations may require limits on the height of structures and design configurations. It must be noted that the building configuration plays an important role in the performance of the structure when subjected to lateral wind and seismic forces. To obtain optimal lateral resistance and performance, a symmetrically configured structural framing system with effectively and efficiently placed lateral resisting elements (shear walls and braced frames) must be considered. Further, the nonstructural elements must be seismic and wind resistant in order to maintain the expected capability (against collapse or post-earthquake operations).

c. Shelter Design for Tornado. Structures to be constructed in tornado areas will be designed so structural integrity and continuity are provided from the foundation to the roof, irrespective of the materials selected for the facility. All components of the structure must be tied positively together to establish an overall integrated resistance to high wind effects.

6-4 DESIGN CONSIDERATIONS

a. If wind loading on the main lateral force resisting system and/or the components and cladding members are greater than the seismic loadings and thus the controlling forces that are used for structural design, the structural seismic detailing requirements given in FEMA 302 must also be used. Both wind and seismic loading for components and cladding must be investigated to determine controlling forces regardless of controlling loads on the main force resisting system.

b. The tributary area “A” to be used in determining the exterior wind pressure coefficients for components and cladding shall be the actual loaded area of the structural element under consideration and not the entire area of the loading region in which the member resides. However, for rectangular tributary areas, the width need not be assumed to be less than one third of the length of the member.

c. When determining the internal wind pressure coefficients for buildings, doors and windows shall be assumed opened or closed as required to produce the coefficients that will produce the greatest wind loadings, both inward and outward.

d. When the design roof snow or snow on rain loading is less than 0.96 KN/sq m (20 psf), a roof live loading for construction and maintenance of 0.96 KN/sq m (20 psf) shall be used for the design of the structure. The minimum roof live load is used in lieu of and not in addition to the snow or rain on snow loading.

e. The maximum net inward and outward loads used in the design shall be indicated on the contract drawings. The design engineer is responsible for calculating the wind loads based on the ASCE 7 wind load requirements. The component and cladding loads shall be calculated based on the tributary area of the member under consideration. A minimum tributary area of one square meter (10 sf) shall be used.

f. Lateral Resistance. Walls used or required for lateral resistance to wind or earthquake shall be considered bearing walls and shall have a complete load path to the foundation.

g. Embedded Steel. Nonstructural steel (handrails, etc.) embedded in concrete shall be prefinished galvanized steel or plastic. All damaged galvanized areas shall be repaired prior to embedment.

h. Wood Flooring Systems. Wood flooring systems shall be glued and screwed. Glue lines shall not be considered for stress transfer.

i. Subfloor. ¾-inch tongue and groove plywood, glued and screwed in place, is required for all rooms requiring a subfloor. ¾-inch tongue and groove plywood subfloor for wet areas (i.e., bathrooms, kitchens, laundry room, and utility rooms)is required and will be rated for Exposure 1 or exterior use.

j. Underlayment: Sanded face underlayment (plywood) is required. Underlayment must be a minimum thickness of 8.7 mm (11/32 inches). Acceptable sanded face underlayment panels can be APA rated A-C, B-C, A-D, B-D, or C-C plugged. Underlayment should be rated for Exposure 1 or exterior use. Underlayment should be installed after interior finish work is complete to avoid damage to the underlayment.

k. Construction Tolerances. Allowable variations from level, or specified slopes, shall be as follows:

   For overall length, or surface of 10 feet or less: plus or minus 1/8-inch.

   Up to 20 feet: plus or minus 1/4-inch.

   Up to 40 feet: plus or minus 3/8-inch.

   Walls are to be constructed straight, true, and plumb.

l. Do not use keys in horizontal and vertical concrete construction joints. Specify the use of joints roughened to ¼-inch amplitude per ACI 318.

m. All foundations are to be of reinforced, cast-in-place concrete.

n. Use minimum 4,000 psi strength concrete measured at 28 days for all concrete work.

o. Concrete stoops shall be provided at all exterior doors. All stoops shall have frost protection.

p. Cast-in-place anchor bolt shall be used at all x-bracing or shear wall hold down locations. The use of expansion bolt anchors is not permitted for connections between elements of the main lateral force resisting system. Cast-in-place anchor straps are not allowed.

q. Slab on grade construction shall be detailed so that the slabs are

independent of the foundations and footings. A 6-inch sand cushion shall be provided between the bottom of the slab and any underlying foundation elements.

r. Concrete Reinforcement: Fiber reinforced concrete is not an acceptable alternative to be utilized in this Project.

s. Brick veneer with steel stud backup exterior wall systems shall strictly adhere to the criteria and detailing requirements of TI 809-05 and TI809-07.

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

u. CMU masonry shall be placed in running bond pattern only.

v. In units where tensioned diagonal bracing is used, the stability of the structure shall not depend on any single connection. Redundancy shall be provided either by using multiple bays of tension only bracing members or by using members that are capable of resisting both tension and compression in the same bay.

w. The use of field welding for connections between members of the main lateral force resisting system shall be avoided.

x. The use of APA sheathing over light gage steel framing as structural roof or floor diaphragms is not allowed.

y. Use of particle board for walls, floors, or roofs will not be allowed.

z. If wood framing systems are selected for use on this Project, use APA’s “Code Plus “ system for walls, floors, and roofs.

aa. Floor joists supporting plywood floor sheathing should be spaced no further than 16 inches on center.

bb. Veneered plywood is to be used for walls, floors, and roofs. Oriented strand board (OSB) may be used at walls only.

cc. If light gage steel is selected for the building’s framing system, coordinate thermal requirements and detailing with HVAC system design. Brick veneer with steel stud backup exterior wall systems will strictly adhere to the criteria and detailing requirements of TI 809-05 and TI 809-07. The technical instructions are available in electronic form via the TECHINFO internet site http://www.hnd.usace.army.mil/techinfo/.

7. UNIT DESIGN - THERMAL PERFORMANCE.

7-1 Thermal Characteristics. Residence construction shall provide at least the minimum R values/maximum U values indicated in Table 7-1 for the appropriate weather region. R and U values shall be calculated in accordance with ASHRAE methods.

TABLE 7-1 THERMAL CHARACTERISTIC REQUIREMENTS[1, 2]

Weather Region	Wall[3] R Value	Ceiling/ Roof R Value[4]	Basement R Value[6]	Slab on Grade R Value[7]	Door R Value[8]	Glazed Openings U Value[9]	
						Window	Door
7	3.3 (19)	6.7 (38)	1.8 (10)	0.9 (5)	0.9 (5)	2.2 (0.38)	2.2 (0.38)

Note[1]: 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)

Note[2]: 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.

Note[3]: Requirements for opaque, exterior walls.

Note[4]: 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 percent 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).

If metal framing is used, insulation between wall studs shall be derated per Table 8C-2 of ASHRAE 90.1 as follows:

Size/Gauge of Member	Framing Spacing (inches)	Rating of Insulation (R)	Derated (R) Value
2 x 4; 18-16 Ga.	16″ o.c.	R-13 R-15	R-6.0 R-6.4
2 x 4; 18-16 Ga.	24″ o.c.	R-13 R-15	R-7.2 R-7.8
2 x 6; 18-16 Ga.	16″ o.c.	R-19 R-21	R-7.1 R-7.4
2 x 6; 18-16 Ga.	24″ o.c.	R-19 R-21	R-8.6 R-9.0

Note[5]: Not used.

Note[6]: 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.

Note[7]: Requirements for perimeter insulation. Perimeter insulation shall extend downward to a total distance of 610 mm (24 inches) as described above.

Note[8]: Requirements for opaque doors in exterior walls (insulated metal).

Note[9]: Window requirements for double pane, low emissivity glass windows as specified in paragraph 5 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 shall be limited to 14 percent of the heated floor space. Solar Heat Gain Coefficient shall be limited to 0.55. Solar Heat Gain Coefficient shall be limited to 0.40.

7-2 Thermal Insulation.

7-2.1 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. 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.

7-3 Air Infiltration.

7-3.1 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, weatherstripped 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.

7-3.2 A blower door test, performed in accordance with ASTM E 779, Measuring Air Leakage by the Pressurization Method, shall be performed on 5 percent of the Project buildings, which will been randomly selected by the Contracting Officer. If buildings are to be turned over in phases, the blower door test shall be

performed on 5 percent of the buildings completed in each 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 the test, an additional 5 percent of the Project buildings shall be tested. This process shall continue until 100 percent of the total number of tested buildings pass the blower door test. All prototype units will be included in the required blower door testing procedures.

7-3.2.1 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.

7-3.2.2 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 residences 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.

7-3.2.3 Any measures taken to reduce the air leakage to acceptable values shall be permanent, and shall be implemented on all similar residences.

8. UNIT DESIGN - PLUMBING.

8-1 Plumbing system shall be designed and installed in accordance with the National Standard Plumbing Code. Installation of water lines and soil, waste, vent and drain lines may have ramifications for the selection of structural members by the designer, however relocation of plumbing fixtures from the locations depicted on the RFP drawings will not be allowed. Inspection and testing of the plumbing system shall be performed as prescribed in the Plumbing Code.

8-2 Water Piping. Under slab supply piping shall be limited to residence service entrance only. Service line to each residence shall be no less than 25 mm (1 inch) diameter and shall include pressure-reducing valves inside the house at the service entrance. All water piping shall be sized in accordance with methods outlined in the National Standard Plumbing Code.

8-2.1 Copper tubing. All interior water piping shall be type K or L hard-drawn copper. Water piping under concrete slabs shall be copper tubing, type K, annealed. Joints under the slabs are prohibited. Type M copper tubing shall not be installed. 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.

8-3 Soil, Waste, Vent, and Drain Piping. Soil, waste, vent, and drain, piping shall be Schedule 40 PVC 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 Schedule 40 PVC pipe. Building waste main lines shall be no less than 102-mm (4-inch) diameter. All soil, waste, and drain piping shall be sized in accordance with the methods outlined in the National Standard Plumbing Code. “Wye” connections shall be used for common drain lines between residences. Tee connections are not permitted. Full-sweep, 90-degree ells shall be used in all drain connections.

8-3.1 Provide a floor drain near HVAC units to receive condensate, and near clothes washers.

8-4 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 for gas line distribution requirements.

8-5 Plumbing Fixtures. Installation of soil lines may have ramifications for the selection of structural members by the designer, however relocation of plumbing fixtures from the locations depicted on the RFP drawings will not be allowed. 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.

8-5.1 Plumbing shall meet the following criteria:

8-5.1.1 Exposed traps shall be chromium-plated, adjustable-bent tube, 20-gauge

brass. Concealed traps may be plastic (ABS).

8-5.1.2 Faucets shall be single-control type 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. Faucets shall be the following makes and models to match existing post standards for availability of uniform parts, and ease of replacement.

Lavatory - Gerber #43-431
Tub and shower - Gerber #48-720-83
Kitchen - (2 handle with spray) - Gerber #42-516

8-5.1.3 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). Control valves shall be anti-scald type.

8-5.1.4 Piping shall be concealed except in unfinished basement areas. Individual shutoff or stop valves shall be provided on water supply lines to all plumbing fixtures except bathtubs and showers. Ball-type, ¼-turn shutoff valves shall be provided for each bathroom group. Connections to fixtures shall be copper or polyethylene. Flexible connections are not allowed.

8-5.1.5 Fixtures shall be water conservation type, in accordance with the National Standard Plumbing Code.

8-5.1.6 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). Plastic fixtures shall conform to ANSI Z124. Enameled cast iron plumbing fixtures shall comply with ANSI A112.19.1, and enameled steel fixtures shall comply with ANSI A112.19.4.

8-5.2 Water closets. Water closets shall have elongated 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). Gerber “Ultra flush.” Color to be white.

8-5.3 Lavatories. Lavatories shall be cross-link acrylic molded counter top with integral bowl, oval-shaped, minimum 19 by 16 inches in size. Lavatories shall have pop-up drains.

8-5.4 Bathtubs. Bathtubs shall be slip resistant and shall be constructed of steel with enclosure gel-coated, glass fiber reinforced polyester resin. Combination tub/showers shall feature as a three-piece or one-piece surround, integral shelves for soap and shampoo, and a wash cloth holder. Appropriately located integral grab bars are required for handicapped accessible units.

8-5.5 Showers. Shower stalls shall be three-piece or one-piece gel-coated, molded acrylic, glass-fiber reinforced polyester with an integral shelf/soap dish. Shower floors shall be slip resistant. Unit floors shall be set in grout bed. Appropriately located integral grab bars are required for handicapped accessible units.

8-5.6 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 are specified in paragraph 5. Strainer and plug shall be eliminated where food waste disposers are provided.

8-6 Clothes Washer Connections. Drainage and hot and cold water supply shall be provided for all automatic clothes washers. Washer connection, complete with 2-inch drain, 3/4-inch hose thread supplies with water shutoff valves 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 2 feet-10 inches above the finish floor. Electrical outlets for both washer and dryer shall also be provided. For units in the basement, hot and cold stops and drain standpipe may be provided without master box.

8-7 Refrigerator Ice Maker Connection. Cold water supply shall be provided for 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.

8-8 Hose Bibbs. Hose bibbs shall be provided at the front and rear of each dwelling unit. Hose bibbs shall be frostproof, and shall be supplied with an integral vacuum breaker.

8-9 Piping Location. Water piping running in attics and spaces over garages 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.

8-10 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 installed in a 12-inch by 12-inch concrete pad, flush with grade. Interior and exterior cleanouts shall have standard locations in all residences to the greatest extent possible. Exterior cleanouts shall be two-way type.

8-11 Water Heater. Water heaters shall be Rheem “Professional” energy miser gas water heater, models 41V40 PRO(N) and 41V50 PRO(N), 8/12-year limited warranty or equal. Hot water piping for the first 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 installed in accordance with Table 8-1.

Table 8-1: Water Heater Sizing

Rheem “Profesional”	3 BR	4 BR	
	2 Bath	2 Bath	3 Bath
41V40 PRO(N)	X	X	
51V50 PRO(N)			X

Gas fired water heaters shall be in accordance with ANSI Z21.10.1, Water Heaters, Gas, Volume I, Storage Type, 22 kW (75,000 BtuH) Input or less, and shall be sealed combustion high efficiency type. Water heaters with powered ventilation

shall be vented in accordance with manufacturer’s instructions. Water heaters shall be installed to allow easy removal and maintenance without obstructions.

8-12 Foundation Sump Pumps: Units with basements shall be provided with sump pump and basin connected to foundation drain and discharging to outdoors. Units shall be located in basement utility room. Equipment to have check valve, cord and plug connection and unions for easy removal/replacement.

9. UNIT DESIGN - ELECTRICAL.

9-1 Conformance to Code. The electrical system shall be designed in compliance with the rules and recommendations of ANSI C2, National Electrical Safety Code, and NFPA 70, National Electrical Code (NEC), and applicable model codes, whichever is more stringent.

9-2 Service Entrance. Service entrances, exterior meters, and panels shall be enclosed or sight screened. Service feeders shall be underground with exterior meters. Individual electric watt-hour meters, Class 200, shall be installed for each dwelling unit. Panel boards shall be painted galvanized steel and furnished with main breakers. Load centers are acceptable if commercial grade. Provide main circuit breaker in the main panel for each residence, sized in accordance with the NEC (200 amps minimum). Electrical panels, disconnects, etc. shall be manufactured by Square “D” or Cutler Hammer. Panel board doors shall be flush one-piece fronts. Panel boards may be surface or recessed mounted depending on their location. No recessed panel boards are to be located in party walls and fire walls. Panelboards for individual residences shall be the plug-in circuit breaker type. Driven ground rod and grounding wire design shall be required at each unit’s main distribution panel. The panelboard shall have at least 24 full-size slots. Provide full size circuit breakers and one full-size spare circuit breaker for every five active circuits. Walls housing service entrance panels shall have sufficient thickness to accommodate wiring bends. A panelboard directory shall clearly indicate each circuits purpose or use and the room served.

9-3 Panel Locations. Residence panels shall be located in the basement near the rear of the unit or in the garage of the single-story units.

9-4 Conductors. Conductors shall be copper. Conductors #10 AWG and below shall be solid. Raceways are not required for interior conductors above grade.

9-4.1 No conductors shall be routed on the exterior of the dwelling unit except for service entrance conductors and they shall be routed in conduit. Exterior above grade conduits shall be galvanized rigid steel. Exterior conduit below grade shall be schedule 40 (minimum) PVC. EMT is permitted only in interior or protected locations.

9-5 Outlet Circuits. Lighting and convenience outlets shall be on separate circuits. Outlets on party walls shall be offset to maintain integrity of the fire wall and sound deadening rating of the wall.

9-6 Exterior Lighting and Outlets. Provide energy efficient high quality lighting for each residence. 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 residence's entry, garage, and patio area. Provide light fixtures on each side of the garage door. Provide exterior outlets with “In-Use” weatherproof covers. 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. Light fixtures at entry, garage, and patio areas shall be switched from the residence interior and shall incorporate motion detection. The light fixture at the front entry shall also light the street address. Common trash areas shall be lighted. These lights shall be

controlled by photocell, activated by minimum light level of 0.5 footcandle. Lights in common areas should have high impact-resistant plastic lenses, and/or be otherwise made vandal-proof.

9-7 Interior Lighting and Switched Outlets.

9-7.1 Generally, incandescent lighting shall be used. Lighting shall provided in accordance with the IES Lighting Handbook. The general type and style of light fixtures shall be in accordance with those indicated in Attachment. 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:

9-7.1.1 Fluorescent tubes, 4 feet: 90 lumens/watt.

9-7.1.2 Fluorescent tubes less than 4 feet: 80 lumens/watt.

9-7.1.3 Compact fluorescent and other lamps: 50 lumens/watt.

9-7.2 Locations. Ceiling lights are preferred. Provide light fixtures operated by wall switches for all rooms. Wall-switch operated ceiling lights shall be provided in dining and utility rooms, halls, bedrooms, kitchens, dinette areas, and basements. 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 bulk storage rooms shall be provided with ceiling lights, wall switch operated. A minimum of two ceiling-mounted lighting fixtures shall be provided in the garage (one per vehicle bay). Garage lights shall be controlled by a switch (switches) located at each door opening into the garage. Use wall sconces in stairwell at 8-feet above the floor. Recessed light fixtures are preferred in most rooms except kitchens, baths, dining rooms and stairways.

9-7.2.1 Light Fixture Types:

Dining Room & Entry Foyer - Manufactured by Progress Lighting, P.O. Box 5704, Spartanburg, SC 29304-5704, Eclipse Collection, Product No.P3573-10, or equal.

Stairwells - Manufactured by Progress Lighting, P.O. Box 5704, Spartanburg, SC 29304-5704, ADA Wall Sconces, Product No. P7168-10EB, or equal.

Mirror Lighting in Bathrooms - Manufactured by Progress Lighting, P.O. Box 5704, Spartanburg, SC 29304-5704, Economy Broadway Lights, Product No's. P3114-10, P3115-10, P3116-10, P3117-10 or P3118-10, or equal. The length of the light fixture will be determined by width of the mirror it serves.

Kitchen (Ceiling) - Manufactured by Progress Lighting, P.O. Box 5704, Spartanburg, SC 29304-5704, Product No. P7336-30EB, or equal.

Kitchen (Undercabinet) - Manufactured by Progress Lighting, P.O. Box 5704, Spartanburg, SC 29304-5704, Product No. P7008-30EB, or equal.

All Remaining Interior Lights - Manufactured by Progress Lighting, P.O. Box 5704, Spartanburg, SC 29304-5704, 5" Incandescent New Construction Air Tight IC Universal Housing, open/open shower trims as appropriate.

Exterior Lanterns for Residences (all locations) - Manufactured by Progress Lighting, P.O. Box 5704, Spartanburg, SC 29304-5704, BrassGuard Lanterns, Product No P5846-10, or equal.

Street Light - Manufacturered by Holophane Outdoor Architectural Lighting,214 Oakwood Ave, Newark, OH 43055, "Utility Arlington Series Luminaire," color: black, or equal.

Street Light Posts - Manufacturered by Holophane Unique Solutions, 515 McKinley Ave, Newark, OH 43055, Charleston Series, Product No. CH12T5/12-CA/black, or equal.

9-7.2.2 The general lighting intensity in kitchens shall be 320 to 540 Lx (30 to 50 footcandles). Kitchen light sources shall be fluorescent and lamps shall be easy to change. 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 footcandles) using fluorescent fixtures surface-mounted below wall cabinets. Kitchen range hood shall be provided with a light, fan, switches, and fire suppression system.

9-7.2.3 A ceiling outlet shall be provided in all garages for the future addition of garage door openers.

9-7.2.4 In bathrooms, provide independent wall switch control of the exhaust fan and lights.

9-7.2.5 Furnish rough-in box for future light in attic space.

9-7.2.6 The ceiling light fixtures boxes in the following rooms: family room, 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.

9-8 Heat and Smoke Detectors. Provide heat and smoke detectors in accordance with NFPA 72 and NFPA 101, and other applicable codes. Provide a heat detector in the garage. Heat and smoke detectors shall be interconnected so that if any device goes into alarm, the alarm in all other devices shall activate. The kitchen hood fire suppression system shall be interlocked with the heat and smoke detector alarms. Detectors shall have battery backup.

9-8.1 Heat detectors shall be of the fixed temperature type and UL Listed.

9-8.2 Residential smoke detectors shall be photoelectric type, 120 volt, and UL Listed. Detectors shall incorporate a built in piezo horn rated 90 dB at 10 feet, red LED alarm/power on indicator, test button, and tamper proof locking base. Detectors shall not contain radioactive material.

9-9 Carbon Monoxide Alarm Detectors: All residences shall receive carbon monoxide detectors as follows:

9-9.1 One CO detector shall be located on each level of the residence. A required detector shall be located in vicinity of the bedrooms, such as in the corridor outside of the bedrooms. CO detectors will not be provided in garages, furnace rooms, unfinished basements or unfinished attics.

9-9.2 CO detectors 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. Units may be powered from circuits powering smoke detectors. In all cases, manufacturer's guidelines and recommendations shall be followed.

9-9.3 CO detectors shall be equipped with an audible alarm, battery back-up,

continuous digital display, peak level memory, test button, and test reset button and shall be UL listed by passing standard test UL 2034.

9-10 Telephone. Pre-wire residences in accordance with local telephone company requirements. Provide outlets in kitchen, study room, living room and bedrooms of each residence. Eight position modular jack connectors shall be provided at all outlets. The jacks provided in the kitchen 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 5E per TIA/EIA 568A, Commercial Building Telecommunications Cabling Standard. Each residence shall be pre-wired separately from other residences in the same building. Provide two plug-in type terminal blocks in the basement located on an outside wall near the protected telephone terminal. Provide two outside telephone lines, one terminated to each terminal block. All interior wiring shall terminate to one of these plug-in terminal blocks. The occupant shall be able to choose which line each telephone outlet is plugged into. Each telephone circuit shall be labeled “Telephone” along with the room served. The two outside telephone lines 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. Each protected telephone terminal shall accommodate a minimum of two outside telephone lines per residence. A single #6, 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 local Telephone Company (Southwestern Bell). Place telephone jacks in locations as indicated on the RFP Floor Plans. The protected telephone terminal unit shall be located near the side or rear of each residence and adjacent to the metering equipment.

9-10.1 Data. Pre-wire residences for data. Provide outlets in study room and bedrooms of each residence. Eight-position modular jack connectors shall be provided at all outlets. Wiring methods shall comply with EIA/TIA Standard 570, Residential and Light Commercial Building Telecommunications Wiring Standard. Cable and jacks shall be Category 5E per TIA/EIA 568A, Commercial Building Telecommunications Cabling Standard. Each residence shall be pre-wired separately from other residences in the same building. All wiring shall terminate at the telephone system demarcation box. Each data circuit shall be labeled “Data” along with the room served. Place data jacks in locations as indicated on the RFP Floor Plans.

9-11 Television.

9-11.1 Commercial Cable Television. Cable television (TV) outlets shall be located in the living room, kitchen, study room, and bedrooms of each housing unit as indicated. Each housing unit shall be prewired in conformance with all local cable TV company (Time Warner) requirements. Each residence shall be prewired separately from other residences in the same building. The local cable company (Time Warner) has requested that the cables be run inside the house in the following manner. Contained within the stud walls or other hidden areas and in accordance with industry standards, run two separate and continuous RG-6 cables from each room outlet location to a central location in the basement near either the electrical panel or the phone terminal box with sufficient cable for the necessary connections. Each pair of cables terminating in the basement shall be labeled “Cable TV” along with the room served. Each wall outlet in the designated rooms shall contain 8 inches of extra cable, neatly rolled up in a

standard electrical wall junction box, and covered with a solid plastic face plate. For additional technical information prior to installation, contact Mr. Ron Lust, Time Warner Field Service Supervisor, (913) 682-2113. Place cable television outlets in locations as indicated on the RFP Floor Plans. The protected television terminal shall be located near the side or rear of each residence and adjacent to the protected telephone terminal.

9-12 Door Bell. The front entrance to each residence shall be provided with a low-voltage doorbell or buzzer and an illuminated push button.

9-13 Convenience Outlets. All outlets shall be of the grounded type. Provide GFCI and convenience outlets in accordance with the NEC and attached RFP Floor Plans.

9-13.1 Near condensing units, provide a GFCI receptacle with a waterproof cover.

9-14 Special Outlets. Provide 240 V electric outlets for electric dryer. Provide outlet for garage door opener in all units whether an opener is specified or not.

9-15 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. Service entrance conductors shall be installed a minimum of 36 inches below finished grade. Installed conductors in conduit shall be used only where specifically required by the NEC.

9-16 Branch Circuit Conductors. Branch circuit conductors and over current devices shall be as rated by NEC. A minimum of one spare circuit space for every five active breakers in the panel shall be provided per residence. Individual circuits shall be provided for the washer, dryer (with receptacles located behind the washer and dryer), dishwasher, garbage disposal, freezer, furnace or air handling unit, air conditioning unit, and water heater. Two utility circuits (20-amp) shall be provided in the kitchen area for the convenience outlets for small appliances serving the kitchen and dining area. A separate 20-amp branch circuit shall be provided for each refrigerator. A separate 20-amp branch circuit shall be provided for each bathroom receptacle per the NEC. All branch circuits serving bedroom outlets shall be protected by arc-fault circuit interrupters. The study room shall be served by at least one dedicated circuit.

9-17 FM Remote Load Shed System. All residences will be interfaced with the installation’s FM remote load shed system. The Offeror will install microprocessor-based FM receiver/switches at each condensing unit. A booster antenna, including pole, devices, and all wiring, must be installed at each of the three sites.

9-18 Mechanical Equipment. All mechanical equipment shall be direct connected and provided with overcurrent protection sized per the manufacturer. All equipment shall be provided with local disconnecting means. Disconnect switch for condensing units shall be fused, dead front, pullout type, NEMA 3R rated, of metal constructed housings.

9-18.1 Radon Removal System. Provide 20 amp, 120 volt circuit in junction box near radon removal pipe in attic for future fan, attic light and outlet.

9-19 Demolition. Disconnect and remove electrical services for units to be removed. Remove both above electrical services. TEXT DELETED Maintain service to units not being removed.

10. UNIT DESIGN - HEATING, VENTILATING, AND AIR CONDITIONING.

10-1 Design. Heat gain and loss calculations shall be, as a minimum, in accordance with the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Residential Cooling Load Calculation methodology. 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 DATA

Type of Design / Design Information	
	Inch-pound
Heating	
Indoor Design Temperature	70°F
Outdoor Design Temperature	3°F
Annual Heating Degree Days	4822
Largest Number of Monthly Heating Degree Days	1032
Cooling	
Indoor Design Temperature	75°F
Outdoor Design Dry Bulb Temperature	93°F
Outdoor Design Wet Bulb Temperature	76°F

Note[1]: Inch-pound data are based on degree days Fahrenheit to a base of 65 degrees F.

10-1.1 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 0.5 cfm/ft^2 for all spaces. The design for each individual residence 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.

10-1.2 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.

10-2 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 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.

10-2.1 All heating and cooling equipment proposed and installed in this contract shall bear the Energy Star Label.

10-2.2 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.

10-2.3 Equipment efficiencies as listed in Table 10-2 below are minimum acceptable levels. Energy conservation as it relates to equipment operating costs will be considered in the evaluation process.

Table 10-2: Minimum Equipment Efficiencies

	Natural gas fired equip	Ground Source Heat pump (ground coupled)		Electric cooling equip
Furnace AFUE	90%[1]	Size A[2]	Size B[2]	
SEER		12[3]	13[3]	10[3]

Note[1]: Efficiency is based on DOE test procedure 10CFR430, Subpart B, Appendix N.
Note[2]: Size A heat pumps have a capacity of 5.9 kW (20,000 Btu/h or less. Size B heat pumps have a capacity of 5.9 kW to 13.5 kW (20,000 to 46,000 Btu/h)
Note[3]: Efficiency is based on DOE test procedure 10CFR430, Subpart B, Appendix M.

10-3 Heating and Cooling Systems. Each residence shall be provided with central heating and air conditioning systems. 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.

10-3.1 Equipment sizes selected for installation shall not oversized more than 125 percent of the calculated loads.

10-3.2 Exterior air conditioning units shall be concrete pad-mounted, with location selected based on site specific conditions and intended uses of outdoor space. Effort shall be made to locate the unit(s) out of the occupant's direct line of sight (screen with shrubbery or wall, locate on sides of residence, avoid placement under windows, etc.). However, the primary concern shall be coordination with the mechanical area location. Mechanical equipment shall be located in basement utility room (first floor rooms in accessible units), and shall be arranged to allow for ease of maintenance, and for proper venting if required. This utility room shall be provided with a light and electrical

receptacle.

10-3.3 Forced warm air systems. Warm air furnaces shall be induced combustion, upflow natural gas. Furnaces shall be equipped with electronic ignition. Natural gas shall be equipped with a flue to exhaust flue gases above the building roof. Units shall be vented in accordance with NFPA 211. High efficiency (AFUE ≥ 90 percent) gas furnaces shall be vented in accordance with AGA requirements and the manufacturer's instructions. Condensate drains for high efficiency units shall be manufacturer approved, and shall be indirectly connected to the building sanitary sewer system. Combustion air shall be provided from the outside in accordance with the appliance listing. For areas with a 97.5 percent outdoor dry bulb design temperature below 20 degrees F, combustion air shall be provided in accordance with SMACNA Installation Standards for Residential Systems. Furnaces shall be equipped with centrifugal fan, disposable filters, controls, and transformer. Fans shall be multi-speed, direct-drive type. It shall be possible to service and replace all controls and internal components from one side of the furnace. Heat exchangers shall be guaranteed for a minimum service life of 10 years. The contractor shall supply Carrier, model number 58MCA or equal.

10-3.4 Split system air conditioning and ground source heat pumps. As a part of the betterments, provide geothermal heat pumps.

10-3.4.1 Electric Air Conditioning system equipment shall consist of an air-cooled condensing unit and evaporator evaporator/blower as matched components with the furnace, all 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 10-3. Equipment shall be sized to meet the total load determined by computer calculation. Equipment may be oversized to no more than 125 percent of the computer-generated load. Evaporator/blower shall be provided complete with centrifugal fan, disposable filters, controls, and transformer. Fans shall be multi-speed, direct drive type. Provide with FM controller for condensing unit shutoff. The contractor shall supply a Carrier, Model number, 38CKC or equal.

TABLE 10-3 – SPLIT SYSTEM AIR CONDITIONING FEATURES

High and low pressure compressor protection.
Filter-drier.
Hermetically sealed compressor with built-in overloads and locked rotor protection.
Electric crankcase heaters.
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.
Fan and coil guards.

10-3.4.2 The evaporator coil, evaporator/blower, shall be provided with a liquid strainer, expansion device, pre-insulated housing, copper or aluminum coil, and insulated condensate drain pan. Centrifugal blower, and electric

resistance supplemental heaters. Coil face velocity shall be limited to 550 fpm.

10-3.4.3 The condensing unit and matched coil, (evaporator/blower), shall deliver a Seasonal Energy Efficiency Rating (SEER), consistent with the minimum requirements shown in Table 10-2.

10-3.4.4 Refrigerant Charge Verification: When split-system air conditioning systems are selected for installation, 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 percent 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.

10-3.5 Unacceptable systems. Room unit heaters space heaters, room (window) air conditioning units; floor furnaces, gravity warm air systems, and electric resistance heaters (see Note[1]) are not permitted.

Note[1]: Electric resistance heaters may be used for supplemental heat in heat pumps.

10-4 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 residences, 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.

10-4.1 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 600 fpm maximum, with a maximum pressure drop of 0.1-inch water. Airflow from any single diffuser shall be limited to 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 6 inches below the ceiling.

10-4.2 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 400 fpm maximum, with a maximum pressure drop of 0.06-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 6 inches 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.

10-4.3 Ductwork. Ductwork shall be externally insulated sheet metal or flexible metal. Length of flexible duct shall be limited to 6 ft. 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. Volume dampers shall be provided at each branch take-off. All ductwork shall be concealed. 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 residence, supply systems, return systems, exhaust systems, ventilation systems, and outside air supply ductwork.

10-4.3.1 Maximum velocity in supply ducts shall be limited to 900 fpm for mains and 600 fpm for branches.

10-4.3.2 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 1 inch 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 2-inch 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.

10-4.3.3 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 12 inch in diameter and 5 screws for ducts over 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 1 inch of tape on the duct lining and 1 inch 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.

10-4.3.4 Provide a minimum of 2-inch thick mineral fiber insulation (or other listed insulation with an equivalent R value) on the exterior of all supply and return air 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.

10-4.3.5 Return, exhaust, and ventilation air ductwork shall be sized for a maximum velocity of 900 fpm. Short runs of return air duct 5 ft or less which directly precede the air handler or furnace shall be acoustically lined to minimize noise.

10-4.4 Filtration. Provide a disposable pleated 1 inch 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. See paragraph 5 for Kitchen

exhaust hood grease filters.

10-4.5 Radon Removal System. Refer to paragraph 4 for radon removal system requirements.

10-5 Thermostats and Humidistats. Thermostats shall be located on interior partitions, approximately 5 ft 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.

10-5.1 Thermostats shall be Lightstat light-activated Model 15970, Energy Star labeled, microprocessor-based, with built-in keypads for scheduling of day and night temperature settings. For a listing of Energy Star labeled thermostats see http://www.epa.gov/appdstar/hvac/thermostats.html. When used for heat-pump applications, the thermostat shall have an emergency heat switch.

10-6 Exhaust Fans. Bathroom and kitchen range hood exhaust fans shall be ducted to the outside. Bathroom fans shall be switched separately from bathroom lights. Each bathroom shall have its own fan. Exhaust fans shall not discharge near the air conditioning condensing unit, entry doors, patios, porches, 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. See paragraph 5 for Kitchen range exhaust fans.

10-7 Dryer Vents. A 4-inch diameter dryer vent shall discharge to the exterior, and 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 14 feet long, with no more than three right angle elbows (with minimum radius of 6 inches), and have a maximum vertical run of 12 feet. Dryer vents shall not exhaust closer than 10 feet from the air conditioning condensing unit, entry doors, patios, or garages. Dryer vents shall not run through non-accessible spaces or garages.

10-8 Humidification. Humidifiers may be of the bypass or duct insertion type. Humidifiers shall be controlled by wall-mounted or return duct mounted humidistat.

10-9 Piping Requirements. Air conditioner condensate drains, refrigerant suction, and exterior refrigerant liquid lines shall be insulated with 1 inch (minimum) thick cellular glass or unicellular foam pipe insulation. Exterior refrigerant line insulation shall be encased in either an aluminum or PVC jacket to prevent damage. 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).

10-10 Testing, Adjusting, and Balancing. Adjusting and balancing of each residence shall be the Contractor's responsibility. Following adjusting and balancing, testing of air and water systems shall be performed on 5 percent of the Project buildings (not to exceed 10 buildings), which have been randomly selected by the Contracting Officer. If buildings are to be turned over in phases, testing shall be performed on 5 percent of the buildings completed in each phase (not to exceed 5 buildings per phase). No additional testing will be required if at least 90 percent of the tested buildings pass the test requirements. If less than 90 percent of the tested buildings pass the test, an additional 5 percent of the Project buildings (not to exceed 5 buildings) shall be tested. This process shall continue until 90 percent of the total number of tested buildings pass. The Contractor shall correct all residences not found in

compliance, and shall be responsible for all labor and materials required for this effort. AABC MN-1, NEBB-01, SMACNA-07 or ASHRAE 111 shall be used as the standard for providing testing of air and water systems. The selected standard shall be used throughout the Project. Instrumentation accuracy shall be in accordance with the standard selected. Testing shall be accomplished by a firm certified for testing by the Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB). Prior to testing, adjusting, and balancing, the Contractor shall verify that the systems have been installed and are operating as specified. Where specific systems require special or additional procedures for testing, such procedures shall be in accordance with the standard selected. Approved detail drawings and all other data required for each system and/or component to be tested shall be made available at the job site during the entire testing effort. Testing shall not commence until approved by the Contracting Officer. The facility shall be essentially complete with final ceiling, walls, windows, doors, and partitions in place. Doors and windows surrounding each area to be balanced shall be closed during testing and balancing operations. Air systems, hydronic systems, and exhaust fans shall be complete and operable. All data, including deficiencies encountered and corrective action taken, shall be recorded. Following final acceptance of certified reports by the Contracting Officer, the setting of all HVAC adjustment devices shall be permanently marked by the Contractor's balancing engineer so that adjustment can be restored if disturbed at any time.

10-11 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 residence 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, no ductwork testing will be required.

10-11.1 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

10-11.1.1 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.

10-11.1.2 Testing may also be accomplished utilizing “Duct Blaster” methodologies and pressurizing the ductwork to 25 Pascal (0.1 inch of water).

10-11.2 The Contractor is advised that the EPA may test, or hire a consultant to test randomly selected residences 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.

10-12 Whole House Fans. As a betterment bid, provide a whole house fan in each residence. Locate the fan in the ceiling of the bedroom hallway exhausting into the attic. Fan shall be a minimum of 36-inch propeller fan, 1/3 HP, belt driven, with automatic closing louver. Provide adequate attic ventilation for exhaust. Control fan by wall switch near fan, interlock with furnace/AC unit so that it will not run when whole-house fan is on.

11. Not Used

12. CONTRACTOR PREPARED SPECIFICATIONS

12-1 The contractor's DESIGNER OF RECORD shall have the freedom to use the following in his Specifications: AIA Masterspec, CSI standard specification, manufacturer's standard data and installation instructions, COE guide specifications, or the new Uniform Facility Guide Specifications. The specifications shall be tailored to meet the requirements of this job. Specifications shall be brief and to the point. Inapplicable data and materials shall be deleted. All prescriptive information and edited guide specifications provided by the Government with this RFP shall be incorporated into the final edited specifications and drawings. Specific requirements are outlined in the Specification Outline portion of this RFP. See also Section 1012, "DESIGN AFTER AWARD" and other specifications provided with this RFP for detailed requirements and guidelines.

12-2 Contractor prepared specifications and individual specification sections for this work shall be organized into divisions and sections in accordance with Construction Specifications Institute (CSI), Master list of Tiles and Numbers for Construction Industry, latest edition.

12-3 Submittal requirements, submittal procedures and quality control are addressed in other specification sections provided with this RFP. The DESIGNER OF RECORD shall use the asbestos, and all other prescriptive specifications provided with this RFP without editing.

SECTION 01012

DESIGN AFTER AWARD

1.0 GENERAL

1.1 Design Quality Control (DQC) Plan: The Contractor shall prepare and submit DQC for Government review prior to starting any work. At a minimum the Contractor's DQC Plan shall provide and maintain an effective quality control program, which will assure that all services required by this design-build contract are performed and provided in a manner that meets professional architectural and engineering quality standards. As a minimum, all documents shall be technically reviewed by competent, independent reviewers identified in the DQC Plan. The same element that produced the product shall not perform the independent technical review (ITR).

The Contractor shall include the design schedule in the master project schedule, showing the sequence of events involved in carrying out the project tasks within the specific contract period. This should be at a detailed level of scheduling sufficient to identify all major tasks including those that control the flow of work. The schedule shall include review and correction periods associated with each item. This should be a forward planning as well as a project monitoring tool. The schedule reflects calendar days and not dates for each activity. If the schedule is changed, the Contractor shall submit a revised schedule reflecting the change within seven calendar days. The Contractor shall include in the DQC Plan the discipline-specific checklists to be used during the design and quality control of each submittal. These completed checklists shall be submitted at each design phase as part of the project documentation.

The DQC Plan shall be implemented by an assigned person with the Contractor's organization who has the responsibility of being present during the times work is in progress, and shall be cognizant of and assure that all documents on the project have been coordinated. This individual shall be a person who has verifiable engineering or architectural design experience and is a registered professional engineer or architect. The Contractor shall notify the Contracting Officer, in writing, of the name of the individual and the name of an alternate person assigned to the position.

The Contracting Officer will notify the Contractor, in writing, of the acceptance of the DQC Plan. After acceptance, any changes proposed by the Contractor are subject to the acceptance of the Contracting Officer.

1.2 Description of The Project. Design and construct 84 family housing residences (42 duplexes). This consists of 62 three-bedroom and 22 four-bedroom residences, supporting infrastructure, site development and landscaping at Fort Leavenworth, Kansas, in accordance with requirements of this RFP.

1.3 The Contractor shall propose a schedule for each of the design submittal phases. As a minimum, design submittals are required at the “fast track, preliminary (50%), final (100%), and at the design complete phase. The requirements of each design stage are listed hereinafter. The Contractor shall show the submittal phase and schedules for each design submittal phase in the progress charts. The 50%, 100%, and “design complete” submittals shall be submitted individually and each package complete, and includes each of the major categories listed in paragraph “Contents of Design Submittals”. The contractor may elect to not “fast track” work and submit all work in a combined 50%, 100% and Final submittal process.

1.4 To facilitate fast-track design-construction activities the contractor may choose to submit a 100% Site/Utility Design as the first design submittal. Following review, resolution, and incorporation of all Government comments, and submittal of a satisfactory set of site/utility design documents, the Kansas City District shall issue a limited Notice to Proceed (NTP) which shall allow the contractor to proceed with site development activities within the parameters set forth in the accepted design submittal.

Submittal review, comment, and resolution times from this specification apply to this initial 100% Site/Utility Design Submittal. No on-site construction activities shall begin prior to receipt of a construction NTP by the contractor.

1.5 DESIGN CAUTION: This RFP (Request for Proposal) contains drawings and some prescriptive specifications of some work items. The contractor shall use the conceptual drawings and specifications as the basis of further design effort. The contractor shall not deviate significantly from those drawings and specification without prior Government approval. Housing layouts and depicted materials shown have been reviewed and approved by the Installation and shall not be significantly revised except to accommodate site utility layouts, mechanical, electrical or structural elements. The contractor is required to survey the site and use this survey for the basis of actual design. Metric design is not required. Final design documents shall be done in English units.

1.6 "Dr. Checks". Dr. Checks is a web based system for management of project reviews and review comments. Dr. Checks will be utilized by the contractor and the Government to make and manage review comments. The AE/Contractor is not required to make replies or annotation to the Dr. Checks Comments prior to the review conference. Comments will be sorted, printed and review by individual reviewers. The access to Dr. Checks will be at no charge to the contractor. Microsoft Internet Explorer 5.0 is necessary to access and utilize the program. The Government will provide access passwords to the contractor and setup the project for using Dr. Checks to manage the review. The contractor shall be responsible to provide responses to comments and maintain necessary documentation for the management of all reviews accomplished under this contract. Additional information about the program and how it is used can be found at Dr. Check web address: http://65.204.17.188/projnet/home/version1/index.cfm .

2.0 DESIGNER OF RECORD

2.1 Contractor Design Services. Design work accomplished by the Design-Build Contractor (also referred to in this RFP as DESIGNER or DESIGNER(s) of RECORD) consists of design and preparation of Design Analysis, Construction Drawings and Specifications. Dr. Checks will be utilized for the processing of design review comments and responses.

Although Structural (i.e., building related) Interior Design shall be performed by the DESIGNER, Furniture Related Interior Design is not required by the DESIGNER.

Energy Evaluation and Energy Analysis, as required by the Kansas City District AE Manual, Chapter 14, paragraph 1.1 and 4., respectively, will not be required to be performed by the DESIGNER.

The Contracting officer may allow the use of shop drawings in lieu of Contract Design drawings (where practical) and allow the use of catalogue cuts and manufactures installation instructions that show compliance with this RFP in lieu of providing specifications. The Contractor is encouraged

to utilize this process to improve the efficiency and timeliness of the design effort.

2.2 The Contractor shall identify, for approval, the Designer of Record for each area of work. One Designer of Record may be responsible for more than one area. All areas of design disciplines shall be accounted for by a listed, registered Designer of Record. The Designer(s) of Record shall stamp, sign, and date all design drawings under their responsible discipline at each design submittal stage (see SCR - "Registration of Designers"). The Contractor shall designate a Project Manager who shall monitor the progress of the design for the Construction Contractor. This person shall provide whatever coordination needs to be accomplished between the Construction Contractor and the Designer(s) of Record to minimize problems during design and construction.

3.0 DEFINITION OF DESIGN SUBMITTALS

3.1 First Site/Utility Design Submittal (100%) "Fast Track". This submittal is provided to allow the contractor to concentrate initial efforts for the site/utility portions of the project. By allowing this work to be separated, the contractor is given the opportunity to "fast track" and begin construction on the site/utility work prior to completion of the building designs. This submittal shall consist of the following:

3.1.1 Design analysis, developed to 100% for site work and utility work only.

3.1.2 100% complete site/utility drawings

3.1.3 Final site/utility specifications

3.1.4 Environmental permits, as required. When environmental permits are not required, the Contractor shall provide a statement with justification to that effect.

3.2 Preliminary Conformance Review Submittal (50%). The submittal shall also depict any work submitted utilizing the "Fast Track" process to ensure proper coordination. This submittal is intended to insure that the contractor's design is proceeding in accordance with the terms of the solicitation and in a timely manner. This submittal shall consist of the following:

3.2.1 Design analysis, developed to 50%

3.2.2 50% complete drawings

3.2.3 Draft specifications

3.2.4 Environmental permits, as required. When environmental permits are not required, the Contractor shall provide a statement with justification to that effect. If the Contractor has elected to "Fast Track" site and utility work, no additional site/utility design information is required for this submittal (except utility interface with each floor plan type). However if the Contractor elected not to "Fast Track", then site/utility plans and specification, at least 50% complete will be provided.

3.3 Final Design Submittal (100%). The review of this submittal is to

insure that the design is in accordance with directions provided the Contractor during the design process as well as the original solicitation. The Contractor shall submit the following documents for Final Design Review:

3.3.1 Annotated 50% review comments and responses utilizing Dr. Checks.

3.3.2 The Design Analysis submitted for Final Design Review shall be in its final form. The Design Analysis shall include all backup material previously submitted and revised as necessary. All design calculations shall be included. The Design Analysis shall contain all explanatory material giving the design rationale for any design decisions.

3.3.3 The Contract Drawings submitted for Final Design Review will be in a design complete condition, ready for construction. It shall include the drawings previously submitted which have been revised and completed as necessary. The Contractor is expected to have completed all of his coordination checks including the incorporation of any design review comments generated by the previous design reviews. If deemed appropriate by the Contracting Officer, shop drawings will be considered design drawings.

3.3.4 The Draft Specifications on all items of work submitted for Final Design Review shall consist of legible marked-up specification sections. The Specifications on all items of work submitted for Final Design Review shall consist of ready to construct specification sections.

3.3.5 If the Contractor has elected to “Fast Track” site and utility work, no additional site/utility design information is required for this submittal (except utility interface with each floor plan type). However if the Contractor elected not to “Fast Track”, then site/utility plans and specification, at least 100% complete will be provided.

3.3.6 The Contractor may begin construction work for items the Government has reviewed, and the Final Design Submission has been determined satisfactory for purposes of beginning construction. The Administrative Contracting Officer (ACO) or COR will notify the Contractor when the design is cleared for construction. The Government will not grant any time extension for any design resubmittal required when, in the opinion of the ACO or COR, the initial submission failed to meet the minimum quality requirements as set forth in the Contract.

3.4 Design Complete Submittal. After the Final Design Review, the Contractor shall revise the Contract Documents by incorporating any comments generated during the Final Design Review and shall prepare final hard copy Contract Specifications. The Contractor shall submit the following documents for the design complete submittal:

3.4.1 Design analysis, in final 100% complete form.

3.4.2 100% complete drawings.

3.4.3 Final specifications

3.4.4 Annotated Final review comments and responses utilizing Dr. Checks.

3.4.5 Electronic Submission: All CADD files in native AutoCAD format, as well as all prepared technical specifications and design analysis shall be provided on CD-ROM. Two copies are required.

3.4.6 Design to construction procedure.

a. The Contractor shall submit the Design Complete Submittal within the number of calendar days specified in his project schedule. Final copies of drawings and specifications must be available to the Government prior to starting any construction work.

b. If the Government allows the Contractor to proceed with limited construction based on pending minor revisions to the reviewed Final Design submission, no payment will be made for any in-place construction related to the pending revisions until they are completed, resubmitted with the Design Complete Submittal and are satisfactory to the Government.

c. Design Reviews by the Government are to primarily verify that the final design conforms to the RFP. They are not for technical verification of the design. Where possible, obvious errors and omissions will be noted and brought to the Contractor's attention. However, the Government does not assume any responsibility either explicitly or implied for the technical adequacy of the design documents. The Government never approves the design.

3.5 Structural Interior Design. The Contractor will submit three of each: samples, catalogue cuts, manufacture's installation instructions, and other information as necessary to fully describe all interior and exterior finish items (installed) that shown conformance with this RFP. All interior finish materials will be submitted together to allow coordination of color and finish selections. Likewise, all exterior finish materials will be submitted together to allow coordination of color and finish selections. Each submittal item will be identified with a title block that includes the Contractor's name, contract number, name and location of the project, and name of the applicable item of work being submitted. These items will also be stamped and approved by the Designer of Record and the Contractor's Quality Control Manager prior to submission. Approved items do not need to be resubmitted during subsequent design reviews.

4.0 QUANTITY OF DESIGN SUBMITTALS

4.1 The Contractor shall submit copies of each item required to be submitted at the "Fast Track" Preliminary (50%) and Final (100%) Conformance Review Submittal in accordance with paragraph 5.1 below. All drawings submitted for review shall be half-size. In addition to the quantities listed in table 5.1, the Contractor shall submit one full size set of plans to the installation (Dave Murdock) and one full size set of plans FM-LV for each review submittal. Also submit one (1) full size copy for the installation and five (5) full size sets of drawings for FM-LV at the Design Complete Stage. Full size drawings shall be 24" X 36".

5.0 MAILING OF DESIGN SUBMITTALS

5.1 Mail all design submittals to the Government during design and construction using 2-day mailing service. All submittals are to be sent by express mail or other expeditious means. Distribution of each design submittal shall be made by the AE directly to the reviewing agencies with the required number of copies as indicated on the following submissions listing.

	Fast Track	50%	100%	Design complete
Commander Director of Installation Support ATTN: ATZL-GCE-E/David Murdock 820 McClellan Avenue (Bldg 85) Fort Leavenworth, KS 66027-2326	15	15	15	6
US Army Corps of Engineers Fort Leavenworth Area Office ATTN: CENWK-FM-LV/Prinslow 750 West Warehouse Road, Bldg 234 Fort Leavenworth, Kansas 66027-3387	6	6	6	6
Directorate of Information Management (DOIM) ATTN: Bob Windom Bldg. 135 Fort Leavenworth, Kansas 66207	1	1	1	1
U.S. Army Corps of Engineers Kansas City District ATTN: CENWK-PM-MO/Werner -Rm 807 601 E. 12th St., 700 Federal Bldg. Kansas City, MO 64106-28296	12	12	12	5

5.2 Each design submittal shall have a transmittal letter accompanying it indicating the date, design percentage, type of submittal, list of items submitted, transmittal number and point of contact with telephone number.

6.0 COORDINATION:

6.1 Written Records. The Contractor shall prepare a written record of each design site visit, meeting, or conference, either telephonic or personal, and furnish within five (5) working days copies to the Contracting Officer and all parties involved. The written record shall include subject, names of participants, outline of discussion, and recommendation or conclusions. Number each written record for the particular project under design in consecutive order.

6.2 Design Needs List. Throughout the life of his contract the Contractor shall furnish the COR a monthly "needs" list for design related items. This list shall itemize in an orderly fashion design data required by the Contractor to advance the design in a timely manner. Each list shall include a sequence number, description of action item, name of the individual or agency responsible for satisfying the action item and remarks. The list will be maintained on a continuous basis with satisfied action items checked off and new action items added as required. Once a request for information is initiated, that item shall remain on the list until the requested information has been furnished or otherwise resolved. Copies of the list will be mailed to both the Administrative Contracting Officer and the agencies tasked with supplying the information.

6.3 The importance of careful checking and coordination of Drawings, Specifications, and other Project Documents cannot be overemphasized. It shall be the responsibility of the DESIGNER to check and coordinate all Project data prior to all design submittals. Deficiencies, ambiguities, conflicts and

inconsistencies shall be rectified prior to submittal of Documents. The letter of transmittal shall certify that all Documents have been checked, coordinated, approved, signed, and dated and that the Documents comply with Contract requirements. The transmittal letter shall be signed by a principal of the DESIGNER's firm.

7.0 GOVERNMENT REVIEW

7.1 Within 21 days after Notice to Proceed: If the Contractor's design schedule is different than the design schedule submitted with his proposal, the Contractor shall submit, for approval, a complete updated design schedule with all submittals and review times indicated in calendar dates. The Contractor shall update the design schedule at least once a month. The Contractor will also provide an updated design schedule whenever circumstances dictate a change in schedule. No design submittals will be reviewed or evaluated until after receipt and acceptance of the proposed design/review schedule.

7.2 Review Conferences. All review conferences will be held at Fort Leavenworth, Kansas and will be scheduled approximately 14 calendar days after the Government receives all required design submittals for each review required. The review will be for conformance with the requirements of the RFP. At a minimum the following Contractor personnel shall attend these conferences: The Design PM, all Designers of Record and the Construction Project Manager.

The DESIGNER shall be responsible for preparing and distributing meeting minutes for all conferences. Conference notes will be prepared and furnished to the COR, within 5 days after date of conference. These minutes shall include the date, place and a list of attendees, their organization and telephone number. General comments made during the conference, or decisions affecting criteria changes, must be recorded in the basic conference notes. The minutes must clearly indicate for any actions required that effect schedule or the next submittal and who is responsible, what is expected and when it is required. The Contractor shall answer and respond to all comments in Dr. Checks, and shall be included with the next scheduled submittal.

7.3 If a design submittal is late in accordance with the contractor's current design schedule, the Government review period will be extended an equal number of days for each day the contractor is late. Revisions to submittal submission dates and schedules must be made in writing at least one (1) week prior to the effected submittal. Submittals will not be reviewed during the last two weeks of December or the first 3 days of January. The contractor shall include this dead time in his schedule and adjust it accordingly.

7.4 Post review conference action: Copies of comments, annotated with comment action agreed on, will be made available to all parties before the conference adjourns. Unresolved problems will be resolved by immediate follow-on action at the end of conferences. Valid comments will be incorporated. After receipt of final corrected design documents upon incorporation of backcheck comments the Kansas City District will recommend issuance of a Construction Notice to Proceed (NTP). The Government, however, reserves the right to disapprove design document submittals if comments are significant. If final or backcheck submittal(s) are incomplete or deficient, and require correction by the Contractor and resubmittal for review, the cost of rehandling and reviewing will be deducted from payment due the Contractor at the rate of $ 5,000.00 per submittal.

8.0 DESIGN ANALYSIS: The Design Analysis (DA) shall be prepared by the DESIGNER in accordance with the guidance provided in the Kansas City District AE Manual. The Design Analysis will incorporate all contract requirements that are not appropriate for inclusion in the contract drawings and specifications

8.1 Media and Format. Present the design analysis on 8-1/2-inch by 11-inch paper except that larger sheets may be used when required for graphs or other special calculation forms. All final documents will be provide to the Government on CD-ROM

8.2 Organization. The DA shall be bound in one document. Furnish a table of contents, which shall be an index of the indices, when there is more than one volume. The title page shall indicate the name of the project, project number and the applicable submittal being made for review (“fast track, 50%, etc)

8.3 Design Calculations. Provide a general table of contents in addition to the individual indices. Bind them separately from the narrative part of the design analysis. The design calculations shall be clean and legible. Identify the source of loading conditions, supplementary sketches, graphs, formulae, and references. Explain all assumptions and conclusions. Calculation sheets shall carry the names or initials of the author and the checker and the dates of calculations and checking. No portion of the calculations shall be computed and checked by the same person. Include descriptions of the computer programs used and copies of the input data and output summaries. Provide sufficient information to permit manual checks of the results.

9.0 GENERAL DESIGN CRITERIA: criteria included in the RFP is intended to serve as a minimum standard for the DESIGNER in the preparation of Design Documents, which will satisfactorily meet design, and construction standards for the project. Technical manuals and other DOD criteria shall not be included by reference in the DESIGNER-prepared Specifications and Drawings. **Additional criteria** that may prove helpful in preparing the design are as follows:

- **Engineering Technical Letters (TL),** latest editions. (See Techinfo at http://www.hnd.usace.army.mil/techinfo/)

- **Fire Protection Plan.** All building design shall be in conformance with Military Handbook 1008C(see http://www.hnd.usace.army.mil/techinfo/). A fire protection plan shall be developed and submitted with the preliminary design submittal. It shall be updated with subsequent submittals.

- **Army Technical Manuals (TM),** latest editions.(See Techinfo)

- **U.S. Army Corps of Engineers Safety and Health Requirements Manual EM 385-1-1),** latest edition is provided as an attachment to the Electronic Bid Sets provided with this RFP.

- **Kansas City District AE Instruction Manual.** (Included in RFP Documents) The District AE Instruction Manual is provided as general guide in the preparation of Design Documents. Chapters 18 and 19 of the Manual do not apply to the design of this Project.

9.1 DRAWINGS: Prepare all drawings using AutoCAD Release 2000. The final full-size drawings shall be a 24" x 36" format. The Contractor will be provided and use standard Corps of Engineers title blocks and borders on all drawings. An index of drawings will be included with each submittal. Additionally the contractor will use the Tri-Service Standards for CADD/GIS that are an attachment to this RFP. The Contractor can access the web site for Computer-Aided Designed Systems as guidance for standard details, cell libraries, title blocks, and layer/level assignments. https://tsc.wes.army.mil/products/standards/aec/intro.as. All Design complete files will be submitted on a read/write CD-Rom and must be independent, freestanding, and not supported by reference files. All Xrefs files shall be removed at the "Design Complete" submittal.

9.2 SPECIFICATIONS

9.2.1 The Specifications will be bound and have a cover with the project name, number and submittal phase. It will include a table of contents, an index page at the beginning of each specification section. The Kansas City District will provide electronic copies of the files contained in this RFP to the designer. The designer shall incorporate these Specifications into their final design documents. However the technical specifications provided with this RFP are not inclusive, and must be supplemented by the Designer as necessary to satisfy the all RFP requirements.

The Contractor is encouraged to use one of the major, well-known master guide specification sources such as **MASTERSPEC** from the American Institute of Architects**, SPECTEXT** from Construction Specification Institute or he may use **Corps of Engineers Guide Specifications,** etc. The Designer shall edit the specifications specifically for this project.

When the Contractor intends to provide a brand-name product indicated in RFP the solicitation (this does not include "or equal" submittals) no additional specification or submittal review for compliance is required. Instead the designer shall include a copy of the product manufacture's cut sheet and installation instructions that show compliance with the RFP in the appropriate Construction Division Section. The Contractor may also submit product manufactures cut sheets and installation instructions for other items not specifically identified by brand name in lieu of a specification provided this does not change once the product is reviewed for compliance with the RFP, by the COR. The specification should be brief, and to the point. Discuss only the criteria needed to comply with this RFP.

9.2.2 Submittal Register. (Eng Form 4288 (RMS)). Develop the submittal requirements during construction during the design phase of the contract, by producing a Contractor Submittal Register during design. Attach a submittal register to each section of the specifications for the submittal requirements of that section. Prepare the Submittal Register on ENG Form 4288. The Contractor shall be responsible for listing all required submittals necessary to insure the project requirements are complied with. The Register shall identify submittal items such as shop drawings, manufacturer's literature, certificates of compliance, material samples, guarantees, test results, etc that the Contractor shall submit for review and/or approval action during the life of the construction contract. The Contractor shall place all the Submittal Register pages in an appendix of the final specifications. The DESIGNER shall create the Specifications, Submittal Register using the Corps' Resident Management System (RMS). The Corps will provide the DESIGNER with the necessary RMS software. The DESIGNER shall complete all information,

including title and location and specification section blocks and all columns of ENG Form 4288 (RMS) Submittal Register.

10.0 CONTENTS OF DESIGN SUBMITTALS

10.1 "FAST-TRACK" 100% site/utility design submittal if applicable.

10.1.1 The documents furnished with this RFP have established many of the factors influencing site decisions. Existing utility systems will be upgraded where necessary to meet design loads. Those not defined by the RFP are the responsibility of the Design-Build contractor:

10.1.2 All "fast track" drawings shall be developed to 100 percent completion. In addition to the individual utility plans, submit a combined utility plan drawn to the same scale as the individual utility plans.

a. General Site Layout: Scale shall be included.

b. Site Grading and Drainage Plans: Show locations of all sediment basins, diversion ditches, and other erosion control structures. Indicate the approximate drainage areas each will service. Indicate the materials, construction and capacity of each structure. Include limits of landscaping and seeded areas. General site grading and drainage shall be indicated by contour lines with an interval of not more than approximately .3 m [1 foot].

c. Road Alignment Plans: Scale shall be no greater than as indicated and profiles showing pavement and shoulder widths, azimuths and curve data, limits of grading, and erosion control. The materials to be used shall be indicated.

d. Traffic Control Plan: Traffic routing and signage shall be in accordance with The Manual on Uniform Traffic Control Devices for Streets and Highways, U.S. Department of Transportation, Federal Highways Administration.

e. Utility Systems: The Contractor shall prepare a design narrative for the natural gas, water supply, storm drainage, and wastewater systems relating to this project. Include an analysis of the existing distribution systems capability to supply sufficient quantity at adequate levels. If the existing distribution systems are inadequate, provide the design solution to augment the systems to provide the requirements for the new facilities.

f. Sanitary Sewer Plan: Scale shall be as indicated and profiles showing location and elevation of pipe, thrust blocks, manholes, etc. Materials and construction of main and appurtenances shall be indicated.

d. Water Supply Line Plans: Scale shall be as indicated and profiles showing locations of valves, thrust blocks, connections, etc. Materials shall be indicated and specifications shall be provided for valves, pipes, etc.

g. Electrical Plan Requirements:

Required diagrams and details on Site Electrical Drawings.

a. Off-Site Electrical Distribution Plan:
b. Off-Site Primary Circuit Routing Plans:
c. Off-Site One Line Diagram. (If applicable)
d. Off-Site Details. (Aerial Pole Line Construction, etc.) (If applicable).
e. On-Site Electrical Distribution Plan:
f. On-Site One Line Diagram.
g. On-Site Distribution Transformer Schedule: Provide with the following headings:

Transformer Designation. Transformer Size (KVA). Building(s)

Served. Primary Phase(s) and Circuit to which connected.

h. On-Site Details (Site Lighting, Trenching, Pad-Mounted Transformer, etc.).

h. Specifications: Provide final draft specifications which include all sections which apply to site/utility work.

i. Design Analysis: Design analysis shall include design calculations fully developed to support the design of the site and utility systems included in this submittal.

j. Geotechnical: Soils analysis and geotechnical report. Geotechnical information must be provided to support all assumptions and design parameters utilized in the presented site/utility design as applicable.

10.2 The 50% design submittal shall contain as a minimum, the following:

10.2.1 Landscape, Planting and Turfing: The concept drawings shall be prepared at a scale which corresponds with the site layout and grading plans and, likewise, shall include reference coordinates, north arrows, graphic scales and appropriate legends. An overall planting layout shall be developed and shall include enlarged detail plans of specific areas, as needed, to clarify requirements. The proposed layout shall indicate shade trees, evergreen trees, flowering trees, shrub masses, etc., according to designated functional and visual locations of planting. A legend which also indicates sizes of plants recommended for each of the above categories shall be included. The drawings and all subsequent plans shall indicate existing and proposed buildings, paved areas, signs, light standards, transformers, dumpster areas, storm drainage system, and other structures and utilities.

10.2.2 Architectural

a. The first sheet of the Architectural plans shall include a detailed code analysis that demonstrates compliance with the RFP solicitation, including all applicable NFPA and Life Safety Code requirements. Architectural Floor Plans shall indicate dimensions, columns lines, and detail references. Bathrooms and other specialized areas shall be drawn to 1/4" scale and shall show any needed interior features.

b. Finish schedule shall indicate material, finishes, colors and any special interior design features such as soffits, fascias, and lighting troughs, etc.

c. All required equipment shall be shown on the drawings with an equipment list.

d. List any special graphics requirements that will be provided.

e. Schedules shall be provided for both doors and windows. These schedules shall indicate sizes, types, and details for all items shown on floor plans.

f. Hardware sets using BHMA designations.

g. SID package.

h. Fire Protection and Life Safety Analysis.

10.2.3 Structural Systems

a. The first sheet of the Structural plans shall include a detailed code analysis that demonstrates compliance with the RFP. State the live loads to be used for design. Include roof and floor loads; wind loads, lateral earth pressure loads, seismic loads, etc., as applicable.

b. Describe the method of providing lateral stability for the structural system to meet seismic and wind load requirements. Include sufficient calculations to verify the adequacy of the method.

c. Furnish calculations for all principal roof, floor, and foundation members.

d. This submittal shall include drawings showing roof and floor framing plans as applicable. Principal members will be shown on the plans. A foundation plan shall also be furnished showing main footings and grade beams where applicable. Where beam, column, and footing schedules are used, show schedules and fill in sufficient items to indicate method to be used. Show typical bar bending diagram if applicable. Typical sections shall be furnished for roof, floor, and foundation conditions. Structural drawings for proposals and submittals shall be separate from architectural drawings.

e. Provide any computer analyses used shall be widely accepted, commercially available programs and complete documentation of the input and output of the program.

f. Provide complete seismic analyses for all building structural components. Seismic calculations shall clearly demonstrate compliance with all requirements set forth in the Statement of Work.

10.2.4 Plumbing Systems

a. Mechanical and plumbing sheets can be combined. The first sheet of the mechanical/plumbing plans shall include a detailed code analysis that demonstrates compliance with the RFP. List all references used in the design including Government design documents and industry standards.

b. If know at the time of design, submit catalogue cuts, manufactures installation instructions, and other appropriate information for each plumbing fixture, in lieu of a specification.

c. Prepare detail calculations and indicate appropriate size for systems such as domestic water piping and natural gas piping.

d. Indicate locations and general arrangement of plumbing fixtures and major equipment.

e. Include plan diagrams of all gas, hot water, cold water, waste and vent piping. Piping layouts and risers should also include natural gas (and meter as required), and other specialty systems as applicable.

f. Include equipment and fixture connection schedules with descriptions, capacities, locations, connection sizes and other information as required.

10.2.5 Electronic Systems: Electronic Systems responsibilities include the following: Fire Detection and Alarm System, Telephone System, Cable Television System, Special Grounding Systems, Cathodic Protection, Central Control and Monitoring System.

a. The design analysis shall include all calculations required to support design decisions and estimates at this stage of design. The analysis shall include specific criteria furnished, conference minutes and cost analyses of all systems considered.

b. Design of the fire alarm and detection system shall include layout drawings for all devices and a riser diagram showing the control panel, annunciator panel, all zones, radio transmitter and interfaces to other systems (HVAC, sprinkler, etc.).

c. The location of telephone outlets are shown on the plans. Include legend and symbol definition to indicate height above finished floor. Underground telephone distribution conduit shall be shown on either the electrical plan.

d. Grounding System. The specifications and drawings shall completely

reflect all of the design requirements. The specifications shall require field tests (in the construction phase), witnessed by the Contracting Officer, to determine the effectiveness of the grounding system. The design shall include drawings showing existing construction. Verification of the validity of any existing drawings and/or any other data furnished by the Government shall be the responsibility of the engineering services firm.

e. Provide a statement describing the extent of any exterior work such as telephone lines, cable television (TV) distribution cables, duct banks, etc., outside of 5 feet from the building line.

f. When cathodic protection is required, provide the name of the licensed corrosion engineer or NACE specialist. Provide the following for cathodic protection systems:

- Clearly define areas of structures or components in soil or water to be protected.
- Type system recommended, comparison of systems, cost estimates showing all equipment alternatives.
- Calculations on all systems that are considered showing all information and descriptions.

Design of Cathodic Protection. The design shall clearly provide a thorough and comprehensive specification and drawing. The design plans and specifications shall show extent of the facilities to be protected, location and type of anodes, location of test points, details for sectionalizing an underground piping system. This design shall be complete enough to purchase equipment and build without design changes to meet criteria of protection.

g. Exterior work to be shown on electrical site plan.

- Existing and new communications service lines, both overhead and underground, shall be properly identified.
- Show removals and relocations, if any.

h. Provide a descriptive narrative of all electronic systems that are required for project. Define any hazardous areas (as defined in the National Electric Code) and indicate the type of equipment proposed for use in such areas. Show the location of all electronic system panels, etc., on the floor plans. Show the proposed riser diagrams for all systems. Sizes of all conduit, wires, cables, panels, etc. Provide a complete symbol legend for all devices or equipment shown on the plans. For work requiring removals or demolition, the designer shall show by use of drawings or narrative, how demolition work is to be done.

10.2.7 Electrical and Mechanical Systems: Provide all information as required on the 100% design submittal developed to 50% completion.

10.2.8 Specifications: Draft of specifications for housing units, including index and trade sections.

10.3 The 100% design submittal shall contain, as a minimum, the following items for all submittals:

10.3.1 General: A complete set of construction documents plans and specifications at the same level of detail as if the project were to be bid including a complete list of equipment, fixtures and materials to be used. The final drawings are an extension of the reviewed 50% drawings and are to

include the 50% comments and responses. All details shall be shown on the drawings.

10.3.2 The design analysis is an extension of the reviewed 50% design analysis and supports and verifies that the design complies with the requirements of the project.

10.3.3 Submit marked-up specifications. The specifications shall be coordinated with the drawings and describe in detail all items shown on the drawings.

10.3.4 Landscape, Planting and Turfing Final design drawing(s) shall include a complete schedule of plant materials which indicates their botanical and common names, plan symbols, quantities, sizes, condition furnished, and pertinent remarks. Scale of drawing shall be prepared at 1" = 30'. Drawing shall correspond with the site layout and grading plans and reference coordinates, north arrows, graphic scales and appropriate legends. An overall planting layout shall be developed and shall include enlarged detail plans of specific areas as needed, to clarify requirements. Final design drawings, indicating proposed plants by a (+) mark for the plant location and a circle which is scaled at approximately 2/3 the ultimate growth spread (diameter) of plants, shall also include a complete schedule of plant materials which indicates botanical and common names, plan symbols, quantities, sizes, condition furnished, and pertinent remarks. Final drawings shall also include the basic details for installation of tree, shrub, and ground cover planting, as well as any other applicable details for clarification of specific project requirements.

10.3.5 Architectural

10.3.5.1 All architectural drawings shall be coordinated with the other engineering disciplines. Ensure that the plans are in compliance with the applicable codes. It will be the Contractor's responsibility to implement the comments generated from any design review submittal as well as verify the consistency between plans and specification. The evaluation of the Contractor's submittals shall be based on degree to which the submittal meet the requirements set forth in this document and the specifications.

10.3.5.2 SID package.

10.3.6 Structural Design

10.3.6.1 Furnish complete checked calculations for all structural members. Incorporate any changes required by comments on 50% Design Submittal.

10.3.6.2 Prior to this submittal, structural drawings shall be coordinated with all other design disciplines.

10.3.6.3 The final structural drawings shall contain the following information as a set of general notes:

The allowable soil bearing value.
The design stresses of structural materials used.
The design live loads used in the design of various portions of the structures.
The design wind speed.
The seismic zone and the "K", "C", "I" and "Z" values used in design.

10.3.6.4 All structural drawings and calculations shall be checked and stamped by the designer of record (a registered Professional Engineer).

10.3.7 Specific Mechanical and Plumbing Requirements:

10.3.7.1 Required Plans, Diagrams, Schedules and Details on Unit Mechanical Drawings:

10.3.7.1.1. Mechanical Floor Plan: The floor plans shall show all principle architectural features of the building which will affect the mechanical design. The floor plans shall also show the following:

Room designations.
Mechanical legend and applicable notes.
Location of all ductwork or piping (double line ductwork required).
Location and capacity of all terminal units (i.e., registers, diffusers, grilles). Exhaust fan and range hood location.
Size of all ductwork and piping.
Thermostat location.
Location of heating/cooling plant (i.e., hot water heater, furnace, condenser, heat pump wells, etc).
Location of all air handling equipment.
Return air paths (i.e., undercut doors, transfer grilles).
Flue piping size and location.

10.3.7.1.2. Equipment Schedule: Complete equipment Schedules shall be provided. Schedule shall also include:

Capacity
Electrical characteristics
Efficiency
Manufacturer's name
Optional features to be provided
Physical size

10.3.7.1.3 Details: Construction details, sections, elevations, etc., shall be provided where required for clarification of methods and materials of design. Roof and exterior wall penetrations shall be detailed on the drawings.

10.3.7.2 Plumbing Floor Plan: Mechanical and Plumbing floor plans can be combined and shall show all principal architectural features of the building which will affect the plumbing design. Separate plumbing plans will not be required if sufficient information can be shown on the mechanical plans to meet the requirements shown above. The floor plan shall also show the following:

Room designations.
Fixture Schedule.
Location of utility entrances.
Waste and water pipe location and size.
Fixture designations.

10.3.7.3 Design Analysis: Complete design calculations for mechanical systems. Include computations for sizing PM&E equipment, air duct design, and U-factors for ceilings, roofs and exterior walls and floors. Contractor

shall employ commercially available energy analysis techniques to determine the energy performance of all passive systems and features. Use of hourly energy load computer simulation (e.g., TRNSYS, DOE 2.1 Blast, etc.) is required. These calculations can be used to size the mechanical systems. Based on the results of calculations, provide a complete list of the materials and equipment proposed for heating and plumbing, with the manufacturer's published cataloged product installation specifications and roughing-in data. The heating and cooling equipment data shall include the manufacturer's wiring diagrams, installation specifications, ARI certification, and the standard warranty for the equipment.

10.3.8 Specific Electrical Requirements:

10.3.8.1 Required Plans, Diagrams, Schedules, and Details on Unit Electrical Drawings:

10.3.8.1.1. Electrical Floor Plan. The floor plans shall show all principle architectural features of the building which will affect the electrical design. The floor plan shall also show the following:

Room designations.
Electrical legend and applicable notes.
Lighting fixtures, properly identified.
Location of smoke and CO detectors.
Location of telephone and cable TV outlets.
Switches for control of lighting.
Receptacles.
Location and designation of panelboards. Plans should clearly indicate type of mounting required (flush or surface) and be reflected accordingly in specifications. Service entrance (conduit and main disconnect).
Location, designation and rating of motors and/or equipment which requires electrical service. Show method of termination and/or connection to motors and/or equipment. Show necessary junction boxes, disconnects, controllers (approximate only), conduit stubs, and receptacles required to serve the motor and/or equipment.

10.3.8.1.2. Building Riser Diagram (from pad-mounted transformer to unit load center panelboard): Indicate the types and sizes of electrical equipment and wiring. Include grounding and metering requirements.

10.3.8.1.3. Load Center Panelboard Schedule(s): Schedule shall indicate the following information:

Panelboard Characteristics (Panel Designation, Voltage, Phase, Wires, Main Breaker Rating and Mounting.
Branch Circuit Designations.
Load Designations.
Circuit Breaker Characteristics. (Number of Poles, Trip Rating, AIC Rating)
Branch Circuit Connected Loads (AMPS).
Special Features.

10.3.8.1.4 Lighting Fixture Schedule: (Schedule shall indicate the following information:)

Fixture Designation.

General Fixture Description.
Number and Type of Lamp(s).
Type of Mounting.
Special Features.

10.3.8.1.5. Details: Construction details, sections, elevations, etc., shall be provided where required for clarification of methods and materials of design.

10.3.8.2. Required Electrical Design Analysis: Design analysis and calculations for the electrical systems shall be prepared by a licensed professional engineer with experience in family housing, and shall be stamped as such. The design analysis shall be separately bound, in one or more volumes. Show functional and engineering criteria, design information, and calculations applicable to the project. The analysis shall be organized in a format appropriate for review, approval, and record purposes. The design calculations shall indicate methods and references identified, and shall explain assumptions and conclusions.

10.3.8.2.1. Voltage Drop (VD) Calculations: Select conductor sizes of primary feeders, site lighting circuits, service laterals, and unit feeder conductors. Calculate maximum length for each phase of each primary circuit, using a maximum allowable VD for each circuit. Calculate voltage drops for each conductor. Maximum allowable voltage drop for site lighting and service laterals is 3%. The combined voltage drop for the service laterals, unit feeders, and branch circuit cannot exceed 5%. Calculate the available fault current at the main breaker for the living unit panel. Provide a coordination study to support breaker selection.

10.3.9 Specifications: Provide final specifications. The Contractor shall make final identification of all materials and finishes at this stage.

10.4 Design complete submittal:

10.4.1 Design Drawings: Drawings shall be 100% complete, signed and sealed by the designer of record. All previous review comments shall be incorporated.

10.4.2 Design Analysis: Complete design analysis for all design disciplines. The final Fire Protection and Life Safety Analysis shall be included in the Design Analysis.

10.4.3 Design Specifications: Complete design specifications for all sections of work that demonstrates compliance with the RFP. All previous review comments shall be incorporated.

10.4.4 Comment Response Package: Complete package showing all comments from all previous reviews and the respective response and disposition.

10.4.5 This submittal shall include all drawings and design information from the 100% site/utility submittal to form a complete design package.

11.0 DESIGN RELATED PRODUCTS

11.1 DD Form 1354: Three (3) sets of DD Form 1354, Transfer and Acceptance of Military Real Property shall be prepared in accordance with ER 415-345-38 and submitted to the Contracting Officer. Copies of Form 1354 and ER 415-

345-38 will be furnished to the successful contractor following award of the project.

11.2 Submittal Register, ENG FORM 4288: The Contractor shall complete and submit three (3) copies of a "preliminary" Eng Form 4288, Submittal Register to Contracting Officer. The "preliminary" Eng Form 4288, Submittal Register shall have the column "Submittal Identification", "Specification Paragraph Number", "Description of Submittal" "Type of Submittal", and "Remarks" completed; the Contractor shall identify whether the submittal is for "Government Approval" or for "Government Information" under the column "Remarks." The "final" Eng Form 4288, Submittal Register, shall be in accordance with clause CONTRACTOR SUBMITTALS AND SUBMITTAL CONTROL in this section.

11.3 Reproduction: Upon Government approval of 100% design documents, the original will be returned to the Contractor for reproduction purposes. The Contractor will be responsible for his own reproduction as well as reproduction for Government use. The original design drawings will be retained by the Contractor for recording of as-built conditions. Upon completion of the project, the original design documents shall be corrected to reflect as-built conditions and new revised drawings turned over to the Government.

12 Other Miscellaneous Requirements and Standards.

12.1 OSHA Regulations. The DESIGNER shall be responsible for full compliance with regulations of the occupational Safety and Health Act of 1970 and for the design of the Project to preclude violations to said act from occurring as a result of the design.

12.2 Site Inspection. The Government has provided site and soils information within the Request for Proposal (RFP) for the DESIGNER to use in preparing subsequent design. The DESIGNER shall be responsible for making the necessary field visits to assess existing conditions and to obtain such detailed information as is required to complete the design. Investigations to determine existing conditions and requirements include required upgrades/improvement to existing utilities.

12.3 Site Survey and Subsurface Explorations. Topographic Survey of the buildings site and Subsurface Investigations Report for the buildings site are furnished as part of the RFP. Boring logs and basic soils design assumptions shall be shown on the DESIGNER prepared Construction Drawings. If additional topographic surveys are required by the DESIGNER beyond those provided with
the RFP, it shall be the responsibility of the DESIGNER to perform these additional surveys.

12.4 Design Project Manager. During the prosecution of the work under the Contract, the DESIGNER shall keep in close liaison with the Corps of Engineers Project Delivery Team and the Contracting Officer, who will coordinate the work with the Installation and the Contractor. All requests made by the Installation, Using Service and/or other agencies shall be made through the Contracting Officer. The Using service has no authority to make changes or direct the Contractor to do any work under this contract. At appropriate times, representatives of the Contracting officer may review the progress and technical adequacy of the work. Such review will not relieve the DESIGNER from performing all Contract requirements, except as may be waived

by written instruction.

12.5 Checking of Shop Drawings. The DESIGNER shall check and recommend approval, or disapproval, of all contractor shop and working drawings, including catalog cuts, diagrams, samples required for the selection of material and/or colors, and other descriptive data designated for designer approval, pursuant to Section 01330, Submittal Procedures, and the technical provisions of the Construction Specifications approved by the government.

12.5.1 Pursuant to Section 01330, Submittal Procedures, for those submittals designated for approval by the DESIGNER, the contractor will submit copies of the shop and working drawings, catalog cuts, diagrams, and ENG Form 4025 directly to the DESIGNER for review and recommendations for approval. Any notes or changes recommended by the DESIGNER shall be incorporated on all copies of the drawings, catalog cuts, etc. The Designer’s recommended approval or disapproval shall be recorded on ENG Form 4026, or similar approved form, and copies thereof forwarded to the Resident Engineer. Action codes are contained on ENG Form 4025. Copies of the corrected shop drawings, catalog cuts, diagrams, etc., and copies of the ENG Form 4025 shall be forwarded by the DESIGNER to the Resident Engineer. Samples for selection of materials and/or color shall be returned to the Resident Engineer. The DESIGNER shall not mark actions on ENG Form 4025.

12.5.2 Data submitted from more than one manufacturer for a single item shall be returned with' a recommendation of "Not Approved" through the Resident Engineer, with the request that the contractor submit one (1) make, since approval can be given to only one. Substitutions submitted at a later date shall not be approved unless the contractor gives a valid reason, such as delayed delivery, discontinuance of manufacture, etc., which has been verified by the Resident Engineer. Equipment or materials which do not ' meet all requirements of the RFP and the plans and Specifications will not be approved. Substitute equipment and materials submitted by the contractor will be given no consideration and will be returned "Not Approved" through the Resident Engineer unless accompanied by a full explanation by the contractor, describing all points in which it differs from the requirements of the Specifications, how its substitution will affect other items, and the reasons for submittal. If material is submitted in this manner by the contractor, and if, in the opinion of the DESIGNER, the substitute has merit and should be considered, the entire Submittal together with comments and recommendations, will be forwarded to the Resident Engineer for action and approval.

12.6.3 The contractor is responsible for field fit and dimensions.

12.6 Design Services During Construction: The DESIGNER must perform necessary visits to the site and preparation of modifications to the plans and Specifications, as required, such as those required by changed field conditions.

13.0 Designer Responsibility. The DESIGNER's responsibilities will remain in force until construction of the Project has been completed. During this period, the DESIGNER will be responsible for the correction of any design errors or deficiencies and any reconstruction costs resulting there from.

14.0 As-built Drawings. The Design Build Contractor shall provide final as-built drawings. The Design Build Contractor shall maintain Red Line as-built Drawings and CADD files during the course of Project construction. At the completion of the project one set of final As-built Drawings shall be

furnished to the Government on full-size mylar, along with two copies of electronic files in AutoCAD on CD.

15.0 NPDES Permit Requirements. The DESIGNER's site design shall include all appropriate measures, including best management practices, to control pollutants in storm water discharges during construction, in accordance with applicable state or local erosion and sediment control requirements. The construction activities for this Project are anticipated to disturb more than five acres. Pursuant to Section 01410, Environmental Protection and Erosion Control, the Corps of Engineers will obtain a National Pollution Discharge Elimination System (NPDES) permit for storm water discharges associated with construction activities. The design shall assure that all requirements under the terms and conditions set out by the permit are complied with.

16.0 Hazardous Materials. It is not anticipated that the DESIGNER will encounter any hazardous material not already identified with the RFP documents during the course of the Project design. However, in the event that a suspected hazardous material is encountered during field investigation or other design related effort, the DESIGNER will inform the ACO immediately. Further, a letter shall be forwarded to the ACO fully documenting the suspected material, location and other pertinent information. The term hazardous material shall include but not be limited to, lead based paint, asbestos, PCBs and pesticides. The DESIGNER has no responsibility, unless specifically stated otherwise in the Contract, to design for the remediation of any suspected hazardous material.

APPENDIX A

The final Design Documents shall include 100 percent complete and coordinated Drawings and Specifications.

1 Drawings. All Drawings shall bear the stamp (seal) and signature of the design discipline (Professional Engineer or Architect) responsible for the design of the Project. Upon completion of the Work, the electronic media and hard copy documentation shall become the property of the Government.

1.1 Drawings. Drawings shall include the following, as a minimum, in the order listed:

1.1.1 Civil Drawings.

a. Detailed Code Analysis Sheet
b. Demolition Plan

c. Site Layout (Complete Plans and Dimensions: Site layout shall show all surface features including buildings, pavements, roadways, curbs, manholes, fire hydrants, valve boxes, culvert headwalls, utility poles, exterior lighting poles, foundations at grade, sidewalks, meters, lift station, etc.

d. Grading and Drainage Plan
(1) New and existing grading contours with spot elevations and contours, at paved areas.
(2) Contours shall not be greater than one (1) foot.
(3) Complete storm drainage systems with manholes, inlets, headwalls, etc. (4) Identify storage area for stockpiled topsoil.
(5) Identify limits of construction and limits of grading.
(6) Indicate berms, swales, flumes, etc.
(7) Identify temporary erosion control measures.
(8) Locate area for Design/Build Contractor's storage, office, parking, and staging.
(9) Locate temporary fence.
(10) Underdrain drainage system.
(11) Set elevations for all buildings, foundations, manholes, etc. to a fixed elevation datum.

e. Site Utility Plan; Routing of sewer, water, gas, telephone, communications and electrical services.

f. Site Details
(1) Profile of gravity flow systems
(2) Paving section details including:

(a) Transition details between pavement types
(b) Pavement edge details

(3) Temporary markings and barricades
(4) Identify type of new surfaces and provide joint patterns in new concrete paving Concrete paving construction, contraction and expansion joints

(6) Details of at-grade foundations
(7) Sidewalk details
(8) Drainage inlet and outlet details
(9) Manhole details
(10)Curb details

g. Landscaping:
(1) Identify limits
(2) Provide layout of planting, seeding, sodding, and ground cover
(3) Plant Lists
(4) Planting and details

1.1.2 Structural Drawings

a. Code Analysis Sheet. Structural Notes: Design statements shall be made on these Drawings such as design loads, design codes, allowable soil loads, etc.
b. Foundation Plans and Details
c. Roof and Wall Framing and Construction Details
d. Steel Details
e. Schedules

1.1.3 Architectural Drawings

a. Plans
(1) Code Analysis Sheet, Life Safety Plans
(2) Overall Floor Plan
(3) Enlarged Floor Plans
(4) Ceiling Plans
(5) Roof Plans

b. Elevations
(1) Exterior Buildings- all unit combinations and types
(2) Interior Elevations – Bathroom, Kitchen as required to indicate mounting heights for cabinets and accessories

c. Section and Details
(1) Building
(2) Walls
(3) Windows and Doors

d. Schedules (some can be provided in the Specifications)
(1) Door and Windows/Hardware
(2) Room Finish (can be provided in Specifications)

1.1.4 HVAC Drawings may be combined with plumbing drawings as long as they are clear and legible

a. Plans
(1) Overall Floor Plans: Layout of A/C units and ductwork, complete piping and equipment plans.
(2) HVAC equipment piping plans may be combined with plumbing plans as long as they are clear and legible.
(3) Enlarged Floor Plans: Mechanical rooms, and bathrooms.

b. Sections and Details

(1) Mechanical rooms and piping trenches. User equipment piping and systems.
(2) Fire protection details (risers, etc).
(3) Site utilities metering details.

c. Schedules: Mechanical equipment schedules for all equipment items.

1.1.5 Plumbing Drawings may be combined with HVAC drawings provided they are clear and legible.

a. Plans
(1) Overall Floor Plan: Layout of all plumbing and piping.
(2) Enlarged Floor Plans: Mechanical rooms and rest rooms
(3) Plumbing details.

b. Schedules: Plumbing equipment schedules for all items.

c. Schematics
(1) Sewer Piping Schematics
(2) Cold Water Piping Schematics
(3) Hot Water Piping Schematics

1.1.6 Electrical Drawings

a. Site Electrical Plan
(1) All electrical and communication services shown and sized.
(2) Transformers and vaults.
(3) Exterior equipment shown with service.
(4) Exterior lighting plans and details.
(5) Electrical feeds to all equipment.

b. Lighting Plans
(1) Layout of all lighting fixtures with circuits.
(2) Lighting panels and transformer(s).
(3) Lighting Panel Schedule.

c. Power Plans
(1) Layout of all receptacles, including junction boxes if required.
(2) Location of electrical disconnects for special equipment.
(3) Power panels and transformer(s).
(4) Panel schedules.
(5) Location of all major equipment requiring power.

-- End of Section --

3.7.1 Restoration

Existing turf areas, pavements, and facilities that have been damaged from the seeding operation shall be restored to original condition at Contractor's expense.

3.7.2 Cleanup

Excess and waste material shall be removed from the seeded areas and shall be disposed offsite. Adjacent paved areas shall be cleaned.

3.8 PROTECTION OF INSTALLED AREAS

Immediately upon completion of the seeding operation in an area, the area shall be protected against traffic or other use by erecting barricades and providing signage as required, or as directed. TEXT DELETED.

3.9 SEED ESTABLISHMENT PERIOD

3.9.1 Commencement

The seed establishment period to obtain a healthy stand of grass plants shall begin on the first day of work under this contract and shall end 3 months after the last day of the seeding operation. Written calendar time period shall be furnished for the seed establishment period. When there is more than 1 seed establishment period, the boundaries of the seeded area covered for each period shall be described. The seed establishment period shall be coordinated with Sections 02922 SODDING and 02930 EXTERIOR PLANTING. The seed establishment period shall be modified for inclement weather, shut down periods, or for separate completion dates of areas.

3.9.2 Satisfactory Stand of Grass Plants

Grass plants shall be evaluated for species and health when the grass plants are a minimum 1 inch (25 mm) high.

3.9.2.1 Lawn Area

A satisfactory stand of grass plants from the seeding operation for a lawn area shall be a minimum 225 grass plants per square foot. Bare spots shall be a maximum 6 inches (150 mm) square. The total bare spots shall be a maximum 2 percent of the total seeded area.

3.9.3 Maintenance During Establishment Period

Maintenance of the seeded areas shall include eradicating weeds, insects and diseases; protecting embankments and ditches from surface erosion; maintaining erosion control materials and mulch; protecting installed areas from traffic; mowing; watering; and post-fertilization.

3.9.3.1 Mowing

Lawn Areas: Lawn areas shall be mowed to a minimum 2 inch (50 mm) height when the turf is a maximum 3 inches (75 mm) high. Clippings shall be removed when the amount cut prevents sunlight from reaching the ground surface.

3.9.3.2 Post-Fertilization

The fertilizer shall be applied as recommended by the soil test. A maximum 1 pound per 1,000 square feet of actual available nitrogen shall be provided to

will be rejected. The sod shall be relatively free of weeds or undesirable plants, stones larger than 5/8 inches (16 mm) any dimension, woody plant roots and other material detrimental to the development of the turf. Sod anchors shall be as recommended by the sod supplier.

2.1.2 Grass Species

Grass species shall be proportioned as follows:

Botanical Name	Common Name	Mixture Percent
Lolium 'Imagine'	'Imagine' Fine Blade Rye	30%
Poa pratensis 'Kentucky'	'Kentucky' Fine Bluegrass	35%
Festuca arundinacea 'Hound Dog 5'	'Hound Dog 5' Fine Fescue	35%

Weed seed shall not exceed 1 percent. Percent pure live seed equals percent purity multiplied by the quantity of percent germination plus percent hard or sound seed.

2.1.3 Quality

Sod shall be relatively free of thatch, diseases, nematodes, soil-borne insects, weeds or undesirable plants, stones larger than 5/8 inch (16 mm) in diameter, woody plant roots, and other materials detrimental to a healthy stand of grass plants. Broadleaf weeds and patches of foreign grasses shall be a maximum 2 percent of the sod section.

2.1.4 Thickness

Sod shall be machine cut to a minimum 1.4-inch (35 mm) thickness. Measurement for thickness shall exclude top growth and thatch.

2.1.5 Anchors

Sod anchors shall be as recommended by the sod supplier.

2.1.6 Substitutions

Substitutions will not be allowed without written request and approval from the Contracting Officer.

2.2 TOPSOIL

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 stripping operation, topsoil shall be delivered and amended as recommended by the soil test for the sod species specified. Topsoil shall be free from slag, cinders, stones, lumps of soil, sticks, roots, trash, or other material over a maximum 1.5-inch (40 mm) diameter. Topsoil shall be free from viable plants and plant parts.

2.3 SOIL AMENDMENTS

Soil amendments shall consist of pH adjuster, fertilizer, organic material, and soil conditioners meeting the following requirements. Vermiculite shall not be used.

2.3.1 pH Adjuster