Army Family Housing Planning Guide

Prepared For

Office of the Assistant Chief of Staff
for Installation Management (OACSIM)
Army Housing Division
600 Army Pentagon
Washington, DC

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ARMY FAMILY HOUSING PLANNING GUIDE

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Prepared by

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INTRODUCTION

ARMY FAMILY HOUSING

Military installations should provide sustainable, efficient, harmonious, secure, and visually compatible physical environments conducive to attracting and retaining skilled and motivated personnel. The impression an installation makes on the Soldiers, Civilians and Families who live and work there has an impact on quality of life as well as mission readiness. Housing is a critical component of installations.

This document is intended as a resource to anyone involved in the Army's Family Housing inspections or the installation Master Planning processes. Family Housing inspections produce assessments of the condition of components of housing facilities and the overall condition of the housing units in terms of Installation Status Report – for Infrastructure (ISR-I) ratings based on ISR-I Booklet 30. These results serve as inputs into the Real Property Planning and Analysis System (RPLANS) data system to be considered in the Real Property Master Planning Process and also into DD1391/Programming Administration and Execution (DD1391/PAX) System. The identified renovation or replacement requirements can then be considered for inclusion in the annual budget submission for Army Family Housing.

Part 1 of this document begins with an overview of the component of the Real Property Master Plan and the installation Real Property Planning Board processes. It concludes with a brief description of the Family Housing neighborhood concepts and the process of selecting Family Housing units for inspection.

Part 2 provides a detailed description of components that are a part of typical Army family dwelling units. Assessors may use this information to gain a better understanding of the utility and sufficiency of components along with ISR-I Booklet 30. These components are described in detail with specific requirements in order to determine the standard as well as determine the level of adequacy for all components in ISR-I Booklet 30. Included in this document are additional components that are not part of ISR-I Booklet 30 but are a part of Army Family Housing.

While much of the material is intended as a supplement to ISR-I Booklet 30, it is wider in scope and addresses a broader audience. For staff involved in planning, from the Garrison Commander to Directorate of Public Works (DPW) and Housing Services Office (HSO) personnel, it provides a detailed understanding of the issues involved in conducting an inspection. For housing assessors it can provide an overview of the annual facilities planning cycle and more detailed information regarding the inspection of Army-owned housing. The results of the data collected using ISR-I Booklet 30 and the details described in the guide will allow staff to make informed decisions as to the practical and most cost-effective method to revitalize Family Housing. This information will be used by the Real Property Planning Board to help make informed decisions about the preservation of Family Housing.

Historic Perspective

In 1992, the Department of the Army began its Whole Neighborhood Revitalization (WNR) Program. This program was designed to improve aging family quarters, utilities and neighborhood amenities, up to DOD construction standards during a 10-year period. This program would also eliminate backlogs in repair and maintenance and reduce annual operating costs. The objective of the WNR Program was to upgrade family housing to a level comparable to new construction standards for energy efficiency, life safety, habitability, durability, and functional requirements while simultaneously improving neighborhood amenities and support facilities. This would extend the useful life of the Army Family Housing (AFH) inventory.

The original Planning Guide instituted the planning process for the revitalization program. Information was gathered through a world-wide inspection process using the components of this guide. The resultant data was used by Army planners and commanders to prioritize projects in the approximately $2.8 Billion AFH WNR buyout program. This value is based on annual project funding data in the 2004 – 2009 Army Family Housing Master plan. The plan would divest of excess housing while upgrading the worst facilities first to achieve maximum usable life from required existing housing.

Since then, most of the housing inventory has been privatized under the Army's Capital Venture Initiative (CVI) and subsequent Residential Communities Initiative (RCI).

Many changes in the housing environment have occurred since the release of the original guide. Sustainability, Accessibility, and Anti-Terrorism/Force Protection are three major areas that have updated requirements that affect AFH planning. Privatization has reduced AFH planning for deficit construction, elimination of excess and revitalization of aging housing inventory to mostly overseas AFH inventory as well as a remaining handful of smaller U.S. installations. This updated guide better focuses on the planning effort required for the remaining non-privatized AFH inventory.

PART 1 PLANNING

CHAPTER 1 MASTER PLANNING 101 PRIMER

1.1 PLANNING

STANDARDS

Army directed that installation design standards be developed for site planning, buildings, vehicular parking and pedestrian circulation, landscaping, site elements such as signs and utilities, force protection and sustainable design. These standards became the framework for the installation design guide process, which provides:

- standardization across installations;
- a sense of community, order, tradition and pride;
- guidance on cost-effective resource investment; and
- sustainability, reliability, and efficiency.

MASTER PLANNING

Planning for Family Housing begins with the initiation of the annual Real Property Master Planning (RPMP) cycle. Housing needs must be balanced with the needs for all other installation facilities. RPMP has a cycle that repeats annually. The Master Planning Technical Manual (technical manual) is the Army's "how-to" master planning guide. Much of the following discussion of planning is taken from the technical manual. It defines the following products that together comprise the RPMP:

- Vision Plan;
- Installation Design Guide;
- Capital Investment Strategy;
- Long-Range Component; and
- Real Property Master Plan Digest.

The Vision Plan guides the scope of the master plan and determines the installation's Real Property Vision, Goals and Objectives.

While the vision and goals are typically enduring, the objectives may be revised more frequently as the mission of the installation changes. Housing staff (including Family Housing inspectors), as stakeholders in the vision, must ensure that they are aware of, and understand, any changes that have implications for Family Housing.

The Installation Design Guide (IDG) prescribes the design, look and feel of the installation.

The IDG is specific to each garrison. The purpose is to provide design guidance for standardizing and improving the quality of the total environment of the installation. This guidance affects not only the visual impact of features on the installation but also the impact of projects on the total built and

natural environment. The improvement of the quality of visual design and development and use of sustainable design and development practices have a direct and future impact on the quality of life for those who live on, work at, or visit the installation.

Staff will need to review the new IDG to ensure that housing plans are compatible with the overall installation design theme. These plans includes those that respond to the ISR-I Booklet 30 inspections.

The Capital Investment Strategy (CIS) provides a list of specific real property actions, (conversion, demolition, new construction, renovation) that address short- and long-term facility needs, as supported by a balanced tabulation of required and existing facilities (TAB).

The Long Range Component (LRC) is a broad-based area analysis of the installation, projected over a period of 20 to 50 years. It contains both baseline information and detailed long-term plans for the use of the installation's land and facilities.

The CIS and the LRC are based on data contained in the TAB. Though it is not one of the listed products of the RPMP, the TAB plays a pivotal role in the planning process. It entails a detailed comparison of an installation's facility assets and requirements as input into the RPMP process. Balancing installation assets against the requirements in the TAB is a requirement of the CIS development process. The CIS must identify and also prioritize the actions necessary to balance the TAB. The Master Planner is the person designated as responsible for producing and maintaining the TAB and ensuring the accuracy of the data used and must also coordinate with proponents. These actions can include renovations, construction, divestiture, or demolition.

Much, if not all, of the actions planned to balance the Family Housing Assets against requirements originate in the Family Housing Office and Department of Public Works. They can include renovations, construction, divestiture or demolition. These actions are ultimately reflected in creation of DD Forms 1391 and result from the findings of the ISR-I Booklet 30 assessments.

The RPMP Digest (RPMPD) captures the essence of the RPMP. It is the over-arching component of the RPMP and provides a snapshot of the Real Property Master Plan. It is completed concurrently with the other components and should be updated as the RPMP is updated.

In order to ensure the proper development of the AFH portion of the master plan, staff must participate in each phase of the above process. Participation means attending not only assigned planning meetings, but also internal meetings of the Family Housing Division that update staff and solicit input for the planning process.

Figure 2.1 from the technical manual, provided below, illustrates the RPMP process in terms of the component products. As can be seen, during the development process these components interact and serve to update each other.

PLANNING MEETINGS & FAMILY HOUSING

The Real Property Planning Board (RPPB) guides the development and maintenance of the RPMP. It oversees and approves all actions related to real property and Master Planning. Its purpose includes the formulation and justification of construction and major repair programs. It also plays a major role related to the review and approval of MILCON projects.

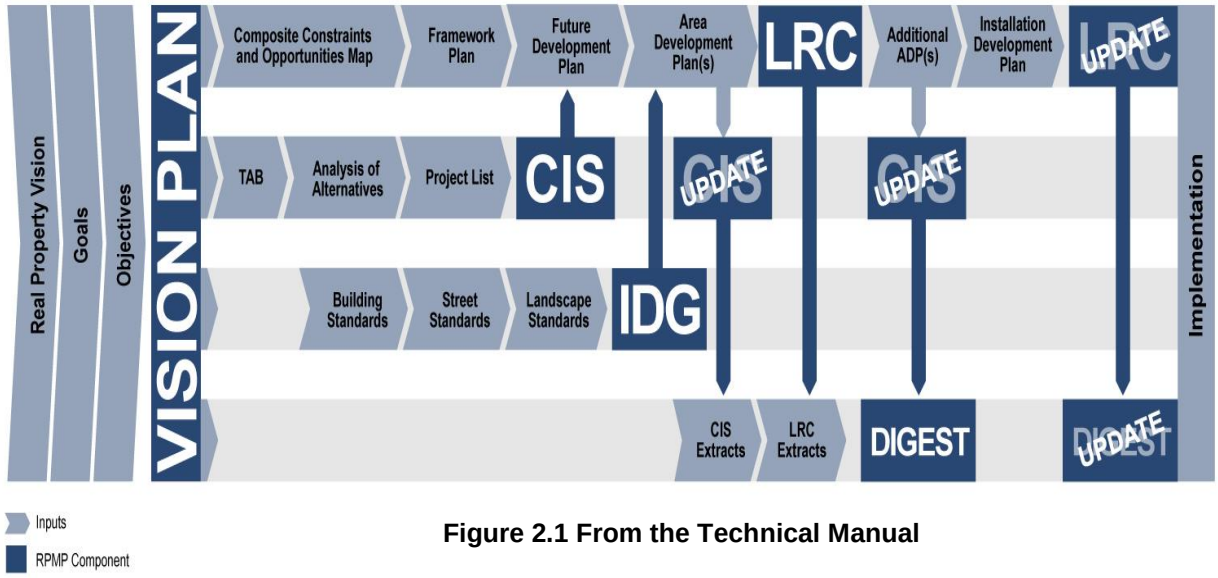

Figure 2.1 From the Technical Manual

The Technical Guide indicates that the RPPB is required to meet at least once a year for formal deliberation, but the board may convene more frequently. AR 210-20, Property Master Planning for Army Installations, (16 May 2005), Section 4-4, paragraph a, indicates that installation RPPBs must meet at least twice each year for formal deliberations.

The Technical Guide indicates that installations hold RPPB working group meetings just prior to the scheduled formal meetings. It also recommends that two to three working group meetings are scheduled for every RPPB meeting. Given this, if the RPPB meets twice annually, the working group meetings may be convened six times each year.

RPPB sub-working groups may be established at the discretion of the garrison. These groups address issues which are beyond the purview of the RPPB board and its steering committees. They typically meet more frequently than the RPPB to resolve controversial or specialized planning issues prior to RPPB meetings.

The senior commander (or a designated delegate) serves as Chairman of the RPPB. Usually the DPW serves as the RPPB executive secretary. The RPPB has an executive board and a working group.

The executive board consists of the garrison staff directors, commanders or directors of major installation units and independent activities. The executive board considers issues presented by the working group and makes recommendations to the garrison commander.

The working group is made up of staff action officers. At the direction of the executive board, it investigates and reports on issues of interest and makes recommendations to the executive board.

The RPPB and its constituent groups seek input from proponents and stakeholders. Housing division staff may be tasked to provide support to the board or a working group and so must prepare for and attend scheduled meetings. Alternatively, staff must be prepared to meet with the designated RPPB staff, on an as-needed basis, to respond to questions and requests for input.

The ISR-I Booklet 30 assessment process needs to be coordinated with the requirements of the RPMP process. The initial planning meeting should include a discussion of the current Vision Plan and the IDG to ensure the inspection process and results are consistent with the installation's requirements. The meeting should include representatives from the offices of the Family Housing Manager, the Director of Public Works (DPW), and the installation's Master Planner. If questions arise during the meeting, the participants should share and discuss the following installation housing information:

- The major groups of units, the number of units in each group, and when the various groups were built.
- The prevalence of various kinds of defects, the frequency of certain types of repairs, and the likelihood that certain systems in the units may be nearing the end of their useful lives.
- Major revitalization considerations, such as the age and repair projections for roofs, evidence of foundation problems, and the improvements needed to bring units up to current construction standards.
- Energy use and costs/metering.
- Special problems, such as the presence of radon, asbestos, lead-based paint, or lead in drinking water.
- Historic quarters, such as those on the National Register of Historic Places, within a historic district, or eligible for nomination.
- Accessible quarters for persons with disabilities.
- Local seismic design requirements.
- Installation Design Guide requirements.
- AT/FP requirements and compliance.
- NFPA requirements and compliance.

The meeting should produce an agreement on the objectives of the projects consistent with the RPMP. These objectives will be broad in scope but will guide subsequent unit and neighborhood assessment phases of the program.

An additional meeting should be scheduled upon completion of the assessment to present the results and to discuss any important issues that arose during the process.

The results of the assessment will reenter the RPMP system as ISR ratings in the RPLANS system and will translate into requirements to be balanced in the TAB.

BROAD OBJECTIVES

This guide provides additional items beyond ISR-I Booklet 30 so as to be comprehensive on the issues that may arise during planning and the inspection process. Several sample objectives follow:

- Conform with construction guidelines in UFC 4-711-01 and Army Family Housing Supplement (UFC 4-711-02A).
- Improve thermal protection of housing units to reduce energy consumption and increase occupant comfort.
- Improve energy efficiency by applying Green Building Standards according to The Army's Sustainable Design and Development Policy as feasible.
- Improve landscaping and unit exteriors to upgrade neighborhood appearance.
- Ensure all AFH is environmentally safe.
- Protect the Army's investment in facilities.

- Ensure the required number of quarters is easily modifiable for persons with disabilities.
- Increase pride in the neighborhood.
- Improve community signage, street layouts and appearance, community buildings, etc.
- Bury overhead power, telephone, and cable TV lines to improve the appearance of the neighborhood and reduce risk of damage from storms.
- Alter street patterns to reduce automobile traffic in residential areas.
- Upgrade neighborhood outdoor recreation areas and facilities.
- Increase the size of housing units up to the new construction benchmarks to provide adequate and equitable size standards across the inventory.
- Provide adequate bulk storage and covered parking.

THE PROCESS OF IDENTIFYING AND DOCUMENTING REQUIREMENTS

The following description directs the process of defining and budgeting a neighborhood revitalization project.

- Develop the total project requirements to meet the objectives, using the guide's building-block approach.
- Ensure that all components of the AFH dwelling unit and AFH community support are considered and evaluated.
- Do not plan uneconomical improvements that will not produce a meaningful benefit to future occupants. Meeting 90 percent of the standard for 50% of what it would cost to meet 100% of the standard is the more economical and better approach for revitalization planning.

This guide provides additional information which allows installation personnel to estimate revitalization requirements and costs without inspecting every unit.

1.2 ASSESSING THE NEIGHBORHOOD REQUIREMENTS

NEIGHBORHOOD DEFINITION

"Neighborhood" can be described as a distinct section of the installation's Family Housing served by common facilities and infrastructure, regardless of the different styles and ages of the housing units within the section.

To prepare for the neighborhood assessment, site plans and utility distribution plans for all Family Housing should be obtained, showing location of recreational facilities, utilities, roads, community support facilities, and other infrastructure related to housing.

The neighborhood evaluation should be conducted separately from the housing evaluations because it is probable that more than one housing type will be found within a neighborhood. Assessments of the general condition and revitalization requirements are not normally a part of an ISR-I Booklet 30 inspection. There is a great variability in the factors involved. However, certain requirements and conditions should be evaluated to ensure that they are adequately covered in the overall plan:

- The physical condition of the infrastructure should be assessed. Each infrastructure item should be evaluated separately. Its condition can usually be tied to age, adequacy of service to housing areas, and maintenance problems. Maintenance records, complaints of water pressure drop, frequent electrical outages, and repeated sewer repairs are

all indications that utility service is not adequate.

- Above-ground infrastructure such as streets, sidewalks, and public parking can be visually evaluated.
- Each neighborhood should be served by adequate transportation and utility system infrastructure, off-street parking, and family support services. The neighborhood assessment and revitalization plan should establish or enhance the sense of neighborhood identity. Uncluttered open spaces, landscaping, adequate street and sidewalk systems that are well lit with residential-type lighting fixtures, conveniently located tot lots and playgrounds, and informal gathering and relaxation areas are neighborhood amenities that should be considered.
- Recreational facilities should be evaluated against new housing standards.

1.3 ASSESSING THE DWELLING UNITS

HOUSES ELIGIBLE FOR REVITALIZATION

Whole house revitalization should occur every 20-30 years. Housing units eligible for assessment should not have been revitalized within the past 10 years.

If housing units have had recent major maintenance and repair work but were not brought up to current standards, include the omitted work in this inventory, along with an explanation. For example, if lack of funds or the proper type of funds prevented the addition of required garages or carports for recently revitalized units, include the garages or carports in the assessment results as work still required to be performed.

SORTING THE UNITS INTO GROUPS

In AFH unit assessment, the first step is to identify similar housing units or types and group them into logical sets. Groupings will normally be based on neighborhood and building configuration and floor plans. However, groupings might more logically be based on age, type of construction, construction materials, numbers of bedrooms, units constructed by the same contractor at the same time, or other physical or administrative characteristics. Once housing sets are determined, all subsequent steps in the unit assessment task are performed independently for each unit set.

CHOOSING UNITS FOR INSPECTION

With sorting completed, choose several houses from each set for examination. They can be randomly selected from units that are vacant to allow detailed analysis of each house. However, at least one occupied housing unit should be examined to obtain occupant feedback and verification of identified problems. If the number of vacancies is insufficient, occupied houses can be selected and appointments made with residents to visit the homes.

Experience has shown that inspecting five percent of the homes in a set, but in any case at least three but not more than 30 houses of any given set, normally provides an adequate assessment of the average condition of a house or unit set. Units for inspection should be randomly selected, if possible.

Occasionally, the members of the assessment team do not reach consensus on the condition of one or more components, or they find wide variation between the first three units inspected. In this situation, the team should inspect more houses until members can reach a consensus. Normally, inspecting no more than five percent of the houses in a particular

housing set will provide adequate information to reach consensus.

ORDER OF INSPECTION

The dwelling unit inspection process is divided into a logical sequence that requires three categories of inspection as follows:

1. General Requirements – These requirements may affect the entire house and are reviewed before beginning the actual walk-through inspection. Items covered are:
   - *Environmental Concerns* – Section 3.0
   - *Fire and Life Safety* – Section 3.2
   - *Historic Quarters* – Section 3.3
   - *Accessibility* – Section 3.4
   - *Seismic Design* – Section 3.5
   - *Anti-Terrorism/Force Protection* – Section 3.6
2. Exterior Inspection – The walk-through should start with the outside of the house, in order, consider:
   - *Lot and Landscaping* – Chapter 4
   - *Exterior Structures* – Chapter 5
   - *Roof System* – Chapter 6
3. Interior Inspection – The inspection team should then enter the housing unit through the front door and follow the general order of spaces as presented in Chapter 8.

EXAMPLE: INSPECTING A BATHROOM

To illustrate the inspection procedure, the team will follow a team member through a bathroom inspection. The team member turns to Section 8.6, *Bathrooms*. The book provides guidance under the following headings:

- *Purpose* – describes the intended service of the component.
- *Common Defects* – describes deficiencies that are most likely to be encountered.
- *References* – alerts the inspector to any new construction standards.
- *Inspection Procedure* – tells the inspector what and how to inspect.
- *Scope of Revitalization* – tells the inspector how to relate the findings from the inspection to the five-part rating scale: Fully Adequate, Minor Repairs, Major Repairs, Replacement, and Special.

In this hypothetical case, the inspector finds the following defects:

- Toilet flush mechanism is defective and must be replaced.
- Chrome finish of faucets in sink and shower has deteriorated; fixtures should be replaced.
- The reflective coating on the medicine cabinet mirror is deteriorating; the cabinet should be replaced.
- The vanity cabinet beneath the sink shows water damage and should be replaced.
- The major fixtures—tub, sink, and toilet—are all in good condition.
- Flooring is badly worn and should be replaced.
- Door hardware is damaged or missing and should be replaced.

Match the defects as closely as possible with one of the revitalization categories. The defects listed above match most closely with Major Repairs. Using ISR-I Booklet 30, the inspector would place a circle around the points in the column for Green, Amber, or Red.

Proceeding in this fashion, an inspector would examine the entire unit and all the other units that have been chosen for inspection, filling out the components of ISR-I Booklet 30 as they go. Minor maintenance items identified during this inspection, which should not wait for the revitalization project for repair, should be reported for routine repair.

FUNCTIONAL ASSESSMENT

The inspector should be aware of such matters as reduction in the number of bedrooms or outmoded layouts that may not meet modern standards of comfort and livability. Criteria to consider may include the following:

- A family room in three- or more bedroom units.
- A bathroom for the master bedroom in three- or more bedroom units.
- A first-floor bathroom in two-story units.
- A washer-dryer area outside the kitchen.
- Central air conditioning where authorized.
- Adequate bulk storage space.
- An informal eating area separate from the formal dining area in three- or more bedroom units.

PART 2
ARMY FAMILY HOUSING

CHAPTER 2 NEIGHBORHOOD

2.1 GENERAL APPEARANCE

PURPOSE

The purpose of creating an attractive general appearance in Army Family Housing (AFH) areas is to achieve maximum aesthetic quality in the residential environment at reasonable initial investment and life-cycle cost.

COMMON DEFECTS

The most common defects in the general appearance of AFH include unattractive entrances to housing areas, unattractive and functionally obsolete temporary buildings, no screening of trash dumpster service areas, parking lots and transformers from adjacent roads and buildings, a tract-built appearance, inadequate division of housing areas into clusters, and failure to achieve a visually attractive ambience through placement and planting of flowers, shrubs, and trees.

REFERENCES

There are several documents that provide guidelines and requirements to assess and implement a program(s) to enhance the general appearance of AFH neighborhoods, as well as other areas.

The Army Installation Design Standards (IDS) provides directives for the mandatory common facility and infrastructure standards for all Army installations. These standards set a common base to facilitate the continuous improvement of the functional and visual aspects of all Army installations.

Army IDS, Section 11.4.5.1.5.1, page 8-11-15, specifies that the signs at the entrance to AFH areas should complement the architectural setting of the housing area and be approved by the installation Real Property Planning Board.

Installation Design (TM 5-803-5) Chapter 16, page 130, contains guidance to identify problems with the general appearances of attached (family) housing:

- A scarcity of planting, which creates a visually harsh residential environment and makes housing units more susceptible to extremes in climate conditions.

- Housing units that lack privacy, especially end units.
- Individual mailboxes that clutter the streetscape.
- An unimaginative straight entrance road, roads that disregard natural topographic conditions, as well as the unsafe intersection.

Installation Design (TM 5-803-5) Chapter 16, page 132, contains guidance to identify problems with the general appearances of detached (family) housing:

- A grid street pattern with houses of identical design and street setback that creates a monotonous residential environment.
- A lack of planting that consequently amplifies the monotonous development pattern and stark appearance of the neighborhoods.
- Little physical distinction between public and private space.

INSPECTION PROCEDURE

1. Review any Area Development Plans (ADP) for Army Family Housing neighborhoods. The ISR Standards Booklet for Family Housing is ISR-I Booklet 30.
2. Inspect the entrance to the AFH housing areas for insufficient planting, failure to hide or soften the appearance of required wire fences through use of shrubbery, lack of screening of dumpsters, transformers and parking areas, and absence of signage for the AFH housing area, where appropriate.
3. Inspect the AFH housing area to determine if the total area has been satisfactorily subdivided into identifiable clusters that can serve as neighborhoods for the residents.
4. Inspect AFH common areas, including circular "islands" in cul-de-sacs and rights-of-way on either side of streets, to determine if they can be made more attractive through planting of flowers, shrubs, trees, and possibly grading to relieve monotony of broad expanses of level land.
5. Correct AFH neighborhoods that have tract-built appearances by modifying the exterior appearance of the structures, the traffic flow, street appearance, and possibly reducing the density of housing.
6. Correct poor surface drainage through grading, ditching, culverts, basins, or underground stone drains as necessary.
7. Inspect the neighborhood appearance at night. Ensure that adequate residential-style street lighting is in place, that signs are appropriately lit, and that an overall attractive nighttime appearance exists. Lighting should be energy efficient using compact fluorescent light bulb fixtures where possible.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Entrance to housing area contains visually attractive flowers, shrubs, and trees and has adequate signs that complement the architectural style of the neighborhood. Housing area is divided into recognizable clusters. Common areas are attractive and contain visually attractive flowering plants, shrubs, and trees.

MINOR REPAIRS

Improvements needed to entrance to housing area. Signage needed at entrance. Moderate number of shrubs and a few trees needed to

improve the division of the area into recognizable clusters and/or to improve the appearance of common areas.

MAJOR REPAIRS

Substantial or total planting of flowering plants, shrubs, and trees required at entrance to housing area. Planting of a significant number of trees and shrubs required to improve the division of the area into recognizable clusters and/or to improve the appearance of common areas.

REPLACEMENT

Few or no trees or shrubs exist to delineate clusters or to improve the appearance of streets and common areas. Total or near-total planting of a large number of trees and shrubs, signs, and construction of facilities are required. Grading is needed to achieve adequate improvement in cluster delineation or to increase the attractiveness of wide stretches of level common ground.

SPECIAL

Other conditions not mentioned above.

2.2 INFRASTRUCTURE

PURPOSE

The purpose of infrastructure in AFH areas is to provide utilities and support facilities. Infrastructure includes roads, sidewalks, parking areas, electrical and gas service, water and sewage facilities, telephone, cable TV, site lighting, and storm drainage.

COMMON DEFECTS

The most common defects include damaged or deteriorated utilities and streets; unsightly overhead power lines; absence of storm drains, sidewalks, walkways, or paths to interconnect various pedestrian destinations within the area or neighborhood; absence of cable TV where available, running paths, and residential street and site lighting; inefficient energy use; unsightly location of gas meters; and inadequate provision for off-street parking due to limited space.

REFERENCES

There are several documents that provide guidelines and requirements regarding infrastructure in AFH neighborhoods, as well as other areas.

Installation Design (TM 5-803-5), Chapter 16, page 130, contains guidance to identify problems with the general infrastructure of attached (family) housing:

- A large parking courtyard that lacks scale and screening for parked vehicles.
- Overhead utility lines that clutter.
- Lighting fixtures mounted to utility poles.
- Transformers located in a visually prominent areas.
- Lack of walkways linking the housing cluster to the overall pedestrian circulation network of the installation.

Installation Design (TM 5-803-5) Chapter 16, page 132, contains guidance to identify problems with the general infrastructure of detached (family) housing:

- Unsafe pedestrian circulation within the street as a result of lack of sidewalks.
- Obtrusive traffic noise from the adjacent arterial road.

Army Family Housing Supplement (UFC 4-711-02A), Section 5.4.2, page 66, Telephone System, discusses the installation and place of telephone lines.

Army Family Housing Supplement (UFC 4-711-02A), Section 5.4.3, page 66, Television

System, discusses the commercial cable TV (CATV) service placement in the housing unit, wiring, and other details.

INSPECTION PROCEDURE

UTILITIES

Review any Area Development Plans (ADP) for Army Family Housing neighborhoods. The ADPs should address the infrastructure needs of the area. Normally, replacing utilities as a whole or at least in an entire geographical area is most cost effective. Do not attempt to replace utilities in small sections just because housing is to be revitalized in sections. Revitalization phases may include utility replacement that extends beyond the area of houses included in that phase if it is the most economical and practical approach. Typically, replacement of below-grade utility will coincide with road upgrades.

Infrastructure inspections should be conducted by personnel experienced in the specific system's operation and maintenance.

1. Determine the overall condition of the electrical distribution system. If an overhead distribution system needs replacement because of its condition, consider replacing it with an underground system.
2. Determine the overall condition of the water distribution system. Maintenance records that indicate frequent failures, complaints of water pressure drop, inadequate flow for firefighting, lead piping, or other problems indicated in engineering studies are good indicators that major repairs or replacement is necessary. Check to see if water distribution is part of the ADP.
3. Determine the overall condition of the sanitary sewer system. If plans call for the addition of new bathrooms to all houses or the possibility of new laundry facilities, consider upgrading or replacing sections of the sewer system. Check to see if sewer system improvements are a part of the ADP.
4. Determine the overall condition of the gas system. Records of frequent problems or plans for expansion may indicate the need for upgrading. Check to see if gas system improvements are a part of the ADP.
5. Determine if the street lighting is residential-type lighting that reflects the style of the neighborhood and if the house exterior lights match the style of other exterior lighting. Inspect the type of lighting used for all outside security and street lighting. Incandescent lighting should be replaced with energy-efficient compact fluorescent light bulb (CFL) lighting fixtures whenever possible. Check to see if exterior lighting system improvements are a part of the ADP.
6. Evaluate the condition and functional adequacy of all storm drainage systems. Conduct a historical review of failures and major maintenance requirements, as well as an analysis of flooding problems. Special attention should be given to identifying drainage problems that are known to maintenance personnel but may have never been documented. Check to see if storm drain improvements are a part of the ADP.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Each infrastructure item (e.g., electrical) is in excellent condition, requires only routine maintenance, is well designed, and provides its intended service. Improvements in the ADP have been fully implemented.

MINOR REPAIRS

An infrastructure item requires routine maintenance as well as repairs that can be expected to occur every 10 years or less, particularly corrosion protection work and replacement of wearing mechanical components. Examples of the latter might include routine replacement of motors and automatic valves that may have a life of only 10 years. Pavement repair might include patching pot holes, seal coating, or line painting. Improvements in the ADP have been planned but have yet to be completed.

MAJOR REPAIRS

Same as Minor Repairs plus replacement of components or sections that have deteriorated through age. Examples might include worn-out underground shut-off valves, obsolete electrical transformers and safety switches, replacement of service feeders, etc. Pavement repairs might include repairing bad sections, upgrading curb, gutter and storm water systems, and overlaying the entire road. Improvements in the ADP have been not been planned. Infrastructures are rated Red.

REPLACEMENT

Each infrastructure item requires replacement of the entire system due to numerous uncontrolled failures, substandard design or lack of the system entirely. Road replacement would include new roads or removing and replacing entire sections of roadway. Improvements that are needed are not included in the ADP.

SPECIAL

Other conditions not mentioned above.

2.3 RECREATION

PURPOSE

Recreational facilities provide adequate provision for play, exercise and leisure outdoor activities on the common grounds associated with AFH areas. ISR-I Booklet 30 doesn't deal with recreational facilities. Therefore, this information is solely provided as an appendage.

COMMON DEFECTS

The most common defects include an insufficient number of recreational facilities for the population served, deterioration of equipment or facilities, improper location of facilities affecting safe and convenient use by children, inadequate seeding or placement of sod on recreation fields, or no recreational amenities provided in conjunction with the open space and walkway systems.

REFERENCES

Family Housing (UFC 4-711-01), Section 2-3.1, page 7, specifies recreational facility requirements. Table 1 contains a listing of those items and the quantity required.

1. Where recreation fields exist, check seeding or sodding and condition of equipment.
2. Determine if there are enough tennis courts for the number of dwelling units. Check condition of courts and nets.
3. Check condition of jogging paths and other pathways and note depressions or other deterioration of the surface that may pose dangers to users. Check for presence of exercise stations on jogging paths.
4. Determine if there are enough basketball courts for the number of dwelling units. Check the condition of surfaces, basketball hoop and backboard.

Table 1. Recreational Facilities	
ITEM	**QUANTITY**
Benches	2 per tot lot, play lot, rec. court and playfield
Tot Lots (2-5 Year Olds)+	1 per 30 housing units
Play Lots (6-10 Year Olds)+	1 per 30 housing units
Open Playing Fields	1 acre per 150 housing units
Tennis Courts	1 per 150 housing units (optional)
Basketball Courts	1 per 100 housing units
Trash Receptacles	1 per tot lot, rec. court, playfield and sitting areas, mailbox cluster
Bicycle Racks	1 per tot lot, play lot, rec. court and playfield
Picnic Areas	1 per 50 housing units
Walkways	1 per neighborhood
Bike Paths	1 per neighborhood (may be combined with Jogging Paths)

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Number or amount of recreational facilities is adequate for number of dwelling units. Recreation field seeded or sodded. All recreational equipment in good condition and properly located to meet community needs.

MINOR REPAIRS

Minor repairs required for some recreational equipment, such as tennis nets, baseball backstops, and swings in tot lots.

MAJOR REPAIRS

Surfaces of tennis courts, basketball courts, and handball courts significantly deteriorated and in need of repair. Major repair or replacement required for recreation area equipment. Recreation field is in need of substantial sodding or upgrade.

REPLACEMENT

The number of tot lots, tennis courts, recreation fields, and/or handball and basketball courts is insufficient and requires construction of additional facilities. Care should be exercised to establish with the community where and if new recreational facilities should be located within the housing area. In high-density areas, only tot lots may be acceptable near houses.

SPECIAL

Land is not available to build required facilities and special provisions are needed to compensate.

2.4 COMMUNITY SUPPORT FACILITIES

PURPOSE

The purpose of community support facilities is to increase living convenience for residents and their families and to increase accessibility to stores, other commercial establishments, recreational and cultural amenities, community services and community centers. ISR-I Booklet 30 doesn't deal with recreational facilities. Therefore, this information is solely provided as an appendage.

COMMON DEFECTS

The most common defects include inadequate public transportation; inappropriate location

or lack of commercial, cultural, and community facilities and services; and insufficient arrangements for security of residents.

REFERENCES

Army Family Housing Supplement (UFC 4-711-02A), Section 2.4.2, page16, specifies that Support Facility design should be based on installation and activity size. The actual support facility design must be customized based on actual personnel demand and other site-specific criteria.

Army Installation Design Standards, Section 6.4.4.1, Types of Signs, page 6-11, specifies that signs identify entrances to the installation, areas within the installation, major tenants, buildings, and organizational or functional components. Signs are to identify a location and greet the visitor to that location.

Army Installation Design Standards, Section 11.3.5.1.1.1, Bus Shelters, page 8-11-5, specifies that bus shelters be located at major facilities along the bus route such as the Commissary/Post Exchange areas, barracks areas, hospital, and library. Bus stops should be on major pedestrian walkways and be placed on concrete pads. A minimum 3'0" clearance between shelters and the edge of walks should be provided.

INSPECTION PROCEDURE

1. Review any Area Development Plans (ADP) for Army Family Housing neighborhoods. The ADPs should address the adequacy of Community Support Facilities.
2. Review access from housing areas to bus service. Check number and location convenience of bus stops. Check frequency of service, arrangement of stops along the route, and destinations of buses.
3. Check number and location of convenience stores. Check accessibility of housing areas to such facilities via walkways, sidewalks, or public transportation.
4. Check accessibility of housing areas to community centers via walkways, sidewalks, or public transportation.
5. Check condition of Community Support Facilities.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Public transportation and/or sidewalks and pathways provide good access for residents of housing areas to convenience stores, other commercial services, and cultural facilities and community centers.

MINOR REPAIRS

Some rearrangement of bus routes and establishment of new bus stops and accompanying signage would provide better access to stores and services.

MAJOR REPAIRS

Existing system of walkways and paths relates poorly to various destinations of residents. Creation of a number of walkways and paths is desirable.

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3.1 ENVIRONMENTAL CONCERNS

One important goal is to eliminate hazards from Army Family Housing. Three particular hazards—asbestos, lead, and radon—are known to exist and should be identified and eliminated during this project. ISR-I Booklet 30 doesn't deal with environmental concerns on this level. Therefore, this information is solely provided as an appendage.

ASBESTOS

Asbestos refers to a group of silicate-based fibers that are found in some soils and rock and that have been frequently used for a number of applications relating to buildings. There are two basic varieties of asbestos-containing materials (ACM): non-friable and friable. Non-friable ACM contains asbestos fibers within a tightly-held matrix of cement or similar binding material. The fibers remain in the matrix unless the ACM is broken, sanded, cut, or otherwise separated. By contrast, fibers can be easily released from friable ACM by relatively small forces.

Inhalation or ingestion of asbestos fibers has been shown to increase the risk of several serious health problems, including lung cancer, asbestosis (scarring of the lung), and mesothelioma (cancer of the lung and stomach linings).

COMMON DEFECTS

Building products that may contain friable ACMs include sprayed-on or troweled-on coatings, joint compounds, insulation board, mastic adhesives, pipe wraps, paper tape, ductwork flex connectors, and roof felt shingles. Non-friable ACM has been used in siding, roofing, piping, wall, floor, and ceiling materials.

REFERENCES

Environmental Protection and Enhancement, (AR 200-1).

INSPECTION PROCEDURE

Only trained specialists, accredited under a program meeting the minimum requirements established by the U.S. Environmental Protection Agency as authorized under the Asbestos Hazardous Emergency Response Act (AHERA), can inspect and assess the presence of asbestos. This process has been initiated on all Army Family Housing. The location, extent, and condition of all known ACMs should be provided to the contractor.

SCOPE OF REVITALIZATION

Fully Adequate

No ACM has been identified.

Minor Repairs

Not Applicable.

Major Repairs

The location, description, and assessment of very limited ACM have been identified. The revitalization contractor will hire a qualified subcontractor to abate asbestos. Only management planners, designers, and contractors meeting AHERA requirements may plan and manage asbestos abatement.

Replacement

A significant amount of asbestos is present or abatement will be more extensive than the major repair effort. Only management planners, designers, and contractors meeting AHERA requirements may plan and manage asbestos abatement.

Cost of asbestos abatement varies depending on conditions unique to the individual

buildings and estimates should be obtained from experienced engineers.

LEAD-BASED PAINT

Lead poisoning is traceable to several sources, one of which is lead-based paint (LBP). Most lead poisoning results from ingestion of lead dust, though some cases of ingestion of paint chips have been reported. Ingestion of lead has been linked to various health problems, including developmental problems, loss of intelligence, short-term memory loss, kidney failure, and, in some cases, death. Risks are considerably higher for children than for adults.

Before being banned in the 1970s, LBP was used extensively in many homes throughout the United States. It is possible to find LBP in any home built before the mid-1970s and most likely to be present in homes built before 1960.

Common Defects

Lead has been used in both interior and exterior paints. Nearly any painted surface can contain LBP, including walls, floors, ceilings, and door and window trim.

References

Facilities Engineering Army Facilities Management (AR 420-1), page 202.

The Department of Housing and Urban Development's (HUD) Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing (2012 Edition) must be followed as a standard of practice for risk assessment, management and abatement of lead hazards. Guidelines may be obtained from HUD's website at http://portal.hud.gov/hudportal/HUD?src=/program_offices/healthy_homes/lbp/hudguidelines. Paint in target housing and child-occupied facilities is assumed to be lead-contaminated, unless testing determines otherwise. Risk assessments to identify lead hazards will be performed for facilities that contain lead-contaminated paint. Lead hazards will be managed by interim controls. Lead-contaminated paint will be abated only when interim controls are ineffective or when economically justified for major repair or whole neighborhood revitalization projects. Such paint will not be removed solely for the purpose of abatement. The Unified Facilities Guide Specifications (UFGS) 028319.0010 will be used for the abatement of lead-based paint hazards in target housing and child-occupied facilities.

Environmental Quality Environmental Protection and Enhancement (AR 200-1), Section 9-(4)2.d, *Lead-based paint management*, page 34.

(1) *Policy*. The Army proponent for lead-based paint (LBP) management is the ACSIM, Directorate of Facilities and Housing. Army facility policy and guidance on LBP management is provided in AR 420–70, chapter 3.

(2) *Legal and other requirements*. Requirements for LBP management are found in 15 USC 2601; Section 1025, Part 1910, Title 29, Code of Federal Regulations (29 CFR 1910.1025); Section 62, Part 1926, Title 29, Code of Federal Regulations (29 CFR 1926.62); Part 745, Title 40, Code of Federal Regulations (40 CFR 745); AR 420–70, chapter 3; and applicable State and local requirements; for overseas installations, the country-specific FGS requirements.

(3) *Major program goals*. Prevent human exposure to LBP hazards on Army-owned property and maintain compliance with pertinent regulations.

(4) Program requirements.

(a) Ensure that all workers that perform lead abatement work in child occupied facilities and target housing are trained, equipped, and supervised according to EPA lead-based paint abatement requirements and OSHA requirements for lead in construction. (LD: 40 CFR 745 and 29 CFR 1926.62, respectively). Construction work impacting lead-based paint that is not considered abatement of lead-based paint in target housing or child occupied facilities need only comply with OSHA requirements. (LD: 29 CFR 1926.62)

(b) Per facility and housing BMPs, manage LBP and lead-contaminated soil in place unless operational, economic, and/or regulatory requirements dictate its removal.

(c) Disclose known LBP hazards in Army housing. (LD: 40 CFR 745)

(d) Ensure that disposal of LBP complies with Federal, State, and local regulations.

SCOPE OF REVITALIZATION

Fully Adequate

No LBP with lead levels of 1.0 mg/cm2 or greater identified.

Minor Repairs

Not Applicable.

Major Repairs

LBP identified only on wall surfaces, which can be encapsulated with new drywall.

Replacement

LBP has been identified and locations provided to the contractor. Abatement, clean-up, worker protection and any necessary follow-up testing shall be conducted by an EPA-certified revitalization contractor or subcontractor.

LEAD CONTAMINATION OF DRINKING WATER

A potential source of metal poisoning is from lead and copper in drinking water. The principal applicable laws governing water resource protection and management are the Safe Drinking Water Act (SDW), its amended version SDWA, and related Federal, State, and local implementing regulations; and for overseas installations, the country-specific requirements.

COMMON DEFECTS

In-home causes of lead contamination in water are mostly lead-based solder in copper plumbing, lead pipe service connections, or corrosive (lead-dissolving) water in the plumbing. Studies have indicated that newer housing (up to two years old) will have higher lead levels because pipes more than two years old develop a filmy coating protective barrier between the water and the materials of the plumbing system. However, lead connectors and service lines were commonly installed in homes built before 1920; these houses may have very high lead levels.

REFERENCES

Applicable U.S. federal laws are the Safe Drinking Water Act, as amended; PL 109–58 (Energy Policy Act of 2005). Army Regulation 200-1(2007) *Environmental Protection and Enhancement* and Army technical guide USACHPPM Technical Guide No. 179, *Guidance for Providing Safe Drinking Water at Army Installations*, November 1995. In that

technical guide are specific testing protocol and assessment criteria for compliance.

INSPECTION PROCEDURE

Action levels are used for evaluating lead and copper in drinking water; they are: 0.015 mg/L for lead and 1.3 mg/L for copper for the first-draw tap water samples. First-draw samples are collected by catching the first water that comes from the tap, not allowing for any flushing or wasting of water. Exceeding the action level requires a system to take actions to correct the lead and copper leaching problem within the system and to educate and protect the consumer from exposure to lead from drinking water.

SCOPE OF REVITALIZATION

Fully Adequate

No known lead contamination, no lead or brass fixtures, and no lead soldering found.

Minor Repairs

First sample is more than 0.015 mg/L but flushed samples are under 0.015 mg/L. Replace one or more brass fixtures with plastic. Introduce a corrosion inhibitor (e.g., silicate or phosphate-based compounds) that will coat the piping interior, sequester various chemical elements, or neutralize the water's aggressiveness.

Major Repairs

Flushed sample is higher than 0.015 mg/L. Resolder pipe joints. Insert pipe coating material in specific home and/or neighborhood main(s).

Replacement

Flushed sample is higher than 0.015 mg/L. Replace water piping and fixtures within the house. Replace service line to neighborhood main.

RADON

Radon is a naturally occurring radioactive gas present to varying degrees in all soils and buildings. Exposure to elevated radon levels is believed to be second only to smoking as a contributor to lung cancer.

COMMON DEFECTS

Radon enters buildings through cracks and other openings in the foundation. It can also enter through water supplies drawn from small private wells in areas where the groundwater contains high levels of radon. In rare cases, radon has been found to emanate from stone, fly ash, and other earth-based building products.

REFERENCES

Unified Facilities Guide Specifications – Radon Mitigation UFGS-31 21 13.

INSPECTION PROCEDURE

1. Indoor measurement is the only known method for determining radon levels in buildings. Short-term measurements have been conducted on all Army Family Housing units and results will be provided to the contractor. Contractors should perform follow-up on all buildings with short-term results greater than four pico Curies per liter (pCi/l).
2. Buildings with follow-up radon measurement results greater than four pCi/l shall be mitigated by a contractor listed in EPA 520/1-90-017, National Radon Contractor Proficiency Program.

Fully Adequate

Initial screening or follow-up long-term measurement results are less that four pCi/l.

Minor Repairs

Long-term measurement results are greater than four pCi/l. The revitalization contractor will obtain the services of a subcontractor to design and implement radon mitigation procedures to lower the long-term radon levels to below four pCi/l. Only individuals listed in EPA 520/1-90-017, National Radon Contractor Proficiency Program, may conduct radon diagnostics, design, and mitigation.

Major Repairs

Same as minor repairs except house does not lend itself to simple mitigation.

Replacement

Not Applicable.

Note: Cost of radon mitigation varies considerably depending on initial radon levels, quality of original construction, and foundation type. Estimates should be obtained from an experienced radon mitigation contractor listed in EPA 520/ 1-90-017, National Radon Contractor Proficiency Program.

TERMITICIDES IN FAMILY HOUSING

If termite infestation occurs, it is usually found in wood members in proximity to the ground. The most common method to prevent or eliminate a termite problem is the introduction of chemicals lethal to the insect in the ground around and below the house foundation.

COMMON DEFECTS

The chemicals used to fight termites—termiticides—can be hazardous to humans and have been known to intrude into other areas of a home via HVAC ducts. The intrusion of termiticides into HVAC systems is usually caused by the placement of ducts in or below the floor slab.

REFERENCES

Army Family Housing Supplement (UFC 4-711-02A), Section 7.1.8, page 81, requires replacement of below-the-floor HVAC ducts with above-the-floor ductwork.

INSPECTION PROCEDURE

Determine if ductwork—air conditioning and/or heating—is in or below the floor slab or in a crawl space.

SCOPE OF REVITALIZATION

Fully Adequate

No ductwork is located in or below the floor slab or in a crawl space.

Minor Repairs

Not Applicable.

Major Repairs

Relocate a section of HVAC duct in or below the floor slab or in a crawl space to above the floor.

Replacement

Replace all HVAC ducts in or below the floor slab or in a crawl space with a system that is above the floor.

Special

1. If unable to relocate enclosed crawl space ducts, a waiver may be obtained provided the crawl space and HVAC ductwork are sealed by the following approved methods:
2. Vapor barrier (four mil visqueen or approved equal) installed over entire soil surface of crawl space area.
3. Two inches of concrete (minimum thickness) poured on top of the vapor barrier in the entire crawl space area.

4. Crawl space ventilation to comply with HUD MPS (1/800 of entire area).
5. Insulating, wrapping, and vapor sealing all ductwork within the crawl spaces.

MOLD IN FAMILY HOUSING

Mold or fungus produces superficial growth on various kinds of damp and decaying organic matter. This typically includes drywall and framing lumber. Exterior surface leaks, as well as moisture build-up from condensation, can perpetuate mold growth. Excessive mold can affect respiratory function, as well as other diseases. Mold remediation must be performed to all active standards.

COMMON DEFECTS

There are three common defects that can help perpetuate mold growth, and they all involve untreated water accumulation. The first is intrusion of water from the exterior because of precipitation. The second is a water leak from a plumbing line or fixture. The last is condensation build-up in exterior wall cavities due to temperature and humidity differences between the interior and exterior walls. During inspections, walls, ceilings, or floors can have discoloration or black spots.

REFERENCES

Army Facilities Management (AR 420–1), 12 February 2008/RAR 24 August 2012, page 69.

The U.S. Army Public Health Command has an aggressive mold prevention campaign. These resources are available at: http://phc.amedd.army.mil/Pages/default.aspx.

Army Facilities Management Information Document on Mold Remediation Issues, (TG 277).

Industrial Hygiene/Preventive Medicine Mold Assessment Guide.

INSPECTION PROCEDURE

Check maintenance records for waterborne repairs in conjunction with any health complaints by the occupants. Visually inspect all rooms, walls, floors, and ceilings for mold. If mold is present, approximate size of mold area and source of moisture should be noted. The source of chronic moisture should be identified and resolved before restoration.

SCOPE OF REVITALIZATION

Fully Adequate

No mold is visually present on walls or ceiling areas.

Minor Repairs

Note all areas of mold no larger than 10 sq. ft. Remediate areas where mold is present by removing and replacing the affected materials in accordance with TG 277.

Major Repairs

Note mold areas larger than 10 sq. ft. Remediate these areas by removing and replacing the affected materials (drywall, insulation, etc.) in accordance with TG 277.

Due to the potential variability in the size of the area affected, a local estimate should be obtained.

Replacement

N/A.

3.2 FIRE/HEALTH/LIFE SAFETY

PURPOSE

Fire, health, and safety requirements for family housing are defined within the references noted below. Specific requirements in this guide are discussed under topical headings in this section; e.g. electrical, plumbing, etc.

COMMON DEFECTS

The most common defects affecting health and safety are functionally obsolete safety mechanisms, including electrical, HVAC, plumbing, or structural systems. Examples include failed insulation or connections; wiring of improper circuit protection that could cause fires; safety risk related to improper lighting levels; defective air exchange or conditioning resulting in improper indoor temperatures and air quality; leaking, leaching, or clogged plumbing leading to excessive indoor dampness, potable water contamination, flooding, or unusable fixtures and equipment; deterioration of structural support leading to floor and wall warping, sagging, or outright failure; existing window height and opening dimensions that may violate code requirements; grounded receptacles that may have been added to some houses without proper grounding; and gas lines that may have deteriorated in crawl spaces.

REFERENCES

Family Housing (UFC 4-711-01), Section 6, page 26, provides the following references to applicable codes and standards for design, construction, and improving family housing: International Building Code, as modified by UFC 01-200-01, UFC 3-600-01, and the International Residential Code.

Family Housing (UFC 4-711-02A), Section 6.1.4, page 78, requires automatic sprinklers, when used, to be in conformance with UFC 3-600-01. Apartment units shall be fully sprinkled. Sprinkler systems for garden apartments (one through four floors) will comply with NFPA 13R. Sprinkler systems for apartment buildings of over four floors will comply with NFPA 13. Townhouse constructions with two-hour fire walls between each unit and duplex constructions with a one-hour fire wall between the units will not require sprinklers.

International Plumbing Code, International Code Council.

National Electric Code, National Fire Protection Association.

NFPA 101 - Life Safety Code, National Fire Protection Association.

MAJOR REQUIREMENTS

Structures may present a high fire risk due to improper fire separation (walls, ceilings, floors, and area separation) or limited or inaccessible emergency exits. Multifamily housing with three or more dwelling units must have one-hour, fire-resistive construction for walls and floors. Buildings more than two stories or with more than 3,000 sq. ft. of floor area above the first floor must have one-hour, fire-resistive construction.

Area separation walls are required in multifamily housing on the basis of allowable square footage, dependent on the type of construction. In buildings constructed with concrete and masonry, area separation walls are required if the floor area of any one floor exceeds 9,100 sq. ft. or the total floor area of all floors exceeds 18,200 sq. ft. For wood-frame buildings, the maximum square footage allowed on any floor is 6,000 sq. ft., without the provision of a fire-resistive separation wall, and 12,000 sq. ft. for all floors between separation walls. The separation wall must be four- or two- hour, fire-resistive construction, depending on the type of construction, and extend from the foundation to a height 30 in. over the roof. The separation must extend to the outer edges of concealed horizontal spaces, such as balconies and roof overhangs. The 30-in. extension of the wall can be eliminated and the separation wall can terminate at the

underside of the ceiling if the roof ceiling assembly is two-hour, fire-resistive construction. If the roof heights vary, the 30-in. extension of the separation wall applies to the lower roof, with exception made for the wall to terminate at the ceiling if framing of the roof is of one-hour, resistive construction and there are no openings within 10 ft. of the separation wall.

In single-family and duplex wood-frame residences with garages, 5/8-in., X-rated gypsum board must be installed on the garage side of the wall with a self-closing, tight-fitting, 1 3/8-in. thick, solid wood door in lieu of one-hour construction. An occupancy separation is not required between a residence and carport provided the carport is entirely open on two or more sides. The total width of openings within the fire separation should not exceed 25 percent of the length of the wall or be more than 120 sq. ft. for a single opening.

Attached single-family homes, whether new or being revitalized, shall have two-hour fire separation walls between dwelling units running from the floor slab to the underside of the roof.

Hard-wired smoke detectors are required and must be installed in accordance with NFPA 74 on the ceiling or the wall, centrally located in the corridor or area giving access to each separate sleeping area, one in each bedroom, and one on each floor, including a basement. Where more than one detector is required, they must be interconnected so that operation of any detector will cause all detectors in the dwelling unit to sound. If ceilings in the sleeping areas exceed the corridor ceiling height by 24 in., an additional detector must be placed in the sleeping area. If any of these requirements is violated, it can cause adverse health consequences over a period of time and potential injury or death.

Where combustible equipment, gas appliance, or fireplace is installed, a Carbon Monoxide (CO) alarm is to be provided in accordance with UL 2034, NFPA 720 and 101. If an attached garage exists, it shall be air sealed from interior space and have a CO alarm provided.

INSPECTION PROCEDURE

This section is meant to complement the sections in this guide that cover the various systems and components of a home whose performance affects health and safety. Fire safety is also discussed here.

1. *Electrical* – check for looseness, degradation, or other signs of failure or imminent failure among outlets, ceiling fixtures, and fuse or circuit breaker panels. Listen for excessively loud buzzes from the electric system. Check for three wire-grounded outlets, aluminum wiring, and adequate size of electrical service to the house. Ground fault interrupters (GFI) are now required, as discussed in Section 9.0, *Electrical Service*.
2. *HVAC* – check for similarity in temperature and thermostat setting, unusual smells or moisture content in the air, unusually loud equipment and difficulty in ignition. Check if ductwork is located in or under floors, if so, it must be replaced (see Section 9.4, *Heating System*). Check furnace flue for leaks, and check if there have been any reports of carbon monoxide poisoning. Check for adequate return air paths and supply, balancing dampers to properly balance the duct system.
3. *Plumbing* – check for water leakage along plumbing lines (or signs of water damage in wood, tile, or other surfaces) and lack of water pressure at hydraulically remote fixtures. Also check the type of metal in

plumbing for indications of contamination and flow restriction.

Check the structure for warping, sagging, disintegration, leaking, or loose structural members. Also, check for signs of water damage from a leaking roof.

4. *Fire safety* (not including items related to electric and HVAC) – look for operational hard-wired smoke detectors on each level of the home (battery-type should be replaced), and emergency egress potential (other than the main door), including alternative doors and windows that can be used for escape by all family members, particularly children. Also look at cooking facilities for possible fire danger, especially stoves with open flame and other equipment that requires manual ignition. If combustible equipment exists, a carbon monoxide (CO) alarm should be provided outside each bedroom. Proper extensions of area separation walls and appropriate fire-resistive construction should be examined where exposed in attics or ceilings. Check every bedroom for proper emergency exits. At least one operable window or exterior door in each bedroom should be available for emergency egress or rescue. Windows for this purpose shall have a sill height of not more than 44 in. and a minimum clear opening of 5.7 sq. ft. The minimum clear opening height is 24 in. and width is 20 in.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

All systems are in working order and show no signs of major deterioration, failure, neglect, or improper maintenance. There is ample and accessible emergency egress. All required fire separation assemblies are in place.

MINOR REPAIR

Electrical – tighten outlets, fixtures, and fuses/circuit breakers; add GFIs as required.

HVAC – recalibrate thermostat, "bleed" radiators, clean furnace filters, and check pilot lights.

Plumbing – tighten connections and replace small pieces, such as washers.

Structural – install additional fasteners (nails or screws), install minor reinforcement members.

Fire Safety – Free up and lubricate or readjust stuck window.

MAJOR REPAIR

Electrical – repair damage to fuse or circuit breaker panel or connections; reconnect lighting fixtures or other outlets; rewire sections(s) of home.

HVAC – patch ducts and registers; repair heat and air exchangers; replace deteriorated flues.

Plumbing – introduce agents into the water to break up ossification materials; replace section(s) of deteriorated piping.

Structural – install additional support beams, walls, flooring, ceilings, or roofing. Upgrade fire separation walls from one-hour to two-hour rating by adding an additional layer of gypsum or equivalent material.

Fire Safety – install hard-wired, interconnected smoke detectors.

REPLACEMENT

Electrical – rewire home.

HVAC – replace furnace, boiler, heat pump, or other service.

Plumbing – replace plumbing system, including service connection to water main.

Structural – replace support beams, walls, flooring, ceilings, or roofing.

Fire Safety – install windows with sills low enough for emergency egress by children; install additional door to outside in an area remote from existing door(s); install escape ladders; install new fire-rated partitions.

3.3 HISTORIC QUARTERS

Revitalization of historically significant family housing quarters involves unique circumstances. Standards for repair and maintenance of Army housing, either listed or determined to be eligible for listing on the National Register of Historic Places, have been established. The Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings provide sound principles for the treatment of older and historic buildings. These standards set forth parameters on livability, functionality, and safety that are appropriate for historic buildings. They also establish procedures to be followed for preservation to satisfy the requirements of the National Historic Preservation Act, as amended. In addition, the Army has divested a significant portion of historic units. Therefore, the assessment procedures will be determined as required on a case-by-case evaluation.

3.4 ACCESSIBILITY

PURPOSE

The accessibility guide located in the Appendix provides an overview of the accommodations that are necessary to achieve basic access, mobility, and communication functions within a residential dwelling on military installations. The military's residential dwellings can be single-family homes or apartment complexes.

On October 31, 2008, the Department of Defense (DOD) issued a policy memorandum, which adopted the *ABA Accessibility Standard for Department of Defense Facilities* based on updated guidelines issued by the United States Access Board. The guidelines incorporate minimum requirements of the Architectural Barriers Act of 1968 (ABA) and the Americans with Disabilities Act of 1991 (ADA). Although the standard addresses all DOD facilities, this accessibility guide only focuses on military housing. ISR-I Booklet 30 doesn't deal with accessibility. Therefore, this information is solely provided as an appendage.

REFERENCES

The primary accessibility reference for military housing (including UPH) is the *ABA Accessibility Standards for Department of Defense Facilities* as published by the United States Access Board. When residential dwelling units are converted, they shall comply with the standard and the policy memorandum issued by the Department of Defense on October 31, 2008.

OTHER RESOURCES:

Residential Rehabilitation, Remodeling and Universal Design.

Common ADA Errors and Omissions in New Construction and Alterations.

Residential Remodeling and Universal Design.

COMMON DEFECTS: ACCESSIBLE ROUTES

When Accessible Routes do not exist, several elements are lacking:

- Maneuverable Clearances (at the main entrance)
- Threshold Design for Wheelchairs (at doorways)
- Floor Surfaces for Wheelchairs (along the accessible route)
- "Easy-to-Use" Door Hardware (do not require twisting, grasping, and pinching)
- Ramps (do not exist or lack railing, sloping, and clearance requirements)
- Accessible Window Features (no crank or easy-to-open device on windows)
- Handrails (on stairways along the accessible route)

Fully Adequate

Meets all accessible route requirements.

Minor Repairs

Change door hardware, add handrails, and replace thresholds at doorways.

Major Repairs

Change floor coverings and windows and add ramps.

Replacement

If maneuvering clearances were not met or the accessible route is not wide enough, add space to the residential dwelling (see Appendix).

COMMON DEFECTS: ACCESSIBLE KITCHEN

When an Accessible Kitchen does not exist, several elements could be lacking:

- Floor Clearances (adequate space for maneuvering while in a wheelchair)
- Threshold Design for Wheelchairs (at doorways)
- Appliances/Sink (that meet accessible requirements)
- "Easy-to-Use" Knobs for Cabinets (no twisting, grasping, and pinching required)
- Light Switch Location (is easy to reach from wheelchair)

Fully Adequate

Meets all accessible requirements for kitchens.

Minor Repairs

Change knobs on cabinets and replace thresholds at doorways.

Major Repairs

Change appliances, sinks/fixtures, and light switch locations.

Replacement

Add space to the residential dwelling. This would be required if maneuvering clearances were not met within the kitchen (see Appendix).

COMMON DEFECTS: ACCESSIBLE BATHROOM

When an Accessible Bathroom does not exist, several elements could be lacking:

- Floor Clearances (provide space for maneuvering while in a wheelchair)
- Doorway Width (to accommodate a wheelchair)

- Threshold Design for Wheelchairs (at doorways)
- Grab Bars
- Toilet Height and Location (to meet clearance requirements and obstructs use)
- Knee Clearance for Sinks/Vanity (to meet the clearance requirements)
- Sink Fixtures (that do not require twisting, grasping, and pinching)
- Accessible Tub/Shower (that meet controls, height, and reach requirements)
- Towel Bars (that meet height and reach requirements)

Fully Adequate

Meets all accessible requirements for bathrooms.

Minor repair

Change the height of towel bars, add grab bars, change fixtures, and replace thresholds at doorways.

Major repairs

Change toilets, sinks/vanities, tubs, and showers.

Replacement

Widen doorways and add space to the residential dwelling—required if maneuvering clearances were not met within the bathroom (see Appendix).

COMMON DEFECTS: COMMUNICATION FEATURES

When an Accessible Communication Feature does not exist, several elements could be lacking:

- Accessible Signage (for the vision impaired)
- Visual Alarms (for the vision impaired)
- Identification Device at Main Door/Entry (peepholes at wheelchair height)
- Placement of Communication Controls (that can reached from wheelchair)
- Accessible Controls (features do not require twisting, grasping, and pinching)

Fully Adequate

Meets all accessible requirements for communications.

Minor Repairs

Add signage, vision alarms, and peepholes at wheelchair height.

Major Repairs

Modify the type or relocate communication controls for wheelchair height.

Replacement

Replace and upgrade the entire communication system to accommodate the hearing and vision impaired (see Appendix).

Though classified as minor repairs, certain alterations can be a major cost. For example, in most cases, adding grab bars is a very straight-forward and minor alteration. But if the wall does not have structure supports to support the new grab bars or if adding the grab bars creates obstructions for the door or maneuvering space, then installing grab bars may become a major repair. For more examples of how the design approach will drive the overall cost of an accessibility alteration, please refer to *Residential Rehabilitation, Remodeling and Universal Design,* published by the Center for Universal Design at NC State University.

3.5 SEISMIC DESIGN

PURPOSE

The minimum performance objective for Army housing is defined in AR 420-1 as noted in the references cited below. This is based upon providing "Substantial Life-Safety" with the objective that an earthquake may cause significant building damage that may not be repairable, but is not expected to significantly jeopardize life from structural collapse, falling hazards, or blocked routes of entrance or egress.

COMMON DEFECTS

All Army structures were designed in accordance with the current seismic codes at the time of construction. Because the codes have changed significantly over the years, older houses may no longer meet current code requirements.

REFERENCES

Facilities Engineering Army Facilities Management (AR 420-1), Section 5-15, Page 200.

To ensure compliance, seismic evaluations and mitigation of unacceptable seismic risks shall be performed.

a. *Seismic evaluation*. Executive Order EO 12941(01 December 1994), Seismic Safety of Existing Federally Owned or Leased Buildings, requires seismic evaluation of Federal facilities. Alteration, renovation, or improvement of an existing building shall require a seismic evaluation in accordance with ASCE 31–03, when:

(1) A change in the facility's use causes a change in the occupancy or importance to a higher Seismic Use Group, as defined in Table 1604.5 of the 2003 International Building Code (IBC 2003).

(2) A project will significantly extend a facility's useful life through alterations or repairs, or will significantly increase a facility's value, and the cost exceeds 50 percent of the current replacement value of the facility.

(3) A facility is damaged to the extent that significant structural degradation of its vertical or lateral load-carrying system has occurred.

(4) A facility is deemed to be an exceptionally high risk to occupants or to the public.

(5) A project is planned which causes the capacity of a facility's structural system or components to be reduced to 90 percent or less of original stability or strength.

(6) A building is added to the Army inventory through purchase or donation.

b. *Exceptions to seismic evaluations*. An existing facility is exempt from seismic evaluation if:

(1) It is located in a region of Low Seismicity, unless it is designated as mission essential. Low Seismicity is lateral earthquake ground motion where the variables of SDS are less than 0.167g and SD1 is less than 0.067g. The IBC 2003 paragraph 1615.1.3 provides equations to determine the design spectral response accelerations SDS and SD1. For an explanation of SDS and SD1, see paragraph 1615.1.3 of the IBC 2003.

(2) Replacement or demolition is scheduled within five years.

(3) It is a detached one- or two-family dwelling, two stories or less located where SDS is less than 0.40g.

(4) It is a detached one- or two-family wood-frame dwelling, two stories or less, located where SDS is equal to or greater than 0.40g, if

it meets the light-frame construction requirements of the FEMA 368/369, 2000 National Earthquake Hazards Reduction Program (NEHRP) Recommended Provisions for Seismic Regulations for New Buildings and Other Structures.

(5) It is a one-story light-frame or wood construction, with a floor area less than 3,000 square feet.

(6) It is a post-benchmark building as defined in Table 1–1 of Interagency Committee on Seismic Safety in Construction (ICSSC) Recommended Provision (RP) 6, NISTIR 6762 (or its original design was done according to the provisions of the IDS). To satisfy this exemption, the building must comply with all structural, non-structural, foundation, geologic site hazard, and adjacency compliance categories of the applicable building codes.

(7) It was designed and constructed for the Federal Government after the date of the adoption of Executive Order (EO) 12699 (5 January 1990), and it was designed in accordance with NISTIR 4852 Guidelines and Procedures for Implementation of the Executive Order on Seismic Safety of New Building Construction.

(8) It has already been seismically rehabilitated in compliance with the provisions of NISTIR 5382, Standards of Seismic Safety for Owned or Leased Buildings and Commentary.

c. *Seismic rehabilitation*. If the seismic evaluation process indicates the earthquake resistance of an existing facility does not meet life-safety or applicable higher performance objectives established for the facility, appropriate mitigation of the risk must be performed. The mitigation method will be selected in accordance with IMCOM guidance. Mitigation alternatives include rehabilitation of structural, non-structural, or geologic hazards; facility abandonment; and reduced occupancy category for the facility. If structural, non-structural, or geologic rehabilitations are the chosen mitigation measures, design and detailing will be done in accordance with FEMA 356, Prestandard and Commentary for the Seismic Rehabilitation of Buildings, and UFC 3–301–05A Seismic Evaluation and Rehabilitation for Buildings.

3.6 ANTI-TERRORISM/FORCE PROTECTION

PURPOSE

Terrorists frequently use explosive devices when they target large numbers of DOD personnel. Many existing DOD buildings offer little protection from terrorist attack. To minimize the effects of explosive devices against buildings and personnel, the DOD has published minimum antiterrorism standards for new and existing buildings in UFC 4-010-01 however, on-post Family Housing buildings with 12 or fewer housing units are exempt from all provisions of the antiterrorism standard, unless the occupant is deemed a HRP.

For buildings that are not exempt, the level of force protection required is determined by the potential level of the identified threat. Methods of protection and levels of threat are outlined in the DOD antiterrorism standards. Primary design strategies for protection against terrorist attacks include maximizing "standoff" distance, constructing superstructures to avoid progressive collapse and reduce flying debris hazards. Other strategies include providing effective building layout, limiting airborne contamination, and facilitating future upgrades.

APPLICABILITY

AR 420-1 requires that all DD Forms 1391 be reviewed by the installation DPW, Provost Marshal or Security Officer, and Force Protection Officer to ensure that security and AT measures have been addressed. The cost and scope of efforts associated with AT measures, as well as the risk and threat analysis, must be specifically identified and addressed in the project documentation. Additionally, the installation Director of Plans and Training (DPT) or equivalent, Provost Marshal or Security Officer, and the Force Protection Officer, along with the DPW, are required to be fully involved in facility planning, programming, budgeting, and review processes to ensure antiterrorism construction requirements are identified for each project.

For on-post family housing exceeding 12 dwelling units per building to comply with these requirements, designated inspection team member(s) should meet with the DPW or designated staff members to identify specific ATFP measures, consistent with installation requirements, to be incorporated into renovation plans for each housing type. If renovation costs are of a sufficient magnitude to merit replacement of the unit, the DPW or other designated staff will develop required features for inclusion in replacement plans and cost estimation.

REFERENCES

DoD Minimum Antiterrorism Standards for Buildings (UFC 4-010-01) contains the standards and recommendations for antiterrorism measures in new and existing buildings. This is the primary reference document for antiterrorism standards when constructing new buildings or upgrading existing buildings. Both performance and prescriptive standards and recommendations in this document apply to all DOD inhabited buildings, billeting, and high-occupancy Family Housing.

Security Engineering: Physical Security Measures for High-Risk Personnel (UFC 4-010-03) provides technical information and guidance on physical security measures for HRP, including the HRP residence. An HRP is a DOD individual who is likely to be the target of terrorists or criminals. The criteria in the document are meant to be used in conjunction with a Personal Security Vulnerability Assessment (PVSA), when available. The document indicates that when a PSVA is not available, it may be used as the selection criteria for a HRP residence. Its recommendations are intended to minimize the possibility of HRP casualties in buildings or portions of buildings in which they work and live. The UFC notes that, while complete protection is cost prohibitive, the intent can be achieved through prudent master planning, real estate acquisition, and design and construction practices.

DOD Security Engineering Facilities Planning Manual (UFC 4-020-01) supports the planning of DOD facilities that include requirements for security and antiterrorism. This manual is used to establish project specific design criteria for DOD facilities, estimate the cost for implementing those criteria, and evaluate both the design criteria and the options for implementing it. This UFC is used in conjunction with UFC 4-010-01 DOD Minimum Antiterrorism Standards for Buildings.

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4.1 LANDSCAPING

PURPOSE

For purposes of this section, landscaping is limited to shrubbery, ground cover, and/or lawn in the vicinity of the unit. Landscaping stabilizes the soil adjacent to the unit, provides shading and reduced heating and cooling loads, and enhances the aesthetic quality of the unit and its surrounding neighborhood.

COMMON DEFECTS

The most common defects include absence of shrubbery that screens the front view of the house foundation, dead or missing trees, existing trees too close to foundations or utility lines, and a poorly established lawn.

REFERENCES

Family Housing (UFC 4-711-01), Section 8-2.1, page 30, specifies landscaping that is environmentally and economically beneficial, including shrubbery, trees, decorative fencing, earth sculpting, rocks or special gardens, and identification signs. Trees, natural areas, and native plant species should be preserved where possible.

Landscape Design and Planning (TM 5-803-13), Section 2-14, page 2-17, describes the objectives of landscape planting. Additionally, mailboxes meeting the criteria of USPS Publications 17 and 13, as appropriate, are required.

INSPECTION PROCEDURE

1. Inspect shrubbery near the housing unit and note whether the ground/foundation line in front of the house is exposed when viewed from the street.
2. Inspect condition of lawn or ground cover in the vicinity of the unit.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Shrubbery is present and in good condition and harmonizes with the landscaping of other nearby units and throughout the neighborhood. The ground/foundation line is not exposed in the front. Low maintenance shrubs, appropriate for the climate, have been used. In arid climates, desert landscaping has been used to conserve water and to keep excess water away from the foundation of the house. Lawn or ground cover is in good condition. There are several healthy trees in the yard.

MINOR REPAIRS

Replace several shrubs as required to screen foundation. Reseed bare areas of the lawn.

MAJOR REPAIRS

Shrubbery is either lacking or clearly dead or dying. Grass is spotty, dead, or dying. Remove dead or dying shrubbery and replace. Reseed existing lawn. Establish all new foundation plantings. Add a tree or two to the lot.

REPLACEMENT

Establish entirely new landscaping.

SPECIAL

Other conditions not mentioned above.

4.2 DRIVEWAYS/PARKING

PURPOSE

A driveway provides automobile access to a garage or carport and space for parking. An

individual parking pad provides off-street parking for one or two automobiles. Garages and carports are covered in Sections 5.0, *Garage,* and 5.2, *Carport*. Where they exist, each counts as a parking space.

COMMON DEFECTS

Defects include cracked, buckled, pitted, or spalled concrete; cracked, broken, or unevenly settled asphalt; and lack of concrete curbs.

REFERENCES

Family Housing (UFC-4-711-01), Section 3.2.1, page 10, specifies space for parking two automobiles off-street for each unit. Each parking space in a garage, carport, or driveway counts as one of the required parking spaces. Each housing unit must be provided an additional 0.5 space for guest parking. In high density areas, 90 degree and gang parking and 0.25 guest parking space may be allowed if necessary. Section 3.1.4, page 21, specifies that driveways must be at least 10 ft. wide. The length of the driveway used for off-street parking should be at least 20 feet wide, as measured from the edge of the sidewalk.

INSPECTION PROCEDURE

Inspect general condition of concrete. Look for pitting, spalling, scaling, cracks, differential settling, and buckling. Hairline cracks are acceptable and normal. Cracks exceeding 1/4 in. in width and 1/4 in. in vertical displacement are not acceptable. Exposed aggregate or loosened pieces of concrete or asphalt are not acceptable.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Driveway provides good access to the house as well as parking for two cars, and concrete or asphalt has minimal surface defects, cracks, settling, or buckling. Edges of all paved surfaces are well defined and even.

MINOR REPAIRS

Fill excessive cracks with caulk and reseal asphalt.

MAJOR REPAIRS

Apply topping over entire driveway/parking pad surface, or expand the driveway for a second car.

REPLACEMENT

Remove and replace a badly deteriorated driveway or add a new one if none exists. No parking is available other than on-street parking.

SPECIAL

Other conditions not mentioned above.

4.3 SIDEWALKS

PURPOSE

Sidewalks provide pedestrian access to and from the house to public sidewalks and other common use areas.

COMMON DEFECTS

The most common defects include deteriorated or nonexistent sidewalks.

REFERENCES

Army Family Housing Supplement (UFC 4-711-02A), Section 3.1.3, page 21, specifies that sidewalks are required on at least one side of the street. Standing curbs at driveways, intersection corners, cross walks, and wheelchair accessibility ramps must be depressed.

INSPECTION PROCEDURE

1. Inspect sidewalk for a minimum width of four feet.
2. Inspect for pitting, spalling, or scaling of the surface of the concrete.
3. Inspect for cracks and differential settling and vertical displacement across cracks. Cracks that are more than 1/4-in. wide or that are accompanied by a 3/16-in. vertical displacement are unacceptable.
4. Inspect walkways for heaving or buckling that may be caused by tree roots.
5. Determine where foot traffic patterns require paved walkways.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Sidewalks exist everywhere as required and are free of defects.

MINOR REPAIRS

Concrete surface shows no evidence of deterioration. Two or three concrete squares may be cracked but with no significant vertical displacement across the cracks. Repair confined to caulking and patching joints or cracks.

MAJOR REPAIRS

Concrete surface deteriorated and crumbling or one-third or more of the concrete squares display open cracks. Remove and replace entire walkway.

REPLACEMENT

Add needed sidewalks.

SPECIAL

Other conditions not mentioned above.

4.4 GRADING/DRAINAGE

PURPOSE

Grading of the soil and drainage requires a natural slope away from a housing unit. They encourage surface water to drain away from the foundation, thereby minimizing moisture penetration into basements or crawl spaces and under slab foundations. Gutter and downspout systems collect rainwater and melting snow from the roof and direct it away from the building foundation by means of splash blocks.

COMMON DEFECTS

The most common defects include improper grading of side and rear yards which, in turn, causes rain water to collect against the building foundation and results in excessive settlement or up-lift, cracking of the foundation and/or floor, and rotting of wood members. Additional defects include missing or deteriorated roof gutters, downspouts, and splash blocks.

REFERENCES

Family Housing (UFC 4-711-01), Section 3-3.2, page 11, and *Site Planning and Design* (UFC 3-210-06A), specify finish grade around perimeter of each housing unit shall slope a minimum of five percent (six-in. fall in 10 ft.) to carry surface water away from foundation walls. Where lot lines, walls, slopes, or other physical barriers prohibit six-in. fall in 10 ft., drains or swales should be provided to ensure drainage away from structure.

Army Family Housing Supplement (UFC 4-711-02A), Section 4.6.2, page 51, specifies gutters and downspouts for all roof areas with downspouts draining onto a lower roof, with metal or plastic splash deflectors and concrete splash blocks under downspouts if not connected to storm drainage system.

INSPECTION PROCEDURE

1. Walk around the perimeter of the housing unit and inspect the angle formed by the foundation and the adjacent soil to be sure that the soil slopes away from the foundation at a slope of six in. in 10 ft.
2. Inspect the perimeter of the housing unit for evidence of water accumulation or puddle formation with particular attention to areas behind shrubbery and in flower beds.
3. Inspect the housing unit to ensure that gutters, downspouts, and splash blocks are present with all components installed and in good condition.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

No evidence of water accumulation. Soil grading around foundation appears to provide adequate drainage. Gutters, downspouts, and splash blocks are present with all components installed and in good condition.

MINOR REPAIRS

Repair leaking or stopped-up gutters, downspouts, and splash blocks.

MAJOR REPAIRS

If there is evidence of small pockets of water accumulation adjacent to foundation, fill or hand grade to provide adequate slope away from the house. Replace or install new gutters and downspouts (see Section 6.4, *Gutters and Downspouts*).

REPLACEMENT

Evidence of water accumulation adjacent to foundation; grade is flat or slopes toward the foundation wall; evidence of soil erosion; or an indication of water leakage or severe puddle formation around the unit during moderate to heavy rain storms. Floor slab cracking is evident, or cracks can be seen in the foundation. Major machine grading and landscaping are required.

SPECIAL

Other conditions not mentioned above.

5.1 GARAGE

PURPOSE

Garages provide sheltered, off-street automobile parking and miscellaneous storage.

COMMON DEFECTS

The most common defects include absence of a garage, absence of or non-locking garage doors, ineffective or non-existent fire walls between house and garage, and lack of locked storage within the garage. Other common defects include inoperable or defective garage doors and cracked, buckled, pitted, or spalled concrete slab. Refer to other sections of this guide: Chapter 6, *Roof System*; Section 7.0, *Foundation*; Section 7.5, *Exterior Wall Finish*; Section 7.9, *Doors*; and Section 7.10, *Windows*.

REFERENCES

Army Family Housing Supplement (UFC 4-711-02A), Section 4.7.9, page 56, specifies that for renovation projects, either a garage or a carport should be provided as the site allows. Garages should be designed to complement architectural features and materials used in the housing unit, with a minimum of one garage per unit. Garages should be attached to or located as close to the kitchen as possible. The concrete slab floor must be a minimum of four in. below the floor of the adjoining house and sloped to drain liquids away from unit walls. For convenience, light switches and outlets should also be provided. Garage door hardware must allow opening and locking from inside and outside the garage.

INSPECTION PROCEDURE

1. Inspect to determine general condition of concrete floor. Look for pitting, spalling, scaling, cracks, differential settling, and large areas of unsightly discoloration. Hairline cracks are acceptable and normal. Cracks exceeding 3/16 in. in width or 3/16 in. in vertical displacement are not acceptable and must be repaired. Exposed aggregate or loosened pieces of concrete are not acceptable. Check for floor drainage by inspecting for either front-to-rear slope or floor drain.
2. Inspect garage door hardware for safe and easy operation and for secure fastening. Garage door should be operable by adults with limited physical strength. Inspect door for damage and condition of finish.
3. Inspect condition of fire wall between house and garage. Typically, the wall should be covered with 5/8-in. thick Type-X Fire code gypsum wallboard. No penetration of gypsum wallboard is acceptable and joints must be taped and spackled. Inspect other walls and ceiling.
4. Space designed for storage is often provided in garages. If garage provides storage, inspect for adequate condition and security. Exterior storage area requirements are addressed in Section 5.3, *Exterior Storage Area*.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Concrete slab has minimal hairline cracks; no aggregate is showing; garage door operates easily; hardware is secure; floor stains are minor or nonexistent; fire wall is sound with no penetrations; storage space floor is in good repair; and shelving is securely fastened. Garage provides secure storage for car and outdoor equipment. The fire wall provides adequate protection against the spread of fire.

MINOR REPAIRS

Excessive concrete cracks do not exceed 29 lin. ft. Clean cracks, fill with concrete sealant, and point-up slab where required. Repair spalled, pitted, or exposed aggregate in concrete slab. Tighten garage door hardware. Repair minor penetrations in fire wall with tape and spackling compound. Tighten shelving. Replace door weather stripping. Repair holes in fire wall by cutting out damaged sections and replace with new 5/8-in. thick Type-X Fire code gypsum wallboard, and refinish and paint.

MAJOR REPAIRS

Same as Minor Repairs plus add locked storage area with shelving. Remove garage door and replace with new unit including all new hardware and weather stripping. Place a two-in. thick concrete slab over entire defective slab surface. Replace large sections of fire wall with 5/8-in. thick Type-X Fire code gypsum wallboard, and tape, spackle, and finish.

REPLACEMENT

If existing garage is considered unsalvageable, tear down and replace. If no garage or carport is present, consider whether space is sufficient to construct one adjacent or close to the housing unit and provide recommendations.

SPECIAL

N/A.

5.2 CARPORT

PURPOSE

Carports provide sheltered off-street automobile parking. Some carports have built-in storage space in bins or closets.

COMMON DEFECTS

The most common defect is absence of a carport. Lack of space to accommodate a carport may require the construction of carports away from the dwelling units. If carport is present, the most common defects included pitted, spalled, or cracked concrete slabs; rotted or insect-damaged support posts; damaged or loose hardware on storage bins/closets; rotted or otherwise damaged trim; cracked, chalky, flaky, or faded paint; and sagging or damaged ceiling finish. Refer to other sections of this guide for Chapter 6, *Roof System*, and Section 7.0, *Foundation*.

REFERENCES

Army Family Housing Supplement (UFC 4-711-02A), Section 4.7.9, page 56, specifies that for renovation projects, either a garage or a carport should be provided as the site allows. Storage may be allowed.

INSPECTION PROCEDURE

1. Inspect to determine general condition of concrete slab. Look for pitting, spalling, scaling, cracking, differential settling, and large areas of unsightly discoloration. Hairline cracks are acceptable and normal. Cracks exceeding 3/16 in. in width or 3/16 in. in vertical displacement are not acceptable and must be repaired. Exposed aggregate or loosened pieces of concrete are not acceptable.
2. Inspect corner posts for rot or insect damage, especially at top and bottom. Poke with screwdriver to determine undersurface damage. Check vertical alignment with carpenter's level. Inspect post/roof and post/slab connections for secure, tight fastening.
3. Space designed for storage is often provided in built-in bins or closets. In bins or closets, inspect hardware for ease of

operation and secure fastening. Inspect shelving and shelf bracket fastening. Look at general condition of bin/closet doors.

4. Check ceiling for sagging or damage to covering. Check paint for flaking, chalking, peeling, and overall appearance.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Carport is close to the house, meets design standards, and provides adequate locked storage for the unit. Concrete slab has minimal hairline cracks and no aggregate is showing; corner posts are vertical and in good condition; storage bin/closet hardware, shelves, and doors are sound and fastened; trim is in good condition; and paint has been recently applied and provides good coverage.

MINOR REPAIRS

Excessive concrete cracks should not exceed 20 lin. ft. Clean cracks, fill with concrete caulking, and point-up slab where required. Repair spalled, pitted, or exposed aggregate in concrete slabs. Tighten storage door hardware and shelf brackets. Repaint all exposed surfaces.

MAJOR REPAIRS

Same as Minor Repairs plus add locked storage to existing carport. Cover entire slab with two-in. thick concrete topping; replace trim boards; replace ceiling; replace storage bin/closet doors and shelves; paint all exposed surfaces.

REPLACEMENT

If carport structure has deteriorated beyond repair, remove it entirely and rebuild. If no carport or garage is present, consider whether space is sufficient to construct one adjacent or close to the housing unit.

SPECIAL

The carport configuration may be such that, for an additional small investment, it is prudent to enclose the carport and convert it to a garage.

5.3 EXTERIOR STORAGE AREA

PURPOSE

Exterior storage provides for the storage of items normally used outdoors. They may be located in the garage or carport or in a storage room within or attached to the house but accessible by an outside service door.

COMMON DEFECTS

The most common defect is lack of proper storage, which results in the construction of non-uniform, tenant-owned storage sheds. If storage areas are part of, or attached to, the house, common defects include nonexistent, loose, or damaged shelving; damaged flooring; damaged wall and ceiling coverings; damaged door; loose or inoperable hardware; and nonfunctional light fixture. If storage is provided in the garage, see Section 5.1, *Garage*; if storage is provided in the carport, see Section 5.2, *Carport*.

REFERENCES

Army Family Housing Supplement (UFC 4-711-02A), Section 4.7.10, page 56, specifies that paved access, lighting, and doors wide enough to accommodate a lawn mower and other typical lawn tools should all be considered in properly locating exterior storage. A switch-controlled light is required outside the service door. Recommended exterior space is based on unit size: 40 square feet for three-bedroom units and 50 square feet for four-bedroom units

INSPECTION PROCEDURE

1. Check operation of access door hinges and hardware. Inspect overall condition of door.
2. If shelving exists, check condition of shelving, brackets, and fasteners.
3. Inspect interior wall and ceiling surface for damage.
4. Check floor surface. If concrete, look for spalling, scaling, cracking, and discoloration. Hairline cracks are acceptable and normal. Cracks greater than 3/16 in. in width or 1/8 in. in vertical displacement are unacceptable. If floor is constructed of other materials, check for peeling, tears, and heavy wear.
5. Check size requirements.
6. From installation plan maps, note location of storage facilities.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Door opens and closes freely. Lockset is in good condition. Shelving and brackets are in good condition and tightly fastened. Floor, wall, and ceiling covering are in good condition.

MINOR REPAIRS

Tighten hinges and shelf brackets and replace lockset. Repair minor damage to wall and ceiling surface with tape and spackling compound. If floor is concrete, clean and fill unacceptable cracks with compatible crack sealer.

MAJOR REPAIRS

Same as Minor Repairs plus remove heavily damaged wall and ceiling surface material and replace. Replace door and paint; install shelf brackets and shelving; replace finish flooring if other than concrete.

REPLACEMENT

Adequate storage space does not exist. Either expand inadequate storage space or build new space onto garage, carport, or house.

SPECIAL

Other conditions not noted above.

5.4 TRASH ENCLOSURE

PURPOSE

External trash enclosures provide an area for placement of household trash for subsequent pick-up by a trash collection service.

COMMON DEFECTS

The most common defects include inadequate screening and inappropriate location of trash containers.

REFERENCES

Army Family Housing Supplement (UFC 4-711-02A), Section 4.7.11, page 57, specifies that exterior trash enclosures should be located in areas least offensive to housing occupants, with architecturally treated screening or enclosures and large enough for two 30-gallon containers plus any recycling containers used by the installation.

INSPECTION PROCEDURE

1. Visually determine if the trash enclosure area is adequately screened from the street, common use areas, and other living areas. Determine if enclosure is convenient for trash pick-up. Check enclosure size to determine if two 30-gallon containers or the recycling containers used by your community can be easily inserted and removed.

2. In some cases, dumpster-type trash containers rather than individual unit trash enclosures are provided for a number of units. If at all possible, dumpsters should be eliminated and individual trash containers provided, with consideration for separation of various types of waste for recycling. If dumpsters are the only alternative, then determine if they are conveniently located and adequately shielded with fencing or screening.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Trash enclosure is properly located, adequately sized, and has a relatively flat but well-drained paved pad.

MINOR REPAIRS

Repair enclosure materials and hardware as necessary and repaint structure.

MAJOR REPAIRS

If severe cracking in pad is evident, demolish and re-pour concrete slab.

REPLACEMENT

Enclosure is improperly located or does not exist. Demolish existing enclosure and break up and remove pad. Build new enclosure to required specification at new location.

SPECIAL

Other conditions not mentioned above.

5.5 PATIO/DECK

PURPOSE

Patios or decks provide the occupants of ground-level units with an outdoor living area.

COMMON DEFECTS

The most common design defects include nonexistent or inadequate outdoor space.

The most common patio defects include cracking or settling of the concrete slab and lack of adequate area. The most common deck defects include rotted, excessively worn, or loose decking; rotted or insect-damaged support posts; and loose railings.

REFERENCES

Army Family Housing Supplement (UFC 4-711-02A), Section 4.4.3, page 49, specifies decks constructed of weather-resistant materials or patios with broom-finished floor. They should be screened from the street, common areas, and adjacent living units and provide direct access to the living room, dining room, or family room. Based on number of bedrooms per unit, the minimum suggested patio size is listed in Table 2. Patios must be sloped to drain.

Table 2.
Minimum Patio Size

No. Bedrooms	Min. Area in sq. ft.	Min. Dimensions (ft.)
2	120	10
3	144	12
4	180	12
5	200	12

INSPECTION PROCEDURE

1. Inspect patio slab to ensure that it drains away from housing unit.
2. Inspect patio slab for evidence of separation from housing unit or for uneven settling, causing slab to tilt sideways or toward one corner.
3. Inspect patio slab for open cracks greater than 3/16 in. and for differential settling greater than 1/8 in. from one side of the

crack to the other. Hairline cracking of the slab is acceptable. Inspect for concrete failure such as surface crumbling or pitting.

4. Inspect wood deck support posts and footings for alignment and settlement.
5. Inspect deck for rot, insect damage, and secure fastening. Inspect deck railing, if any, for structural stability.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

If patio exists, it is properly placed and large enough to provide adequate outdoor space. It is in good condition with no significant settling, cracking, or separation from unit. The joint between house and slab is sealed with caulking that is somewhat resilient to the touch. If deck exists, all wood members are free of rot and insect damage; railing, if any, is secure. Posts are adequately supported by footings.

MINOR REPAIRS

Reseal joint between patio and house. Caulk minor cracks that do not exceed vertical displacement limits. If deck exists, re-nail loose decking and refasten railing. Paint if necessary.

MAJOR REPAIRS

Patio or deck is not adequate to serve its purpose. Expand or reconfigure to make it more functional.

REPLACEMENT

Patio or deck does not exist. Patio cracks exceed limits in inspection procedure; settling adjacent to housing unit is evident; or concrete is deteriorating. Remove and replace patio. If deck exists, it is structurally unsound with rot or insect damage. Remove and replace it; consider the use of recycled plastic "wood."

SPECIAL

Other conditions not mentioned above.

5.6 PRIVACY FENCE

PURPOSE

Privacy fences and screening define both an outside area for family activities and individual space.

COMMON DEFECTS

The most common defects include lack of any fence or privacy. Other common defects include deterioration of paint or stain, loose boards and fasteners, rotted rails, boards, and/or posts, insect damage, settling or frost heaving of posts, out-of-plumb or loose posts, missing or damaged gate hardware, and lack of fence uniformity throughout the housing area.

REFERENCES

Army Family Housing Supplement (UFC 4-711-02A), Section 4.4.1, page 49, requires each family dwelling unit to have privacy screening unless it is deemed impractical due to location or density.

INSPECTION PROCEDURE

1. Consider adequacy of height and location of fence or screen for its intended function.
2. Inspect general condition of fence or screen finish. Look for flaking, chalky surface, cracks, fading, and uneven coverage.
3. Inspect boards, rails, and posts for rot and insect damage, especially in areas where water tends to sit without draining and where wood is in contact with the ground. Use a screwdriver to probe into the wood

at high-risk areas to determine if undersurface rot or insect damage exists.

4. Check vertical alignment. It is not necessary to use a carpenter's level or plumb-bob unless the inspector is uncomfortable with visual analysis. A slightly out-of-plumb (about one in. in six ft.) fence is acceptable.
5. Check general sturdiness, especially at the posts. Grasp posts at the top and push and pull. There should be little or no movement if posts are properly set. Inspect board fastenings.
6. If present, check gate hardware by observing smooth swinging and latching. If an unlatched gate opens by itself, it is out of plumb.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Fence or screen is of adequate dimensions and height, is relatively plumb and level, has no sign of rot or insect damage, and has sturdy posts set in concrete. Fasteners are not loose, gate operates and latches freely, and paint or stain is in good condition.

MINOR REPAIRS

Straighten posts, re-nail boards, paint or stain, replace, or adjust gate hardware.

MAJOR REPAIRS

Expand existing fencing to provide adequate privacy. Replace up to 25 percent of the posts, rails, and boards. Re-level, paint or stain. Replace gate hardware.

REPLACEMENT

Fencing is missing and must be added. Remove existing fencing or screen; rebuild with new materials. Consider recycled plastic or other materials that do not require paint or stain.

SPECIAL

Other conditions not mentioned above.

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6.1 ROOF COVERING

PURPOSE

The roof provides a durable waterproof covering that sheds water. Material and slope requirements provide maintainability and residential scale to the neighborhood.

COMMON DEFECTS

The most common defect is deterioration caused by exposure to the sun, heat and cold cycling, and physical damage by wind. Defects are evidenced by broken, curled, or missing shingles in the case of composition (asphalt) or wood shingles; by cracks, blisters, and depressed areas on a flat roof; or by missing or broken shingles on a slate roof.

REFERENCES

Army Family Housing Supplement (UFC 4-711-02A), Section 4.6.1, page 51, sets guidelines for roof coverings. Roofing material is limited to: minimum of 225 lbs. Class A wind-resistant, fiberglass-reinforced asphalt shingles; minimum of 540 lbs., standing or flat seam, metal roofing with 0.027-in.-thick, zinc-copper-titanium alloy finish; or 0.032-in.-thick, aluminum standing-seam roofing. Minimum slope requirements for shingle and tile roofs is 4:12 and for metal roofs 2:12. Other roof covering materials (e.g. clay or concrete tile) should not be used except when dictated by special conditions. The guideline prohibits wood shingles and shakes in new construction.

INSPECTION PROCEDURE

1. Review O&M records to determine if roof leaks have been reported and to determine year of installation and anticipated useful life remaining.
2. Determine if roof covering material and slope provide residential scale to the neighborhood.
3. Inspect composition shingle-covered roofs for the following:
    a. Inspect roof surface for missing, cracked, bulging, or cupped shingles.
    b. Examine sheathing material (usually plywood or wood boards) beneath shingles around roof edges, particularly adjacent to rain gutters. Carefully lift shingles and probe sheathing with a screwdriver to determine if it is deteriorating.
4. Inspect flat roofs. Built-up roof covering usually consists of several layers of asphalt and roofing felt bonded together with asphalt. Insulation may be installed and the entire roofing system may be covered with a layer of fine gravel or stone, or with a mineral surface cap sheet.
    a. Examine surfaces for bubbles or blisters between layers, for cracks in the covering, and for openings in seams between asphalt-covered strips of roofing felt. Inspect surfacing (cap sheet, gravel, and applied coatings).
    b. Note presence or evidence of puddle formation due to depressions in the roof surface. This is a symptom of structural deterioration. Major failure indications may warrant further detailed infrared scanning to determine the extent of damage.
5. Inspect tile- and slate-covered roofs for cracked, broken, or missing units.
6. Inspect metal-covered roofs for rust, corrosion, loosened seams or nails, and physical damage.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Current roof covering is in excellent condition with few if any reports of leaks in O&M records and is less than 10 years old.

MINOR REPAIRS

Roofing is less than 10 years old and in excellent repair except for minor defects that can easily be repaired. Such defects include several broken tiles or an occasional leak.

MAJOR REPAIRS

Roof covering shows obvious signs of weathering or deterioration. Roof leaks have been reported in five percent or more of the units. Only one layer of shingles exists on the roof. Install a new roof covering over the old.

REPLACEMENT

Roof covering shows obvious signs of weathering or deterioration. Roof leaks have been reported in 5 percent or more of the units. Two or more layers of shingles exist on the roof. Remove and replace roof covering and add insulation as appropriate. Wood shingles or shakes are prohibited.

SPECIAL

It may be desirable to replace flat roofs with pitched roofs involving the installation of roof trusses, sheathing, roof covering, flashing, and gutters, and extension of plumbing vent pipes and chimneys as required.

6.2 ROOF FLASHING

PURPOSE

Roof flashing is typically sheet metal (e.g., aluminum, galvanized steel, and copper), roofing felt, or plastic. It is installed to prevent water penetration into roofing beams. The most common locations of roof flashing are at the intersection of roof and chimney, at plumbing vent penetrations, at the intersection of roof and walls extending above the roof, and at the valley formed by two roof sections.

COMMON DEFECTS

The most common defect includes rust or corrosion of metal flashing or separation of flashing from surfaces to which it should be sealed.

REFERENCES

Roofing (UFC 3-110-03), Section 3-5.3, page 22, specifies that flashing must be copper, lead, or stainless steel.

INSPECTION PROCEDURE

1. Inspect attachment of flashing to elements such as chimneys and walls that extend above the roof surface. Note if flashing is loose or if sealants are cracked, missing, or brittle. Inspect tightness of reglets in masonry surfaces.
2. Inspect metal flashing for corrosion and all flashing for deterioration or physical damage.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Flashing is free of rust or other corrosion and shows no signs of physical damage or deterioration. Flashing along walls and chimneys is firmly attached to the vertical surface. Caulking between the flashing and the surface is continuous and somewhat resilient to the touch.

MINOR REPAIRS

Flashing is free of rust or other corrosion. Refasten and seal between flashing and vertical surfaces as required.

MAJOR REPAIRS

N/A.

REPLACEMENT

N/A.

SPECIAL

Other conditions not mentioned above.

Note: Rusted or otherwise corroded flashing must be replaced. Replacement may require removal and replacement of roof covering.

6.3 ROOF TRIM

PURPOSE

Roof overhangs protect siding from rain, ice, or snow, and divert water away from the foundation. In warm and temperate climates, extended overhangs shade windows from the summer sun. In cold climates and for certain designs, roof trim may be reduced to no more than a trim board.

COMMON DEFECTS

The most common defects include rot and insect damage that affect the soffit (panel installed under the overhang) and fascia (board running along the roof edge).

REFERENCES

Army Family Housing Supplement (UFC 4-711-02A), Sections 4.7.3 and 4.7.4, page 53, specifies the type of materials to be used on the roof trim.

INSPECTION PROCEDURE

1. Inspect soffit and fascia for flaking or peeling paint.
2. Inspect soffit and fascia for evidence of rot, insect damage, or other forms of deterioration and weathering. Probe suspect areas with a screwdriver to determine if wood is sound. Inspecting the fascia may require that the rain gutter be pried away from the fascia.
3. Inspect eave and/or soffit vents to ensure they are open, clear, and undamaged.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Paint is in good condition and there is no visible evidence of rot or deterioration.

MINOR REPAIRS

Paint soffit and fascia.

MAJOR REPAIRS

Remove and replace up to 40 feet of soffit and/or fascia. Paint all soffits and fascia boards. Clean out eave vents and replace screens as necessary.

REPLACEMENT

Remove, replace, and paint entire soffit and fascia. Install new eave vents.

SPECIAL

Other conditions not mentioned above.

Note: If fascia is to be replaced, rain gutters and downspouts should be replaced at the same time. This repair is addressed under the procedure for Section 6.4, *Gutters and Downspouts*.

6.4 GUTTERS AND DOWNSPOUTS

PURPOSE

The purpose of gutters and downspouts is to collect and direct rain water and melting snow from the roof to the ground in a way that avoids damage to the roof, walls, and foundation.

COMMON DEFECTS

The most common gutter defects include physical damage or deterioration, improper slope, poor attachment to the fascia, or leaks at seams between gutter sections. The most common downspout defects include detachment from the gutter, poor attachment to the side of the house, and improper positioning of discharge.

REFERENCES

Army Family Housing Supplement (UFC 4-711-02A), Section 4.6.2, page 51, specifies gutters and downspouts shall be provided for all roof areas with downspouts draining onto a lower roof with metal or plastic splash deflectors and concrete splash blocks under downspouts if not connected to storm drainage system.

INSPECTION PROCEDURE

1. Inspect inside of gutters for corrosion and for standing water that indicates improperly sloped gutters. In the absence of standing water, improper gutter slope or low spots are evidenced by an accumulation of mud or silt on the bottom of the gutter.
2. Inspect mounting brackets or nails that connect gutter to fascia. Pull firmly on gutter to ensure that fasteners cannot be disconnected from house. In areas of potential ice build-up, twice as many fasteners are needed.
3. Inspect seams in gutter sections, if present, to determine that sealing compound inside the gutter is sound and provides a water-tight seal. Look at the underside of gutter for staining that may indicate a water leak.
4. Inspect attachment of downspout and gutter by firmly pulling on downspout to ensure that the attachment cannot be disconnected.
5. Inspect bottom of downspout to ensure that water discharge is not directed onto a walkway or toward the foundation. A splash block should be positioned under the downspout or the downspout should be connected to a hose or drain to direct discharged water away from foundation.
6. Check for the use of dissimilar metals (copper, aluminum, galvanized or ungalvanized metal used together), which could result in uncontrolled corrosion of one type of metal.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

All gutters and downspouts are firmly attached, properly sloped, and free of corrosion and leaks.

MINOR REPAIRS

Gutters and downspouts are free of corrosion. Replace mounting brackets, ensuring proper slope. Reseal joints as needed. Reattach downspouts to gutters and house. Replace defective splash blocks.

MAJOR REPAIRS

N/A.

REPLACEMENT

Replace entire gutter and downspout system; refinish fascia boards.

SPECIAL

Other conditions not mentioned above.

7.1 FOUNDATION

PURPOSE

The foundation supports the weight of the house. The three foundation types described below are basement, crawl space, and concrete slab-on-grade. Foundation walls are usually either concrete block or poured concrete.

COMMON DEFECTS

The most common defects are excessive cracking, differential settling, and water leakage in basements. CAUTION: Because foundation failures are often undetected until revitalization begins, extensive cost overruns can occur.

REFERENCES

N/A.

INSPECTION PROCEDURE

1. Inspect exterior perimeter of foundation for cracks in concrete or cracks in mortar between blocks. Minor cracking is normal. Crack openings in excess of 1/8 in. or cracks with differential settling of wall sections on either side of the crack may indicate a serious foundation failure.
2. Inspect interior and exterior foundation perimeter for corner or center settling or up-lift. Attach a string to the top of the foundation corners and pull taut. Settling or up-lift at corners or along length of a side will be evident by a space between top of foundation and string. Displacement in excess of one in. may indicate a serious condition.
3. In basements, check interior foundation wall and floor surfaces for cracks and evidence of water leaks. Check basement floor drain operation by pouring water into drain. If sump pump is present, check sump pit for accumulation of water. Check operation of pump.
4. In crawl spaces, check for moisture, condensation, or standing water by looking into crawl space scuttle. A vapor retarder should completely cover the ground surface and be free of tears and holes.
5. Inspect interior walls, doors, windows, and floors for symptoms of foundation settlement or up-lift such as doors either out of plumb or sticking against jambs and cracks in drywall or plaster.
6. Check several points on floor with a carpenter's level. A sloping floor indicates differential settlement or up-lift in the foundation system. In older housing units, limited settlement or up-lift may not be a serious condition as long as other symptoms are not apparent.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Foundation wall or slab displays no significant evidence of cracking, differential settling, or other movement. In basements, no evidence of water leaks is apparent. If crawl space is present, floor insulation meets recommended level.

MINOR REPAIRS

Foundation wall or slab displays minor (1/8 in.) cracks with no horizontal or vertical displacement across the crack. Patch and seal cracks. If crawl space is present, install vapor retarder. Upgrade or repair insulation in crawl space.

MAJOR REPAIRS

Foundation wall or floor slab has cracks with differential horizontal or vertical displacement across the crack. Interior and/or exterior wall coverings show minor cracking. Doors and windows may stick and floors may slope somewhat. Jack floor to level and support with shims, footers, or piers. If basement is present, repair waterproofing or, if this is not feasible, consider installing a collection system with sump pump.

REPLACEMENT

Foundation or slab displays major cracking or structural failure. Symptoms of foundation failure are evident on interior and exterior walls above the foundation. Repair by perimeter excavation; jack and level slab or wall; and support with footers or piers. If basement is present, repair or replace waterproofing and add external insulation board with waterproof treatment.

SPECIAL

CAUTION: Extensive foundation failures often lead to a decision to demolish and replace the structure. Obtain professional engineering and architectural analysis before deciding whether to repair or replace severely damaged foundations.

7.2 CRAWL SPACE CONDUCTIVE HEAT LOSS

PURPOSE

Many homes were built when the cost of energy was low and fuel was not fully recognized as a strategic resource. These homes can benefit from thermal insulation improvements. Potential reductions in conductive heat losses can be substantial. Housing rehabilitation often presents the opportunity for relatively easy upgrades of R-values in the floors above crawl space foundations.

COMMON DEFECTS

In many older homes, insulation of crawl spaces was routinely neglected. In some homes, the insulation may be less than currently required, could be damaged or otherwise degraded.

REFERENCES

Table 3 presents the minimum R-values for floors of housing units specified by 2009 IECC by climate zone. These also coincide with IECC climate maps and tables located in the Appendix.

Table 3.
Nominal R-values for Floors

Zone	R-Value	Thickness
1	13	3.5
2	13	3.5
3	19	5.5
4	19	5.5
5	30	9.5
6	30	9.5
7 & 8	38	12

INSPECTION PROCEDURE

Check the thickness of batt insulation between floor joists. (If access to space between the joists is not possible, determine the insulation level from plans or maintenance records.) Compare the thickness to the required level in Table 3 and make a notation of both the actual and the required R-values. Inspect the condition of the insulation to ensure that it is not torn, sagging, wet, etc.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

The house is in compliance with all thermal insulation requirements of Table 3.

MINOR REPAIRS

Make minor repairs to insulation.

MAJOR REPAIRS

Upgrade existing insulation in floor joist spaces over a crawl space up to the minimum value presented in Table 3 or replace 50 percent of existing insulation.

REPLACEMENT

No insulation present or existing insulation requires replacement.

SPECIAL

Other items not mentioned above.

7.3 MASONRY CHIMNEY

PURPOSE

The chimney is a masonry structure for venting smoke and gas from a combustion furnace, fireplace, or appliance.

COMMON DEFECTS

The most common defects include cracked or deteriorating joints or chimney cap, improper height or clearance from surrounding structure, deteriorated flue lining, accumulation of soot, and inoperative dampers.

REFERENCES

Not Applicable.

INSPECTION PROCEDURE

1. Inspect chimney for cracks, missing mortar, presence (or absence) of flue liner, separation of flues, wall thickness, height over roof, and settling (separation from building or sinking in relation to siding).
    a. A fire-clay flue liner with outer walls at least 5/8 in. thick should be present inside the chimney. Mortar joints between flue liner sections should be of a high-temperature mortar type and should be sound.
    b. Two flues located in the same chimney should be separated by a four-in. solid masonry divider wall.
    c. Masonry chimney walls must be at least four in. thick.
    d. Top of the chimney must extend vertically at least three ft. above the point where it penetrates the roof and at least two ft. above any portion of the house or roof within 10 ft. of the chimney.
2. Inspect the clean-out door, usually located inside the house near the base of the chimney. The clean-out should be equipped with a tight-fitting door and be located at least 12 in. below the lowest flue inlet opening. Shine a flashlight up the flue. With a mirror, inspect inside of flue for loose or missing mortar between liners and for clogging with soot.
3. If masonry fireplace exists, inspect mortar joints for loose mortar. Check the damper operation by burning a piece of paper in the fireplace with the damper open and then closing the damper while smoke is present to see how well the damper seals. Look up the chimney. If the sky is visible, no smoke shelf exists and the fireplace should be sealed or removed.

4. A clay thimble should be present where the vent pipe enters the masonry chimney.
5. No gas- or oil-fired appliances should share a chimney with a fireplace.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Chimney is of sufficient height, and brick or concrete masonry is in good condition. Liner is present and in good condition, and flue is not clogged with soot. If fireplace exists, damper operates correctly, smoke shelf is present, and mortar is solid.

MINOR REPAIRS

Repoint mortar joints in places. Clean flue. If fireplace exists, adjust damper and repoint masonry.

MAJOR REPAIRS

Same as minor repairs plus replace missing bricks and cap. Install a clean-out door at base of chimney.

REPLACEMENT

Remove and replace chimney.

SPECIAL

If a fireplace exists and is in poor repair or lacks a smoke shelf, it should be sealed or removed.

7.4 EXTERIOR WALL STRUCTURE

PURPOSE

The exterior walls transmit roof loads to the foundation and resist wind and seismic loads. In addition, the walls provide a part of the envelope that separates the environmentally controlled space from the outdoors. The exterior wall is commonly framed with either 2x4 wood studs spaced 16 in. on center or concrete block.

COMMON DEFECTS

The most common defects in wood-frame structural walls include insect damage caused by termites or carpenter ants, rotting caused by excessive moisture, and sagging headers over openings. The most common defects in concrete block walls include cracking due to settling of the foundation and loose or missing mortar. Both types of walls may have inadequate insulation and sealing ability against outside air infiltration.

REFERENCES

Family Housing (UFC-4-711-02A), Section 4.7.6, page 55, specifies that use of "Advanced Framing Techniques – Optimum Value Engineering (OVE)" framing is recommended.

INSPECTION PROCEDURE

Note: Because the wood-frame exterior wall structure cannot be inspected visually, its structural integrity is not necessarily apparent. However, many observable symptoms can provide an indication of structural problems.

1. Look at the roof/wall intersection to see if the roof appears to sag at any point along the wall. If so, determine if the foundation is level at that point and refer to Section 7.1, *Foundation*. If the roof sags and the foundation is level, a structural failure within the wall is likely.
2. Inspect siding for buckling or pulling away from the wall. Look for loose siding fasteners that may indicate deterioration of the framing or sheathing.
3. From a distance, look at the vertical alignment of all exterior walls (especially at corners) to determine if they have racked.

4. Look for excessive deflection in headers (more than 3/8 in.), particularly over wide window and patio door openings.
5. Look for discolored, mildewed, or rotted siding or sheathing. If surface materials have deteriorated, framing beneath may also have deteriorated.
6. Inspect window and door frames for secure fastening. A loose frame may indicate that the structural framing has deteriorated at that point.
7. Look for excessive cracking of interior gypsum wallboard. Cracking is not necessarily an indication of structural failure but, if combined with other observable symptoms, could signify serious foundation problems.
8. Moisture stains on interior gypsum wallboard, especially at wall and ceiling corners and near the base of exterior walls, indicate a build-up of moisture in the exterior wall. If gypsum wallboard is replaced, check framing for structural soundness and fill cavity with insulation.
9. In areas of termite infestation, look for termite mud tubes both inside and outside the foundation. Subterranean termites build mud "tubes" from the ground to untreated wood. Evidence of such tubes indicates that termites have entered the exterior wall framing.
10. Damage by carpenter ants is not normally critical from a structural point of view. However, in extreme cases of long-term infestation, structural damage can occur. Carpenter ants are large black ants that are 1/4 to 1/2 in. long. Carpenter bees resemble large bumblebees and bore an almost perfectly round 3/8 in. hole in exposed wood, usually in trim. Only rarely do carpenter bees have access to structural members.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

No evidence of structural failure exists.

MINOR REPAIRS

Not Applicable.

MAJOR REPAIRS

Jack up and brace floor or roof over opening; remove and replace header with adequate member.

REPLACEMENT

Structural damage is evident. Remove interior gypsum wallboard and/or exterior siding and sheathing at the area of damage; brace roof; replace damaged wall framing, gypsum wallboard, sheathing, and siding; bring wall insulation up to standards shown in Table 13, and use new exterior siding products to improve tightness of the house and exterior appearance.

SPECIAL

In the unlikely event that structural damage is so severe that it is impractical to replace only a portion of the exterior wall framing, it may be advisable to consider demolition.

7.5 EXTERIOR WALL FINISH

PURPOSE

Exterior wall finishes provide an attractive covering for the building and protect it from the weather.

COMMON DEFECTS

Several defects in exterior wall finishes are common. Masonry walls may be cracked and mortar may be loose. Wood siding may be bowed, warped, split, or delaminated; finish may be cracked, peeling, faded, or stained; or

fasteners may be rusted. Metal or vinyl siding may be loose, faded, dented, cracked, bowed, or wrinkled. Stucco may be cracked, faded, or stained.

REFERENCES

Family Housing (UFC-4-711-02A), Section 4.7.1, page 52, provides specifications for brick, masonry units, stucco, aluminum and steel siding, hardboard, and vinyl siding. Aluminum or steel siding should not be used within six ft. of the finished grade. All houses shall have house numbers.

INSPECTION PROCEDURE

1. Inspect masonry for cracks and loose mortar. Check brick for faces that may have split off.
2. Inspect wood siding products for warps, splits, delamination, swelling, rusted fasteners, stained finish, and faded or peeling paint.
3. Inspect aluminum or vinyl siding for loose siding, fading, dents, bows, or wrinkles.
4. Inspect stucco for cracks and discoloration.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

No cracks, splits, warps, dents, wrinkles, looseness, or rusted nails are apparent in siding. Masonry mortar joints are in good condition and brick faces are intact. No apparent cracks in stucco. Paint is in good condition.

MINOR REPAIRS

Re-point up to 10 percent of brick or masonry unit mortar joints. Patch minor stucco cracks. Make minor repairs to other siding types.

MAJOR REPAIRS

Re-point brick or block mortar joints. Repair large areas of stucco surface with a new top coat. Refinish all siding surfaces.

REPLACEMENT

Replace exterior wall coverings. Consider alternative wall finishes, taking into account future maintenance requirements. Upgrade insulation levels as necessary. If exterior siding is to be removed, add cavity insulation and, if required, add insulating sheathing and/or polystyrene board insulation. In the exterior wall finish notes, indicate if cavity wall insulation and/or foam board insulation will be installed from the exterior. Note also existing and required R-values.

SPECIAL

Expansive or weak clay soil, unusual frost, flood, or earthquake has caused the foundation to settle or heave, breaking the masonry or stucco finish above. The foundation must be repaired or replaced before masonry or stucco can be repaired or replaced.

7.6 PORCH/STOOP

PURPOSE

Entry porches or stoops provide safe, convenient access into the house, are typically constructed of concrete, include one or more steps, and may be covered with a roof projection.

COMMON DEFECTS

The most common defects include inadequate tread width or landing size, risers of different heights and treads of different depths, severely out-of-level steps and/or landing caused by settling, and separation of the stoop or porch from the living unit. If roof exists, common defects include rotted

supports, sagging roof, and/or leaky flashing. If railing exists, common defects include loose, rotted, rusted, or otherwise unsafe railing.

REFERENCES

Family Housing (UFC-4-711-01), Section 4.7.5, page 20, requires all houses to have an individual house number, doorbell, and slip-resistant finish for porch surfaces.

INSPECTION PROCEDURE

1. Inspect overall condition of steps and landing. Look for cracking and spalling, concrete. Hairline cracks are normal and acceptable. Cracks greater than 1/8 in. in width or vertical displacement are unacceptable and must be repaired. Exposed aggregate or loosened pieces of concrete are unacceptable. Check connection of stoop/porch to dwelling unit. Separation of greater than 1/2 in. is unacceptable. Stoop/porch should slope slightly (3/4 in. in three ft.) away from house to provide drainage. Surfaces should have a rough finish for slip resistance.
2. If the porch or stoop is more than 30 in. above grade, a railing should be present on both sides of the steps and around the landing. Railing must have intermediate rails or patterns such that a four-in. sphere cannot pass through. If railings exist, inspect attachments to concrete and house and check general condition. If railing is metal, inspect for rust. If railing is wood, look for rot and/or insect damage; probe with screwdriver into suspect areas to uncover subsurface damage. Push and pull top of railing to test fastening. Inspect condition of paint.
3. If roof exists, inspect roof and supports. Roof edge should be level. Check condition of support posts, if any. Check attachment to porch and roof by shaking post. Inspect condition of braces, if any, for firm connection to house and roof frame. Inspect for rot or insect damage and for paint condition. Inspect roofing material for signs of leaking, cracking, and curling and for color match with house roof. Check flashing. Excessive signs of patching or other repairs make the roof a candidate for replacement. Inspect ceiling, if any, for firm attachment to roof frame and for condition of paint.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Concrete has minimal hairline cracks and no aggregate is showing. Connection with dwelling unit is within acceptable tolerance. Widths, heights, and depths meet requirements. If railings exist, they are secure and in good repair. If roof exists, supports are firmly fastened and wood shows no sign of rot or insect damage. Roof is level, roofing is in good condition with no signs of leakage, and flashing is properly installed. Ceiling, if any, is securely fastened to frame and does not sag. Paint is in good condition.

MINOR REPAIRS

Clean cracks and fill with concrete caulking; tighten railing connections to concrete and to house; caulk stoop/porch connection to dwelling unit; and paint exposed wood or metal surfaces.

MAJOR REPAIRS

Same as minor repairs for concrete work plus replace or add railing; replace roof support posts or braces; replace roofing and flashing; replace ceiling; and paint exposed wood surfaces.

REPLACEMENT

Remove and replace entire stoop/porch, railings, and roof.

SPECIAL

Other conditions not mentioned above.

7.7 BALCONY

PURPOSE

Balconies are sometimes used to provide outdoor living space for second-story living units.

COMMON DEFECTS

The most common defects include deterioration of guardrails, decking, or structural supports.

REFERENCES

Family Housing (UFC-4-711-02A), Section 4.4.2, page 49, specifies minimum balcony area as 72 sq. ft., with a minimum dimension of six ft. Direct access from the balcony to the living room, dining room, or family room is required.

INSPECTION PROCEDURE

1. Inspect balcony for separation from outside wall of housing unit.
2. For wood balconies, inspect wood flooring for attachment to framing and for signs of excessive wear, rot, or insect damage. For concrete balconies, inspect for open cracks (closed hairline cracks are acceptable).
3. Inspect guardrail, support posts, and wall attachment for evidence of rust or corrosion. Guardrails must have intermediate rails or patterns such that a four-in. sphere cannot pass through. Grasp the top center of the guardrail and firmly push and pull. There should be no indication that the guardrail is loose or may fail.
4. Inspect structure from below, looking for rot, insect damage, concrete cracks, separation from building, and rot or corrosion of supporting members.
5. Use carpenter's level or pour water on balcony to see that it slopes away from the building.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Balcony is adequately sized, structurally sound, and properly sloped. Guardrail is firmly attached with no evidence of deterioration or corrosion.

MINOR REPAIRS

Balcony is adequately sized, structurally sound, and properly sloped. Guardrail and guardrail connections to housing unit are deteriorating and need replacement.

MAJOR REPAIRS

Structure is sound, but all decking and guardrails need replacing.

REPLACEMENT

Balcony is not structurally sound. Remove and replace.

SPECIAL

Other conditions not mentioned above.

7.8 EXTERIOR STAIRS

PURPOSE

The purpose of exterior stairs is to provide access to second-story housing units and basements.

COMMON DEFECTS

The most common defects include structural deterioration, unsafe tread and riser dimensions, and low slip resistance in foul weather.

REFERENCES

Family Housing (UFC-4-711-02A), Section 4.4.4, page 49, specifies exterior stairs have a minimum width of 1.1 m (three ft. six in.). They should not be made of wood.

INSPECTION PROCEDURE

1. Check O&M records for occupant complaints regarding structural stability or hazardous nature of exterior stairs.
2. With a carpenter's level and measuring tape, measure how far treads are out of level. Treads more than 1/4 in. out of level are considered dangerously sloped.
3. Walk heavily on wood steps to determine if treads are weak. Inspect for rot and insect (e.g., termite) damage and examine condition of paint or stain.
4. Walk heavily on metal steps to determine if treads are weak. Inspect for rust or corrosion and examine finish to determine if a new coat of paint is needed.
5. Inspect concrete steps for spalling and for broken tread edges.
6. Push and pull firmly on handrails to see if they are securely fastened. Open guardrails must have intermediate rails or patterns such that a four-in. sphere cannot pass through.
7. Pour water on treads to check for pooling and potential ice formation.
8. Examine treads and landings to determine their skid resistance. Skid resistance may be provided by a non-slip strip applied to the tread surface or by surface roughness created in the manufacturing or construction process.
9. Inspect for the presence of a light fixture at the top and/or bottom of the stairs for providing night illumination.
10. Inspect roof and wall enclosure, if any, for general condition.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Steps are correctly sized, structurally sound, and sloped to drain water. Treads are uniformly deep, risers are uniformly high, and illumination is adequate. Concrete treads and landings have rough finish for slip resistance, metal treads are manufactured with rough surface, and wood treads have nonslip strips applied to the surface of the wood. Railings, treads, and structural members of the steps are sound and free of rot or rust.

MINOR REPAIRS

Stairs are lighted, correctly sized, and structurally sound but need painting. Tighten railings, paint railings, and paint or reseal stairs.

MAJOR REPAIRS

Railing is weak or unsound. Several treads or landings are cupped and may hold water. Nonslip surface needs to be added. Concrete needs minor caulking and repairs. Replace railing and some cupped or split wood treads; add slip-resistant surface treatment; and caulk and reseal concrete steps.

REPLACEMENT

Exterior stairs are unsafe due to rotted or deteriorated wood, rusted or corroded metal, or cracked or deteriorated concrete. Remove and replace stairs.

SPECIAL

Other conditions not mentioned above.

Note: Roof and wall enclosure, if any, should be assessed according to applicable criteria for Chapter 6, *Roof System* and Section 7.4, *Exterior Wall Structure*.

7.9 DOORS

PURPOSE

Exterior doors provide entry to and exit from the house as well as security and energy efficiency.

COMMON DEFECTS

The most common defects include dirt-stained or deteriorated finish and minor physical damage such as nicks, dents, and gouges. Other defects may include excessive air leakage, door swinging to the outside, loose hinges, missing or inoperable hardware and locks, or missing storm or screen door. Failure of the door to swing freely and binding of the door in its frame can be caused by sagging or warping of the door and/or door frame or by movement or settling of the building.

REFERENCES

Family Housing (UFC-4-711-02A), Section 4.7.7, page 55, specifies that exterior doors should be an insulated type for energy performance. Dead-bolt locks are required on all hinged entry doors. Impact-resistant glass for side lights at entry door or a wide-angle viewer is required for security. Exterior door energy rating should comply with ENERGY STAR®. The housing unit primary entrance door shall be three ft. in width by six ft. eight in. in height by 1 3/4 in. thick of metal construction. Other housing unit entrance doors should meet this requirement but may be of lesser width. Aluminum screen and storm doors when used should have self-storing feature. Frames shall be a minimum of 1 1/4 in. thick and two in. wide. Aluminum alloy materials shall be not less than 0.05 in. thick and two in. wide. Doors shall have solid bottom panels and midsection protective grills. Screening materials shall be nonferrous.

INSPECTION PROCEDURE

1. Check doors for condition of the finish and general physical condition. Check for warping and sagging of door, out-of-squareness of opening, and rotting of frame, thresholds, or sills.
2. Check for presence and condition of threshold and weather stripping. Note any open crack between bottom of door and sill.
3. Check presence and operating condition of knobs, latches, locks, deadbolts, strike plates, and hinges.
4. Check operation of the doors and note if they fail to swing freely, do not latch when closed, or bind in their frames.
5. Check for presence of screen and/or storm doors.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Doors are in good condition with all hardware intact, require no refinishing or painting, swing freely in their frames, and latch and lock when closed.

MINOR REPAIRS

Refinish doors and tighten hinges and other hardware.

MAJOR REPAIRS

Same as minor repairs plus replace hardware and/or locks; adjust swing, replace weather

stripping, and replace storm and/or screen doors for wood units or screen doors.

REPLACEMENT

Replace exterior doors.

SPECIAL

Other conditions not mentioned above. Binding of a door in its frame and door frames that are out of square may be related to settling of the foundation. This problem is addressed in Section 7.1, *Foundation*.

7.10 WINDOWS

PURPOSE

Windows provide natural light, ventilation and means of emergency egress in the event of a fire. Windows must meet minimum egress requirements in NFPA 101, Life Safety Code.

COMMON DEFECTS

The most common defects include inoperable sashes, broken window balance, broken panes, rotted sills and frames, cold drafts around windows in the winter, and missing storm windows or inadequate glazing for weather conditions.

REFERENCES

Family Housing (UFC 4-711-01), Section 4-7.2, page 19, specifies that operable windows must be manually operated and lockable. Screens are required for operable windows in habitable rooms and spaces and must be made of non-ferrous material. When window replacement is justified, window energy performance should comply with ENERGY STAR recommendations. Tilt-in windows are recommended to facilitate cleaning. Windows above ground floor should have screens capable of withstanding a minimum force of 60 pounds as a concentrated load applied to the middle of the screen. Screens must be removable for window cleaning and emergency egress purposes without the use of any special tools. Removable window guards or child safety locks may be provided in lieu of reinforced window screens.

INSPECTION PROCEDURE

1. Examine O&M records to determine reports of inoperable window sashes or excessive cold drafts around windows in the winter.
2. Observe house from curbside to note if window size and placement are in harmony with the overall house style and design.
3. Inspect each window for the following:
    a. Glazing putty, if present, should be smooth, free of cracks, and not brittle.
    b. Window sash and frame material should be in good condition; any metal should be well painted and/or free of corrosion; any wood should be solid, well painted, and free of weathering cracks or splits; and any vinyl should be free of cracks.
    c. The exterior window trim should be well caulked to the siding in which the window is installed. Caulk should be continuous and should not be brittle.
    d. Ensure that a screen is available for each operable window and that each screen is in good condition.
4. Note the type of glazing in each window and whether a storm sash is present or available and is in good condition. Note whether windows are double- or single-glazed and/or whether storm windows are available.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Windows appear to be in excellent condition with no sign of weathering or other deterioration of sash or frame. Frame is well sealed around the perimeter of the wall opening in which the window unit is installed. Window must be operable, dual pane or insulated glass, and must have an insect screen.

MINOR REPAIRS

Replace glazing putty and repaint or refinish window frames. Replace broken panes or sash. Repair screen. All other aspects of the windows are in excellent condition.

MAJOR REPAIRS

Same as minor repairs plus replace storm windows and/or screens on all windows. Replace entire window unit in bathroom due to moisture damage.

REPLACEMENT

Remove all old windows and replace with new energy-efficient units in accordance with Family Housing standards.

Note: Replacement is rarely justified by expected energy savings alone. Window replacement may, however, be justified by window condition, excess air leakage, or inside condensation or frosting that damages sills and walls.

SPECIAL

Other conditions not mentioned above.

8.1 OVERALL FUNCTIONAL ANALYSIS OF THE HOUSE

SIZE

Design review should incorporate data from the housing manager who provides information on the types and sizes of families that will need housing. Floor plans for each housing type should be examined to determine if reconfiguration of the plan or expansion of floor space is needed to bring the units in line with Army guidelines for Family Housing.

Because reconfiguration or expansion of living areas is expensive, careful consideration should be given to ensure that the benefits are commensurate with cost. Minor flaws should not necessarily be candidates for corrective action if they do not endanger the health or safety of the occupants. However, major flaws that are incompatible with contemporary living styles are candidates for corrective action. Anytime floor plan modifications are recommended, future occupants should realize a major benefit. Relocating a wall several inches does not provide this benefit and is not justified. Plans for the redesign should always consider the aesthetics of the house and property.

The visual impact from the street (curb appeal) and from the front entrance is extremely important when making large investments in the property and houses. Add-ons to the outside of the shell of the house that are not in keeping with the style of the house and neighborhood may meet one functional requirement but may not meet the overall goal of totally functional and attractive housing and neighborhoods.

UNIT SIZE BENCHMARKS

An important consideration in evaluating floor plans for Army Family Housing is the unit floor area (Table 4) in accordance with pay grade. Gross area is defined as the living space inside the exterior and party walls. Net area excludes exterior and party walls; utility and laundry rooms; interior and exterior bulk storage; washer and dryer closet (not to exceed 30 sq. ft.); furnace, domestic water heater, and solar equipment spaces; stairwells; landings (not to exceed 10 sq. ft.); walls and interior spaces specifically designed for passive solar systems (other than required habitable areas); weather vestibules (not to exceed 16 sq. ft.); unfinished attic and basement space; patios/balconies and terraces; carports and garages; increases required to meet accessibility standards; and open or screened porches without heating or air conditioning.

Some older units are significantly below current standards and must be improved by adding to floor area or modifying the floor plan. It may not be possible to adhere precisely to the specified floor areas, so houses up to 10 percent smaller than the maximum may be acceptable as long as all functional requirements are adequately addressed. Existing units which exceed the allowable size limit need not be reduced to the limit during revitalization.

FUNCTIONAL AREAS

Basic functional areas of the house are the primary concern in the design review and include entry, entertainment, food preparation, eating, sleeping, bathing, laundry, and storage areas. Outdoor living space such as patios, decks, and balconies and facilities such as automobile parking, entry

Table 4. Programming Benchmark Minimum Size of Living Units by Pay Grade		
Pay Grade	**Number of BR**	**Gross Square Feet**
O7 and above	4	3,330
O6	4	2,520
O4 and O5	4	2,310
	3	2,020
O1 to O3	5	2,510
	4	2,150
	3	1,860
	2	1,180
E1 through E6	5	2,300
	4	1,950
	3	1,630
	2	1,180

Note: Gross floor area may be increased by a maximum of 10 percent for officers holding special command positions as designated by the Secretary of Defense, Commanding Officers of military installations, and the senior noncommissioned officer of a military installation. The law permits a five percent increase or decrease in these limitations the modification will permit a turnkey proposer to offer "off-the-shelf" designs currently being constructed in the commercial marketplace. The increases listed in Table 4 are the maximum allowed regardless of whether the units are procured by conventional design/bid or turnkey methods. The maximum gross floor area may also increase indoor activity room by 300 sq. ft. if the installation records more than 7,500 heating degree days annually.

walkways, porches, and stoops should also be considered during design review.

FLOOR PLAN MODIFICATION

Many existing family housing units have floor plans that are satisfactory and do not warrant modification, even though they do not meet all of the guidelines. However, wherever possible, the revitalization plan should include certain basic features for enhanced livability of the units. Such features include:

1. Separate bathroom for master bedroom in three-, four-, and five-bedroom units.
2. First-floor half-bath or powder room in two-story units.
3. Dishwasher and garbage disposal in kitchens.
4. Laundry area large enough for washer and dryer in all units.
5. Storage areas in all units.
6. Electrical system with grounded outlets.

Some of the more basic floor plan changes that can be made are addition, removal, and/or relocation of interior partitions to alter circulation patterns, separation of functional areas, provision of more open living space, reallocation of space among functional areas, or the creation of new functional areas. Somewhat more complex changes may include the rearrangement of functional areas to produce a completely new floor plan. Other design concepts include moving or adding family rooms, bedrooms, or bathrooms. Generally, additions should be considered to correct major deficiencies or to meet minimum requirements.

Design changes result in costs that are difficult to estimate without specific information about those changes. However, rules of thumb can provide reasonable estimates for certain types of design changes.

The following examples show how existing floor plans can be modified to meet program objectives:

EXAMPLE 1:

Living space in a four-bedroom duplex was expanded without adding to the gross square footage of the unit.

1. The kitchen was reconfigured to expand living space as follows:
    a. The storage closet and utility area for the washer, dryer, and water heater were relocated.
    b. An eat-in area was added.
    c. A new double-sink, range, and oven were installed.
2. The carport was extended to accommodate a utility room for the washer, dryer, laundry tub, freezer, and water heater; a large interior storage room; and an area for exterior storage, accessible from the utility room.
3. A screened patio was added, accessible from the living-dining room.
4. The heater was moved from its position adjacent to the front door and accessible by a separate door to the outside, to the former coat closet space, accessible from the interior hall. This relocation improved the appearance of the house entry area.
5. The coat closet was moved from the interior hall to the foyer.
6. The former storage closet located in the interior hall was replaced by a small second closet for the largest bedroom and a large linen closet accessible from the hall.

EXAMPLE 2:

The kitchen of a one-story three-bedroom duplex was reconfigured and space added outside the standard gross square footage to accommodate a utility room and storage.

1. The kitchen was reconfigured to expand living space as follows:
    a. The large interior storage closet and utility area for the washer, dryer, and water heater were relocated.
    b. An eat-in area was added.
    c. A new double-sink, range, and oven were installed.
2. A large storage closet was relocated from the bedroom hall area and the water heater put in its place.
3. The furnace and coat closet were swapped in the foyer and entrance hall to improve the appearance of the foyer.
4. The carport was extended to include additional exterior storage, accessible from the outside, and a large interior storage area, accessible from the added utility room.
5. A utility room for the washer, dryer, and laundry tub was added adjacent to the kitchen and carport and accessible from the kitchen.
6. A screened patio was added adjacent to the kitchen, living-dining room, and utility room and accessible from the living-dining room.
7. Bedroom closet doors were replaced with bi-fold doors.

8.2 FOYER

PURPOSE

The foyer is the principal point of entrance to and exit from the housing unit.

COMMON DEFECTS

The most common design defects include poor definition of main entry area, lack of separation from other rooms/functional areas, inadequate size, absence of coat closet, inadequate lighting, and inappropriate flooring materials.

REFERENCES

Army Family Housing Supplement (UFC 4-711-02A), Section 4.3.6, page 39, requires the foyer be located adjacent to the living room, each foyer should be lighted and have direct access to the living room. Access to other areas such as the kitchen, hall, or stairs should be provided without having to pass directly through the living room. Foyers should be a minimum of four ft. square and located near a coat closet.

INSPECTION PROCEDURE

1. Inspect walls, ceilings, floors, trim, windows, doors, and electrical system in accordance with the guidelines in Section 8.1, *Overall Functional Analysis of the House*.
2. Observe functional relationships between the main entry area and other areas of the house. The entry should be located in or adjacent to the living room but should provide access to other areas without requiring passage through the living room.
3. Note whether a coat closet is present in or convenient to the main entry area.
4. Observe and note available light levels (natural and artificial).
5. Check to see if entry door opens inward at least 90 degrees.
6. Determine if flooring is of a durable, moisture-resistant material.

SCOPE OF REVITALIZATION

Complete redesign of the house because of an inadequate foyer is neither practical nor desirable. However, if other rooms are being redesigned, the foyer area should be considered within the total plan.

FULLY ADEQUATE

Foyer meets all requirements.

MINOR REPAIRS

Minor rearrangement is needed to meet requirements. Repair walls, ceiling, floors, trim, windows, and doors and paint. Upgrade electrical system with grounded outlets (if a ground wire exists in the outlets).

MAJOR REPAIRS

Enlarge, reduce, rearrange, or change style of exterior windows and/or doors. Replace wall and/or ceiling surfaces, trim, doors, or windows. Add sound insulation to walls as needed.

REPLACEMENT

Expand or relocate foyer into adjacent or newly constructed floor space, provided it does not exceed the programming benchmark floor area limitation.

SPECIAL

Conditions not noted above.

8.3 LIVING ROOM

PURPOSE

The living room is the principal formal meeting space for occupants of the housing unit.

COMMON DEFECTS

The most common design defects include a poor floor plan that directs traffic through living room; main entry door that opens directly into living room; and arrangement of exterior windows and doors or interior door swings that make furniture placement difficult or awkward.

REFERENCES

Family Housing (UFC-4-711-02A), Section 4.3.10, page 40, specifies that the living room should have direct access to the front entrance foyer and to the dining area without requiring passage through another room. The minimum dimension for a living room is specified as 11 ft. 8 in. The entertainment area can be the living room and/or family room in units with three or more bedrooms. The kitchen's food preparation areas should not be in direct sight of the living room. Similarly, bathrooms should not be in direct sight of the entertainment area. The living room should include one wall with a minimum length of 10 ft. to accommodate a sofa and end tables.

INSPECTION PROCEDURE

1. Inspect walls, ceilings, floors, trim, windows, doors, and electrical systems in accordance with the guidelines in Section 8.1, *Overall Functional Analysis of the House*.
2. Review housing unit floor plan.
3. Observe functional and circulation relationships between living room and other rooms.
4. Note exterior window arrangements, available natural light, views to exterior, and ventilation.
5. Visualize furniture arrangement. Note circulation and traffic patterns within the room.
6. Determine if there is adequate sound attenuation in common walls between the units.
7. Check plans and maintenance records for insulation records or consult with installation staff. If cavity insulation levels for exterior walls need to be upgraded from the house interior, indicate by circling points in the Red column. Also, note existing and required R-values.

   It is probably not practical or economic to open exterior walls just to upgrade insulation. If walls are in good shape, insulation can be blown into walls but may not provide the full R-value per Table 13. If the walls are damaged and must be rebuilt, then the insulation should be brought up to the full R-value in Table 13 by filling the wall cavity. Add foam board to exterior as necessary (see Section 7.5, *Exterior Wall Finish*).

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Living room is in excellent condition, is adequately sized and configured, well lighted, and located to minimize through circulation to other areas of the house.

MINOR REPAIRS

Repair walls, ceiling, floors, trim, windows, and doors. Upgrade electrical system with grounded outlets (if a ground wire exists in the outlets).

MAJOR REPAIRS

Enlarge, reduce, rearrange, or change style of exterior windows. Replace wall and/or ceiling surfaces, trim, doors, or windows. Add sound insulation to walls as needed.

REPLACEMENT

Expand or relocate living room into adjacent or newly constructed floor space, provided it does not exceed the programming benchmark floor area limitation. If cavity wall insulation requires upgrading from the interior of the house, indicate in the living room notes. Note also the existing and required R-values.

SPECIAL

Other conditions not noted above.

8.4 FAMILY ROOM

PURPOSE

The family room provides an informal area for family activities and provides a space for children's activities.

COMMON DEFECTS

The most common design defects include a poor floor plan that directs traffic through the family room and window or door placement that makes furniture arrangement difficult or awkward.

REFERENCES

Family Housing (UFC 4-711-01), Section 4-3.10, page 16, specifies that units with three or more bedrooms should be provided with a family room, separate from the living room. Each room should include one wall with a minimum length of 10 ft. to accommodate a sofa and end tables. Often several compatible living functions can be combined advantageously into a single "Great Room." However, this Great Room should be able to accommodate multiple furniture arrangements associated with spaces that are combined. Benefits of such arrangements are that the combined space can be used more efficiently. For adjacent spaces to be considered a combined room, a clear opening between them, at least eight ft. wide, should permit concurrent and separate use of the space.

INSPECTION PROCEDURES

1. Inspect walls, ceilings, floors, trim, windows, doors, and electrical system in accordance with the guidelines in Section 8.1, *Overall Functional Analysis of the House*.
2. Observe functional and circulation relationships between family room and other rooms, particularly the kitchen.
3. Note exterior window arrangements; note available natural light, views to exterior, and ventilation.
4. Visualize furniture arrangement. Note circulation and traffic patterns within the room.
5. Determine if there is adequate sound attenuation in common walls between units.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Family room is adequately sized and configured, well lighted, and located to minimize through circulation to other areas of the house. Alternatively, family room does not exist, but adequate space for informal family activity is available in other areas such as oversized kitchen.

MINOR REPAIRS

Repair walls, ceiling, floors, trim, windows, doors; paint. Upgrade electrical system with grounded outlets (if a ground wire exists in the outlets).

MAJOR REPAIRS

Enlarge, reduce, rearrange, or change style of exterior windows. Replace wall and/or

ceiling surfaces, trim, doors, or windows. Add sound attenuation insulation as needed.

REPLACEMENT

Expand or relocate family room into adjacent or newly constructed floor space, provided it does not exceed the programming benchmark floor area limitation.

SPECIAL

Other conditions not noted above.

8.5 DINING ROOM

PURPOSE

The dining room is an area for serving and consuming meals.

COMMON DEFECTS

The most common design defects include insufficient space to accommodate furniture and door and window placement that makes furniture arrangement awkward and difficult.

REFERENCES

Army Family Housing Supplement (UFC 4-711-02A), Section 4.3.5, page 39, specifies that there should be a circular pattern to direct traffic flow, the primary eating area must be large enough to accommodate a table, chairs, and china cabinet or buffet. The dining area may be separate or combined dining and living room. The dining room should have direct accessibility to the kitchen and living room, but not in direct sight of bathrooms. A separate dining area large enough to accommodate a minimum of 10 people should be provided for O7 and higher personnel (Table 5).

Table 5.
Minimum Dining Area Dimensions

Units	Area
2- and 3-BR Units	9 ft. 6 in.
4- and 5-BR Units	10 ft. 6 in.
Flag Dining Area	12 ft.

INSPECTION PROCEDURE

1. Inspect walls, ceilings, floors, trim, windows, doors, and electrical system in accordance with the guidelines in Section 8.1, *Overall Functional Analysis of the House*.
2. Observe functional and circulation relationships between dining room/area and other areas of the house, especially the kitchen. Visualize furniture arrangements in the space.
3. Note available natural and artificial lighting.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

The dining room/area is sufficiently sized for intended occupancy, is located adjacent to the kitchen, and presents no furniture placement problems.

MINOR REPAIRS

Add or relocate doorways to improve traffic patterns. Repair walls, ceiling, floors, trim, windows, doors; paint. Upgrade electrical system with grounded outlets (if a ground wire exists in the outlets).

MAJOR REPAIRS

Same as minor repairs plus enlarge, reduce, rearrange, or change style of exterior windows. Replace wall and/or ceiling surfaces, trim, doors, or windows.

REPLACEMENT

Same as major repairs plus expand or relocate dining room into adjacent or newly constructed floor space, provided it does not exceed the programming benchmark floor area limitation.

SPECIAL

Other conditions not mentioned above.

8.6 BATHROOMS

PURPOSE

Bathrooms are provided for personal hygiene and sanitation.

COMMON DEFECTS

The most common defects include poor layout, inadequate size, lack of proper lighting, wall plugs without GFIs, lack of ventilation, and worn-out or damaged fixtures, flooring, countertops, and wall surfaces.

REFERENCES

Family Housing (UFC_4_711_02A), Section 4.3.2, page 38, specifies that in two-story units, a half-bath should serve the first floor. When a half-bath is provided on the first floor, consider access to both guests and family activities. Open a half-bath to circulation space rather than to a habitable room. The master bedroom shall have a private full bathroom. Include a tub with shower assembly in at least one full bathroom in each unit which is directly accessible from the bedroom hall without passing through another room. The minimum number of bathrooms is shown in Table 6. Provide lavatories mounted in two-ft wide (minimum) countertops, with vanity bases. Countertops shall be high-pressure laminated plastic, ceramic tile, marble, or homogeneous, non-porous, solid surface-type materials, with minimum four-in. high backsplashes. Bathroom accessories may be surface mounted or recessed, of non-corrodible metal or ceramic tile, and shall include a toilet paper holder, soap dish (at sink and at tub/shower), toothbrush and tumbler holder, and grab bar at tub or shower stall, bathrobe hook, and towel bars totaling not less than 42 in. for a full bath and not less than 30 in. for a half bath. A recessed medicine cabinet shall be provided in each bathroom. Cabinets shall be corrosion-resistant with plate glass mirrors, sliding or hinged door type. Do not place recessed medicine cabinets in party walls. Tubs and showers shall not be placed under windows. Exhaust shall be provided in all baths, shall be ducted directly to the exterior of the building.

Table 6.
Bathroom Design Guidelines

Number of Bedrooms on Floor	Number of Bathrooms on Floor
0	1/2
1 - 2	1
3 - 5	2

INSPECTION PROCEDURE

1. Inspect walls, ceilings, floors, trim, windows, doors, and electrical system in accordance with the guidelines in Section 8.1, *Overall Functional Analysis of the House*.
2. Inspect to ensure that the house has the correct number of bathrooms.
3. Check for proper ventilation, either by an operable window or exhaust fan.
4. Determine if bathroom doors are located for privacy. Doors should not open directly into living rooms, dining rooms, or kitchens.
5. Inspect plastic bathtubs, shower bases, and enclosures for scratches, abrasions, cracks, and stains. Inspect steel or cast

iron tubs for chips, scratches, and stains. Inspect control lever and drain plug operation. Observe whether soap dish is firmly attached to the wall. Inspect caulking between tub and wall finish.

6. Inspect operation of shower doors, if applicable. Inspect glass or plastic surfaces for scratches or cracks. Direct shower head toward the doors, turn on shower, close doors, and observe whether any water leaks onto floor.
7. Inspect bathtub, shower, and sink faucets for drips and deterioration of chrome finish. Unscrew bathtub and shower faucet cover plates to ensure that the holes around pipes are sealed. Turn shower on and inspect for an even, low-volume spray. Inspect fittings for deteriorated finish.
8. Inspect toilet for proper operation and leaks. Inspect for chipped or cracked porcelain. Inspect seat and lid for cracks, discoloration and fastening.
9. Inspect sink bowl for chips, cracks, and stains. Close drain plug and turn on water to see if sink holds water. Inspect caulking around bowl. Check drain trap for leaks. Inspect vanity cabinet finish for water damage, scratches, or chips. Observe operation of doors. Inspect interior bottom for rot or evidence of leaking sink trap or water supply stops.
10. Inspect size of medicine cabinet and operation of doors. Inspect finish for scratches and rust. Inspect mirror for size, cracks, scratches, or chips and for deterioration of silver coating.
11. Inspect ceramic tile flooring for stained or deteriorated grout, cracks, breaks, and mismatched or missing tiles.
12. Inspect vinyl tile for wear, fading, or discoloration; damaged, loose, mismatched, or missing pieces; and spaces between tiles.
13. Inspect vinyl sheet for wear, fading, discoloration, cracks, or tears.
14. If there is evidence of possible deterioration of underlayment, lift a corner of the flooring in vicinity of apparent problem to examine condition of underlayment. Evidence of underlayment problems includes bumps over nail heads, swelling, straight-line ridges over gap between sections of underlayment, or depressions over deteriorated sections of underlayment.
15. Check ceramic or plastic cover base for loose, damaged, or missing sections.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Unit has correct number of bathrooms that meet design guidelines. Bathrooms are adequately ventilated. All bathroom fixtures, fittings, and hardware are in excellent condition.

MINOR REPAIRS

Re-caulk tub, shower, and sink; replace worn-out shower doors with a shower curtain rod; replace putty seal behind faucet cover plates; replace toilet flush mechanism; replace toilet seat and lid; and replace washers in faucets. Replace a few cracked or missing tiles if matching tiles are available; re-grout tiles where necessary; and clean stained grout. Add GFI breakers or outlets. Repair small cuts or tears in vinyl sheet flooring with vinyl seam sealer. Drive in several popped nails. Repair minor gouges or holes in gypsum wallboard with tape and spackling compound. Repaint gypsum wallboard surfaces.

MAJOR REPAIRS

Same as minor repairs plus replace faucets and shower head; replace sink vanity; replace medicine cabinet and mirror; replace towel bars, toilet paper holder, toothbrush holder, and soap dishes. Remove and replace ceramic tile; remove and replace other tub or shower wainscot materials; and replace severely damaged gypsum wallboard and repaint surfaces. Change location of door for privacy. Remove and replace all bathroom fixtures, fittings, and hardware. Remove and replace flooring that is badly worn, faded, discolored, cracked, or torn. Replace underlayment and replace base.

REPLACEMENT

Add a new bathroom in existing or newly constructed floor space, provided it does not exceed the programming benchmark floor area limitation.

SPECIAL

Other conditions not noted above.

8.7 KITCHEN/AUXILIARY DINING AREA

PURPOSE

The kitchen and auxiliary dining area provide an area for food preparation, eating, after-meal clean-up, utensil and general storage, and other miscellaneous activities.

COMMON DEFECTS

The most common design defects include insufficient space, poor overall layout, inadequate work surfaces, too little storage space, and deficient ventilation. Common cabinet and countertop defects include separation of cabinets from walls and general deterioration such as nicks, gouges, and damage to the finish; delaminating plywood; broken or missing shelves or drawers; structural separation of members of the frame and/or shelves; warping of sides, frames, and doors; loosening of hinges; weakening of spring hinges; missing pulls; and/or broken drawer rollers and guides.

REFERENCES

Family Housing (UFC 4-711-01), Section 4-3.8, page 16, specifies that the kitchen be located adjacent to the dining room and family room with direct access to both. It provides a visual separation between the kitchen and all formal living areas. The kitchen must provide a minimum space of four ft. in front of the cabinet.

Army Family Housing Supplement (UFC 4-711-02A), Section 4.3.8, page 40, specifies the location of the kitchen be adjacent to dining room and family room, with direct access to each. Convenient access from kitchen to a covered parking area, and to interior utility and exterior service areas, is desirable. Provide four-ft. minimum space between fronts of cabinets. The kitchen must provide an efficient work triangle. A base cabinet, minimum 15 in. wide, must be provided on the handle side of the refrigerator. The range must not be located adjacent to the refrigerator, in a corner, or adjacent to a passageway. The dishwasher must be installed adjacent to the kitchen sink. Provide a backsplash behind the range, extending to the underside of the range hood, finished to match the countertop or range and the range hood. Space for a tenant-owned upright refrigerator/freezer, minimum 42 in. wide, must be provided adjacent to the kitchen or an area such as the laundry/utility area or garage. Space for a tenant-owned microwave oven must be provided. In the kitchen, shoe molding (1/4 round) is required at all base cabinets where they meet the floor surface.

Army Family Housing Supplement (UFC 4-711-02A), Section 4.3.13.1, page 45, indicates that countertop finish may be high pressure laminated plastic 0.043-in. thick for post-formed tops or 0.05-in. thick for countertops with separate backsplash, and shall be applied with heat-resistive adhesive. Countertops may also be ceramic tile or homogeneous, non-porous, solid surface materials. Minimum backsplash height is four in. The substrate for countertops (except solid surface countertops) shall be 3/4-in.-hick exterior plywood.

Table 7 presents the minimum square footage for kitchen cabinets, counters, and pantry. Flat area is shown for countertops and drawers. Combined shelf area is shown for base and wall cabinets and pantry. Countertop length is exclusive of sink and range space. Table 7 also shows the minimum number of kitchen drawers.

Section 4.3.4, page 39, indicates that a secondary eating area (auxiliary dining area) may be provided in the form of an oversized kitchen, breakfast bar, or family room/dining area. The auxiliary dining area may be in direct sight of food preparation areas but not in the direct sight of the bathroom.

Army Family Housing Supplement (UFC 4-711-02A), Section 4.3.12, page 42, specifies seamless sheet vinyl flooring.

Army Family Housing Supplement (UFC 4-711-02A), Section 4.3.14, page 46, requirements for kitchen appliances are as follows.

1. Ranges shall be 760 mm [30 in.] wide and provided with porcelain enamel cooktop, oven, clock and timer, oven light, and cooking surface light. Oven must have black, glass window door, broiler pan, and self-lock racks. Use either gas or electric range, depending upon energy fuel source. Ranges for all General Officer's housing units must be the double-oven type with separate burner top. Over-under microwave and conventional oven combinations will satisfy the double-oven requirement.
    a. Gas ranges must have two, 150 mm [six-in.] and two, 205 mm [eight-in.] 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.
    b. Electric ranges must have four tubular plug-in surface elements of 4,500 watts minimum, removable reflector bowls, infinite-control switches, and range-indicating lights. Ovens must be equipped with one, 2,000-watt (minimum) tubular broil element and one, 700-watt (minimum) bake element, oven indicating light, thermostatic heat

Table 7.
Kitchen Cabinet Counter and Pantry Area

	Wall Cabinets	Base Cabinets	Drawer	Counter*	Pantry
Officer O6-O10	36	46	22	20	20
OTHER					
4- and 5-BR	30	40	18	16	16
2- and 3-BR	24	32	14	12	-

* Counter length does not include sink and range top.

control, utensil drawer, and self-cleaning oven. Electric ranges must conform to UL 858, Household Electric Ranges.

2. Provide metal range hoods, the same length and finish as the range, with separately switched light and exhaust fan. The hood must have a washable filter. The fan must have a capacity of not less than 78.7 L/s per meter of range hood [50 cubic ft. per minute per linear foot of range hood]. The sound level shall not exceed six sones. Duct the fan to the exterior and provide backdraft protection.
3. The refrigerator must comply with UL 250, Household Refrigerators and Freezers, and shall bear the EPA ENERGY STAR certified label. Provide refrigerator with frost-proof top freezer, automatic defrosting, and ice maker. Refrigerator must have two vegetable bottom baskets, at least four adjustable shelves, at least two shelves and egg container in door; freezer compartment shall contain separate interior shelves, multiple door shelves, and ice maker. Provide reversible (left swing and right swing interchangeable) doors. Refrigerators must conform to the energy compliance standards of 10 CFR 430, including those refrigerators manufactured before the code took effect. The use of refrigerants with an Ozone Depletion Potential (ODP) of .05 or less is required.

   Minimum refrigerator volume and maximum energy use are as follows:

   a. Volume: 0.58 CM, 21 CF
   b. Energy Efficiency: 722 kWh/yr.
4. Dishwashers must 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 must cycle through the Wash, Rinse, Dry/Heat, and Stop phases, and be capable of rinse and hold cycle as well as a no-heat drying feature. The unit shall contain instantaneous, or in-line, water heater booster, with automatic thermostat set for 60 degrees C [140 degrees F]. Rated energy use for standard capacity models will not exceed 620 kWh/yr.
5. Garbage disposals shall conform to UL 430, 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.

INSPECTION PROCEDURE

1. Inspect walls, ceilings, floors, trim, windows, doors, and electrical system in accordance with the guidelines in Section 8.1, *Overall Functional Analysis of the House*.
2. Observe and note space layout and placement of major appliances and work areas (range, refrigerator, sink). The work triangle (total of distances between the center of the range front, refrigerator, and sink) should not exceed 24 linear feet.
3. Consider adequacy of auxiliary dining area.
4. Note circulation and traffic patterns.
5. Note natural and artificial light sources, overall brightness.
6. Note provisions for tenant-owned upright freezer.

7. Push cabinets upward and toward the wall. If the cabinet moves, the wall attachment will need to be repaired.
8. Open and close all cabinet doors to see if they operate smoothly and to determine if all hinges and door handles are securely fastened.
9. Check drawer pulls, guides, and rollers by opening each drawer from a closed to fully open position while applying moderate downward pressure on the drawer handle. Guide and roller hardware should be capable of supporting moderate weight along the length of the drawer without binding, sticking, or becoming detached.
10. Observe general condition of the cabinets. Note any deterioration or damage to the finish, delamination of surface veneer, broken or missing shelves, or separation of the structural elements of the cabinet frame.
11. Inspect surface for cuts, cracks, scorching, fading, and separation of plastic laminate from top and edges. Check for places where laminate has broken off.
12. Check all appliances for dents, scratches, chips, or other signs of wear and tear. Operate all appliances if possible.

Note: If dishwasher or range hood are not present, the task of adding them may involve modification of kitchen cabinets, plumbing, electrical wiring, etc.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Kitchen meets or exceeds design requirements, specifications, and guidelines within acceptable limits.

MINOR REPAIRS

Cabinets need reattachment to the wall. Several pulls, hinges, drawer rollers or guides, and/or shelf supports need replacement, assuming matching hardware is available. Repair walls, ceiling, floors, trim, windows, doors; paint. Upgrade electrical system with grounded outlets (if a ground wire exists in the outlets) and GFI breakers and receptacles.

MAJOR REPAIRS

Completely remodel kitchen with replacement cabinets, countertop and sink, flooring, appliances, and new finishes.

REPLACEMENT

Relocate or expand the kitchen.

SPECIAL

Important: Removal of floor covering containing asbestos may require an estimate by a qualified engineer.

8.8 LAUNDRY

PURPOSE

The laundry area provides space for a clothes washer and dryer and an organized work station for laundering clothes.

COMMON DEFECTS

The most common design defects of a laundry area or room (aside from absence) include: poor location, inadequate space, and deficient plumbing or electrical connections for the clothes washer and dryer.

REFERENCES

Family Housing (UFC 4-711-01), Section 4-3.9, page 16, specifies the laundry area should be large enough to accommodate a side-by-side washing machine and dryer and provide

adequate shelving or cabinets for laundry supplies. The laundry areas should not be located near eating or entertainment areas, in a bedroom, bathroom, or the kitchen. Exhaust from such moisture-producing equipment as dryers must be vented to the exterior. Ventless clothes dryers are not acceptable in humid area locations.

INSPECTION PROCEDURE

1. Inspect walls, ceilings, floors, trim, windows, doors, and electrical system in accordance with the guidelines in Section 8.1, *Overall Functional Analysis of the House*.
2. Inspect floor plan to ensure that properly located and adequate space exists for a washer and dryer.
3. Dryer vent should not discharge onto balcony or patio, near entry doors, or near an air conditioner compressor unit.
4. Check shelving or wall cabinet for adequate storage of laundry supplies.
5. Check for plumbing and electrical connections and area lighting.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Laundry area is in good location and properly served by water, electricity, drainage, dryer venting, and is well lit and equipped with storage shelves or cabinets.

MINOR REPAIRS

Add shelving or wall cabinet for storage of laundry supplies. Dryer vent is missing or discharges at improper location. Repair walls, ceiling, floors, trim, windows, doors; paint. Upgrade electrical system with grounded outlets (if a ground wire exists in the outlet) and GFI breakers and receptacles.

MAJOR REPAIRS

Laundry area is inefficient for use of washer and dryer. Rearrange space; make necessary adjustments in plumbing, wiring, venting, and lighting. Replacement flooring should be seamless vinyl flooring rather than tile to reduce potential water damage.

REPLACEMENT

Laundry area not present and must be added, complete with electrical wiring, plumbing, and venting.

SPECIAL

Conditions not covered above.

8.9 STORAGE

PURPOSE

Bulk storage and closets are provided inside heated space for household and personal items.

COMMON DEFECTS

The most common defect is insufficient space.

REFERENCES

Family Housing (UFC 4-711-01), Section 4-3.11, page 16, specifies storage areas in the form of clothes closets, linen closets, and bulk storage in housing units for seasonal personal effects. Interior bulk storage is required to be in addition to the required closet area and exterior storage. The housing unit should provide a minimum interior bulk storage space of 16 square feet. *Army Family Housing Supplement* UFC 4-711-02A, Section 4.3.11, page 40, specifies also providing a broom closet and a coat closet located convenient to the entrance.

Table 8 lists the size standard for closets. Closets (except linen closets) shall be equipped with a 12-in.-deep shelf and a clothes hanger rod. Linen closets shall be

Table 8. Minimum Closet Width Requirements (in feet)						
	Coat	Master BR	BR 2/3	BR 4/5	Broom	Linen
Officer (O7-O10)	5	10	6	4	3	4
Officer (O1-O6)	4	6	4	4	3	3
Enlisted	3	6	4	4	3	2

provided with at least four full-depth shelves. Minimum inside clear depth dimension for linen closets shall be 1 1/2 ft. Minimum inside clear depth dimension for other closets shall be two ft. Closet walls shall not extend beyond either door jamb more than 1 1/2 ft. A broom closet shall be provided convenient to the kitchen. Closets must be located to permit the placement of furniture in corners of rooms by providing an 18-inch return adjacent to a furnishable wall. Bedroom closets are addressed in Section 8.11, *Bedrooms*.

The guideline also specifies that each dwelling unit must be provided with interior bulk storage space in a separate room or walk-in closet. Minimum dimensions specified are 2 1/2 ft. wide x 2 1/2 ft. deep x 6 1/2 ft. high.

Army Family Housing Supplement specifies minimum interior, exterior, and combined storage space requirements. These requirements are presented in Table 9. Interior Bulk Storage is to be provided in a separate room or included as an extension of utility room when one is provided. Exterior storage can either be in the garage, a separate exterior enclosure, or within the housing unit and accessible from the exterior.

INSPECTION PROCEDURE

1. Measure closet widths and compare with *Family Housing* (UFC 4-711-01), Section 4-3.11, page 16, which specifies storage areas in the form of clothes closets, linen closets, and bulk storage in housing units for seasonal personal effects. Interior bulk storage is required to be in addition to the required closet area and exterior storage. The housing unit should provide a minimum interior bulk storage space of 16 square feet. *Army Family Housing Supplement* UFC 4-711-02A, Section 4.3.11, page 40, specifies also providing a broom closet and a coat closet located convenient to the entrance.

   Table 8 lists the size standard for closets. Closets (except linen closets) shall be equipped with a 12-in.-deep shelf and a clothes hanger rod. Linen closets shall be provided with at least four full-depth shelves. Minimum inside clear depth dimension for linen closets shall be 1 ½ ft. Minimum inside clear depth dimension for other closets shall be two ft. Closet

Table 9. Minimum Bulk Storage (in square feet)									
Minimum Space by Type of Storage and Bedroom									
Bedroom Count	3 BR			4 BR			5 BR		
Grade	Interior	Exterior	Combined	Interior	Exterior	Combined	Interior	Exterior	Combined
Officer O7-O10	-	-	-	54	60	200	-	-	-
Officer O4-O10	40	48	111	44	54	120	-	-	-
Enlisted/ Officer O1-O3	32	40	85	50	50	100	50	50	100

walls shall not extend beyond either door jamb more than 1 ½ ft. A broom closet shall be provided convenient to the kitchen. Closets must be located to permit the placement of furniture in corners of rooms by providing an 18-in. return adjacent to a furnishable wall. Bedroom closets are addressed in Section 8.11, *Bedrooms*.

2. Inspect walls, ceilings, floors, trim, windows, doors, and electrical system in accordance with the guidelines in Section 8.1, *Overall Functional Analysis of the House*.
3. Measure interior storage and compare with Table 9.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Interior storage space exists and is adequately sized and well located.

MINOR REPAIRS

Repair walls, ceiling, floor, trim, door; paint.

MAJOR REPAIRS

Bulk storage is inadequate and must be provided by adding a closet. Design of house will dictate possible locations for adding storage area.

REPLACEMENT

Bulk storage must be added into newly constructed floor space.

SPECIAL

Other conditions not noted above.

8.10 STAIRS

PURPOSE

Interior stairs provide occupant access to different levels of the dwelling and serve as a passageway for the movement of furniture.

COMMON DEFECTS

The most common defects include deterioration of the finish or covering on the treads; worn, loose, uneven, warped, or broken treads; and lack of or loose railings.

REFERENCES

Army Family Housing Supplement (UFC 4-711-02A), Section 4.3.7, page 35, specifies to minimize lost floor space due to circulation, attention to detail should be given during construction of interior stairs and stairwells. Stairs should be hardwood with a clear or carpeted finish. Minimum hallway width of three ft. six in. is recommended.

INSPECTION PROCEDURE

1. Inspect walls, ceilings, floors, trim, windows, and doors in accordance with the guidelines in Section 8.1, *Overall Functional Analysis of the House*.
2. Check condition of the finish on the treads; if steps are carpeted, check for looseness of fit or signs of wear.
3. Check for weak, worn, loose, cracked, or broken treads. Walk heavily on the steps to determine if they show any sign of weakness.
4. Push on railings to see if they are tight and secure. Open guardrails must have intermediate rails or patterns such that a four-in. sphere cannot pass through.
5. Check O&M records to see if occupants have registered complaints about the

condition, width, or steepness of the stairway.

6. In instances in which stairs appear to be steep or narrow, measure stairway width, tread depth, and riser height. Dimensions should be approximately 36 in. for step width, 10 to 11 in. for tread depth, and seven to eight in. for riser heights.
7. Inspect handrail for stability.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Stairs are structurally tight and sound, treads or coverings are in good condition, and railings are strong and tight.

MINOR REPAIRS

Tighten railings and refinish stairs.

MAJOR REPAIRS

Replace some treads and railing parts. Replace worn carpet. Replace wall and/or ceiling surfaces, floor, trim, doors, or windows.

REPLACEMENT

Not Applicable.

SPECIAL

Other conditions not noted above.

Note: If stairs are too narrow or too steep to meet the prevailing building code but are in sound condition, the problem should be noted. Extensive structural changes and the resulting high cost may argue against taking any action if the condition is not considered hazardous. If extensive exterior renovation is under consideration, then correction should be considered in the context of such renovation.

8.11 BEDROOMS

PURPOSE

Bedrooms provide space for sleeping, dressing, and clothes storage.

COMMON DEFECTS

The most common design defects include inadequate size, windows too small for emergency egress, deficient closet space, and poor location with respect to other functional areas.

REFERENCES

Army Family Housing Supplement (UFC-4-711-02A), Section 4.3.3, page 39. Each bedroom shall be accessible without requiring passage through another bedroom. One bedroom shall be provided on the ground floor of each flag or general officer quarters. This bedroom shall be accessible from a public area of the unit separate from the other bedrooms. Minimum desirable dimensions and square footages for bedrooms are shown in Table 10. Do not plan to move walls several inches if there will not be an appropriate benefit for the occupants. Common sense should prevail in deciding on expensive floor plan modifications. The sleeping area, including a master bedroom and one or more additional bedrooms, should be separated from other areas of the house but conveniently located near bathrooms. The route from bathrooms to bedrooms should not pass through or in sight of other area. The master bedroom in units with three or more bedrooms should be served by a separate full bathroom. Table 11 provides minimum bedroom closet width requirements.

INSPECTION PROCEDURE

1. Inspect walls, ceilings, floors, trim, windows, doors, and electrical system in accordance with the guidelines in

Table 10. Bedroom Size		
	Minimum Desirable Dimension (ft.)	Minimum Desirable Area (sq ft.)
Master Bedroom	11 2/3	150
Bedroom 2	10	120
Bedroom 3	10	100
Bedroom 4/5	9 ½	90

Section 8.1, *Overall Functional Analysis of the House*.

2. Check bedroom and closet dimensions and compare with the above tables. Minor deviations from the tables are generally acceptable in existing housing as long as bedrooms have adequate space for a bed, dresser, and two bedside tables.
3. Determine if window dimensions and locations provide emergency access and egress.
4. Review functional relationship of bedrooms to other areas of the dwelling. Bedroom doors should not be visible from living room, dining room, or kitchen, and bathrooms should be convenient to bedrooms.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Bedroom size and dimensions meet acceptable limits for placement of furniture. Closets are adequately sized. Bedrooms are appropriately located in relation to other functional areas of the dwelling.

MINOR REPAIRS

Repair walls, ceiling, floors, trim, windows, doors; paint. Upgrade electrical system with grounded outlets (if a ground wire exists in the outlets).

MAJOR REPAIRS

Replace closet shelving, clothes rods, and doors. Replace wall and/or ceiling surfaces, floor, trim, doors, or windows.

REPLACEMENT

Remove entire bedroom wall and rebuild to new size. Replace closet shelving, clothes rods, and door.

SPECIAL

If necessary and design permits, it is possible to reconfigure the dwelling from five to four bedrooms, from four to three bedrooms, or from three to two bedrooms. On the other hand, excessive bulk storage space and other areas can be used to expand bedroom or closet sizes.

Table 11. Minimum Bedroom Closet Widths (in feet)			
	Enlisted Personnel	Officers by Grade	
		O1 to O6	O7 to O10
BR No. 1	6	6	10
BR No. 2	4	4	6
BR No. 3	4	4	6
BR Nos. 4 and 5	4	4	6

8.12 ATTIC

PURPOSE

The roof structure provides the structural "skeleton" for roof loading associated with roofing materials, snow, and wind. Attic insulation isolates the conditioned spaces of the house from the outside environment.

COMMON DEFECTS

The most common defects include rotting caused by leaks, inadequate ventilation, improper vent pipes or bathroom fans, and lack of adequate insulation for the climate.

REFERENCES

Army Family Housing Supplement (UFC-4-711-02A) Section 4.6.4, page 51, specifies that structural design shall conform to the Uniform Building Code and ceiling/roof insulation levels.

INSPECTION PROCEDURE

1. Inspect framing with a flashlight through the attic scuttle hole. Look for cracked or sagging rafters, ceiling joists, or truss chords. Inspect for evidence of roof leaks and FRT plywood.
    a. Observe the type of insulation (batt or loose-fill) and depth between joists. Compare to the standard shown in Table 13. Make notation in ISR-I Booklet 30 as appropriate.
2. It is unlikely that termites will be evident in roof framing. However, if exterior wall framing is heavily infested, it is conceivable that termites could have penetrated the roof framing. Further, flying termites and carpenter ants have been known to inhabit roof framing where moisture is present.
3. Check that attic vents are fully functional and not blocked. If roof sheathing shows deterioration and roof covering is in good condition, check for adequate attic ventilation.
4. Check that plumbing vents and bathroom exhaust fans do not terminate in the attic but actually penetrate the roof with adequate flashing.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

No evidence of structural failure exists. Insulation levels meet Table 13.

MINOR REPAIRS

Insulation is insufficient. Add insulation; repair any leaks; and improve ventilation and piping as necessary.

MAJOR REPAIRS

Several defective or deficient framing members need to be replaced. Roof sheathing along the eaves is deteriorated, requiring replacement and reroofing.

REPLACEMENT

Structural damage is evident in more than several framing members, or roof structure is generally deficient or defective. Replace damaged materials as necessary.

SPECIAL

Other conditions not mentioned above.

8.13 BASEMENT FOUNDATION CONDUCTIVE HEAT LOSS

PURPOSE

Many homes were built when the cost of energy was low and fuel was not fully recognized as a strategic resource. These homes can benefit from thermal insulation improvements. Potential reductions in

conductive heat losses can be substantial. Housing rehabilitation often presents the opportunity for relatively easy upgrades of R-values in the floors above unconditioned basements or the walls of conditioned basements.

COMMON DEFECTS

In many older homes, insulation of basements was routinely neglected. In some homes, the insulation may be less than currently required, could be damaged or otherwise degraded.

REFERENCES

Table 12 presents the minimum R-values for basement walls of conditioned basements or the floors above unconditioned basements of housing units specified by *IECC 2009*, Chapter 4, pg. 27, by climate zone. These also coincide with IECC climate maps and tables located in Table 13.

Table 12.
Nominal R-values for Walls and Floors

Climate Zone	Basement Wall [A, B]	Floor
1	0	R-13
2	0	R-13
3	R-5/R-13	R-19
4	R-10/R-13	R-19
5	R-10/R-13	R-30
6	R-15/R-19	R-30
7&8	R-15/R-19	R-38

A. First number R-value is for continuous insulation. Second number is for cavity insulation.

B. Basement wall insulation is not required in warm humid climates as defined in IECC climate map and corresponding county listing.

INSPECTION PROCEDURE

1. In unheated basements, check the thickness of batt insulation between floor joists. (If access to space between the joists is not possible, determine the insulation level from plans or maintenance records.) Compare the thickness to the required level in Table 12 and note both the actual and the required R-values. Inspect the condition of the insulation to ensure that it is not torn, sagging, wet, etc.
2. If the HVAC equipment is located in the basement, install insulation on the walls to the minimum listed in the table.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

The house is in compliance with all thermal insulation requirements of Table 12.

MINOR REPAIRS

Make minor repairs to insulation.

MAJOR REPAIRS

For unheated basements, upgrade existing insulation in floor joist spaces up to the minimum value presented in Table 12 or replace 50 percent of existing insulation.

For heated basements, upgrade existing wall insulation to minimum values presented in Table 12 or replace 50 percent of existing insulation.

REPLACEMENT

No insulation present or existing insulation requires replacement.

SPECIAL

Other items not mentioned above.

9.1 ELECTRICAL SERVICE

PURPOSE

The electrical system supplies sufficient electrical power to appliances, equipment, light fixtures, and outlets for convenient and safe use.

COMMON DEFECTS

The most common defects include the absence of individual circuits for dishwasher, garbage disposer, air conditioner, heat pump; an insufficient number of outlets; insufficient capacity for existing or additional loads; expansion not in accordance with the National Electrical Code; overloaded circuit, ground fault interrupter-protected (GFI) circuits not provided where required; no outlets for laundry room; no circuit identification at the service panel; lack of an adequate ground on the supply side of the service entrance; and nonfunctioning outlets, switches, or light fixtures. Telephone and cable TV lines may be surface mounted either inside or outside the house. Other defects might include deteriorated and failing underground service lines caused by corrosion or uneven settlement of the ground.

REFERENCES

Army Family Housing Supplement (UFC 4-711-02A) Section 3.8, page 30. Generally, electrical systems should conform to the National Electrical Code. The guideline specifies that all conductors shall be copper. New electrical service drops shall be underground, and any that are replaced because of their condition shall be located underground. Only one service drop per building is allowed, and individual unit meter bases are required.

INSPECTION PROCEDURE

WARNING: INSPECTION OF THE ELECTRICAL SYSTEM SHOULD BE PERFORMED BY A QUALIFIED ELECTRICIAN.

1. Check O&M records for complaints of circuit overload evidenced by blown fuses, tripped circuit breakers, or flickering or dimming of lights.
2. Walk through and inspect each room for needed additional light fixtures, outlets, or wall switches. Light fixtures operated by wall switches should be provided in all rooms except the living room. Determine if ground (three-hole) outlets are provided throughout the house. If outlets have only two holes (no ground), remove a face plate and determine if there is a copper ground wire in the outlet. Note if bathrooms and kitchen sink area have GFI receptacles and/or circuit.
3. Note whether central air conditioning or other major electrical equipment or appliances are to be added to the unit.
4. Examine the service panel to determine whether capacity is adequate and whether it can accommodate additional circuits. Note whether all conductors are copper.
5. Determine if additional circuits are required; if a new service line, individual unit meter base, or panel box is required.
6. Determine if outside light fixtures and weatherproof GFI receptacles exist and are operable at each entry, garage/carport, and patio/balcony area.
7. Determine if a 220V outlet exists and is operable in laundry room to accommodate a dryer.

8. Check that telephone outlets are provided in at least the kitchen and master bedroom. Additional outlets for the living room and family room (if applicable) may be considered at the time of a major renovation. No surface-mounted telephone wiring shall be allowed, either inside or outside the house.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

Sufficient grounded outlets and lights are present and operable. Required GFI breakers or receptacles are in place. Weatherproof covers are present on exterior outlets. No additional appliances are required. An individual unit meter base is present.

MINOR REPAIRS

Replace or repair dead receptacles and switches. Replace nongrounded outlets with a grounded receptacle, provided that a copper ground wire is in the outlet. Add GFI breakers or receptacles as required by the National Electrical Code in bathroom, kitchen, entry, basement, garage/carport, and outdoor areas. Add an individual unit meter base.

MAJOR REPAIRS

Same as minor repairs plus add wiring for new outlets and/or kitchen appliances (dishwasher and garbage disposer), including a subpanel next to the main panel box if required. Relocate telephone and/or cable TV wiring into walls.

REPLACEMENT

Same as major repairs plus upgrade service panel because service is less than 100A/220V, is inadequate for the anticipated load, or the service panel is obsolete. Add new 220V circuit(s).

SPECIAL

If no ground wire is present in the outlet boxes or if aluminum wire was used in the house, then complete rewiring of the house is required or special aluminum/copper adapters are required to meet the National Electrical Code. This work requires a cost estimate by an engineer.

9.2 WATER DISTRIBUTION

PURPOSE

The purpose of the water distribution system is to provide safe, potable hot and cold water to faucets and fixtures.

COMMON DEFECTS

The most common defects include inadequate pressure, insufficient quantities of hot water, leaks, dripping faucets, and lack of a shut-off valve accessible to residents. Plumbing fixtures and fittings are covered under Section 8.6, *Bathrooms*.

REFERENCES

Army Family Housing Supplement (UFC 4-711-02A), Section 5.1.2, page 58. Generally, the water supply system should conform to the Design: Plumbing Systems (UFC 3-420-01), FEMP, and EPA ENERGY STAR Recommendations. If the water service to the housing unit is to be replaced, the new service should be large enough to support a fire suppression sprinkler system for the unit (typically one in. for a single-family unit). If the housing unit is to receive a major renovation or upgrade, it should have sprinklers installed if required for new housing of the same type.

INSPECTION PROCEDURE

1. Shut off the main valve serving the water supply system to ensure that the valve operates. With the valve off, turn on a

cold water faucet to verify that the water supply system is, in fact, shut off.

2. Examine pipe material used for the water system to note whether pipe is copper, galvanized steel, or plastic.
3. Operate all faucets, including outside hose bibs, to verify that they operate and that pressure is adequate. Adequate pressure with a fully opened faucet or showerhead should fill a quart container in six seconds or less. Inadequate pressure affecting a group of houses is beyond the scope of the individual unit and should be noted for the installation engineer.
4. Operate shut-off valve serving plumbing fixtures such as toilets, lavatories, water heater, and kitchen sink to ensure that they function. (Note: Packing nut may need to be retightened following operation to prevent leaking.)
5. Inspect exposed plumbing fittings and connections for active leaks or evidence of previous leaks that have self-sealed.
    a. Previous leaks in copper plumbing are evidenced by a build-up of a greenish-blue-colored coating around leaking fittings.
    b. Previous leaks in galvanized steel or cast iron plumbing are evidenced by a build-up of a black or rust-colored coating around leaking fittings.
    c. It may be possible to observe spots of similar coloring where water leaks drip on the floor or sink cabinet bottom.
    d. Inspect manufacturer's name plate on water heater to determine rated capacity. Check O&M records for occupant complaints about insufficient hot water and to determine age of water heater.
6. Listen for water hammer when faucets are shut off suddenly.
7. Check to see if laundry room hot and cold water supply is available and that hardware is in good condition.
8. Determine if polybutylene piping with acetal plastic fittings are used. If found, they are subject to failure and should be replaced.
9. Some circumstances may indicate that the water distribution system be professionally inspected and be performed by a qualified plumber.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

All plumbing valves and fixtures operate freely and properly and do not cause water hammer. Water pressure and hot water supply are adequate. There is no evidence of past or present water leaks. The water heater is less than eight years old.

MINOR REPAIRS

Replace fixture stops and repair minor leaks. Replace hose bibs with frost-proof type to reduce the potential for freezing of lines.

MAJOR REPAIRS

Same as minor repairs plus replace water heater because of age or condition.

REPLACEMENT

Based on information from installation staff or recommendations from a qualified plumber, replace the entire water piping system and conduct both minor and major repairs.

SPECIAL

Occasionally, it is necessary to replace the water service line from the house to the main due to settlement or deterioration.

9.3 DRAIN WASTE/VENT

PURPOSE

The purpose of the drain/waste/vent (DWV) component of the plumbing system is to provide sanitary disposal of wastewater from plumbing fixtures and to prevent sewer gas from entering the dwelling unit.

COMMON DEFECTS

The most common defects include clogged drains and leaky pipe joints and, occasionally, the smell of sewer gas.

REFERENCES

Army Family Housing Supplement (UFC 4-711-02A), Section 5.1.2, page 58, provides guidelines for DWV plumbing in new house construction. Generally, the DWV system should conform to the International Residential Code.

Plumbing Systems (UFC 3-420-01), also specifies the general requirements for plumbing systems.

INSPECTION PROCEDURE

1. Check O&M records for reported problems with DWV system and for record of maintenance services that have been performed. Persistent DWV problems affecting a group of houses that are beyond the scope of the individual unit should be discussed with the installation engineer.
2. Inspect plumbing fixtures for signs of drain or trap leaks. Look for water stains on floors, beneath fixtures, or on ceilings of rooms located beneath second-floor fixtures.
3. Test drain rate of fixtures in kitchen, bathrooms, and laundry area. Stop drain, fill fixture with one gallon of water, remove stopper and note time for complete discharge. If discharge time is greater than six seconds, it is likely that flow restrictions exist. Listen for gurgling sound that may indicate trap siphonage due to inadequate venting.
4. Some circumstance may indicate that the DWV system must be performed by a qualified plumber.

SCOPE OF REVITALIZATION

FULLY ADEQUATE

All DWV piping is free of leaks and functions properly.

MINOR REPAIRS

Replace traps and repair minor leaks. Clean out DWV piping system.

MAJOR REPAIRS

Not Applicable.

REPLACEMENT

Based on information from installation staff or recommendations from a qualified plumber, replace major portions of DWV piping and complete minor repairs.

SPECIAL

Occasionally, it is necessary to replace sewer laterals from the house to the sewer main due to settlement, breakage, or deterioration.

9.4 HEATING SYSTEM

PURPOSE

Heating systems maintain a minimum 68° F temperature in all rooms of the house during cold weather.

COMMON DEFECTS

The most common defects of warm air systems include inadequate or uneven heating; noisy fan; lack of dampers; leaking ducts; uninsulated ducts; improperly functioning thermostats; mineral build-up on built-in humidifiers; flues in poor condition; and furnaces with corroded heat exchangers. Common defects of electric baseboard systems include insufficient unit capacities; lack of or inoperable room thermostats; and physically damaged units. Common defects of hydronic systems include hot and cold rooms; clanging or pinging radiators; scale build-up in radiators or boilers; insufficient boiler capacity; and corroded pipes. A related and serious defect is pesticide contamination of under-floor ductwork, which requires replacement of the ductwork with overhead ducts. (Section 3.1, *Environmental Concerns*)

REFERENCES

Army Family Housing Supplement (UFC 4-711-02A), Section 5.5.7.6, page 71, discusses heating system requirements for new Army housing. Generally, the minimum efficiency rating for new heating equipment installations is ENERGY STAR. Room unit heaters, floor furnaces, and heat lamps are prohibited.

INSPECTION PROCEDURE

In most cases, a visual inspection of the heating system may not be required. An assessment of the repair/replacement needs of heating system based on information supplied by the office of the DPW or other knowledgeable installation staff will suffice. There should be a request of maintenance, repair, and replacement records of heating system components. The staff should also be included in discussions of the state of the equipment in each housing type and the anticipated maintenance, repair, and replacement needs. Combining those anticipated needs with typical historical costs escalated to current prices, allows for the development of estimates of the anticipated cost for bringing the heating equipment to the required level of functionality.

The state of heating equipment ranges from newly installed to approaching or beyond its expected useful life. Some new units may not be anticipated to need any work, but other newly installed equipment may need some scheduled annual maintenance and/or some minor repair. These needs correspond to the adequate and minor repair categories used throughout this guide. Installation staff should be able to identify which houses are equipped with these units.

Units nearing or even exceeding the average useful life will likely need to be replaced. Other units may need to be replaced earlier than expected due to some factor other than age. Installation staff should be aware of the presence of these units in each housing type. Some may already be programmed for replacement. The inspection team should be able to develop an estimate of the replacement costs based on historical costs supplied by the installation staff.

Other heating units will require an intermediate level of maintenance/repair. Development of an estimate of the representative cost can be based on an examination of historic cost data to identify problems similar to those indicated in discussions with installation staff.

Current heating equipment could have been installed within the same timeframe and therefore can be estimated to be in generally the same condition. The anticipated cost should be estimated for a typical housing unit. It may be that the condition and/or age of the houses vary. The need then arises to compute the average cost across all the housing units of that type. The results would be escalated to current year.

Some circumstances may indicate that the heating system should be inspected. This inspection must be performed by a qualified mechanical engineer or HVAC mechanic.

9.5 AIR CONDITIONING SYSTEM

PURPOSE

Cooling systems provide cool air to all habitable areas of the house, usually with a central forced-air system that relies on the same distribution ducts used for heating. Occasionally, window units or through-the-wall units have been installed for individual room or zone cooling. Evaporative "swamp" coolers are sometimes used in hot, arid regions of the United States.

COMMON DEFECTS

The most common defects with standard refrigerant systems include thermostat malfunctions; inadequate or uneven cooling; condensate leaking or backing up; dented condenser coils that can restrict air or refrigerant flow; a damaged or dirty evaporator coil; refrigerant leaks; and a defective compressor. In evaporative cooling systems, common defects include dirty pads, corroded water reservoir, or defective blower and/or pump. A related and potentially serious defect is pesticide contamination of ducts located under slabs or in crawl spaces (Section 3.1, *Environmental Concerns*).

REFERENCES

The National Appliance Energy Conservation Act of 1987 prohibits manufacturers from producing split system heat pumps or air conditioners with SEER ratings less than 13 beginning in 2006. As well, refrigerants shall contain no HCFCs (hydrochlorofluorocarbons). *Family Housing* (UFC 4-711-01), Section 5-6.2, page 24, specifies that air conditioning will be provided in locations where during the six warmest months of the year the dry bulb temperature is 80°F or higher for over 650 hours or the wet bulb temperature is 67°F or higher for over 800 hours. Air-to-air heat pumps should be used only in locations where the heating design temperature (97.5 percent basis) is greater than 12°F (except when 30 percent or more of annual heating hours below 65°F occur during May through October). Refrigerants must have an ozone depletion potential (ODP) of .05 or less. See Section 1.1, [SHOULD BE 3.1] *Environmental Concerns*.

INSPECTION PROCEDURE

In most cases, a visual inspection of the cooling system may not be required. The office of the DPW should be able to supply an assessment of the repair/replacement needs of cooling system based on information supplied by knowledgeable installation staff. The information should include maintenance, repair, and replacement records of cooling system components. They should also engage the staff in discussions of the state of the equipment in each housing type and the anticipated maintenance, repair, and replacement needs. Combining those anticipated needs with typical historical costs escalated to current prices, would allow the development of estimates of the anticipated cost for bringing the cooling equipment to the required level of functionality.

The state of cooling system ranges from newly installed to approaching or beyond its expected useful life. Some new units may not be anticipated to need any work, but other newly installed equipment may need some scheduled annual maintenance and/or some minor repair. These needs correspond to the adequate and minor repair categories used throughout this guide. Installation staff should be able to identify which houses are equipped with these units.

Units nearing or even exceeding the average useful life will likely need to be replaced. Other units may need to be replaced earlier than expected due to some factor other than age. Installation staff should be aware of the presence of these units in each housing type. Some may already be programmed for replacement.

Other cooling units will require an intermediate level of maintenance/repair.

Development of an estimate of the representative cost can be based on an examination of historic cost data to identify problems similar to those indicated in discussions with installation staff.

It may be that all of the current cooling equipment was installed within the same timeframe and so are estimated to be in the same condition. The anticipated cost should be that for the typical housing unit. It may be that the condition and/or age of the houses vary. In such a case, there would be a need to compute the average cost across all the housing units of that type. The results would be escalated to current year.

Some circumstances may indicate that the cooling system should be inspected. This inspection must be performed by a qualified mechanical engineer or HVAC mechanic.

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PART 3
ISR-I BOOKLET 30/ PLANNING GUIDE COMPARISON

CHAPTER 10 ISR-I BOOKLET 30 COMPARISON

10.1 ISR-I BOOKLET 30

ISR-I Booklet 30 is a part of the most current Rating Standards Booklet. ISR-I Booklet 30 looks at various components associated with Family Housing.

The comparison takes a look at the components for ISR-I Booklet 30, the Planning Guide and the two basic requirements for family housing which are UFC 4-711-01 and UFC-4-711-02A. The Planning Guide gives a supplementary detailed description of the inspection process. UFC 4-711-01 gives the basic standards that are to be used in family housing. UFC 4-711-02A is a working document that gives standards as well as design criteria for the various components.

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CONTENTS – ISR-I Booklet 30 / Planning Guide Comparison

SITE, GROUNDS & PARKING (MISSION – FUNCTIONAL) LIGHTING	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**

• Lighting is present and operational that provides direct or area lighting for:
  ○ Streets and driveways
  ○ Sites and grounds security
  ○ Signage
  ○ Walkways
	N/A

AMBER	**MINOR REPAIRS**
• 1 of the 4 types of lighting in the GREEN column is missing or broken (Note: if site and ground security lighting is missing, the rating for lighting is RED)	N/A
RED	**MAJOR REPAIRS/REPLACE**
• Two or more of the 4 types of lighting in the GREEN column are missing or broken or • No site and grounds lighting exists	N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 3-1.6, pg 10 states: Guidance for minimum lighting of walkways, streets, and parking areas is available from the Illuminating Engineering Society of North America (IESNA). Foreign locations must also adhere to Host Nation standards for street signs and markings.	
UFC-4-711-02A, JANUARY 2011 Section 3.8.3, pg. 31 states: Guidance for minimum lighting of walkways, streets, and parking areas is available from the Illuminating Engineering Society of North America (IESNA). Provide lighting at roadway intersections, and at intervals not exceeding 60.9 m [200 ft] between intersections. Area lighting shall be provided at intervals not exceeding 60.9 m [200 ft] along area walkways not otherwise illuminated, common area walks connecting tot lots, and at all steps in area walkways.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS Planning Guide in Inspection Procedure under Neighborhood, pg. 16, states: Determine if the street lighting is residential-type lighting that reflects the style of the neighborhood and if the house exterior lights match the style of other exterior lighting. Inspect the type of lighting used for all outside security and street lighting. Incandescent lighting should be replaced with energy-efficient compact fluorescent light bulb (CFL) lighting fixtures whenever possible. Check to see if exterior lighting system improvements are a part of the ADP (Area Development Plan).	

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SITE, GROUNDS & PARKING (MISSION – FUNCTIONAL) GARAGE	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Two off-street parking spaces with at least one covered space (carport or garage) • Second space does not block first space	**FULLY ADEQUATE** Concrete slab has minimal hairline cracks; no aggregate is showing; garage door operates easily; hardware is secure; floor stains are minor or nonexistent; fire wall is sound with no penetrations; storage space floor is in good repair; and shelving is securely fastened. Garage provides secure storage for car and outdoor equipment. The fire wall provides adequate protection against the spread of fire. (pg. 39)
AMBER • Two off-street parking spaces but no carport or garage • Second space blocks first space	**MINOR REPAIRS** Excessive concrete cracks do not exceed 29 lin. ft. Clean cracks, fill with concrete sealant, and point-up slab where required. Repair spalled, pitted, or exposed aggregate in concrete slab. Tighten garage door hardware. Repair minor penetrations in fire wall with tape and spackling compound. Tighten shelving. Replace door weather stripping. Repair holes in fire wall by cutting out damaged sections and replace with new 5/8-in.-thick Type-X Fire code gypsum wallboard and refinish and paint. (pg. 40)
RED • Less than two off-street parking spaces per family	**MAJOR REPAIRS** Same as Minor Repairs plus add locked storage area with shelving. Remove garage door and replace with new unit including all new hardware and weather stripping. Place a two-in.-thick concrete slab over entire defective slab surface. Replace large sections of fire wall with 5/8-in.-thick Type-X Fire code gypsum wallboard and tape, spackle, and finish. (pg. 40) **REPLACEMENT** If existing garage is considered unsalvageable, tear down and replace. If no garage or carport is present, consider whether space is sufficient to construct one adjacent or close to the housing unit. (pg. 40)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 3-2.1, pg. 10, states: Each unit should have a minimum of two off-street parking spaces. Indented, 90-degree, and gang parking are not desirable. Parking areas should be designed to comply with Installation specifications and Family Housing Master Plans. Each parking space provided in a garage, carport, or driveway counts as a parking space. Provide guest parking of an additional 0.5 spaces per unit. Where necessary in high density areas, 90-degree and gang parking, and 0.25 guest parking spaces per unit, may be allowed.	
UFC-4-711-02A, JANUARY 2011 Section 4.7.9, pg. 56, states: For new construction, a minimum of one-car garage shall be provided for each unit. For renovation projects, garages or carports shall be provided as the site allows. Refer to Table 4-6 for minimum dimensions. Garages shall be attached to housing unit they serve. If garages cannot be attached, locate them as	

SITE, GROUNDS & PARKING (MISSION – FUNCTIONAL) GARAGE
close as possible to kitchen and service area of house. Provide convenient access between garage and service area, and between kitchen and service area. Automatic garage door operation shall be provided.
NOTES/RECOMMENDATIONS
NOTES/ISR-I BOOKLET 30 AND UFC-4-711-02A
NOTES/RECOMMENDATIONS

SITE, GROUNDS & PARKING (MISSION – FUNCTIONAL) PAVED SIDEWALKS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Installed from parking to facility (if handicapped parking is provided, sidewalk has curb cuts) • Installed from adjacent streets to facility • At least 4 feet wide	**FULLY ADEQUATE** Sidewalks exist everywhere as required and are free of defects. (pg. 37)
AMBER • Meets Two of the three elements in the GREEN column	**MINOR REPAIRS** Concrete surface shows no evidence of deterioration. Two or three concrete squares may be cracked but with no significant vertical displacement across the cracks. Repair confined to caulking and patching joints or cracks. (pg. 37)
RED • Meets one or none of the three elements in the GREEN column	**MAJOR REPAIRS** Concrete surface deteriorated and crumbling or one-third or more of the concrete squares display open cracks. Remove and replace entire walkway. (pg. 37)
	REPLACEMENT Add needed sidewalks. (pg. 37)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 3-1.5, pg. 10, states: Pave sidewalks and walks, and provide appropriate surfaces for jogging, exercise, and bike paths. Walkways should provide pedestrian access to and from housing units, public sidewalks, and other common use areas. Walkways should be a minimum of 1.2 m (4 ft) wide, and jogging paths and bikeways should be a minimum of 1.8 m (6 ft) wide. Pedestrian circulation should be separated from vehicular circulation as much as possible. Walks must conform to UFAS provisions.	
UFC-4-711-02A, JANUARY 2011 Section 3.1.5, pg. 21, states: Pave sidewalks and walks, and provide appropriate surfaces for jogging, exercise, and bike paths. Walkways shall provide pedestrian access to and from housing units, public sidewalks, and other common use areas. Walkways shall be a minimum of 1.2 m (4 ft) wide exclusive of curb width, and made of non-reinforced concrete with a minimum thickness of 100 mm [4 in]. Where walks are adjacent to the curb, the curb width is not to be included as sidewalk. Jogging paths and bikeways shall be a minimum of 1.8 m (6 ft) wide. Pedestrian circulation shall be separated from vehicular circulation as much as possible. Walks must conform to current accessibility standards.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

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SITE, GROUNDS & PARKING (MISSION – FUNCTIONAL) NEIGHBORHOOD DESIGN	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Exterior colors, signs & streetscape fit a neighborhood theme that is documented in an Installation Design Guide (IDG) on file and available from Public Works and endorsed by the current USAG Commander	**FULLY ADEQUATE** Entrance to housing area contains visually attractive flowers, shrubs, and trees and has adequate signs that complement the architectural style of the neighborhood. Housing area is divided into recognizable clusters. Common areas are attractive and contain visually attractive flowering plants, shrubs, and trees. (pg. 12)
AMBER • Exterior colors, signs & streetscape do not yet fit a neighborhood theme that is documented in an approved (IDG)	**MINOR REPAIRS** Improvements needed to entrance to housing area. Signage needed at entrance. Moderate number of shrubs and a few trees needed to improve the division of the area into recognizable clusters and/or to improve the appearance of common areas. (pg. 12)
RED • Exterior colors, signs & streetscape do not follow a design theme and there is no approved IDG	**MAJOR REPAIRS** Substantial or total planting of flowering plants, shrubs, and trees required at entrance to housing area. Planting of a significant number of trees and shrubs required to improve the division of the area into recognizable clusters and/or to improve the appearance of common areas. (pg. 13)
	REPLACEMENT Few or no trees or shrubs exist to delineate clusters or to improve the appearance of streets and common areas. Total or near-total planting of a large number of trees and shrubs, signs, and construction of facilities is required. Grading is needed to achieve adequate improvement in cluster delineation or to increase the attractiveness of wide stretches of level common ground. (pg. 13)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 2-1.1, pg. 4, states: Planners and designers must ensure that lot and site designs conform to standards or requirements stated in installation and family housing master plans. The goal of neighborhood design for military family housing is to develop and sustain a residential environment that responds to the military family, and reinforces the connection between families and community.	
UFC-4-711-02A, JANUARY 2011 Section 3.1.5, pg. 21, states: Pave sidewalks and walks, and provide appropriate surfaces for jogging, exercise, and bike paths. Walkways shall provide pedestrian access to and from housing units, public sidewalks, and other common use areas. Walkways shall be a minimum of 1.2 m (4 ft) wide exclusive of curb width, and made of non-reinforced concrete with a minimum thickness of 100 mm [4 in]. Where walks are adjacent to the curb, the curb width is not to be included as sidewalk. Jogging paths and bikeways shall be a minimum of 1.8 m (6 ft) wide. Pedestrian circulation shall be separated from vehicular circulation as much as possible. Walks must conform to current accessibility standards.	

SITE, GROUNDS & PARKING (MISSION – FUNCTIONAL) NEIGHBORHOOD DESIGN	
ISR-I BOOKLET 30	**PLANNING GUIDE**
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

SITE, GROUNDS & PARKING (QUALITY) LIGHTING	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• More than 90% is working	N/A
AMBER	**MINOR REPAIRS**
• 75%–90% is working	N/A
RED	**MAJOR REPAIRS**
• Less than 75% is working	N/A
	REPLACEMENT
	N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 N/A	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

SITE, GROUNDS & PARKING (QUALITY) PAVED SIDEWALKS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Less than 10% of surface area is cracked or broken	**FULLY ADEQUATE** N/A
AMBER • 10–25% of surface area is cracked or broken	**MINOR REPAIRS** N/A
RED • More than 25% of surface area is cracked or broken; sidewalk poses a tripping hazard	**MAJOR REPAIRS** N/A **REPLACEMENT** N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 N/A - condition of sidewalks	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

SITE, GROUNDS & PARKING (QUALITY) DRIVEWAY	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Paved driveway has only aesthetic cracks	**FULLY ADEQUATE** Driveway provides good access to the house as well as parking for two cars, and concrete or asphalt has minimal surface defects, cracks, settling, or buckling. Edges of all paved surfaces are well defined and even. (pg. 36)
AMBER • Paved driveway has larger cracks that need resealing or filling in	**MINOR REPAIRS** Fill excessive cracks with caulk and reseal asphalt. (pg. 36)
RED • Driveway needs paving or repaving	**MAJOR REPAIRS** Apply topping over entire driveway/parking pad surface, or expand the driveway for a second car. (pg. 36)
	REPLACEMENT Remove and replace a badly deteriorated driveway or add a new one if none exists. No parking is available other than on-street parking. (pg. 36)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 3-1.4, pg. 10, states: Driveways should have a minimum width of 3.0 m (10 ft). The minimum length for driveways utilized for off-street parking should be 7.3 m (20 ft), measured from edge of sidewalk.	
UFC-4-711-02A, JANUARY 2011 Section 3.1.4, pg. 21, states: Driveways shall have a minimum width of 3.0 m (10 ft). The minimum length for driveways utilized for off-street parking shall be 7.3 m (20 ft), measured from back edge of sidewalk. Driveway grades shall provide safe access	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

SITE, GROUNDS & PARKING (QUALITY) SITE DRAINAGE	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • No erosion channels • No dead turf from water ponding • No debris at pavement drain	**FULLY ADEQUATE** No evidence of water accumulation. Gutters, downspouts, and splash blocks are present with all components installed and in good condition. (pg. 38)
AMBER • Erosion channels • Dead turf from water ponding • Some debris at pavement drains	**MINOR REPAIRS** Repair leaking or stopped-up gutters, downspouts, and splash blocks. (pg. 38)
RED • Large areas eroded • Channel cuts and dead shrubs • Significant ponding/standing water • Significant debris at pavement drains (clogging risk)	**MAJOR REPAIRS** If there is evidence of small pockets of water accumulation adjacent to foundation, fill or hand grade to provide adequate slope away from the house. Replace or install new gutters and downspouts. (pg. 38)
	REPLACEMENT Evidence of water accumulation adjacent to foundation; grade is flat or slopes toward the foundation wall; evidence of soil erosion; or an indication of water leakage or severe puddle formation around the unit during moderate to heavy rain storms. Floor slab cracking is evident, or cracks can be seen in the foundation. Major machine grading and landscaping are required. (pg. 38)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 3-3.2, pg. 11, states: Areas should be designed for positive drainage away from housing units. Finish grade around perimeter of each housing unit should slope a minimum of 5% (15 cm (6 in) fall in 3.0 m (10 ft)) to carry surface water away from foundation walls. Where lot lines, walls, slopes, or other physical barriers prohibit 15 cm (6 in) fall in 3.0 m (10 ft), drains or swales should be provided to ensure drainage away from structure.	
UFC-4-711-02A, JANUARY 2011 Section 3.4.2, pg. 23, states: Areas shall be designed for positive drainage away from housing units.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

SITE, GROUNDS & PARKING (QUALITY) LANDSCAPING	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Plans and greenery is appropriate to the area, healthy and well maintained	**FULLY ADEQUATE** Shrubbery is present and in good condition and harmonizes with the landscaping of other nearby units and throughout the neighborhood. The ground/foundation line is not exposed in the front. Low-maintenance shrubs, appropriate for the climate, have been used. In arid climates, desert landscaping has been used to conserve water and to keep excess water away from the foundation of the house. Lawn or ground cover is in good condition. There are several healthy trees in the yard. (pg. 35)
AMBER • Does not meet GREEN column minimum conditions	**MINOR REPAIRS** Replace several shrubs as required to screen foundation. Reseed bare areas of the lawn. (pg. 35)
RED • N/A [no RED condition]	**MAJOR REPAIRS** Shrubbery is either lacking or clearly dead or dying. Grass is spotty, dead, or dying. Remove dead or dying shrubbery and replace. Reseed existing lawn. Establish all new foundation plantings. Add a tree or two to the lot. (pg. 35)
	REPLACEMENT Establish entirely new landscaping. (pg. 35)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 8-2.1, pg. 30, states: Landscaping may consist of shrubs, trees, decorative fencing, earth sculpting, rocks or special gardens, and identification signs. Trees, natural areas, and native plant species should be preserved where possible. Grade sites so that slopes follow natural contours as much as possible.	
UFC-4-711-02A, JANUARY 2011 Section 8.2.1, pg. 87, states: Landscaping may consist of shrubs, trees, decorative fencing, earth sculpting, rocks or special gardens, and identification signs.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

SITE, GROUNDS & PARKING (QUALITY) UTILITY SERVICES	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • All utility lines are underground	**FULLY ADEQUATE** N/A
AMBER • Utility lines are not underground • Utility equipment is screened by landscaping or fencing	**MINOR REPAIRS** N/A
RED • Utility lines and equipment are not underground and not screened or fenced	**MAJOR REPAIRS** N/A **REPLACEMENT** N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 3-4.2, pg. 11, states: Where feasible, and acceptable to local utility supplier or servicing agency, use common trenches for two or more utilities and applicable underground utility marking protocol.	
UFC-4-711-02A, JANUARY 2011 Section 3.8.1, pg. 30, states: Provide new electrical distribution systems with underground primary and secondary feeds, unless otherwise indicated.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS In Infrastructure section of the Planning Guide (pg. 15) there is the only reference to utility lines. It states: The most common defects include damaged or deteriorated utilities and streets; unsightly overhead power lines…	

BUILDING EXTERIOR – GENERAL (QUALITY) OUTSIDE DRAINAGE	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Gutters, roof drains, and downspouts pass water down to splash blocks or drains • Sections show no signs of leaks • Outflow drains away from the building	**FULLY ADEQUATE** All gutters and downspouts are firmly attached, properly sloped, and free of corrosion and leaks. (pg. 50)
AMBER • Gutters, roof drains, and downspouts pass water to ground level freely • Sections show leaks, but no holes • Outflow ponds at the building base around splash blocks	**MINOR REPAIRS** Gutters and downspouts are free of corrosion. Replace mounting brackets, ensuring proper slope. Reseal joints as needed. Reattach downspouts to gutters and house. Replace defective splash blocks. (pg. 50)
RED • Gutters, roof drains, and downspouts are backed up with rainwater and roof debris • Sections leak and are broken open • Outflow ponds at building base; no splash blocks	**MAJOR REPAIRS** N/A **REPLACEMENT** Replace entire gutter and downspout system; refinish fascia boards. (pg. 50)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 4-6.1, pg. 19, states: Design roof overhangs, gutters and downspouts, roofing materials, and attic ventilation in accordance with roofing installation standards to conserve energy and reduce maintenance costs. See UFC 3-190-04FA Roofing and Waterproofing, for additional guidance.	
UFC-4-711-02A, JANUARY 2011 Section 4.6.2, pg. 51, states: Gutters 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 if not connected to the storm drainage system.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

BUILDING EXTERIOR - GENERAL (QUALITY) ENTRANCE AND PORCH LIGHTING	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • 90% or more is working • Motion detector activated	**FULLY ADEQUATE** N/A
AMBER • 75%–90% is working • Manual switch	**MINOR REPAIRS** N/A
RED • Less than 75% is working	**MAJOR REPAIRS** N/A
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 5-1.3, pg. 22, states: Provide exterior lighting, controlled from inside the living unit, at each exterior door and in carport or garage.	
UFC-4-711-02A, JANUARY 2011 Section 5.4.1.11.1 pg. 64, states: Provide a minimum of one light fixture and one ground-fault-protected outlet in each housing unit's entry, garage or carport, and patio or balcony area(s). Light fixtures at entry and patio or balcony areas shall be switched from the housing unit interior. Entry ways serving two or more housing units, and common carports, may have a common light, photo-electric cell activated, in lieu of individual switched lights. In addition, common trash areas shall be lighted. These lights shall be controlled by photo-electric cell, activated by minimum light levels of 5.4 Lx [0.5 foot-candle].	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

BUILDING EXTERIOR - ROOF (QUALITY) ROOF	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Roof less than 10 yrs old • No mildew or cracked decking • No evidence of water seeping into interior • Flashing is not cracked and seams are not broken *On sloped roofs:* • No shingles or roofing elements are missing or torn/broken *On flat roofs:* • No standing puddles • Walkways prevent foot traffic damage	**FULLY ADEQUATE** Current roof covering is in excellent condition with few if any reports of leaks in O&M records and is less than 10 years old. (pg. 48) Roof flashing states: flashing is free of rust or other corrosion and shows no signs of physical damage or deterioration. (pg. 48) Roof trim states: paint is in good condition and there is no visible evidence of rot or deterioration. (pg. 49)
AMBER • Roof 11-25 yrs old • Visible eave warping/shingles lifting up/tiles uneven (up to 50% discolored/fading/stained; • Some mildew and/or cracked decking; Interior evidence of pervious leaks/seeping • Flashing is not intact; seams are broken; some pieces cracked *On sloped roofs:* • Up to 10% Of shingles or roofing elements are missing or torn/broken • 10–50% of shingles/roofing materials are missing or torn/broken *On flat roofs:* • Signs that water puddles • Walkways are present, but there is some visible damage to roof material	**MINOR REPAIRS** Roof covering states: roofing is less than 10 years old and in excellent repair except for minor defects that can easily be repaired. Such defects include several broken tiles or an occasional leak (pg. 48). Roof flashing states: flashing is free of rust or other corrosion. Refasten and seal between flashing and vertical surfaces as required. (pg. 48) Roof trim states: paint soffit and fascia. (pg. 49)

BUILDING EXTERIOR - ROOF (QUALITY) ROOF	
ISR-I BOOKLET 30	**PLANNING GUIDE**
RED • Roof more than 25 yrs old • Shows warping or pieces missing • Large areas of mildew & cracked decking • Leaks water clearly seeps to interiors • Pieces of flashing are missing *On sloped roofs:* • More than 10% of shingles or other materials are missing or torn/broken *On flat roofs:* • Standing water is evident • No walkways; significant damage to roof material	**MAJOR REPAIRS** Roof covering shows obvious signs of weathering or deterioration. Roof leaks have been reported in five percent or more of the units. Only one layer of shingles exists on the roof. Install a new roof covering over the old. (pg. 48) Roof flashing - N/A Roof trim states: remove and replace up to 40 feet of soffit and/or fascia. Paint all soffits and fascia boards. Clean out eave vents and replace screens as necessary. (pg. 49) **REPLACEMENT** Two or more layers of shingles exist on the roof. Remove and replace roof covering and add insulation as appropriate. Wood shingles or shakes are prohibited. (pg. 48) SPECIAL It may be desirable to replace flat roofs with pitched roofs involving the installation of roof trusses, sheathing, roof covering, flashing, and gutters and extension of plumbing vent pipes and chimneys as required. (pg. 48) Roof flashing - N/A Roof trim states: remove, replace, and paint entire soffit and fascia. Install new eave vents. (pg. 49)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 4-6.1, pg. 19, states: Wood shingles and shakes are prohibited. Roofing material should comply with ENERGY STAR® recommendations.	
UFC-4-711-02A, JANUARY 2011 Section 4.6.1, pg. 51, states: Shingle and tile roofs shall have a minimum slope of 4:12 for maintainability, and to provide residential scale to the neighborhood. Metal roofs shall have a minimum slope of 2:12. Install fall protection anchor points on all roofs with a slope greater than 2:12. Wood shingles and shakes are prohibited. Design roof overhangs, gutters and downspouts, roofing materials, and attic ventilation in accordance with roofing installation standards to conserve energy and reduce maintenance costs. See UFC 3-190-04FA Roofing and Waterproofing, for additional guidance.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

BUILDING EXTERIOR – WALLS (QUALITY) STRUCTURAL FRAME (MASONRY/CONCRETE FRAME)	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • No major cracks visible on exterior surfaces • No stucco or masonry materials flaking or breaking away • No signs of water dripping from frame or floor slab above	**FULLY ADEQUATE** No evidence of structural failure exists. (pg. 55)
AMBER • Cracks visible on up to 25% of exterior surface • Less than 10% of cracks are wider than a round toothpick • No stucco or masonry material flaking or breaking away • No signs of water dripping from frame or floor slab above	**MINOR REPAIRS** N/A
RED • Cracks visible on more than 25% of exterior surfaces • More than 10% of cracks are wider than a round toothpick • Stucco or masonry material is flaking or breaking away • Signs of water dripping from frame or floor slab above	**MAJOR REPAIRS** Jack up and brace floor or roof over opening; remove and replace header with adequate member. (pg. 55) **REPLACEMENT** Structural damage is evident. Remove interior gypsum wallboard and/or exterior siding and sheathing at the area of damage; brace roof; replace damaged wall framing, gypsum wallboard, sheathing, and siding. (pg. 55).
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 4-7.3, pg 20, states: Use of "Advanced Framing Techniques - Optimum Value Engineering (OVE)" framing is recommended.	
UFC-4-711-02A, JANUARY 2011 Section 4.7.1, pgs. 52 - 53, states: Concrete masonry units shall conform to ASTM C90. Portland cement plaster or synthetic stucco shall have integral color. Factory-prefinished siding shall have a minimum non-prorated 15-year warranty on the finish. Aluminum or steel siding with or without backing are acceptable only on the second story of a structure or at least 2000 mm [6 ft] above finish grade. Aluminum siding shall conform to the requirements of AAMA 1402.3, Standard Specification for Aluminum Siding, Soffit, and Fascia, except aluminum substrate shall be a minimum of 0.6 mm [0.024 inch] thick if it is not fiberboard backed.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

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BUILDING EXTERIOR – WALLS (QUALITY) STRUCTURAL FRAME (WOOD FRAME)	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • No cracks in exterior stud walls, or interior walls supporting roof (load bearing walls) • No walls bowed or leaning more than 1/4." • No cracks in wall finishes on structural frame greater than 1/4." • No exterior roof deflections greater than 1/2." • No deflections of rafters or trusses greater than 1/2." • No signs of tunneling or small wood dust piles from insect damage. • No fungal growths on wood. • No scorching or discoloration indicating fire, water, or chemical damage. • No rotting of wood. • No cracks or splitting of rafters, trusses, or connections in attic. No other damage as listed above in attic.	**FULLY ADEQUATE** No cracks, splits, warps, dents, wrinkles, looseness, or rusted nails are apparent in siding. (pg. 56)
AMBER • Scattered hairline cracks in long direction of wood member. No cracks or breaks across member width • No bowing or leaning of walls greater than 1/2" • No cracks in finish materials greater than 3/8." • No exterior roof deflections greater than 1." • No deflections of rafters or trusses greater than 1." • No more than two wood tunnels or small wood dust piles showing insect damage. • No more than two isolated fungal growths. • No more than two areas with scorching or other discoloration due to fire, water, or chemical damage. • No more than two areas with wood rot due to water damage. • No cracks or breaks across rafters, trusses, or connections in attic. No more than two hairline cracks in long direction of embers in one area.	**MINOR REPAIRS** N/A

BUILDING EXTERIOR – WALLS (QUALITY) STRUCTURAL FRAME (WOOD FRAME)	
ISR-I BOOKLET 30	**PLANNING GUIDE**
RED • Large cracks or breaks occur across stud widths (greater than 1/8") in exterior stud walls, or interior walls supporting roof, or in attic framing. • Wall are bowing or leaning more than 1." • Cracks in finish materials greater than 1/2." • Exterior roof deflections exceed 1." • Deflections of rafters or trusses greater than 1." • Three or more studs or rafters with insect borings, or three or more wood dust piles. • Fungal growths damaging wood. • Members burned through over 1/2." • Discoloration or wet surfaces with rotting or damage over 1/2" deep indicating fire, water, or chemical damage. • Rotting of wood over 1/2" deep.	**MAJOR REPAIRS** See Structural Frame – Masonry/Concrete Frame. **REPLACEMENT** See Structural Frame – Masonry/Concrete Frame.
REGULATIONS	
UFC-4-711-01, JULY 2006 Steel siding material shall be a minimum of 0.017-inch thick [29 gauge], zinc-coated steel conforming to ASTM A653, 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. Vinyl siding shall conform to the requirements of ASTM D3679, Rigid Poly (Vinyl Chloride) (PVC) Siding and shall be a minimum of 1.16 mm [0.044 inch] thick.	
UFC-4-711-02A, JANUARY 2011	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

BUILDING EXTERIOR – WALLS (QUALITY) EXTERIOR SURFACE	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• No noticeable deterioration or damage	No cracks, splits, warps, dents, wrinkles, looseness, or rusted nails are apparent in siding. Masonry mortar joints are in good condition and brick faces are intact. No apparent cracks in stucco. Paint is in good condition. (pg. 56)
AMBER	**MINOR REPAIRS**
• Requires patch repairs and exterior painting	Re-point up to 10 percent of brick or masonry unit mortar joints. Patch minor stucco cracks. Make minor repairs to other siding types. (pg. 56)
RED	**MAJOR REPAIRS**
• Requires replacement of exterior wall siding/stucco	Re-point brick or block mortar joints. Repair large areas of stucco surface with a new top coat. Refinish all siding surfaces. (pg. 56)
	REPLACEMENT
	Replace exterior wall coverings. Consider alternative wall finishes, taking into account future maintenance requirements. (pg. 56)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 4-7.1, pg. 19, states: Use sustainable, low maintenance finish materials, such as brick, integrally-colored concrete masonry, integrally colored stucco, factory finished vinyl-clad steel, vinyl siding, fiber-cement siding, and drainable exterior insulated finish systems. Avoid materials requiring field finishing. Provide vapor barrier/diffusion retarder as required by dew point analysis. Aluminum siding should not be used.	
UFC-4-711-02A, JANUARY 2011 Section 4.7.1, pg. 52, states: Use sustainable, low maintenance finish materials, such as brick, integrally-colored concrete masonry, integrally colored stucco, factory pre-finished siding, steel siding, vinyl siding. Materials shall be residential in size, scale, and texture. Avoid materials requiring field finishing. Provide vapor barrier/diffusion retarder as required by dew point analysis. Aluminum siding, hardboard and cement asbestos shingle siding shall not be used.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

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BUILDING EXTERIOR – WINDOWS (QUALITY) WINDOWS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Windows less than 5 yrs old; no noticeable deterioration or damage (triple pane is GREEN) • Open, close and lock easily • Glass, weather-stripping, and vapor seal between panes are intact	**FULLY ADEQUATE** Windows appear to be in excellent condition with no sign of weathering or other deterioration of sash or frame. Frame is well sealed around the perimeter of the wall opening in which the window unit is installed. Window must be operable, dual-pane or insulated glass, and must have an insect screen. (pg. 62)
AMBER • Windows 6-15 yrs old and show evidence of deterioration and/or damage (double pane is AMBER)	**MINOR REPAIRS** Replace glazing putty and repaint or refinish window frames. Replace broken panes or sash. Repair screen. All other aspects of the windows are in excellent condition. (pg. 62)
RED • Windows more than 15 yrs old and need to be replaced (single pane is RED)	**MAJOR REPAIRS** Same as minor repairs plus storm windows and/or screens on all windows. Replace entire window unit in bathroom due to moisture damage. (pg. 62)
	REPLACEMENT Remove all old windows and replace with new energy-efficient units in accordance with Family Housing standards. Note: Replacement is rarely justified by expected energy savings alone. Window replacement may, however, be justified by window condition, excess air leakage, or inside condensation or frosting that damages sills and walls. (pg. 62)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 4-7.2, pg. 19, states: Provide windows that meet minimum egress requirements in NFPA 101, Life Safety Code. Operable windows must be manually operated and lockable. Provide non-ferrous screens for operable windows. Maximize amount of natural light in living areas. Window energy performance should comply with Energy Star® recommendations. Tilt-in windows are recommended to facilitate cleaning by occupants. Provide glass door and window treatments for occupant privacy.	
UFC-4-711-02A, JANUARY 2011 Section 4.7.5, pg. 54, states: Provide windows and glazed door (50 percent or more glass) that meet minimum egress requirements in the Life Safety Code (NFPA 101). Operable windows must be manually operated and lockable. Provide non-ferrous screens for operable windows. Maximize amount of natural light in living areas. Window energy performance shall comply with ENERGY STAR® recommendations. Tilt-in windows are recommended to facilitate cleaning by occupants. Provide glass door and window treatments for occupant privacy. Window screens shall be provided for operable windows in habitable rooms and spaces. Screens must be removable for window cleaning and emergency egress purposes without the use of any special tools. Removable window guards or child safety locks may be provided in lieu of reinforced window screens.	

BUILDING EXTERIOR – WINDOWS (QUALITY) WINDOWS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

BUILDING EXTERIOR – DOORS (QUALITY) EXTERIOR DOORS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Less than 5 yrs old with no signs of leaking or noticeable deterioration or damage • Energy Star label attached • Hinge pins cannot be removed from outside	**FULLY ADEQUATE** Doors are in good condition with all hardware intact, require no refinishing or painting, swing freely in their frames, and latch and lock when closed. (pg. 60)
AMBER • 6-15 yrs old and show evidence of leaking, deterioration and /or damage (missing security and insulation label is AMBER) • Hinge pins can be removed from outside	**MINOR REPAIRS** Refinish doors and tighten hinges and other hardware. (pg. 60)
RED • More than 15 yrs old; need to be replaced (uninsulated doors are RED) • Hinge pins are easily removed from outside	**MAJOR REPAIRS** Same as minor repairs plus replace hardware and/or locks; adjust swing, replace weather stripping, and replace storm and/or screen doors for wood units or screen doors. (pg. 60)
	REPLACEMENT Replace exterior doors. (pg. 61)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 4-7.4, pg. 20, states: Provide insulated exterior doors for increased energy performance. Provide dead-bolt locks on all hinged entry doors. Provide impact-resistant side light at entry door, or a wide-angle viewer. Door energy performance should comply with Energy Star® recommendations.	
UFC-4-711-02A, JANUARY 2011 Section 4.7.7, pg. 55, states: Provide insulated exterior doors for increased energy performance. Provide dead-bolt locks on all hinged entry doors. Door energy performance shall comply with ENERGY STAR® recommendations	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

FOUNDATION (QUALITY) FOUNDATION	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • No work is required to correct slab or basement foundation problems (settling, cracks, moisture, mold)	**FULLY ADEQUATE** Foundation wall or slab displays no significant evidence of cracking, differential settling, or other movement. In basements, no evidence of water leaks is apparent. If crawl space is present, floor insulation meets recommended level. (pg. 51)
AMBER • Foundation shows visible signs of minor settling or cracking that can be easily repaired • Basement floors or walls are damp and have a film of moisture or mold	**MINOR REPAIRS** Foundation wall or slab displays minor (1/8 in.) cracks with no horizontal or vertical displacement across the crack. Patch and seal cracks. If crawl space is present, install vapor retarder. Upgrade or repair insulation in crawl space. (pg. 51)
RED • Foundation shows significant signs of settling (sinking) or water infiltration that will require a major project to correct or is uneconomical to correct	**MAJOR REPAIRS** Foundation wall or floor slab has cracks with differential horizontal or vertical displacement across the crack. Interior and/or exterior wall coverings show minor cracking. Doors and windows may stick and floors may slope somewhat. Jack floor to level and support with shims, footers, or piers. If basement is present, repair waterproofing, or if this is not feasible, consider installing a collection system with sump pump. (pg. 52)
	REPLACEMENT Foundation or slab displays major cracking or structural failure. Symptoms of foundation failure are evident on interior and exterior walls above the foundation. Repair by perimeter excavation; jack and level slab or wall; and support with footers or piers. If basement is present, repair or replace waterproofing and add external insulation board with waterproof treatment. (pg. 52)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 4-5.1, pg. 18, states: Design foundations in accordance with UFC 1-200-01 and the International Residential Code (IRC).	
UFC-4-711-02A, JANUARY 2011 Section 4.5.1, pg. 50, states: Design foundations in accordance with UFC 1-200-01 and the International Residential Code (IRC).	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

PATIOS, BULK STORAGE, & TRASH (MISSION – FUNCTIONAL) BULK STORAGE SPACE	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Bulk storage is secure, protected from elements, has lighting, is conveniently located (do not consider 1st garage space for bulk storage), and is at least 40 sf.	**FULLY ADEQUATE** Door opens and closes freely. Lockset is in good condition. Shelving and brackets are in good condition and tightly fastened. Floor, wall, and ceiling covering are in good condition. (pg. 42)
AMBER • Bulk storage exists but does not meet ALL GREEN criteria	**MINOR REPAIRS** Tighten hinges and shelf brackets and replace lockset. Repair minor damage to wall and ceiling surface with tape and spackling compound. If floor is concrete, clean and fill unacceptable cracks with compatible crack sealer. (pg. 42)
RED • No bulk storage exists	**MAJOR REPAIRS** Same as Minor Repairs plus remove heavily damaged wall and ceiling surface material and replace. Replace door and paint; install shelf brackets and shelving; replace finish flooring if other than concrete. (pg. 42)
	REPLACEMENT Adequate storage space does not exist. Either expand inadequate storage space or build new space onto garage, carport, or house. (pg. 42)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 4-7.7, pg. 20, states: Provide an outside service door opening to exterior storage areas, wide enough to accommodate lawn mowers and typical lawn tools, except when storage is provided in garage. Locate outside service door near outdoor living and lawn areas. Provide paved access to the door. Provide a switch-controlled light at outside service door. Recommended exterior storage space is 2.8 m^2 (30 ft^2) for two-bedroom units, 3.7 m^2 (40 ft^2) for three-bedroom units, and 4.7 m^2 (50 ft^2) for four- and five-bedroom units.	
UFC-4-711-02A, JANUARY 2011 Section 4.3.11.3, pg. 41, states: Provide exterior storage in a garage, a separate exterior enclosure, or within the housing unit with access from the exterior. (See Table 4-5, pg. 42)	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

PATIOS, BULK STORAGE, & TRASH (MISSION – FUNCTIONAL) PATIO/DECK	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Surfaced patio or deck greater than 100 sf (for apts. greater than 72 sf balcony)	**FULLY ADEQUATE** If patio exists, it is properly placed and large enough to provide adequate outdoor space. It is in good condition with no significant settling, cracking, or separation from unit. The joint between house and slab is sealed with caulking that is somewhat resilient to the touch. If deck exists, all wood members are free of rot and insect damage; railing, if any, is secure. Posts are adequately supported by footings (pg. 44)
AMBER • Present but does not meet GREEN criteria	**MINOR REPAIRS** Reseal joint between patio and house. Caulk minor cracks that do not exceed vertical displacement limits. If deck exists, re-nail loose decking and refasten railing. Paint if necessary. (pg. 44)
RED • No patio (or balcony) is present	**MAJOR REPAIRS** Patio or deck is not adequate to serve its purpose. Expand or reconfigure to make it more functional. (pg. 44)
	REPLACEMENT Patio or deck does not exist. Patio cracks exceed limits; settling adjacent to housing unit is evident; or concrete is deteriorating. Remove and replace patio. If deck exists, it is structurally unsound with rot or insect damage. Remove and replace it; consider the use of recycled plastic "wood." (pg. 44)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 4-4.3, pg. 18, states: For each living unit that opens to the exterior at ground level, provide a minimum patio area of 11.2 m^2 (120 ft^2) with a minimum dimension of 2.4 m (8 ft).	
UFC-4-711-02A, JANUARY 2011 Section 4.4.3, pg. 49, states: For each living unit that opens to the exterior at ground level, provide a minimum patio area of 11.2 m^2 [120 ft. with a minimum dimension of 2.4 m [8 ft].	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

PATIOS, BULK STORAGE, & TRASH (MISSION – FUNCTIONAL) PRIVACY SCREENING/FENCE	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Adequate privacy screening/fence exists between patios or balconies	**FULLY ADEQUATE** Fence or screen is of adequate dimensions and height, is relatively plumb and level, has no sign of rot or insect damage, and has sturdy posts set in concrete. Fasteners are not loose, gate operates and latches freely, and paint or stain is in good condition. (pg. 45)
AMBER • Privacy screening between patios/balconies is less than 5' high OR less than 5' wide OR requires REPAIRS	**MINOR REPAIRS** Straighten posts, re-nail boards, paint or stain, replace or adjust gate hardware. (pg. 45)
RED • No privacy screening between patios or balconies	**MAJOR REPAIRS** Expand existing fencing to provide adequate privacy. Replace up to 25 percent of the posts, rails, and boards. Re-level, paint, or stain. Replace gate hardware. (pg. 45)
	REPLACEMENT Fencing is missing and must be added. Remove existing fencing or screen; rebuild with new materials. Consider recycled plastic or other materials that do not require paint or stain. (pg. 45)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 4-4.1, pg. 17, states: Each family dwelling unit should have an adjoining private or semi-private outdoor space, partially or completely surrounded by privacy screening, unless space is considered impracticable because of density or location.	
UFC-4-711-02A, JANUARY 2011 Section 4.4.3, pg. 49, states: Screen patios and decks from streets, common areas, and adjacent living units.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

PATIOS, BULK STORAGE, & TRASH (MISSION – FUNCTIONAL) DUMPSTER	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Screened to limit direct views from housing occupants and visitors • Conveniently located for occupants	**FULLY ADEQUATE** Trash enclosure is properly located, adequately sized, and has a relatively flat but well-drained paved pad. (pg. 43)
AMBER • Not sufficiently screened to obscure view from housing occupants and visitors • More than 20 feet beyond bldg 5' line but less than 33 feet from 5' line of adjacent occupied facilities	**MINOR REPAIRS** Repair enclosure materials and hardware as necessary and repaint structure. (pg. 43)
RED • Not enclosed or screened from view by occupants and visitors • Less than 20 feet away from bldg 5' line of adjacent occupied facilities	**MAJOR REPAIRS** If severe cracking in pad is evident, demolish and re-pour concrete slab. (pg. 43)
	REPLACEMENT Enclosure is improperly located or does not exist. Demolish existing enclosure and break up and remove pad. Build new enclosure to required specification at new location. (pg. 43)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 4-7.8, pg. 21, states: Provide each living unit with a paved pad area large enough for two 114-liter (30-gallon) containers, plus any recycling containers required by the installation. Locate any dumpster areas in areas least offensive to housing occupants, and provide adequate shielding with fencing or screening.	
UFC-4-711-02A, JANUARY 2011 Section 4.7.11, pg. 57, states: Provide each living unit with a paved pad area large enough for two 114-liter [30-gallon] containers, plus any recycling containers required by the installation. Locate dumpster areas, if provided, in areas least offensive to housing occupants, and provide adequate shielding with fencing or screening.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

APARTMENT COMMON STAIRWELLS (MISSION – FUNCTIONAL) LANDINGS & TREADS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Non-skid treads • Material does not pose pedestrian tripping hazards	**FULLY ADEQUATE** Treads are uniformly deep, risers are uniformly high, and illumination is adequate. Concrete treads and landings have rough finish for slip resistance, metal treads are manufactured with rough surface, and wood treads have nonslip strips applied to the surface of the wood. Railings, treads, and structural members of the steps are sound and free of rot or rust. (pg. 59)
AMBER • Landings or stairs require minor repair	**MINOR REPAIRS** Stairs are lighted, correctly sized, and structurally sound but need painting. The railing is loose. Tighten railings, paint railings, and paint or reseal stairs. (pg. 59)
RED • Landings and stairs require major repairs to: • Cover with non-skid treads/material • Replace extensively damaged surfaces that pose a pedestrian tripping hazard	**MAJOR REPAIRS** Railing is weak or unsound. Several treads or landings are cupped and may hold water. Nonslip surface needs to be added. Concrete needs minor caulking and repairs. Replace railing and some cupped or split wood treads; add slip-resistant surface treatment; and caulk and reseal concrete steps. (pg. 59)
	REPLACEMENT Exterior stairs are unsafe due to rotted or deteriorated wood, rusted or corroded metal, or cracked or deteriorated concrete. Remove and replace stairs. (pg. 59)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 4-4.4, pg. 18, states: Exterior stairways serving multiple units should be sheltered from wind and precipitation. Wood exterior stairs are prohibited.	
UFC-4-711-02A, JANUARY 2011 Section 4.4.4, pg. 49, states: Exterior stair treads and landings shall be constructed of concrete or steel, and provided with non-slip type treads.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

APARTMENT COMMON STAIRWELLS (MISSION – FUNCTIONAL) MAIN ENTRANCE STAIR DOORS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Insulated metal, security glass or solid core wood • Door hardware fully functional and secure • Panic hardware does not require key or special tools to exit from inside	**FULLY ADEQUATE** Doors are in good condition with all hardware intact, require no refinishing or painting, swing freely in their frames, and latch and lock when closed. (pg. 60)
AMBER • Common Stairwell doors 6-15 yrs old • Handles, hinges or surfaces are stained, chipped, gouged or worn and need repair	**MINOR REPAIRS** Refinish doors and tighten hinges and other hardware. (pg. 60)
RED • More than 15 yrs old; need to be replaced (uninsulated doors are RED) • No lever handles or push plates on corridor side • Panic hardware requires key or special tools to operate from inside	**MAJOR REPAIRS** Same as minor repairs plus replace hardware and/or locks; adjust swing, replace weather stripping, and replace storm and/or screen doors. (pg. 60)
	REPLACEMENT Replace exterior doors. (pg. 61)
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 N/A	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

APARTMENT COMMON STAIRWELLS (MISSION – FUNCTIONAL) LIGHTING & OUTLETS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Exit and emergency lights are in place and tied to backup power • At least one GFI outlet at each floor landing	**FULLY ADEQUATE** N/A
AMBER • Exit and emergency lights are in place but not tied to backup power • Non-GFI outlet(s) at each floor landing	**MINOR REPAIRS** N/A
RED • Exit and emergency lights are not in place • No outlet at each floor landing	**MAJOR REPAIRS** N/A
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 5.4.1.11.1, pg. 64, states: Lights for common areas as in gang carports and apartments shall be photo-electric cell controlled. Lights in common areas shall have high impact-resistant plastic lenses, and/or be otherwise made vandal-proof.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

APARTMENT COMMON STAIRWELLS (MISSION – FUNCTIONAL) SIGNAGE	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• Present and current	N/A
AMBER	**MINOR REPAIRS**
• Present, but not current	N/A
RED	**MAJOR REPAIRS**
• Not present	N/A
	REPLACEMENT
	N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 4.3.17.2, pg. 48, states: All new units shall be provided with building identification signage in accordance with the Installation Design Guide requirements.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

APARTMENT COMMON STAIRWELLS (QUALITY) LANDINGS & TREADS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Material is not cracked or gouged with pieces broken off	**FULLY ADEQUATE** Treads are uniformly deep, risers are uniformly high, and illumination is adequate. Railings, treads, and structural members of the steps are sound and free of rot or rust. (pg. 59)
AMBER • Material has minor defects, chips or flakes, but poses no threat to pedestrians • Some handrails are chipped and worn, but remain securely fastened	**MINOR REPAIRS** The railing is loose. Tighten railings, paint railings, and paint or reseal stairs. (pg. 59)
RED • Material is extensively damaged and poses a pedestrian tripping hazard • Handrails are damaged and not securely fastened to wall	**MAJOR REPAIRS** Railing is weak or unsound. Several treads or landings are cupped and may hold water. Nonslip surface needs to be added. Concrete needs minor caulking and repairs. Replace railing and some cupped or split wood treads; add slip-resistant surface treatment; and caulk and reseal concrete steps. (pg. 59)
	REPLACEMENT Exterior stairs are unsafe due to rotted or deteriorated wood, rusted or corroded metal, or cracked or deteriorated concrete. Remove and replace stairs. (pg. 59)
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 N/A	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

APARTMENT COMMON STAIRWELLS (QUALITY) MAIN ENTRANCE STAIR DOORS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Fully functional handles and hinges • Less than 5 yrs old with no noticeable deterioration or damage	**FULLY ADEQUATE** N/A
AMBER • 6-15 yrs old and show evidence of leaking, deterioration and/or damage • Door hardware is broken or difficult to operate • Lever handles are chipped and worn or doors have dents, gouges, scratches, or stains	**MINOR REPAIRS** N/A
RED • Greater than 15 yrs old; need to be replaced (uninsulated doors are RED)	**MAJOR REPAIRS** N/A
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 N/A	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

APARTMENT COMMON STAIRWELLS (QUALITY) LIGHTING & OUTLETS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • At least 90% of stair lights are working • Exit and emergency lights are in place and working, and tied to backup power, either emergency generator or battery	**FULLY ADEQUATE** N/A
AMBER • 75%–90% of stair lights are working • Exit and emergency lights are in place, at least 75% are working, and are tied to backup power, either emergency generator or battery	**MINOR REPAIRS** N/A
RED • Less than 75% of stair lights are working • Exit and emergency lights are in place, but less than 75% are working, or do not tie to backup power (either emergency generator or battery	**MAJOR REPAIRS** N/A **REPLACEMENT** N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 N/A	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

APARTMENT COMMON STAIRWELLS (QUALITY) CEILINGS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Not gouged, stained, broken areas, or missing pieces	**FULLY ADEQUATE** N/A
AMBER • Not more than 25% of ceiling area is gouged, stained, broken, or missing pieces	**MINOR REPAIRS** N/A
RED • More than 25% of ceiling area is gouged, stained, broken, or missing pieces	**MAJOR REPAIRS** N/A **REPLACEMENT** N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 N/A	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

APARTMENT COMMON STAIRWELLS (QUALITY) WALLS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • In good condition; not gouged or stained • Conduits are concealed or covered	**FULLY ADEQUATE** N/A
AMBER • Minor gouges and stains require minor repairs, such as patching • Conduits exposed	**MINOR REPAIRS** N/A
RED • Need major repairs or refurbishing; gouges and stains are beyond patching • N/A [no RED condition]	**MAJOR REPAIRS** N/A
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 N/A	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

<table>
<tr><th colspan="2">BATHROOMS (MISSION – FUNCTIONAL)
BATHROOMS AVAILABILITY</th></tr>
<tr><th>ISR-I BOOKLET 30</th><th>PLANNING GUIDE</th></tr>
<tr><td>GREEN
• Two or more bathrooms in 3 to 4 bedroom (BR) units (1 bath in 2 BR units)
• One bath connected to master bedroom (MBR)
• A bath or ½ bath on main level of 2-story house</td><td>FULLY ADEQUATE
Unit has correct number of bathrooms that meet design guidelines. (pg. 71)</td></tr>
<tr><td>AMBER
• Only 1 bathroom in 3 bedroom (BR) unit or 1.5 baths in 4 BR unit (1 bath in 2 BR unit)
• N/A [No AMBER condition]
• No bath or ½ bath on main level of 2 story house</td><td>MINOR REPAIRS
Table 6 on pg. 70, states:
BR per Floor = BA per Floor
0 Bedrooms = 1/2 Bathroom
1-2 Bedrooms = 1 Bathroom
3-5 Bedrooms = 2 Bathrooms</td></tr>
<tr><td rowspan="2">RED
• Only 1 bathroom in 4 bedroom (BR) unit
• No bath connection to master bedroom (MBR)
• No bath on main level</td><td>MAJOR REPAIRS
N/A</td></tr>
<tr><td>REPLACEMENT
Add a new bathroom in existing or newly constructed floor space, provided it does not exceed the statutory gross floor area limitation. (pg. 72)</td></tr>
<tr><th colspan="2">REGULATIONS</th></tr>
<tr><td colspan="2">UFC-4-711-01, JULY 2006
Section 4-3.2, pg. 15, states: In units having three or more bedrooms, the master bedroom should have a private full bathroom.</td></tr>
<tr><td colspan="2">UFC-4-711-02A, JANUARY 2011
Section 4.3.2, pg. 38, according to Table 4-3: BR per Floor = BA per Floor
0 Bedrooms = 1/2 Bathroom
1-2 Bedrooms = 1 Bathroom
3-5 Bedroom = 2 Bathroom
GO units shall have three full bathrooms, with one on the first floor configured for accessibility.</td></tr>
<tr><th colspan="2">NOTES/RECOMMENDATIONS</th></tr>
<tr><td colspan="2">ISR-I BOOKLET 30 AND UFC-4-711-02A</td></tr>
<tr><td colspan="2">RECOMMENDATIONS</td></tr>
</table>

BATHROOMS (MISSION – FUNCTIONAL) VENTILATION	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Electrically operated ventilation to exterior	**FULLY ADEQUATE** N/A
AMBER • No mechanical ventilation but an operable exterior window is present	**MINOR REPAIRS** Inspection Procedure #3 states: 3. Check for proper ventilation, either by an operable window or exhaust fan. (pg. 70)
RED • No mechanical ventilation and no operable exterior window is present	**MAJOR REPAIRS** N/A
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 5-6.4, pg. 25, states: Provide an exhaust fan (maximum 1.5 sones) in each bathroom. Exhaust fans must discharge to exterior. Discharging into attic or crawl space is prohibited.	
UFC-4-711-02A, JANUARY 2011 Section 4.3.2.5, pg. 39, states: Exhaust shall be provided in all baths, shall be ducted directly to the exterior of the building, and shall be a part of an engineered ventilation system.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

BATHROOMS (MISSION – FUNCTIONAL) LIGHTING & OUTLETS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • All outlets grounded/GFI rated available where water may be present	**FULLY ADEQUATE** N/A
AMBER • Insufficient lighting (a center room light only and no lighting at or directly above the mirror)	**MINOR REPAIRS** Add GFI breakers or outlets. (pg. 71)
RED • Ungrounded outlets or outlets where water may be present are not GFI rated	**MAJOR REPAIRS** N/A
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 5-1.3, pg. 22, states: As a minimum, provide wall-switched overhead light fixtures in ... bedrooms.... An electrical wall outlet should be located in hallway near bedrooms.	
UFC-4-711-02A, JANUARY 2011 Section 5.4.1.11.2, pg. 65, states: Wall-switch operated wall-mounted lights shall be provided in bathrooms and half baths located above the mirror over the lavatory.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

BATHROOMS (MISSION – FUNCTIONAL) BATHROOM ACCESSORIES	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Toilet paper and towel holders are firmly mounted and in fully functional	**FULLY ADEQUATE** N/A
AMBER • Toilet paper and towel holders are available, but either loose, broken or inconvenient to reach	**MINOR REPAIRS** N/A
RED • Toilet paper OR towel holders are not present	**MAJOR REPAIRS** Replace towel bars and toilet paper holder. (pg. 72)
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 4.3.2.2, pg. 39, states: Bathroom accessories may be surface mounted or recessed, of non-corrodible metal or ceramic tile, and shall include a toilet paper holder, soap dish (at sink and at tub/shower), toothbrush and tumbler holder, and grab bar at tub or shower stall, bathrobe hook, and towel bars totaling not less than 1100 mm [42 inches] for a full bath and not less than 750 mm [30 inches] for a half bath.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

BATHROOMS (QUALITY) PLUMBING FIXTURES	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Less than 10% leak or do not work • Ample hot water • Dependable and adequate water pressure • Water from faucets is clear • Toilet bowl does not have permanent stains	**FULLY ADEQUATE** All bathroom fixtures, fittings, and hardware are in excellent condition. (pg. 71)
AMBER • 10%–25% leak or do not work • Lukewarm "hot" water • Low water pressure • Water is slightly discolored • Toilet has permanent stains	**MINOR REPAIRS** Re-caulk tub, shower, and sink; replace worn out shower doors with a shower curtain rod; replace putty seal behind faucet cover plates; replace toilet flush mechanism; replace toilet seat and lid; and replace washers in faucets. (pg. 71)
RED • More than 25% leak or do not work • No hot water • Very low water pressure • Water is heavily discolored • Toilet has permanent stains and frequent backups/clogging	**MAJOR REPAIRS** Remove and replace all bathroom fixtures, fittings, and hardware. (pg. 72) **REPLACEMENT** N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 5.1.5.3, pg. 60, states: 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.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A ISR-I Booklet 30 deals with water distribution, other references deal with the kind and quality of plumbing fixtures.	
RECOMMENDATIONS	

BATHROOMS (QUALITY) FLOORS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• Floors are in good condition, no gouges or stains	N/A
AMBER	**MINOR REPAIRS**
• Floors have minor gouges, chips or stains needing REPAIRS	Repair small cuts or tears in vinyl sheet flooring with vinyl seam sealer. (pg. 71)
RED	**MAJOR REPAIRS**
• Floors need extensive repairs or replacement; they pose a safety threat	Remove and replace flooring that is badly worn, faded, discolored, cracked, or torn. Replace underlayment and replace base. (pg. 72)
	REPLACEMENT
	N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 4.3.12.1, pg. 43, states: Bathrooms shall have ceramic tile flooring with ceramic tile base or seamless sheet vinyl.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

BATHROOMS (QUALITY) LIGHTING & OUTLETS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • 90% of overhead and task lighting works • Outlets work safely	**FULLY ADEQUATE** N/A
AMBER • 75%–90% of lighting is working • Outlets loose or provide power erratically	**MINOR REPAIRS** Lighting: N/A Outlets: Add GFI breakers or outlets. (pg. 71)
RED • Less than 75% of lighting is working • Outlets do not work or shock users	**MAJOR REPAIRS** N/A **REPLACEMENT** N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 5.4.1.11.2, pg. 65, states: Wall-switch operated wall-mounted lights shall be provided in bathrooms and half baths located above the mirror over the lavatory. N/A – Outlets	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

BATHROOMS (QUALITY) BATHROOM ACCESSORIES	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • No more than 10% of accessories need repairs	**FULLY ADEQUATE** All bathroom fixtures, fittings, and hardware are in excellent condition. (pg. 71)
AMBER • 10%–25% of accessories need repairs	**MINOR REPAIRS** Re-caulk tub, shower, and sink; replace worn-out shower doors with a shower curtain rod; replace putty seal behind faucet cover plates; replace toilet flush mechanism; replace toilet seat and lid; and replace washers in faucets. Replace a few cracked or missing tiles if matching tiles are available; re- grout tiles where necessary; and clean stained grout (pg. 71)
RED • More than 25% of accessories need major repairs or replacement	**MAJOR REPAIRS** Same as minor repairs plus replace faucets and shower head; replace sink vanity; replace medicine cabinet and mirror; replace towel bars, toilet paper holder, toothbrush holder, and soap dishes. Remove and replace ceramic tile; remove and replace other tub or shower wainscot materials. Remove and replace all bathroom fixtures, fittings, and hardware. (pg. 72)
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 4.3.2.2, pg. 39, states: Bathroom accessories may be surface mounted or recessed, of non-corrodible metal or ceramic tile, and shall include a toilet paper holder, soap dish (at sink and at tub/shower), toothbrush and tumbler holder, and grab bar at tub or shower stall, bathrobe hook, and towel bars totaling not less than 1100 mm [42 inches] for a full bath and not less than 750 mm [30 inches] for a half bath.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

BATHROOMS (QUALITY) CEILINGS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• In good condition; not gouged or stained	N/A
AMBER	**MINOR REPAIRS**
• Minor gouges and stains require minor repairs, such as patching	Drive in several popped nails. Repair minor gouges or holes in gypsum wallboard with tape and spackling compound. Repaint gypsum wallboard surfaces. (pg. 71)
RED	**MAJOR REPAIRS**
• Need major repairs or refurbishing; gouges and stains are beyond patching	Replace severely damaged gypsum wallboard and repaint surfaces. (pg. 72)
	REPLACEMENT
	N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 N/A	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

BATHROOMS (QUALITY) WALLS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• In good condition; not gouged or stained	N/A
AMBER	**MINOR REPAIRS**
• Minor gouges and stains require minor repairs, such as patching	Drive in several popped nails. Repair minor gouges or holes in gypsum wallboard with tape and spackling compound. Repaint gypsum wallboard surfaces. (pg. 71)
RED	**MAJOR REPAIRS**
• Need major repairs or refurbishing; gouges and stains are beyond patching	Replace severely damaged gypsum wallboard and repaint surfaces. (pg. 72)
	REPLACEMENT
	N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 4.3.12.2, pg. 43, states: Water-resistant wallboard shall be used in wet areas such as bath, powder, and laundry room. Cementitious backer board shall be used for ceramic tile applications.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

BATHROOMS (QUALITY) DOORS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Fully functional handles and hinges • Less than 5 yrs old with no noticeable deterioration or damage	**FULLY ADEQUATE** N/A
AMBER • 6-15 yrs old • Handles, hinges or surfaces are stained, chipped, gouged or worn and need repair	**MINOR REPAIRS** N/A
RED • More than 15 yrs old; need to be replaced	**MAJOR REPAIRS** Change location of door for privacy. (pg. 72) **REPLACEMENT** N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 4.3.15, pg. 47, states: Interior doors shall be 2050 mm [6 ft -8 inches] in height by 35 mm [1-3/8 inch] thick, hollow core wood or hollow panel. Wood doors will be painted.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

HEATING/VENTILATION/AIR CONDITIONING (QUALITY) COOLING	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Cooling system is fully operational with SEER rating >13	**FULLY ADEQUATE** N/A
AMBER • Cooling system requires repairs OR SEER is <13	**MINOR REPAIRS** N/A
RED • Cooling system requires replacement	**MAJOR REPAIRS** N/A
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 5.5.1, pg. 67, states: Each housing unit shall be provided with central heating [and air conditioning] system[s].	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

HEATING/VENTILATION/AIR CONDITIONING (QUALITY) HEATING	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• Heating system is fully operational	N/A
AMBER	**MINOR REPAIRS**
• Heating system works, but repairs are needed to improve performance	N/A
RED	**MAJOR REPAIRS**
• Heating system requires replacement	N/A
	REPLACEMENT
	N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 5.5.1, pg. 67, states: Each housing unit shall be provided with central heating [and air conditioning] system[s].	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

HEATING/VENTILATION/AIR CONDITIONING (QUALITY) HVAC CONTROLS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Instrumentation works well • Controls require no repair • Dials are clear and legible • System responds to adjustments	**FULLY ADEQUATE** N/A
AMBER • Control instruments meet at least 3 of the 4 elements in the GREEN column	**MINOR REPAIRS** Under Fire/Health/Safety Section: HVAC – recalibrate thermostat (pg. 27)
RED • Control instruments meet 1 or 2 of the 4 elements in the GREEN column	**MAJOR REPAIRS** N/A
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 5-6.3, pg. 25, states: Provide Energy Star® labeled programmable (set-back) thermostats in new construction, and major revitalizations.	
UFC-4-711-02A, JANUARY 2011 Section 5.5.10.2, pg. 74, states: Thermostats shall be microprocessor-based, with built-in key pads for scheduling of day and night temperature settings. Thermostats shall be programmable for heating only, cooling only, or heating and cooling as required.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

HEATING/VENTILATION/AIR CONDITIONING (QUALITY) HVAC DISTRIBUTION SYSTEM	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • System responds to control adjustments • System provides sufficient heating (and cooling if A/C is required) to keep dwelling between 70-78 degrees Fahrenheit	**FULLY ADEQUATE** N/A
AMBER • Control adjustments are erratic • Temperature distribution between rooms is erratic, with one area hot, another cold	**MINOR REPAIRS** N/A
RED • Controls do not respond to adjustments • System is unable to keep dwelling between 70-78 degrees Fahrenheit	**MAJOR REPAIRS** N/A **REPLACEMENT** N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 N/A	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

HEATING/VENTILATION/AIR CONDITIONING (QUALITY) INDIVIDUAL WINDOW/WALL AC UNITS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• If present, units are working	N/A
AMBER	**MINOR REPAIRS**
• Up to 25% of units not working	N/A
RED	**MAJOR REPAIRS**
• More than 25% of units not working	N/A
	REPLACEMENT
	N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 5-6.2, pg. 25, states: Window or through-wall units should not be used to provide air conditioning.	
UFC-4-711-02A, JANUARY 2011 Section 5.5.8, pg. 72, states: Room unit heaters, space heaters, room (window) air conditioning units; floor furnaces, gravity warm air systems, and electric resistance heaters are not permitted.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

HEATING/VENTILATION/AIR CONDITIONING (QUALITY) RADIATORS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• If present, units are working	N/A
AMBER	**MINOR REPAIRS**
• Up to 25% of units need replacement	N/A
RED	**MAJOR REPAIRS**
• More than 25% of units need replacement	N/A
	REPLACEMENT
	N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 N/A	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

FIRE PROTECTION (MISSION-FUNCTIONAL) FIRE PROTECTION – FAMILY HOUSING	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Fully operational hard-wired interconnected smoke detectors installed in each bedroom, outside of sleeping areas, and on every floor level (Carbon Monoxide detector required for any housing unit that has its own fuel burning heat source)	**FULLY ADEQUATE** All systems (includes smoke detectors) are in working order and show no signs of major deterioration, failure, neglect, or improper maintenance. (pg. 27)
AMBER • Fully operational hard-wired inter-connected smoke detectors installed outside of sleeping areas and on every floor level	**MINOR REPAIRS** N/A
RED • Fully operational battery operated smoke detectors in use or no smoke detectors installed or not all hard-wired smoke detectors are fully operational	**MAJOR REPAIRS** Fire Safety – install hard-wired, interconnected smoke detectors. (pg. 26 - Excerpt from Inspection Procedure #4)
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 6-1.3, pg. 26, states: Provide hard-wired smoke alarms with battery backup, in accordance with UFC 3-600-01. Interconnect alarm devices in such a manner that actuation of one alarm will activate all other alarms in an individual unit. Provide an audible-visible type smoke detection device in housing unit where there is a vision or hearing impaired occupant.	
UFC-4-711-02A, JANUARY 2011 Section 6.1.3, pg. 78, states: Provide hard-wired smoke alarms in accordance with UFC 3-600-01. Interconnect alarm devices in such a manner that actuation of one alarm will activate all other alarms in an individual unit. Provide an audible-visible type smoke detection device in housing unit where there is a vision or hearing impaired occupant.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

FIRE PROTECTION (MISSION-FUNCTIONAL) SPRINKLERS (FOR APARTMENTS)	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN [RECORDS CHECK] • System has been inspected by qualified fire inspectors within the locally specified time intervals	**FULLY ADEQUATE** N/A
AMBER [RECORDS CHECK] • System is overdue for inspection, but was inspected and rated fully operable during the previous inspection cycle	**MINOR REPAIRS** N/A
RED [RECORDS CHECK] • System has never been inspected, or • System has not been inspected in more than twice the specified cycle	**MAJOR REPAIRS** N/A **REPLACEMENT** N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 6-1.4, pg. 26, states: Provide sprinkler protection in accordance with UFC 3-600-01.	
UFC-4-711-02A, JANUARY 2011 Section 6.1.4, pg. 78, states: For four units or more in a single building, residential type sprinkler systems must be used. Apartment units shall be fully sprinkled.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

FIRE PROTECTION (MISSION-FUNCTIONAL) FIRE ALARM SYSTEMS (FOR APARTMENTS)	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• Produces both sound and flashing light	N/A
AMBER	**MINOR REPAIRS**
• Audio only; no flashing light alarms	N/A
RED	**MAJOR REPAIRS**
• No central building-wide fire alarm	N/A
	REPLACEMENT
	N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 6.1.3, pg. 78, states: Provide an audible-visible type smoke detection device in housing unit where there is a vision or hearing impaired occupant.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

FIRE PROTECTION (MISSION-FUNCTIONAL) CENTRAL FIRE CONTROL PANEL (FOR APARTMENTS)	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • A central fire control panel for the facility that indicates where in the facility a detector is sensing heat or smoke • Alerts a Central Fire Station	**FULLY ADEQUATE** N/A
AMBER • A central fire control panel for the facility that indicates where in the facility a detector is sensing heat or smoke • Does not alert a Central Fire Station	**MINOR REPAIRS** N/A
RED • No central fire control panel for the facility	**MAJOR REPAIRS** N/A
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 N/A	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

FIRE PROTECTION (MISSION-FUNCTIONAL) FIRE EXTINGUISHERS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN [IF NOT INSPECTED ALREADY]: • In place • Indicator, if present, in green range • Inspected by qualified inspector within the locally specified time intervals	**FULLY ADEQUATE** N/A
AMBER [IF NOT INSPECTED ALREADY]: • N/A (no AMBER condition) • N/A (no AMBER condition) • Overdue for inspection, but was inspected and rated fully operable during the previous inspection cycle	**MINOR REPAIRS** N/A
RED [IF NOT INSPECTED ALREADY]: • Not available, or not enough extinguishers for the facility • Indicator out of green range • Has not been inspected in more than twice the specified time interval	**MAJOR REPAIRS** N/A **REPLACEMENT** N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 N/A	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

FIRE PROTECTION (QUALITY) SPRINKLERS (FOR APARTMENTS)	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN [RECORDS CHECK] • System was rated fully operable and in good condition during the most recent inspection	**FULLY ADEQUATE** N/A
AMBER [RECORDS CHECK] • During most recent inspection, system required parts replacement, which have not been replaced yet	**MINOR REPAIRS** N/A
RED [RECORDS CHECK] • Local Fire Marshal requires replacement of system	**MAJOR REPAIRS** N/A **REPLACEMENT** N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 6-1.4, pg. 26, states: Provide sprinkler protection in accordance with UFC 3-600-01.	
UFC-4-711-02A, JANUARY 2011 N/A	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

FIRE PROTECTION (QUALITY) FIRE ALARM SYSTEMS (FOR APARTMENTS)	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• Fire Alarm System worked during last fire drill	N/A
AMBER	**MINOR REPAIRS**
• N/A (no AMBER condition)	N/A
RED	**MAJOR REPAIRS**
• Fire Alarm System does not work	N/A
	REPLACEMENT
	N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 N/A	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

FIRE PROTECTION (QUALITY) CENTRAL FIRE CONTROL PANEL (FOR APARTMENTS)	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• Detectors are installed and fully operational	N/A
AMBER	**MINOR REPAIRS**
• N/A (no AMBER condition)	N/A
RED	**MAJOR REPAIRS**
• Detectors are not fully operational	N/A
	REPLACEMENT
	N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 N/A	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

FIRE PROTECTION (QUALITY) FIRE EXTINGUISHERS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN [IF NOT INSPECTED ALREADY]: • In place and working • Indicator, if present, in green range	**FULLY ADEQUATE** N/A
AMBER [IF NOT INSPECTED ALREADY]: • N/A (no AMBER condition)	**MINOR REPAIRS** N/A
RED [IF NOT INSPECTED ALREADY]: • In place but not working • Indicator out of green range	**MAJOR REPAIRS** N/A **REPLACEMENT** N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 N/A	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

LIVING, FAMILY, AND DINING ROOMS (MISSION-FUNCTIONAL) ROOM SIZE	
ISR-I BOOKLET 30	**PLANNING GUIDE**

GREEN
• Adequate size rooms:
  ○ Living Room shortest dimension is at least 11'-8" wide
  ○ Family room is at least 9'-6" wide
  ○ Dining room is at least 9'-6" wide
	FULLY ADEQUATE
	Living Room - N/A
	Family Room - N/A
	Dining Room – See Table 5 (pg. 69)

AMBER • One of the three areas in the GREEN column is under minimum dimensions	**MINOR REPAIRS** Living Room - N/A Family Room - N/A Dining Room - N/A
RED • One of the 3 areas in the GREEN column is missing, or • Two or three areas in the GREEN column are under minimum dimensions	**MAJOR REPAIRS** Living Room - N/A Family Room - N/A Dining Room - N/A
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 4-3.10, pg. 16, states: Each room should include one wall with a minimum length of 3 m (10 ft) to accommodate a sofa and end tables. Minimum dimension of living room should be 3.6 m (11 ft 8 in). Units with three or more bedrooms should be provided with a family room, separate from the living room. Each room should include one wall with a minimum length of 3 m (10 ft) to accommodate a sofa and end tables. Dining Room - N/A	
UFC-4-711-02A, JANUARY 2011 Section 4.3.10, pg. 40, states: Minimum dimension of living room shall be 3.6 m (11 ft 8 in). Section 4.3.10, pg. 40, states: Units shall be provided with a family room, separate from the living room, adjacent to and contiguous with the kitchen. Each room shall include one wall with a minimum length of 3 m (10 ft) to accommodate a sofa and end tables. Section 4.3.5, pg. 39, states: The primary eating area may be a separate dining room, or an extension of, or an "L" off the living room. If so, it shall be of adequate size to accommodate a table and chairs, and china cabinet or buffet.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

LIVING, FAMILY, AND DINING ROOMS (MISSION-FUNCTIONAL) COAT CLOSET	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Coat closet is at least 3 feet wide & 2 feet deep	**FULLY ADEQUATE** See Table 8 (pg. 77)
AMBER • Coat closet is less than 3 feet wide or 2 feet deep or more than 10' from entrance	**MINOR REPAIRS** Minimum Width Officer (O7-O10) = 5 ft. Officer (O1-O6) = 4 ft. Enlisted = 3 ft. (pg. 77)
RED • No coat closet available	**MAJOR REPAIRS** N/A
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 4.3.11.2, pg. 47, states: Table for Minimum Width Officer (O7-O10) = 5 ft Officer (O1-O6) = 4 ft Enlisted = 3 ft	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

LIVING, FAMILY, AND DINING ROOMS (MISSION-FUNCTIONAL) LIGHTING & OUTLETS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Energy efficient overhead lighting is available • At least one electrical duplex outlet (three prong grounded) on all wall surfaces	**FULLY ADEQUATE** N/A
AMBER • Incandescent overhead lighting is available • One or more walls lack grounded duplex outlets	**MINOR REPAIRS** Lighting - N/A Upgrade electrical system with grounded outlets (if a ground wire exists in the outlets). (pg. 67)
RED • Overhead lighting is NOT available • No grounded duplex outlets	**MAJOR REPAIRS** Lighting - N/A Outlets - N/A
	REPLACEMENT Lighting - N/A Outlets - N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 5-1.3, pg. 22, states: Wall switch operated and Energy Star® labeled ceiling fans in living/dining area, family room. Outlet - N/A	
UFC-4-711-02A, JANUARY 2011 Section 5.4.1.11, pg. 64, states: Unit lighting fixtures shall have a minimum overall Light Efficacy Rating (LER) of 65, including ballasts. Section 5.4.1.5, pg. 63, states: Two utility circuits (20 amp) shall be provided in the kitchen area for the convenience outlets for small appliances serving the kitchen, dining area, and family room area.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

LIVING, FAMILY, AND DINING ROOMS (MISSION-FUNCTIONAL) TV CABLE	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • TV cable or satellite connection available on 2 walls	**FULLY ADEQUATE** N/A
AMBER • TV cable or satellite connection available on 1 wall	**MINOR REPAIRS** N/A
RED • TV cable or satellite connection is not available in Living or Family room	**MAJOR REPAIRS** N/A
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 5-1.5, pg. 22, states: Where commercial cable TV (CATV) service is available. Provide, as a minimum, duplex pre-wired cable TV/television antenna outlets in living room, family room with duplex jacks.	
UFC-4-711-02A, JANUARY 2011 Section 5.4.3.1, pg. 66, states: Cable Television (CATV) outlets shall be located in the living room, family room, and all bedrooms. Units shall be pre-wired in conformance with all local CATV company requirements. Ensure that outlet locations are compatible with various furniture arrangements.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

LIVING, FAMILY, AND DINING ROOMS (MISSION-FUNCTIONAL) TELEPHONE SYSTEM	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• Telephone jack(s) are available on 2 walls	N/A
AMBER	**MINOR REPAIRS**
• Telephone jack(s) are available on 1 wall	N/A
RED	**MAJOR REPAIRS**
• No telephone jack is available in Living or Family or Dining room	N/A
	REPLACEMENT
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 5-1.4, pg. 22, states: Telephone service wiring within units should be a minimum of Category 5 wiring located in ... living room, family room, dining room..., with multiple modular jacks compatible with furniture arrangements.	
UFC-4-711-02A, JANUARY 2011 Section 5.4.2, pg. 66, states: Pre-wire housing units in accordance with local telephone company requirements. Provide outlets in kitchen, dining, or family area, living room and bedrooms of each housing unit, compatible with furniture arrangements.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

LIVING, FAMILY, AND DINING ROOMS (QUALITY) FLOORS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Durable floors with complete finish details • Finish is not cracked, chipped, gouged or stained, nor is it a tripping hazard	**FULLY ADEQUATE** N/A
AMBER • Cracks, gouges or stains require repair • Repairs are needed, but finish is not a tripping hazard	**MINOR REPAIRS** Living Room: Repair floors. (pg. 67) Family Room: Repair floors. (pg. 68) Dining Room: Repair floors. (pg. 69)
RED • Requires replacement • Floor cracks, gouges or missing pieces pose a tripping hazard	**MAJOR REPAIRS** N/A
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 4-3.12.2, pg. 17, states: Carpet may be installed in all living areas except kitchens, baths, laundry areas, utility areas, storage rooms, entryways, patios, porches, and areas exposed to weather elements.	
UFC-4-711-02A, JANUARY 2011 Section 4.3.12.1, pg. 42, states: Carpet shall meet requirements of 16 CFR 1630.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

LIVING, FAMILY, AND DINING ROOMS (QUALITY) LIGHTING & OUTLETS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Overhead lighting is available; more than 90% is working • Outlets work safely	**FULLY ADEQUATE** N/A
AMBER • 75%–90% of lighting is working • Outlets loose or provide power erratically	**MINOR REPAIRS** Lighting - N/A Upgrade electrical system with grounded outlets (if a ground wire exists in the outlets). (pgs. 67, 68, 69)
RED • Less than 75% of lighting is working, or • Outlets do not work, or shock users	**MAJOR REPAIRS** N/A
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 5-1.3, pg. 22, states: As a minimum, provide wall-switched overhead light fixtures in ... Bedrooms ….. An electrical wall outlet should be located in hallway near bedrooms.	
UFC-4-711-02A, JANUARY 2011 Section 5.4.1.11.2, pg. 65, states: Living room shall have a convenience outlet, half controlled by a wall switch, located at the room entrance. Wall-switch operated ceiling lights shall be provided in dining and utility rooms, halls, bedrooms, kitchens, dinette areas, and basements. Dining room ceiling light fixtures (hanging type) shall be movable by means of a track, chain and hooks, or other means in order to accommodate other than the typical dining room furniture arrangement. The ceiling light fixtures boxes in the 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. Ceiling fan/light combination may be provided in these rooms as a betterment.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

LIVING, FAMILY, AND DINING ROOMS (QUALITY) CEILINGS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • No gouged, stained, broken areas or missing pieces	**FULLY ADEQUATE** N/A
AMBER • Need minor repairs; some gouged, stained, broken, or missing pieces covering not more than 25% of ceiling	**MINOR REPAIRS** Living Room: Repair ceiling. (pg. 67) Family Room: Repair ceiling. (pg. 68) Dining Room: Repair ceiling. (pg. 69)
RED • Need major repairs; more than 25% of ceiling area is damaged	**MAJOR REPAIRS** N/A
	REPLACEMENT Living Room: Replace ceiling surfaces. (pg. 68) Family Room: Replace ceiling surfaces. (pg. 69) Dining Room: Replace ceiling surfaces. (pg. 70)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 4-3.12.3, pg. 17, states: Cathedral or vaulted ceilings are encouraged to improve the visual quality of living spaces.	
UFC-4-711-02A, JANUARY 2011 Section 4.3.12.2, pg. 43, states: Cathedral or vaulted ceilings are encouraged to improve the visual quality of living spaces. Textured ceiling finish may be provided in areas other than kitchen, laundry, or bathrooms.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

LIVING, FAMILY, AND DINING ROOMS (QUALITY) WALLS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • In good condition; not gouged or stained • Conduits are concealed or covered	**FULLY ADEQUATE** N/A
AMBER • Minor gouges and stains require minor repairs, such as patching • Conduits exposed	**MINOR REPAIRS** Living Room: Repair walls. (pg. 67) Family Room: Repair walls; paint. (pg. 68) Dining Room: Repair walls; paint. (pg. 69)
RED • Need major repairs or refurbishing; gouges and stains are beyond patching • N/A [no RED condition]	**MAJOR REPAIRS** N/A
	REPLACEMENT Living Room: Replace walls. Add sound insulation to walls as needed. (pg. 68) Family Room: Replace walls. Add sound attenuation insulation as needed. (pg. 69) Dining Room: Replace walls. (pg. 70)
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 4.3.12.2, pg. 43, states: Provide 13 mm [1/2-inch] gypsum wallboard, taped and smooth finished.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

LIVING, FAMILY, AND DINING ROOMS (QUALITY) DOORS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Fully functional handles and hinges • Less than 5 yrs old with no noticeable deterioration or damage	**FULLY ADEQUATE** N/A
AMBER • 6-15 yrs old • Handles, hinges or surfaces are stained, chipped, gouged or worn and need repair	**MINOR REPAIRS** Living Room: Repair doors. (pg. 67) Family Room: Repair doors. (pg. 68) Dining Room: Repair doors (pg. 69)
RED • More than 15 yrs old; need to be replaced	**MAJOR REPAIRS** N/A
	REPLACEMENT Living Room: Replace doors. (pg. 68) Family Room: Replace doors. (pg. 69) Dining Room: Replace doors (pg. 70)
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 4.3.15, pg. 47, states: Interior doors shall be 2050 mm [6 ft -8 inches] in height by 35 mm [1-3/8 inch] thick, hollow core wood or hollow panel. Wood doors will be painted. Hinges shall be 90 mm x 90 mm [3-1/2 in x 3-1/2 in] at interior doors.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

LIVING, FAMILY, AND DINING ROOMS (QUALITY) TV CABLE	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• TV cable connection available and in good repair	N/A
AMBER	**MINOR REPAIRS**
• TV cable connection needs minor repairs	N/A
RED	**MAJOR REPAIRS**
• TV cable connection is not available	N/A
	REPLACEMENT
	N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 5-1.5, pg. 22, states: Where commercial cable TV (CATV) service is available, … Provide as a minimum, duplex pre-wired cable TV/television antenna outlets in living room and family room with duplex jacks	
UFC-4-711-02A, JANUARY 2011 Section 5.4.3.1, pg. 66, states: Cable Television (CATV) outlets shall be located in the living room ... Ensure that outlet locations are compatible with various furniture arrangements.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

LIVING, FAMILY, AND DINING ROOMS (QUALITY) TELEPHONE SYSTEM	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• Telephone jacks work reliably	N/A
AMBER	**MINOR REPAIRS**
• Existing telephone jacks need minor repairs	N/A
RED	**MAJOR REPAIRS**
• Existing telephone jacks need major repairs	N/A
	REPLACEMENT
	N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 5-1.4, pg. 22, states: Multiple communication jacks are desirable.	
UFC-4-711-02A, JANUARY 2011 Section 5.4.2, pg. 66, states: Provide outlets in kitchen... of each housing unit. The jacks provided in the kitchen shall be for a wall-mounted phone.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

KITCHEN (MISSION-FUNCTIONAL) SPACE LAYOUT	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • The shortest wall-to-wall dimension is at least 8 feet wide • At least 4 feet of free space in front of cabinets (3.5 feet for islands) • Eating space or breakfast-bar is provided within or adjoining to the kitchen	**FULLY ADEQUATE** Kitchen meets or exceeds design requirements, specifications, and guidelines within acceptable limits. (pg. 75)
AMBER • N/A [No AMBER condition] • N/A [No AMBER condition] • Inadequate space provided to eat in kitchen; breakfast bar exists	**MINOR REPAIRS** N/A
RED • Layout does not meet overall dimension requirements • Less than 4 feet of free space in front of cabinets (3.5 feet for islands) • No breakfast eating space or breakfast bar is provided within or adjoining to the kitchen (dining room does not count).	**MAJOR REPAIRS** N/A **REPLACEMENT** N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A - Kitchen Dimensions Section 4-3.8, pg. 16, states: Provide 1.2 m (4 ft) minimum space between fronts of cabinets. Section 4-3.4, pg. 15, states: A secondary eating area may be provided in the form of an oversized kitchen, breakfast bar, or family room and dining area.	
UFC-4-711-02A, JANUARY 2011 Section 5.4.1.11.2, pg. 65, states: Wall-switch operated ceiling lights shall be provided in dining and utility rooms, halls, bedrooms, kitchens, dinette areas, and basements. Section 4.3.1, pg. 36, states in Table 4-2 the minimum area and dimensions for interior spaces: Kitchen = 60 sq. ft.; Eat-in Kitchen = 72 sq. ft. Section 4.3.8, pg. 40, states: Provide 1.2 m (4 ft) minimum space between fronts of cabinets. Section 4.3.4, pg. 39, states: A secondary eating area may be provided in the form of an oversized kitchen, breakfast bar, or family room and dining area, and may be in direct sight of food preparation areas, but not in direct sight of a bathroom.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

KITCHEN (MISSION-FUNCTIONAL) LIGHTING & OUTLETS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • All outlets grounded/GFI rated available where water may be present	**FULLY ADEQUATE** N/A
AMBER • N/A [no AMBER condition]	**MINOR REPAIRS** Lighting - N/A Upgrade electrical system with grounded outlets (if a ground wire exists in the outlets) and GFI breakers and receptacles. (pg. 75)
RED • Outlets where water may be present are not GFI rated; existing outlets are ungrounded	**MAJOR REPAIRS** N/A
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 5.4.1.11.2, pg. 65, states: Wall-switch operated ceiling lights shall be provided in dining and utility rooms, halls, bedrooms, kitchens, dinette areas, and basements. Section 5.4.1.5, pg. 63, states: Two utility circuits (20 amp) shall be provided in the kitchen area for the convenience outlets for small appliances serving the kitchen.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

KITCHEN (MISSION-FUNCTIONAL) CABINETS & COUNTERTOPS	
ISR-I BOOKLET 30	**PLANNING GUIDE**

GREEN
• Countertop and cabinet space meets the following standards:
  ○ For a 4-5 bedroom house: 16 linear feet of countertop space, 30 linear feet of wall cabinets and 40 linear feet of base cabinets are provided
  ○ For a 2-3 bedroom house: 12 linear feet of countertop space, 24 linear feet of wall cabinets and 32 linear feet of base cabinet space are provided
	FULLY ADEQUATE
	N/A

AMBER • N/A [no AMBER condition]	**MINOR REPAIRS** Table 7 on pg. 73, states minimum square footage: For a 4-5-bedroom house: 16 ft. of countertop space, 30 ft. of wall cabinets and 40 ft. of base cabinets are provided For a 2-3-bedroom house: 12 ft. of countertop space, 24 ft. of wall cabinets and 32 ft. of base cabinet space are provided
RED • Countertop and cabinet space meets less than the standards outlined in the GREEN column	**MAJOR REPAIRS** Completely remodel kitchen with replacement cabinets, countertop and sink, flooring, appliances, and new finishes. (pg. 75)
	REPLACEMENT Relocation or expansion of the kitchen.
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A - Countertop and cabinet length	
UFC-4-711-02A, JANUARY 2011 Section 4.3.13, pg. 44, states minimum square footage: For a 4-5 bedroom house: 16 feet of countertop space, 30 feet of wall cabinets and 40 feet of base cabinets are provided For a 2-3 bedroom house: 12 feet of countertop space, 24 feet of wall cabinets and 32 feet of base cabinet space are provided	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A ISR-I Booklet 30 uses linear measurement, while the Planning Guide and UFC's use square feet measurements.	
RECOMMENDATIONS	

KITCHEN (MISSION-FUNCTIONAL) APPLIANCES	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • They include a refrigerator/freezer, a cook-top and oven or microwave	**FULLY ADEQUATE** N/A
AMBER • N/A [no AMBER condition]	**MINOR REPAIRS** N/A
RED • Some standard appliances are missing	**MAJOR REPAIRS** Completely remodel kitchen with replacement cabinets, countertop and sink, flooring, appliances, and new finishes. (pg. 75)
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 4.3.14, pg. 46, states: Provide the following equipment in accordance with specifications listed, one each per housing unit. A listing of currently labeled ENERGY STAR® appliances is available through the internet at the EPA website: http://www.energystar.gov, specifically the Refrigerator, Range/oven and Microwave.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A Kitchen appliance requirements (pgs. 75-77), which include a range (electric or gas), refrigerator/freezer, dishwasher and garbage disposal.	
RECOMMENDATIONS	

KITCHEN (MISSION-FUNCTIONAL) VENTILATION	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Stove hood with 2 or 3-speed fan exhausts to outside	**FULLY ADEQUATE** N/A
AMBER • Stove hood with only 1-speed fan OR does not exhaust to outside (re-circulates)	**MINOR REPAIRS** N/A
RED • Mechanical exhaust fan not present or requires replacement	**MAJOR REPAIRS** N/A
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 5-6.4, pg. 25, states: Provide an exhaust fan (maximum 5.0 sones) in each kitchen. Exhaust fans must discharge to exterior.	
UFC-4-711-02A, JANUARY 2011 Section 4.3.14.4, pg. 47, states: 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. Duct the fan to the exterior and provide back-draft protection.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A Kitchen Range exhaust fan are also discussed in Section 5.5.11.1, pg. 75.	
RECOMMENDATIONS	

KITCHEN (QUALITY) PLUMBING FIXTURES	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Less than 10% leak or do not work • Ample hot water • Dependable and adequate water pressure • Water from faucets is clear	**FULLY ADEQUATE** N/A
AMBER • 10%–25% leak or do not work • Lukewarm "hot" water • Low water pressure • Water is slightly discolored	**MINOR REPAIRS** Replace fixture stops and repair minor leaks. (pg. 75)
RED • More than 25% leak or do not work • No hot water • Very low water pressure • Water is heavily discolored	**MAJOR REPAIRS** N/A **REPLACEMENT** N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 5.1.5.4, pg. 60, states: Faucets shall be single-control type, with seals and seats combined in one replaceable cartridge designed to be interchangeable among lavatories, bathtubs and kitchen sinks, or having replaceable seals and seats removable either as a seat insert or as a part of a replaceable valve unit. Water flow shall be no more than .158 L/s [2.5 gpm] from any faucet.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

KITCHEN (QUALITY) LIGHTING & OUTLETS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Overhead and task lighting is energy efficient and working • Outlets work safely	**FULLY ADEQUATE** N/A
AMBER • Overhead and task lighting is incandescent and working • Outlets loose or provide power erratically	**MINOR REPAIRS** Lighting - N/A Upgrade electrical system with grounded outlets (if a ground wire exists in the outlets) and GFI breakers and receptacles. (pg. 75)
RED • Missing either task lighting or overhead lighting • Outlets do not work or shock users	**MAJOR REPAIRS** N/A
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 5-1.3, pg. 22, states: As a minimum, provide wall-switched overhead light fixtures in kitchen. N/A - Outlets	
UFC-4-711-02A, JANUARY 2011 Section 5.4.1.11.2, pg. 65, states: The general lighting intensity in kitchens shall be 320 to 540 Lx [30 to 50 foot-candles]. Supplementary lighting shall be provided at the sink and under one of the wall cabinets for a work center to produce a composite lighting level of 210 Lx [75 foot-candles] using either down-lights, fluorescent fixtures surface-mounted below wall cabinets or wall-mounted fixtures (1520 mm [5 ft] and higher above the floor) as appropriate. Kitchen range hood shall be provided with a light, fan, and switches.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

KITCHEN (QUALITY) CABINETS & COUNTERTOPS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Cabinets, hinges and countertops are in good condition and do not need repairs	**FULLY ADEQUATE** N/A
AMBER • Cabinets, hinges and countertops need repairs	**MINOR REPAIRS** Cabinets need reattachment to the wall. Several pulls, hinges, drawer rollers or guides, and/or shelf supports need replacement, assuming matching hardware is available. (pg 75)
RED • Cabinets, hinges and countertops replacement	**MAJOR REPAIRS** Completely remodel kitchen with replacement cabinets, countertop and sink, flooring, appliances, and new finishes. (pg. 75)
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Replacement specifications can be found at Section 4-3.13, pg. 17.	
UFC-4-711-02A, JANUARY 2011 For Replacement specifications can be found at Section 4.3.13, pg. 44.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

KITCHEN (QUALITY) APPLIANCES	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Appliances are less than 7 years old AND Energy Star rated (in Europe Energie-Effizienzklasse A) and in good condition	**FULLY ADEQUATE** N/A
AMBER • Appliances are 8-10 years old AND functional OR not Energy Star rated (in Europe Energie-Effizienzklasse B or less)	**MINOR REPAIRS** N/A
RED • Appliances are more than 10 years old	**MAJOR REPAIRS** N/A
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A - Age of Appliances	
UFC-4-711-02A, JANUARY 2011 Section 4.3.14, pg. 46, states: Provide the following equipment in accordance with specifications listed, one each per housing unit. A listing of currently labeled ENERGY STAR® appliances is available through the internet at the EPA website: http://www.energystar.gov, specifically the Refrigerator, Range/oven and Microwave.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

KITCHEN (QUALITY) FLOORS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• Floors are in good condition, no gouges or stains	N/A
AMBER	**MINOR REPAIRS**
• Floors have minor gouges, chips or stains needing repairs	Repair floors. (pg. 75)
RED	**MAJOR REPAIRS**
• Floors need replacement	Completely remodel kitchen with replacement of flooring. Important: Removal of floor covering containing asbestos may require an estimate by a qualified engineer. (pg. 75)
	REPLACEMENT N/A SPECIAL Important: Removal of floor covering containing asbestos may require an estimate by a qualified engineer. Tearing up flooring containing asbestos can release miniscule fibers that can remain airborne for significant periods of time. (pg. 75)
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 4.3.12.1, pg. 43, states: Kitchen and laundry/utility area flooring shall be seamless sheet vinyl.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

KITCHEN (QUALITY) CEILINGS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Not gouged, stained, broken areas, or missing pieces	**FULLY ADEQUATE** N/A
AMBER • Need minor repairs; some gouged, stained, broken, or missing pieces covering not more than 25% of ceiling area	**MINOR REPAIRS** Repair ceiling. (pg. 75)
RED • Need major repairs; more than 25% of ceiling area is damaged	**MAJOR REPAIRS** N/A
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 4.3.12.2, pg. 43, states: Combined kitchen and eating areas shall have the same type of wall and ceiling finishes.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

KITCHEN (QUALITY) WALLS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• In good condition; not gouged or stained	N/A
AMBER	**MINOR REPAIRS**
• Minor gouges and stains require minor repairs, such as patching	Repair walls, paint. (pg. 75)
RED	**MAJOR REPAIRS**
• Need major repairs or refurbishing; gouges and stains are beyond patching	N/A
	REPLACEMENT
	N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 4.3.12.2, pg.43, states: Combined kitchen and eating areas shall have the same type of wall and ceiling finishes.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

KITCHEN (QUALITY) DOORS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Fully functional handles and hinges • Less than 5 yrs old with no noticeable deterioration or damage	**FULLY ADEQUATE** N/A
AMBER • 6-15 yrs old • Handles, hinges or surfaces are stained, chipped, gouged or worn and need repair	**MINOR REPAIRS** Repair doors. (pg. 75)
RED • More than 15 yrs old; need to be replaced	**MAJOR REPAIR** N/A
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 4.3.15, pg. 47, states: Interior doors shall be 2050 mm [6 ft -8 inches] in height by 35 mm [1-3/8 inch] thick, hollow core wood or hollow panel. Wood doors will be painted. Hinges shall be 90 mm x 90 mm [3-1/2 in x 3-1/2 in] at interior doors.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

BEDROOMS (MISSION-FUNCTIONAL) ROOM SIZE	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Master bedroom (MBR) dimensions are at min 11'-8" wide by 12'-10" long; total size standard is 150 SF. • Smallest bedroom (BR) is at min 10'-0" wide by 10'-0" long; total min size standard is 100 square feet for BR other than MBR.	**FULLY ADEQUATE** Bedroom size and dimensions meet acceptable limits for placement of furniture. See Table 10 (pg. 80)
AMBER • One or two of the dimensions are not met • Bedrooms (BRs) are at least 90% of minimum size	**MINOR REPAIRS** N/A
RED • Three of four of the dimensions are not met • Bedrooms (BRs) are less than 90% of minimum size	**MAJOR REPAIRS** N/A **REPLACEMENT** Remove entire bedroom wall and rebuild to new size. (pg. 80)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 4-3.3, pg. 15, states: Separate these sleeping areas from all other functional areas of the house, conveniently located near bathrooms. Provide access to bathrooms from bedrooms, without passage through other rooms of the house. For new construction bedrooms should be designed to accommodate a king size bed in master bedroom, and a full size bed in other bedrooms.	
UFC-4-711-02A, JANUARY 2011 Section 4.3.1, Table 4-2, pg. 37, states: Minimum area and dimension for Master Bedroom or Bedroom 1 is 150 sf and 11'-8"; for Bedroom 2 is 120 sf and 10'; and for Bedrooms 3/4/5 is 100 sf and 10'.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A Planning Guide Table 11, pg. 81, states BR size for 4/5-bedroom is 90 sf. Note in Special section of Planning Guide states: If necessary and design permits, it is possible to reconfigure the dwelling from five to four bedrooms, from four to three bedrooms, or from three to two bedrooms. On the other hand, excessive bulk storage space and other areas can be used to expand bedroom or closet sizes. (pg. 82)	
RECOMMENDATIONS ISR-I Booklet 30 could be reworded to state only the minimum SF and one dimension (the smallest).	

BEDROOMS (MISSION-FUNCTIONAL) CLOSET SPACE	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Closet standards are met: • MBR closet has at least 6'-0" linear rods • Other BR have at least 4'-0" linear rods	**FULLY ADEQUATE** Closets are adequately sized. Table 11 for adequate closet size for bedrooms. (pg. 80) MBR for Officer (O7-O10) = 10 ft. MBR for Officer (O1-O6) = 6 ft. MBR for Enlisted = 6 ft. 2/3 BR for Officer (O7-O10) = 6 ft. 2/3 BR for Officer (O1-O6) = 4 ft. 2/3 BR for Enlisted = 4 ft. 4/5 BR for Officer (O7-O10) = 4 ft. 4/5 BR for Officer (O1-O6) = 4 ft. 4/5 BR for Enlisted = 4 ft.
AMBER • Closet space does not meet standards	**MINOR REPAIRS** N/A
RED • No closet spaces available	**MAJOR REPAIRS** Replace closet shelving, clothes rods, and doors. (pg. 80) **REPLACEMENT** Same as Major Repairs (pg. 80)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 4-3.11, pg. 16, states: Provide storage areas in the form of clothes closets, linen closets, and bulk storage in housing unit for seasonal personal effects. Interior bulk storage is in addition to required closet area and exterior storage. Minimum interior bulk storage space of 1.5 m^2 (16 ft^2) should be provided.	
UFC-4-711-02A, JANUARY 2011 Section 4.3.11.2, pg. 41, states: Closets shall be equipped with a 12 inches deep shelf and a clothes hanger rod. Closet shelving and rods in excess of 4 ft shall have center supports. Shelves and supports shall be capable of carrying 35 lbs/ft. Closet shelving shall be minimum 3/4 inch thick solid wood, plywood, or high density particle board. Factory finished welded wire shelving meeting the capacity requirements is also permitted.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A Table for Minimum Width Officer (O7-O10) = 5 ft Officer (O1-O6) = 4 ft Enlisted = 3 ft	
RECOMMENDATIONS Planning Guide, pg. 77 has Table for Minimum Width Requirements	

BEDROOMS (MISSION-FUNCTIONAL) BULK STORAGE	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• Not in ISR-I Booklet 30	Interior storage space exists and is adequately sized and well located. (pg. 78)
AMBER	**MINOR REPAIRS**
• Not in ISR-I Booklet 30	Repair walls, ceiling, floor, trim, door; paint. (pg. 78)
RED	**MAJOR REPAIRS**
• Not in ISR-I Booklet 30	Bulk storage is inadequate and must be provided by adding a closet. Design of house will dictate possible locations for adding storage area (pg. 78)
	REPLACEMENT
	Bulk storage must be added into newly constructed floor space. (pg. 78)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 4-3.11, pg. 16, states: Provide storage areas in the form of clothes closets, linen closets, and bulk storage in housing unit for seasonal personal effects. Interior bulk storage is in addition to required closet area and exterior storage. Minimum interior bulk storage space of 1.5 m^2 (16 ft^2) should be provided.	
UFC-4-711-02A, JANUARY 2011 Section 4.3.11.3, pg. 41, states: Interior bulk storage is in addition to required closet area and exterior storage. Provide interior storage in a separate room or included as an extension of the utility room when one is provided. Bulk storage space shall be at least 1200 mm [4 ft] in depth and a minimum clear height of 2000 mm [6 ft-6 inches], except that space under stairs may be counted at 1/2 area if the space is 1200 mm [4 ft] or more in height. Provide a minimum of three nominally 305 mm [12 inches] deep shelves with a combined length of 7300 mm [24 ft] within each bulk storage room. Common walls and ceilings between adjacent storage areas shall be finished on both sides.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

BEDROOMS (MISSION-FUNCTIONAL) LIGHTING & OUTLETS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Overhead lighting is available • At least one electrical duplex outlet (three prong grounded) on all wall surfaces	**FULLY ADEQUATE** N/A
AMBER • N/A [no AMBER condition] • One or more walls lack grounded duplex outlets	**MINOR REPAIRS** Lighting: N/A Outlets: Upgrade electrical system with grounded outlets (if a ground wire exists in the outlets). (pg. 80)
RED • Overhead lighting is NOT available • No grounded duplex outlets	**MAJOR REPAIRS** Lighting: N/A Outlets: N/A
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 5-1.3, pg. 22, states: As a minimum, provide wall-switched overhead light fixtures in kitchen, dining room, bedrooms, walk-in closets, bathrooms, halls, stairs, and utility/storage rooms. An electrical wall outlet should be located in hallway near bedrooms. Unit lighting fixtures should have a minimum overall Light Efficacy Rating (LER) of 65, including ballasts.	
UFC-4-711-02A, JANUARY 2011 Section 5.4.1.6, pg. 64, states: Wall-switch operated ceiling lights shall be provided in bedrooms. Section 5.4.1.11.2, pg. 65, states: Lighting and convenience outlets shall be on separate circuits.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A No discussion about outlets on wall surfaces found in UFC 4-711-02A.	
RECOMMENDATIONS	

BEDROOMS (MISSION-FUNCTIONAL) SERVICE PANEL	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• Not in ISR-I Booklet 30	N/A
AMBER	**MINOR REPAIRS**
• Not in ISR-I Booklet 30	N/A
RED	**MAJOR REPAIRS**
• Not in ISR-I Booklet 30	N/A
	REPLACEMENT Upgrade service panel because service is less than 100A/220V, is inadequate for the anticipated load, or the service panel is obsolete. Add new 220V circuit(s). (Electrical Systems Replace - pg. 84)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 5-5.2, pg. 24, states: Provide 150 amp minimum electrical service to each living unit (200 amp where heat pumps or air conditioning are provided). However, 200 amp service is recommended for all housing units. Locate service panel within dwelling unit, easily accessible to occupant, but not in living areas.	
UFC-4-711-02A, JANUARY 2011 Section 5.4.1.2, pg. 63, states: Provide 200 amp minimum electrical service to each living unit.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

BEDROOMS (MISSION-FUNCTIONAL) TV CABLE	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• TV cable connection available	N/A
AMBER	**MINOR REPAIRS**
• TV cable connection is not available	N/A
RED	**MAJOR REPAIRS**
• N/A [no RED condition]	N/A)
	REPLACEMENT
	N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 5-1.5, pg. 22, states: Where commercial cable TV (CATV) service is available. Provide, as a minimum, duplex pre-wired cable TV/television antenna outlets in living room, family room, and bedrooms, with duplex jacks. Ensure that outlet locations are compatible with various furniture arrangements.	
UFC-4-711-02A, JANUARY 2011 Section 5.4.3.1, pg. 66, states: Cable Television (CATV) outlets shall be located in the living room, family room, and all bedrooms. Units shall be pre-wired in conformance with all local CATV company requirements. Ensure that outlet locations are compatible with various furniture arrangements.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A Planning Guide discusses TV mostly in context of Infrastructure & outside wiring.	
RECOMMENDATIONS	

BEDROOMS (MISSION-FUNCTIONAL) TELEPHONE SYSTEM	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• At least one phone jack is available	N/A
AMBER	**MINOR REPAIRS**
• Telephone jack is not available	N/A
RED	**MAJOR REPAIRS**
• N/A [no RED condition]	N/A)
	REPLACEMENT
	N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 5-1.4, pg. 22, states: Telephone service wiring within units should be a minimum of Category 5 wiring located in kitchen, living room, family room, dining room, and all bedrooms, with multiple modular jacks compatible with furniture arrangements. Multiple communication jacks are desirable.	
UFC-4-711-02A, JANUARY 2011 Section 5.4.2, pg. 66, states: Pre-wire housing units in accordance with local telephone company requirements. Provide outlets in kitchen, dining, or family area, living room and bedrooms of each housing unit, compatible with furniture arrangements. Eight position modular jack connectors shall be provided at all outlets.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A Planning Guide discusses TV mostly in context of Infrastructure & outside wiring.	
RECOMMENDATIONS	

BEDROOMS (QUALITY) FLOORS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Durable floors with complete finish details • Finish is not cracked, chipped, gouged or stained, nor is it a tripping hazard	**FULLY ADEQUATE** N/A
AMBER • Minor cracks, gouges or stains • Minor repairs are needed, but finish is not a tripping hazard	**MINOR REPAIRS** N/A
RED • Major repairs or replacement needed • Floor cracks, gouges or missing pieces pose a tripping hazard	**MAJOR REPAIRS** N/A **REPLACEMENT** N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 4-3.12.2, pg. 17, states: Carpet may be installed in all living areas except kitchens, baths, laundry areas, utility areas, storage rooms, entryways, patios, porches, and areas exposed to weather elements.	
UFC-4-711-02A, JANUARY 2011 Section 4.3.12.1, pg. 42, states: Carpet may be installed in all living areas except kitchens, baths, laundry room, utility areas, storage rooms, entryways, patios, porches, and areas exposed to weather elements.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A ISR-I Booklet 30 discusses durable floor covering and the reference states carpeting "may" be installed. There is no other mention of flooring in the bedrooms.	
RECOMMENDATIONS	

BEDROOMS (QUALITY) LIGHTING & OUTLETS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Overhead lighting is available; more than 90% is working • Outlets work safely	**FULLY ADEQUATE** N/A
AMBER • 75%–90% of lighting is working • Outlets loose or provide power erratically	**MINOR REPAIRS** Lighting: N/A Outlets: N/A
RED • Less than 75% of lighting is working, or • Outlets do not work or shock users	**MAJOR REPAIRS** Lighting: N/A Outlets: N/A
	REPLACEMENT Lighting: N/A Outlets: N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 5-1.3, pg. 22, states: As a minimum, provide wall-switched overhead light fixtures in kitchen, dining room, bedrooms, walk-in closets, bathrooms, halls, stairs, and utility/storage rooms. An electrical wall outlet should be located in hallway near bedrooms. Unit lighting fixtures should have a minimum overall Light Efficacy Rating (LER) of 65, including ballasts.	
UFC-4-711-02A, JANUARY 2011 Section 5.4.1.11.2, pg. 65, states: The ceiling light fixtures boxes in 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. Ceiling fan/light combination may be provided in these rooms as a betterment.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A In the Section for Electrical Service, the Planning Guide states: Light fixtures operated by wall switches should be provided in all rooms except the living room. (pg. 85) However, lights are not discussed in the Scope of Revitalization.	
RECOMMENDATIONS	

BEDROOMS (QUALITY) CEILINGS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Not gouged, stained, broken areas, or missing pieces	**FULLY ADEQUATE**
AMBER • Need minor repairs; some gouged, stained, broken, or missing pieces covering not more than 25% of ceiling	**MINOR REPAIRS** Repair walls, ceiling, floors, trim, windows, doors; paint. (pg. 80)
RED • Need major repairs; more than 25% of ceiling area is damaged	**MAJOR REPAIRS** Replace wall and/or ceiling surfaces, floor, trim, doors, or windows. (pg. 80)
	REPLACEMENT Remove entire bedroom wall and rebuild to new size. (pg. 80)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 4-3.12.3, pg. 17, states: Cathedral or vaulted ceilings are encouraged to improve the visual quality of living spaces. For new construction, minimum ceiling height should be 2.4 m (8 ft), except where minor drops occur for structural or utility soffit requirements.	
UFC-4-711-02A, JANUARY 2011 Section 4.3.12.2, pg. 43, states: Cathedral or vaulted ceilings are encouraged to improve the visual quality of living spaces. Textured ceiling finish may be provided in areas other than kitchen, laundry, or bathrooms.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A ISR-I Booklet 30 refers to ceiling tiles, while UFC 4-711-02A discusses the actual design of the ceiling.	
RECOMMENDATIONS	

BEDROOMS (QUALITY) WALLS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • In good condition; not gouged or stained • Conduits are concealed or covered	**FULLY ADEQUATE** N/A
AMBER • Minor gouges and stains require minor repairs, such as patching • Conduits exposed	**MINOR REPAIRS** Repair walls, ceiling, floors, trim, windows, doors; paint. (pg. 80)
RED • Need major repairs or refurbishing; gouges and stains are beyond patching • N/A [no RED condition]	**MAJOR REPAIRS** Replace wall and/or ceiling surfaces, floor, trim, doors, or windows. (pg. 80)
	REPLACEMENT Remove entire bedroom wall and rebuild to new size. (pg. 80)
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 4.3.12.2, pg. 43, states: Provide 13 mm [1/2-inch] gypsum wallboard, taped and smooth finished.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A UFC-4-711-02A discusses the type of material used for walls and ISR-I Booklet 30 discusses the condition of the walls.	
RECOMMENDATIONS	

BEDROOMS (QUALITY) DOORS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Fully functional handles and hinges • Less than 5 yrs old with no noticeable deterioration or damage	**FULLY ADEQUATE** N/A
AMBER • 6-15 yrs old • Handles, hinges or surfaces are stained, chipped, gouged or worn and need repair	**MINOR REPAIRS** Repair walls, ceiling, floors, trim, windows, doors; paint. (pg. 80)
RED • More than 15 yrs old; need to be replaced	**MAJOR REPAIRS** Replace wall and/or ceiling surfaces, floor, trim, doors, or windows. (pg. 80)
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 4.3.15, pg. 47, states: Interior doors shall be 2050 mm [6 ft-8 inches] in height by 35 mm [1-3/8 inch] thick, hollow core wood or hollow panel. Wood doors will be painted. Hinges shall be 90 mm x 90 mm [3-1/2 in x 3-1/2 in] at interior doors.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A UFC-4-711-02A discusses the type of material used for doors and ISR-I Booklet 30 discusses the condition of the doors.	
RECOMMENDATIONS	

BEDROOMS (QUALITY) TV CABLE	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• TV cable connection available and in good repair	N/A
AMBER	**MINOR REPAIRS**
• TV cable connection needs minor repairs	N/A
RED	**MAJOR REPAIRS**
• TV cable connection not working	N/A
	REPLACEMENT
	N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 5-1.5, pg. 22, states: Where commercial cable TV (CATV) service is available. Provide, as a minimum, duplex pre-wired cable TV/television antenna outlets in living room, family room, and bedrooms, with duplex jacks. Ensure that outlet locations are compatible with various furniture arrangements.	
UFC-4-711-02A, JANUARY 2011 Section 5.4.3.1, pg. 66, states: Cable Television (CATV) outlets shall be located in the living room, family room, and all bedrooms. Units shall be pre-wired in conformance with all local CATV company requirements.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A ISR-I Booklet 30 discusses the location of the wiring while UFC-4-711-02A discusses the condition of the TV cable connection.	
RECOMMENDATIONS	

BEDROOMS (QUALITY) TELEPHONE SYSTEM	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• Telephone jack works reliably	N/A
AMBER	**MINOR REPAIRS**
• Existing telephone jack needs minor repairs	N/A
RED	**MAJOR REPAIRS**
• Existing telephone jack needs major repairs.	N/A
	REPLACEMENT
	N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 5-1.4, pg. 22, states: Telephone service wiring within units should be a minimum of Category 5 wiring located in all bedrooms, with multiple modular jacks compatible with furniture arrangements.	
UFC-4-711-02A, JANUARY 2011 Section 5.4.2, pg. 66, states: Pre-wire housing units in accordance with local telephone company requirements. Provide outlets in kitchen, dining, or family area, living room and bedrooms of each housing unit.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

LAUNDRY ROOM/CLOSET (MISSION-FUNCTIONAL) HOOKUPS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Washer and dryer hookups are located inside the dwelling unit in a utility room	**FULLY ADEQUATE** N/A
AMBER • Washer and dryer hookups are inside dwelling unit, but in a closet kitchen, hall or garage.	**MINOR REPAIRS** N/A
RED • No washer or dryer hookups within the dwelling unit, or attached garage.	**MAJOR REPAIRS** Laundry area is inefficient for use of washer and dryer. Rearrange space; make necessary adjustments in plumbing, wiring, venting, and lighting. Replacement flooring should be seamless vinyl flooring rather than tile to reduce potential water damage. (pg. 76)
	REPLACEMENT Laundry area not present and must be added, complete with electrical wiring, plumbing, and venting. (pg. 76)
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 5.1.5.5, pg. 61, states: Drainage and hot and cold water supply shall be provided for automatic clothes washers. Washer connection, complete with 50-mm [2-inch] drain, 20-mm [3/4-inch] hose thread supplies shall be provided in standard manufactured recessed wall box with single-face plate. Boxes shall be constructed of plastic or sheet steel. Steel boxes shall have a corrosion-resistant epoxy enamel finish. Boxes shall be mounted a minimum of 865 mm [2 ft-10 inches] above the finish floor. Electrical outlets for both washer and dryer shall also be provided.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

LAUNDRY ROOM/CLOSET (MISSION-FUNCTIONAL) LIGHTING & OUTLETS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Overhead and task lighting is available and operational • All outlets grounded/GFI rated available where water may be present	**FULLY ADEQUATE** Laundry area is in good location and properly served by water, electricity, drainage, dryer venting, and is well lit and equipped with storage shelves or cabinets. (pg. 76)
AMBER • N/A [no AMBER condition]	**MINOR REPAIRS** Lighting: N/A Outlets: Upgrade electrical system with grounded outlets (if a ground wire exists in the outlet) and GFI breakers and receptacles. (pg. 76)
RED • Does not meet GREEN column minimum requirements	**MAJOR REPAIRS** Rearrange space; make necessary adjustments in lighting and wiring (pg. 76)
	REPLACEMENT Laundry area not present and must be added, complete with electrical wiring, plumbing, and venting. (pg. 76)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 5-1.3, pg. 22, states: As a minimum, provide wall-switched overhead light fixtures in ... utility/storage rooms.	
UFC-4-711-02A, JANUARY 2011 Section 5.4.1.11.2, pg. 65, states: Wall-switch operated ceiling lights shall be provided in dining and utility rooms, halls, bedrooms, kitchens, dinette areas, and basements. N/A - outlet condition	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

LAUNDRY ROOM/CLOSET (MISSION-FUNCTIONAL) VENTILATION	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Dryers vent to the building exterior • Ventilation integrated into forced air system	**FULLY ADEQUATE** Laundry area is in good location and properly served by dryer venting. (pg. 76)
AMBER • No more than 75% of dryers vent to the building exterior • Fans provided, but not integrated into forced air system	**MINOR REPAIRS** Dryer vent is missing or discharges at improper location. (pg. 76)
RED • Less than 75% of dryers vent to building exterior • Poor or no ventilation	**MAJOR REPAIRS** Rearrange space; make necessary adjustments in plumbing, wiring, venting, and lighting. (pg. 76)
	REPLACEMENT Laundry area not present and must be added, complete with electrical wiring, plumbing, and venting. (pg. 76)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 4-3.9, pg. 16, states: Exhaust from moisture-producing equipment (e.g. clothes dryers) must be vented to the exterior.	
UFC-4-711-02A, JANUARY 2011 Section 5.4.1.11.2, pg. 75, states: A 100-mm [4-inch] diameter dryer vent shall discharge to the exterior, and provide connection to occupant-owned dryer (one dryer per vent). Dryer vents shall not exhaust near the air conditioning condensing unit, entry doors, patio or balconies, carports, or garages. Dryer vents shall not run through non-accessible spaces or garages.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A Ventilation integrated into forced air system is a code violation.	
RECOMMENDATIONS Change wording to Dryers MUST vent to the building exterior. Dryer vents shall not exhaust near the air conditioning condensing unit, entry doors, patio or balconies, carports, or garages.	

LAUNDRY ROOM/CLOSET (MISSION-FUNCTIONAL) SHELVES SPACE	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Adequate storage shelves or cabinets	**FULLY ADEQUATE** Laundry area is equipped with storage shelves or cabinets. (pg. 76)
AMBER • Insufficient shelves space available	**MINOR REPAIRS** Add shelving or wall cabinet for storage of laundry supplies. (pg. 76)
RED • No shelves available	**MAJOR REPAIRS** N/A
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 4-3.9, pg. 16, states: Provide a laundry area large enough to accommodate side-by-side washing machine and dryer, plus shelving or cabinets for storing laundry supplies.	
UFC-4-711-02A, JANUARY 2011 Section 4.3.9, pg. 40, states: Provide a laundry/utility area large enough to accommodate side-by-side washing machine and dryer, plus shelving or cabinets for storing laundry supplies.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

LAUNDRY ROOM/CLOSET (MISSION-FUNCTIONAL) LINEN CLOSET	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• Linen closet is at least 2'-0" wide by 1'- 6" deep	Interior storage space exists and is adequately sized and well located. (pg. 78)
AMBER	**MINOR REPAIRS**
• Linen closet is less than 2'-0" wide by 1'-6" deep	Repair walls, ceiling, floor, trim, door; paint. (pg. 78)
RED	**MAJOR REPAIRS**
• No linen closet available	Bulk storage is inadequate and must be provided by adding a closet. (pg. 78)
	REPLACEMENT
	Bulk storage must be added into newly constructed floor space. (pg. 78)
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 4-3.11, pg. 16, states: Provide storage areas in the form of … linen closets ... in housing unit for seasonal personal effects. Minimum interior bulk storage space of 1.5 m^2 (16 ft^2) should be provided.	
UFC-4-711-02A, JANUARY 2011 Section 4.3.11.2, pg.41: Tables 4-4 state the minimum linen closet requirements, 2 ft.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

LAUNDRY ROOM/CLOSET (QUALITY) PLUMBING FIXTURES	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Less than 10% leak or do not work • Ample hot water • Dependable and adequate water pressure • Water from faucets is clear	**FULLY ADEQUATE** N/A
AMBER • 10%–25% leak or do not work • Lukewarm "hot" water • Low water pressure • Water is slightly discolored	**MINOR REPAIRS** Replace fixture stops and repair minor leaks. (pg. 85)
RED • More than 25% leak or do not work • No hot water • Very low water pressure • Water is heavily discolored	**MAJOR REPAIRS** N/A **REPLACEMENT** N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 5.1.5.4, pg. 60, states: Faucets shall be single-control type, with seals and seats combined in one replaceable cartridge designed to be interchangeable among lavatories, bathtubs and kitchen sinks, or having replaceable seals and seats removable either as a seat insert or as a part of a replaceable valve unit. Water flow shall be no more than .158 L/s [2.5 gpm] from any faucet.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

LAUNDRY ROOM/CLOSET (QUALITY) FLOORS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• Floors are in good condition, no gouges or stains	N/A
AMBER	**MINOR REPAIRS**
• Floors have minor gouges, chips or stains needing repairs	Repair floors. (pg. 76)
RED	**MAJOR REPAIRS**
• Floors need extensive repairs or replacement; they pose a safety threat	Replacement flooring should be seamless vinyl flooring rather than tile to reduce potential water damage. (pg. 76)
	REPLACEMENT
	N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 4.3.12.1, pg. 43, states: Kitchen and laundry/utility area flooring shall be seamless sheet vinyl.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

LAUNDRY ROOM/CLOSET (QUALITY) LIGHTING & OUTLETS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • 90% of overhead and task lighting is working • Outlets work safely	**FULLY ADEQUATE** Laundry area is well lit. (pg. 76)
AMBER • 75%-90% of lighting is working • Outlets loose or provide power erratically	**MINOR REPAIRS** Lighting: N/A Outlets: Upgrade electrical system with grounded outlets (if a ground wire exists in the outlet) and GFI breakers and receptacles. (pg. 76)
RED • Less than 75% of lighting is working • Outlets do not work, or shock users	**MAJOR REPAIRS** Lighting: Rearrange space; make necessary adjustments in lighting. (pg. 76) Outlets: Rearrange space; make necessary adjustments in wiring. (pg. 76)
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 Section 5-1.3, pg. 22, states: As a minimum, provide wall-switched overhead light fixtures in ... utility/storage rooms.	
UFC-4-711-02A, JANUARY 2011 Section 5.4.1.11.2, pg. 65, states: Wall-switch operated ceiling lights shall be provided in dining and utility rooms, halls, bedrooms, kitchens, dinette areas, and basements.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

LAUNDRY ROOM/CLOSET (QUALITY) CEILINGS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN	**FULLY ADEQUATE**
• Not gouged, stained, broken areas, or missing pieces	N/A
AMBER	**MINOR REPAIRS**
• Need minor repairs; some gouged, stained, broken, or missing pieces covering not more than 25% of ceiling area	Repair ceiling. (pg. 76)
RED	**MAJOR REPAIRS**
• Need major repairs; more than 25% of ceiling area is damaged	N/A
	REPLACEMENT
	N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 4.3.12.2, pg. 43, states: Cathedral or vaulted ceilings are encouraged to improve the visual quality of living spaces. Textured ceiling finish may be provided in areas other than kitchen, laundry, or bathrooms.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

LAUNDRY ROOM/CLOSET (QUALITY) WALLS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • In good condition; not gouged or stained	**FULLY ADEQUATE** N/A
AMBER • Minor gouges and stains require minor repairs, such as patching	**MINOR REPAIRS** Repair walls and paint. (pg. 76)
RED • Need major repairs or refurbishing; gouges and stains are beyond patching	**MAJOR REPAIRS** N/A **REPLACEMENT** N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 4.3.12.2, pg. 43, states: Provide 13 mm [1/2-inch] gypsum wallboard, taped and smooth finished.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

LAUNDRY ROOM/CLOSET (QUALITY) DOORS	
ISR-I BOOKLET 30	**PLANNING GUIDE**
GREEN • Fully functional handles and hinges • Less than 5 yrs old with no noticeable deterioration or damage	**FULLY ADEQUATE** N/A
AMBER • 6-15 yrs old • Handles, hinges or surfaces are stained, chipped, gouged or worn and need repair	**MINOR REPAIRS** Repair doors. (pg. 76)
RED • More than 15 yrs old; need to be replaced	**MAJOR REPAIRS** N/A
	REPLACEMENT N/A
REGULATIONS	
UFC-4-711-01, JULY 2006 N/A	
UFC-4-711-02A, JANUARY 2011 Section 4.3.15, pg. 47, states: Interior doors shall be 2050 mm [6 ft -8 inches] in height by 35 mm [1-3/8 inch] thick, hollow core wood or hollow panel. Wood doors will be painted. Hinges shall be 90 mm x 90 mm [3-1/2 in x 3-1/2 in] at interior doors.	
NOTES/RECOMMENDATIONS	
ISR-I BOOKLET 30 AND UFC-4-711-02A	
RECOMMENDATIONS	

PART 4
APPENDICES

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PURPOSE

This Accessibility guide provides an overview of the accommodations that are necessary to achieve basic access, mobility and communication functions within a residential dwelling on military installations. The military's residential dwellings can be single family homes, apartment complexes, or unaccompanied personnel housing (UPH).

On October 31, 2008, the Department of Defense (DOD) issued a policy memorandum[1], which adopted the ABA Accessibility Standard for Department of Defense Facilities based on updated guidelines issued by the United States Access Board. The guidelines incorporate minimum requirements of the Architectural Barriers Act of 1968 (ABA) and the Americans with Disabilities Act of 1991 (ADA). Although the standard addresses all DOD facilities, this accessibility guide only focuses on military housing.

KEY REQUIREMENTS

To comply with the ABA Accessibility Standard for Department of Defense Facilities, at least five percent of all residential dwelling units on military installations must provide mobility features in accordance with sections 809.2 through 809.4 of the standard; and at least two percent of all residential dwelling units on military installations must provide communication features complying with section 809.5 of the standard. If compliance is lacking and residential dwelling alterations are planned, the following requirements must be met:

1. Alterations cannot "decrease" accessibility of existing building and an alteration shall not impose a requirement of accessibility greater than that required for new construction.
2. If Historic Significance of building is "destroyed" by accessible modifications, accessible modifications shall not be implemented.
3. Residential Dwellings with mobility features (accessibility): At least five percent but no less than one unit of the total number of residential dwellings shall provide mobility features complying with 809.2 thru 809.4 and be on an accessible route as required by F206.
4. Residential Dwellings with communication features (hearing/sight): At least two percent but no less than one unit of the total number of residential dwellings shall provide communication features complying with 809.5.
5. When a building is vacated for the purposes of alterations—five percent of the residential dwelling units shall comply with 809.2 thru 809.4 and shall be on an accessible route as required by F206. In addition, at least two percent shall comply with 809.5 (communication features).
6. When an addition increases the number of residential units, the total number of residential units must comply with the minimum accessible units required—if the minimum is not met, the new units must have the required mobility features and/or communication features.
7. When a residential unit has a bathroom or kitchen substantially altered and one other room, the total number of

[1] www.access-board.gov/ada-aba/dod-memorandum.htm#2

residential units must comply with the minimum accessible units required—if minimum not met, the alterations must include accessibility.

8. Residential units having mobility or communication features shall be dispersed among the various types of residential dwellings—such that the "choices" of residential dwelling type for those with disabilities on the military installation are comparable to other residents.

ELEMENTS OF AN ACCESSIBLE RESIDENTIAL DWELLING

The *ABA Accessibility Standard for DOD Facilities' Chapter 8 – Section 809*: "Residential Dwelling Units" identifies the accessibility requirements for military housing. The section defines (1) mobility features in terms of the Accessible Routes, Kitchen, and Bathroom; and (2) communication features in terms of Fire Alarm Systems, Smoke Detectors, and Entrance Devices for Notification and Identification.

On the following pages, we provide a summary of those elements that constitute accessibility for the Accessible Routes, Kitchens, Bathrooms, Public (or Common) Areas within UPH or Apartments and Communication Devices. In fact, the military family housing manager can evaluate the following features to determine what alternations are necessary to achieve accessibility for any given residential dwelling.

ACCESSIBLE ROUTES

Accessible Routes are a primary means of mobility within a Residential Dwelling. Generally, the accessible route is the path, which provides accessibility to people with disabilities; it starts on the exterior of the dwelling, travels through the entrance and connects the common areas, the kitchen, the bath, and bedroom(s). Figure 1 illustrates typical elements of the accessible entrance; while Figure 2 illustrates the width and clearance requirements for an interior hallway or corridor that defines the accessible route.

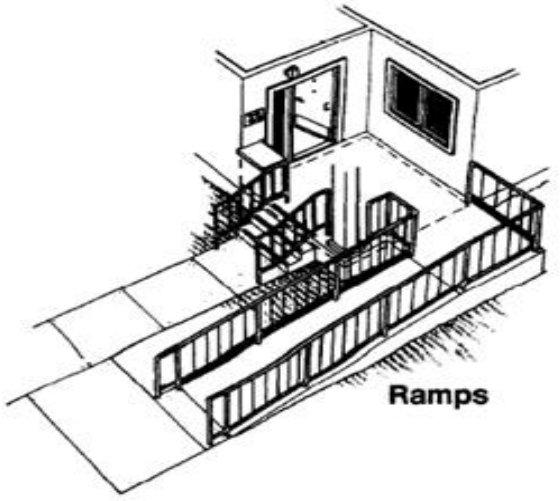


Figure 1. Typical Accessible Entrance[2]

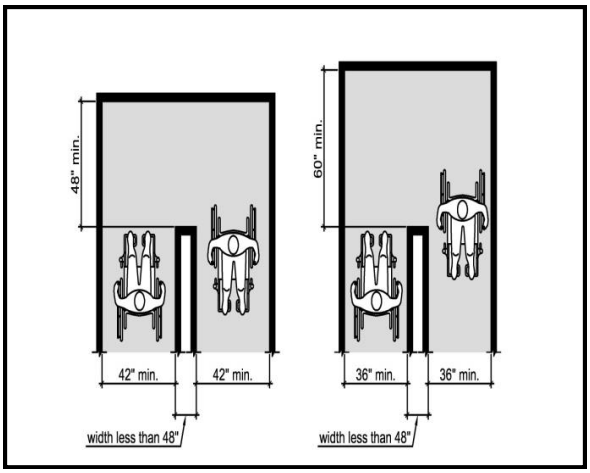


Figure 2. Accessible Hallways

[2] *Residential Remodeling and Universal Design,* U.S. Department of Housing and Urban Development

The military family housing manager should evaluate the following features to determine if an accessible route exists:

- *Walking Surfaces* – Slopes & Transitions must accommodate wheelchairs
- *Curb Ramps* – Slopes & Transitions must accommodate wheelchairs
- *Patios and Deck Ramps & Railing* – Design features must accommodate wheelchairs
- *Main Entrance Layout* – Must accommodate wheelchairs and allow for maneuvering
- *Doorway & Hallway Width* – Must facilitate entry and accommodate wheelchairs
- *Doorway Features* – Graspable, Easy to Use, and Easy to Communicate
- *Window Features* – Crank Style or Easy to Use from wheelchair

ACCESSIBLE KITCHENS

Accessible Kitchens are a primary means of mobility within a Residential Dwelling. Generally, accessible kitchen features include clearance requirements for maneuvering a wheelchair, sink and appliance heights to accommodate a wheelchair, plumbing fixtures that are graspable and reachable from a wheelchair, and operable parts of appliances that facilitate use from a wheelchair. Generally, the kitchen is either a Pass-Through Design or U-Shape Design. Figure 3 illustrates the typical Pass-Through Design; while Figure 4 illustrates the typical U-Shape Design.

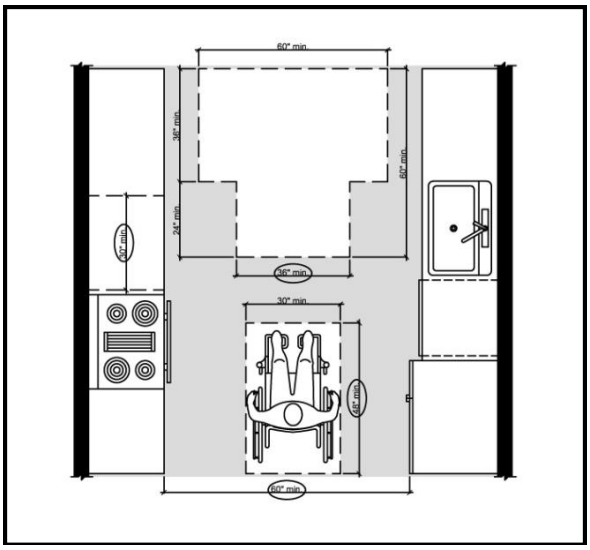


Figure 3. Pass-Through Kitchen Design

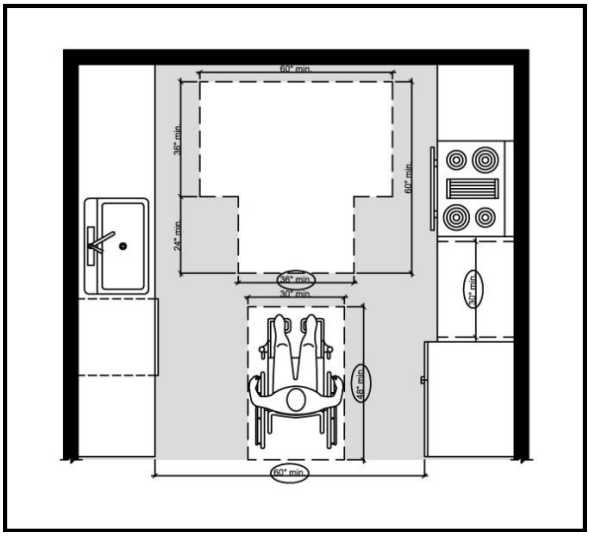


Figure 4. U-Shape Kitchen Design

The military family housing manager should evaluate the following features to determine if the kitchen is accessible:

- *Entryway & Hallway Width* – Must accommodate wheelchairs
- *Clear Floor Space* – Turning space for wheelchair maneuvers (forward/side approach)
- *Work Surface/Desk* – Height for wheelchairs and have clearance underneath

- *Sink* – Height for wheelchairs and fixtures that are easy to use/grasp
- *Appliances* – Must have easy-to-reach operable parts from wheelchair position
- *Refrigerator* – Freezer section must be reachable from wheelchair position
- *Oven/Range* – Controls must be located on the front panel of the appliance
- *All Controls* – Must be operable with one hand and maximum of five-pounds of force
- *All Controls* – Must not require pinching, twisting, or tight grasping

ACCESSIBLE BATHROOMS

Accessible Bathrooms are a primary means of mobility within a Residential Dwelling. Generally, accessible bathroom features include clearance requirements for maneuvering a wheelchair, sink and vanity heights to accommodate a wheelchair, plumbing fixtures that are graspable and reachable from a wheelchair, toilets/showers that can be used by those in a wheelchair, and grab bars. Generally, the bathroom will require space for maneuvering a wheelchair and several accessible features including grab bars, which are critical to an accessible bathroom. Figure 5 illustrates a typical bathroom layout; while Figure 6 illustrates the size requirement for non-circular grab bar cross-sections.

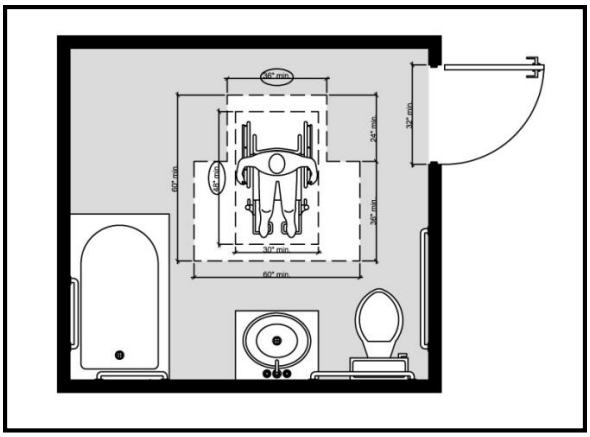


Figure 5. Basic Accessible Bathroom

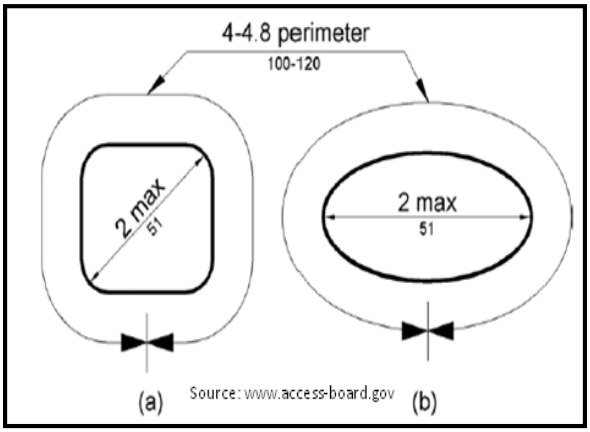


Figure 6. Non-Circular Grab Bars

The military family housing manager should evaluate the following features to determine if the bathroom is accessible:

- *Entryway, Doorway, & Hallway Width* – Must accommodate wheelchairs
- *Clear Floor Space* – Turning space for wheelchair maneuvers (forward/side approach)
- *Vanity* – Height for wheelchairs and clearance underneath
- *Sink* – Height for wheelchairs and have fixtures that are easy to use/grasp
- *Toilets*– Must have easy to reach operable parts from wheelchair position
- *Tubs & Showers* – Must be easy to enter and operate by persons with disabilities

- *Grab Bars* – Must be designed and located as per the standard
- *All Controls* – Must be operable with one hand and maximum of five-pounds of force
- *All Controls* – Must not require pinching, twisting, or tight grasping

PUBLIC (OR COMMON) AREAS IN UPH OR APARTMENT COMPLEX

The public (or common) areas in an UPH or apartment complex must be accessible to people with disabilities. Generally, these areas are located on the first floor of the facility and may include a lobby, laundry area, mailroom, vending area, public telephone area, activity room, public restrooms, and drinking fountains. Public parking spaces may also exist depending upon the size and internal accommodations of the complex. Generally, the public (or common) area alterations may have a separate budget from the primary residential dwelling renovations because of the 20 percent accessibility cap over the original budget. Nonetheless, Figure 7 illustrates typical elements of an Apartment or UPH accessible entrance; while Figure 8 illustrates the typical interior accessible lobby area.

Figure 7. UPH Accessible Entrance

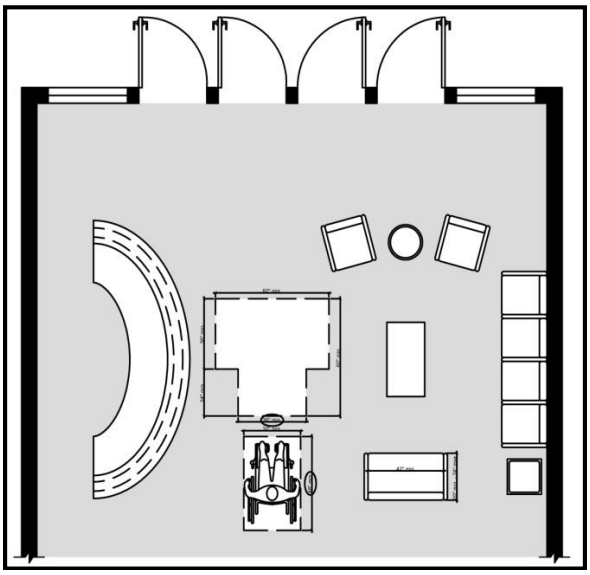


Figure 8. Typical Accessible Lobby

The military family housing manager should evaluate the following features to determine if the public (or common) areas are accessible:

- *Walking Surfaces* – Slopes & Transitions must accommodate wheelchairs
- *Curb Ramps/Deck Ramps* – Slopes & Transitions must accommodate wheelchairs
- *Parking Spaces* – Size and labeling must indicate wheelchair access
- *Main Entrance Layout* – Must accommodate wheelchairs for maneuvering
- *Doorway & Hallway Width* – Must facilitate entry and accommodate wheelchairs
- *Doorway Features* – Graspable, Easy to Use, and Easy to Communicate
- *Lobby (or Front Desk)* – Must accommodate wheelchairs for maneuvering

- *Other Public or Common Areas* – Must accommodate wheelchairs for maneuvering

ACCESSIBLE COMMUNICATION FEATURES

Accessible Communication features allow the vision and hearing impaired to benefit from alarms, signage, and two-way communication systems within a Residential Dwelling. Generally, communication features are common in gated communities such as Unaccompanied Personnel Housing or multifamily dwellings such as apartment complexes. If they exist for any dwelling type, they must also accommodate the needs of vision and hearing impaired individuals. Typical accessible communication features include visual alarm and detection devices, large signage (and Braille below written text), and listener assisted two-way communication systems. Figure 9 illustrates a doorbell connected to flashing light; while Figure 10 illustrates a combination visual/audible alarm.

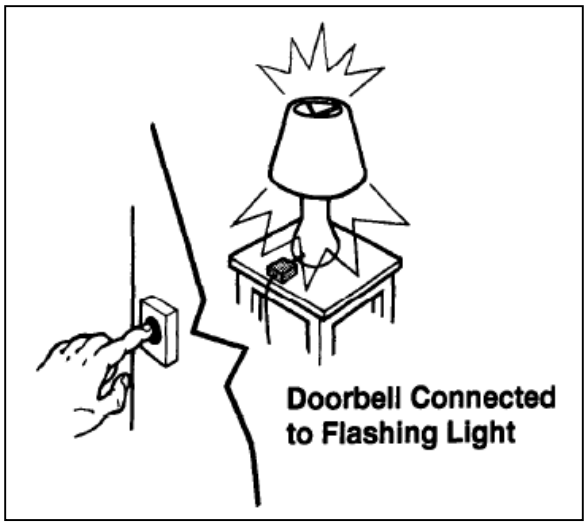


Figure 9. Visual "Flashing" Doorbell[3]

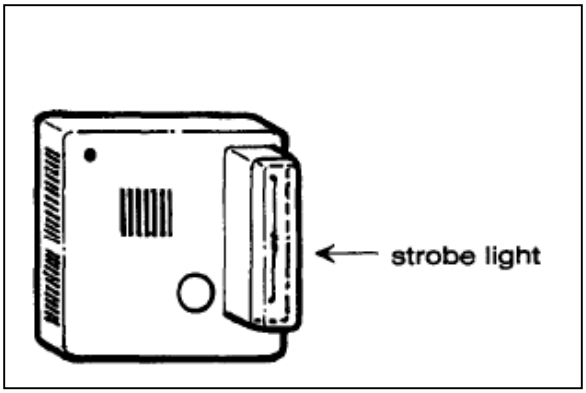


Figure 10. Visual & Audible Alarm[6]

The military family housing manager should evaluate the following features to determine if the communication features are accessible:

- *Signage* – Must accommodate the vision impaired (i.e., Braille)
- *Entry Communication* – Devices must accommodate the vision and hearing impaired
- *Visual & Audible Alarms* – Must alert the vision and hearing impaired
- *Smoke Detection Device* – Must alert the vision and hearing impaired
- *Identification Device* – Door peepholes must accommodate person in a wheelchair
- *Two-Way Communication* – Must accommodate the vision and hearing impaired
- *All Controls* – Must not require pinching, twisting, or tight grasping

CONDITION ASSESSMENT AND COST OF ALTERATIONS

The inspector or housing manager will "rate" five core areas of the residential dwelling by evaluating the (1) Accessible Route, (2) Kitchen, (3) Bathroom, (4) Public (or

[3] *Residential Remodeling and Universal Design*, U.S. Department of Housing and Urban Development

Common) Areas, and (5) Communication Devices. The ratings include: "**0**" for **Non-Applicable** (elements that do not exist), "**1**" for **Fully Adequate** (all elements fully comply with accessibility requirements), "**2**" for **Minor Repairs** (most elements fully comply with accessibility requirements, but minor upgrades are needed), "**3**" for **Major Repairs** (most elements do not fully comply with accessibility requirements and repairs are similar to a gut rehab), and "**4**" for **Replacement** (the unit requires substantial upgrades similar to an "addition" where both interior and exterior wall modifications are performed). The "non-applicable" or "fully adequate" ratings do not add cost; but the remaining ratings have an estimated range of cost based on the housing element being altered. This cost is captured within the Common Defect tables for the five core areas. This cost estimates considers the conversion from non-accessible residential dwelling to accessible accommodations.

In the following sections, we provide a summary of typical accessibility defects that maybe encountered during assessments of the Accessible Route, Kitchen, Bathroom, and Communication devices. Cost estimates are generally based on common defects; but actual costs will vary based on the specific issues at any given residential dwelling and the actual alterations will depend on the remodeling approach.

COMMON DEFECTS: ACCESSIBLE ROUTES

When Accessible Routes do not exist, they typically lack:

- Maneuvering Clearances (at the main entrance)
- Threshold Design for Wheelchairs (at doorways)
- Floor Surfaces for Wheelchairs (along the accessible route)
- "Easy-to-Use" Door Hardware (do not require twisting, grasping, and pinching)
- Ramps (do not exist or lack railing, sloping, and clearance requirements)
- Accessible Window Features (no crank or easy-to-open device on windows)
- Handrails (on stairways along the accessible route)

Minor repairs typically include changing door hardware, adding handrails, and replacing thresholds at doorways. Major repairs typically include changing floor covering, windows, and adding ramps. Replacement involves adding space to the residential dwelling; this would be the case if maneuvering clearances were not met or the accessible route is not wide enough.

COMMON DEFECTS: ACCESSIBLE KITCHEN

When an Accessible Kitchen does not exist, it typically lacks:

- Floor Clearances (provide space for maneuvering while in a wheelchair)
- Threshold Design for Wheelchairs (at doorways)
- Appliances/Sink (that meet accessible requirements)
- "Easy-to-Use" Knobs for Cabinets (no twisting, grasping, and pinching required)
- Light Switch Location (is easy to reach from wheelchair)

Minor repairs typically include changing knobs on cabinets and replacing thresholds at doorways. Major repairs typically include changing appliances, sinks/fixtures, and light switch locations. Replacement involves

adding space to the residential dwelling; this would be the case if maneuvering clearances were not met within the kitchen.

COMMON DEFECTS: ACCESSIBLE BATHROOM

When an Accessible Bathroom does not exist, it typically lacks:

- Floor Clearances (provide space for maneuvering while in a wheelchair)
- Doorway Width (to accommodate a wheelchair)
- Threshold Design for Wheelchairs (at doorways)
- Grab Bars (do not exist)
- Toilet Height and Location (to meet clearance requirements and obstructs use)
- Knee Clearance for Sinks/Vanity (to meet the clearance requirements)
- Sink Fixtures (that do not require twisting, grasping, and pinching)
- Accessible Tub/Shower (that meet controls, height, and reach requirements)
- Towel Bars (that meet height and reach requirements)

Minor repairs typically include changing the height of towel bars, adding grab bars, changing fixtures, and replacing thresholds at doorways. Major repairs typically include changing toilets, sinks/vanities, tubs, and showers. Replacement involves widening doorways and adding space to the residential dwelling; this would be the case if maneuvering clearances were not met within the bathroom.

COMMON DEFECTS: COMMUNICATION FEATURES

When an Accessible Communication Feature does not exist, it typically lacks:

- Accessible Signage (for the vision impaired)
- Vision Alarms (for the vision impaired)
- Identification Device at Main Door/Entry (peepholes at wheelchair height)
- Placement of Communication Controls (to be reached from wheelchair)
- Accessible Controls (features do not require twisting, grasping, and pinching)

Minor repairs typically include adding signage, vision alarms, and peephole for person in wheelchair. Major repairs typically include modifying the type communication controls for wheelchair or relocating the communication controls. Replacement cost may be considered if the entire communication system were replaced and upgraded to accommodate the hearing and vision impaired.

Although we have generally assumed that certain alterations are minor, there are cases where a "typical" minor alteration can be a major cost. For example, in most cases, adding grab bars is a very straight-forward and minor alteration; but if the wall does not have structure supports existing to support the new grab bars or if adding the grab bars creates obstructions for the door or maneuvering space, then this may become a major alteration. For more examples of how the design approach will drive the overall cost of an accessibility alteration, please refer to *Residential Rehabilitation, Remodeling and Universal Design*, published by the Center for Universal Design at NC State University.

The costs of appliances are not included in the housing remodeling budget; hence, it is

not reflected in any of the cost estimate tables. Nonetheless, we have identified it as a common defect and classified it as a major cost.

REFERENCES

The primary accessibility reference for military housing (including UPH) is the *ABA Accessibility Standards for Department of Defense Facilities* as published by the United States Access Board. When residential dwelling units are converted, shall comply with the standard and the policy memorandum issued by the Department of Defense on October 31, 2008.

OTHER RESOURCES:

Residential Rehabilitation, Remodeling and Universal Design

Common ADA Errors and Omissions in New Construction and Alterations

Residential Remodeling and Universal Design

The Army has assigned high priority to energy conservation in Army Family Housing and is committed to reliable, cost-effective efforts to achieve it. Energy conservation and sustainable construction have become increasingly important issues as reflected in current requirements embodied in UFC 3-400-01 Energy Conservation and CFR Title 10, Part 435, Energy Efficiency Standards for New Federal Low-Rise Residential Buildings. Those updated requirements are included in this document.

This section provides general information on energy conservation, under seven major headings:

- Role of the Occupant
- Residential Energy Defects
- References
- Energy Conservation Opportunities
- Air Infiltration Reduction
- Space Heating and Cooling Equipment
- Domestic Hot Water Systems

This information is designed to provide general information for inspectors and others who are responsible for creating and carrying out policies in support of energy conservation.

ROLE OF THE OCCUPANT

Basic to energy conservation in Army Family Housing is the behavior of occupants. For every revitalization effort and procedure, further savings can be achieved by the occupants themselves. Conversely, the energy conservation value of the best revitalization efforts can be partly or wholly nullified by the uninformed or careless activities of those occupying Army Family Housing.

There is no doubt that Army families are devoted to energy conservation and will cooperate in efforts to save energy. The issue is, therefore, one of awareness and of effective education, for which each installation and command must take responsibility. All Army families should be knowledgeable of general steps that they can and should take to save energy and of specific steps associated with the use of the equipment in their homes.

RESIDENTIAL ENERGY DEFECTS

There are four types of residential energy defects:

- Excessive air infiltration
- Excessive conductive heat losses through the building envelope
- Inefficient heating and cooling equipment
- Inefficient lighting and appliances

Each of these areas offers important Energy Conservation Opportunities and is covered by a section in this chapter.

REFERENCES

General Building Requirements (UFC 1-200-01), *Army Family Housing Supplement* (UFC 4-711-02A), *Energy Conservation* (UFC 3-400-01) reference the ICC *International Energy Conservation Code* (IECC) for requirements for climate zones and energy-efficient minimums. Table 13 and the associated map shows climate zones and their typical heating and cooling standards. These zones correlate to code minimum insulation, window, and door requirements. These standards also recognize the ENERGY STAR program to be installed at a minimum. Existing houses should be brought into compliance with these new construction standards whenever practical.

Executive Order 13423 is an energy and water conservation policy signed January 24, 2007. It was enacted to ensure the governing agencies abide by a high standard in regard to environment, economy, sustainability, and efficiency. Accordingly, energy improvements by 2015 should be at least 30 percent better than that of 2003 and water consumption should improve 16 percent by 2015 in comparison to 2007.

The Energy Policy Act of 2005 (EPAct 2005) established energy management goals for Federal facilities. Its requirements include metering and reporting; energy-efficient product procurement; energy savings performance contracts; building performance standards; renewable energy requirement; and alternative fuel use. The Energy Independence and Security Act of 2007 (EISA 2007) and Executive Order (E.O.) 13423, issued subsequent to the passage of this act, update many of its energy management requirements.

The Energy Independence and Security Act of 2007 (EISA 2007) established energy management goals and requirements and amended the National Energy Conservation Policy Act (NECPA). The Federal energy management requirements include: energy reduction goals for federal buildings; performance and standards for new building and major renovations; high-performance buildings; energy savings performance contracts; metering; and energy-efficient product procurement.

The ASHRAE handbooks, particularly *Fundamentals* and *HVAC Systems and Equipment*, are cited as references throughout this chapter. These handbooks provide detailed information on the theoretical bases of engineering methods, insulation, recommended practices, and various types of heating and cooling equipment. They are the engineer's desk reference for heating, ventilation, air conditioning, and all related fields. ASHRAE's standard for energy-saving construction, entitled *ASHRAE Standard 90.2P, Energy-Efficient Design of New Low-Rise Residential Buildings*, was released as a draft for public comment in March, 1989, and last updated in 2007.

Table 13.
IECC Climate Zone Definitions

CLIMATE ZONE	FENESTRATION *U*-FACTOR [B]	SKYLIGHT [B] *U*-FACTOR	GLAZED FENESTRATION SHGC [B,E]	CEILING *R*-VALUE	WOOD FRAME WALL *R*-VALUE	MASS WALL *R*- VALUE[I]	FLOOR *R*-VALUE	BASEMENT [C] WALL *R*-VALUE	SLAB [D] *R*-VALUE & DEPTH	CRAWL SPACE [C] WALL *R*-VALUE
1	1.20	0.75	0.30	30	13	3/4	13	0	0	0
2	0.65[J]	0.75	0.30	30	13	4/6	13	0	0	0
3	0.50[J]	0.60	0.30	30	13	5/8	19	5/13[F]	0	5/13
4 except Marine	0.35	0.60	NR	38	13	5/10	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.35	0.60	NR	38	20 or 13+5[H]	13/17	30[G]	10/13	10, 2 ft	10/13
6	0.35	0.60	NR	49	20 or 13+5[H]	15/19	30[G]	15/19	10, 4 ft	10/13
7 and 8	0.35	0.60	NR	49	21	19/21	38[G]	15/19	10, 4 ft	10/13

For SI: 1 foot = 304.8 mm.

[A] R-values are minimums. U-factors and SHGC are maximums. R-19 batts compressed into a nominal 2x6 framing cavity such that the R-value is reduced by R-1 or more shall be marked with the compressed batt R-value in addition to the full thickness R-value.

[B] The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration.

[C] "15/19" means R-15 continuous insulated sheathing on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. "15/19" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulated sheathing on the interior or exterior of the home. "10/13" means R-10 continuous insulated sheathing on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.

[D] R-5 shall be added to the required slab edge R-values for heated slabs. Insulation depth shall be the depth of the footing or 2 ft, whichever is less, in Zones 1 through 3 for heated slabs.

[E] There are no SHGC requirements in the Marine Zone.

[F] Basement wall insulation is not required in warm-humid locations as defined by Figure 301.1 and Table 301.1.

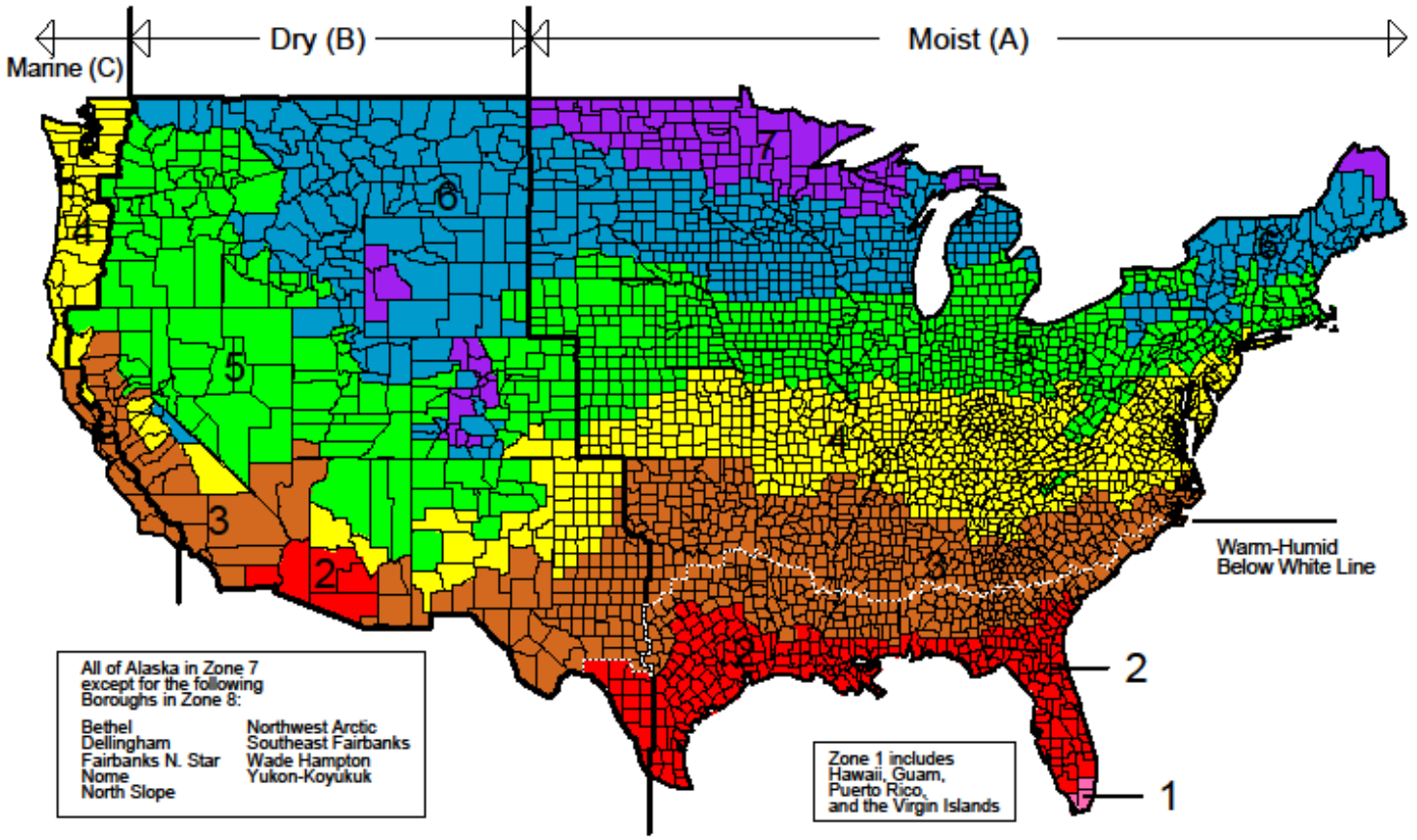
[G] Or insulation sufficient to fill the framing cavity, R-19 minimum.

[H] 13+5" means R-13 cavity insulation plus R-5 insulated sheathing. If structural sheathing covers 25 percent or less of the exterior, insulating sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25 percent of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.

[I] The second R-value applies when more than half the insulation is on the interior of the mass wall.

[J] For impact rated fenestration complying with Section R301.2.1.2 of the International Residential Code or Section 1609.1.2 of the International Building Code, the maximum U-factor shall be 0.75 in Zone 2 and 0.65 in Zone 3.

Map of DOE's Proposed Climate Zones



March 24, 2003

Table 14.
Current and Future Energy Efficiency Minimum Standards for Alternative Equipment

Source	Federal	Federal			ENERGY STAR		
Status	Current	Amended			Current		
Equipment	National	National	Northern	Southeastern	Southwestern	National	South	North
Non-Weatherized Gas Furnace AFUE[A]	78	80	90	-	-	-	90	95
Split-System Air Conditioner SEER	13	13	-	14	14	14.5	-	-
Split-System Heat Pump Cooling SEER	13	14	-	14	14	14.5	-	-
Split-System Heat Pump Heating HSPF	7.7	8.2	-	8.2	8.2	8.2	-	-
Gas Water Heater, Storage EF	0.57[A]	0.61[C]	-	-	-	0.62[E]	-	-
Gas Water Heater, Instantaneous EF	0.67[B]	0.82[D]	-	-	-	0.82[F]	-	-

[A] EF= 0.67 – (0.0019 x Related Storage Volume in gallons) Volume assumed to be 55.

[B] EF= 0.67 – (0.0019 x Related Storage Volume in gallons) Volume assumed to be minimal.

[C] EF=0.675 – (0.0012 x Related Storage Volume in gallons) For Tanks below 60 gallons. Volume assumed to be 55.

[D] EF=0.82 – (0.0019 x Related Storage Volume in gallons) Volume assumed to be minimal.

[E] A nominal input of 75,000 BTU/hour or less and a rated storage volume of 20 to 100 gallons.

[F] Whole-Home Gas Tankless – A nominal input of over 50,000 BTU/hour up to 200,000 BTU/hour and a rated storage of two gallons or less.

Minimum standards of energy efficiency for many major appliances were established by Congress in the Energy Policy and Conservation Act (EPCA), and amended in a series of regulations including the National Energy Conservation Policy Act and the National Appliance Energy Conservation Act, culminating with the Energy Policy Act of 2005. Regulations are issued by executive branch agencies, such as the Department of Energy (DOE), to carry out federal laws. Standards laws are available in the Code of Federal Regulations. Proposed and recently adopted rules and regulations may be found in the Federal Register. Such documents serve as the source of the data found in Table 14 such as:

Current Conservation Standards for Residential Furnaces – 10 CFR Part 430, *Energy Conservation Program for Consumer Products: Energy Conservation Standards for Residential Furnaces and Residential Air Conditioners and Boilers*, Federal Register, Volume 72, No. 222, November 19, 2007

Current Conservation Standards for Residential Central Air Conditioners and Heat Pumps – 10 CFR Part 430, *Energy Conservation Program for Consumer Products: Central Air Conditioners and Heat Pumps*, Federal Register, Volume 69, No. 158, August 17, 2004.

Amended Conservation Standards for Residential Furnaces, Central Air Conditioners and Heat Pumps – 10 CFR Part 430, *Energy Conservation Program: Energy Conservation*

Standards for Residential Furnaces and Residential Air Conditioners and Heat Pumps, Federal Register, Volume 76, No. 210, October 31, 2011.

Current and Amended Conservation Standards for Gas Fired Water Heaters – 10 CFR Part 430, *Energy Conservation Program: Energy Conservation Standards for Residential Water Heaters, Direct Heating Equipment and Pool Heaters; Proposed Rule*, Federal Register, Volume 74, No. 237, December 11, 2009.

The compliance date for the non-weatherized furnaces standards is May 1, 2013, and January 1, 2015, for weatherized furnaces and central air conditioners and heat pumps. Similarly, the standards established in a final rule for water heaters are scheduled to be applied April 16, 2015. The amended DOE standards for residential furnaces and residential central air conditioners and heat pumps set minimum energy efficiency requirements at both national and regional levels. Specifically, the standards contain requirements: for residential furnaces at the national level and for the northern region; and for air conditioners and heat pumps at the national level, and for the southeastern and southwestern regions. Water heater requirements were established at the national level.

Although the amended energy efficiency requirements discussed above are not in effect at the time of publication (assuming they go into effect), they are presented in Table 14, along with current Federal energy conservation standards and ENERGY STAR requirements in effect in 2012.

Energy conservation opportunities (ECOs) associated with older housing include:

- Adding ceiling or roof insulation
- Adding wall insulation
- Adding floor insulation
- Upgrading windows and doors
- Reducing air infiltration
- Upgrading heating and cooling equipment
- Upgrading domestic water heating equipment

ECOs also exist in the infrastructure of the neighborhood. Typical ECOs involve street and security lighting, heated swimming pools, district heating systems, and landscaping. Strategic planting of deciduous trees, for example, can reduce cooling loads in summer and allow solar gains in winter.

Specific ECOs which exceed the minimum design criteria and/or result in going below the EU for the house should be justified by a life-cycle cost analysis showing a payback within 25 years.

ENERGY AUDITS

For detailed planning of specific revitalization projects, evaluation of the energy efficiency of homes begins with an energy audit. To identify ECOs, audits focus on the four problems listed above—air leakage, conductive heat losses, heating and cooling equipment, and, to a lesser extent, household appliances. The auditor records the condition of the structure and its equipment, potential ECOs, and personal notes on an audit form. Energy audits generally require more detailed information than required by this guide.

Typically, the auditor then assesses the economic feasibility of each ECO. Using estimates of installation costs and energy savings for each item, the auditor eliminates those that do not meet an acceptable payback criterion. The remaining list of economically feasible ECOs forms the basis for the project's budget and scope of work.

When ECOs reach the stage of budget allowance or installation, they are referred to as energy conservation measures (ECMs).

The information that follows helps identify some of the more common ECOs that auditors and inspectors encounter in Army housing.

BUILDING ENVELOPE ECOS

The building envelope consists of the portions of a house that separate the indoors from the outdoors, including the ceiling or roof, walls, floor, windows, and doors. ECOs for each of these components are discussed below. The use of recycled products should be seriously considered.

CEILING AND ROOF INSULATION

Attic Insulation – Adding ceiling insulation to the attics of older homes is cost-effective in many areas of the country. Various types of batt and loose-fill (blown-in) insulation may be used to bring the insulation thickness up to levels required for new construction by IECC as shown in Table 13 Ceiling insulation should be visually inspected in the attic.

Inspect the attic floor for paths of air leakage from the house into the attic. Light fixtures, ventilation fans, attic access doors, and penetrations for wiring and plumbing are typical paths of air entry into the heated space below. Chapter 8, *Interior Spaces*, presents a detailed discussion of this inspection procedure.

Low-Density Loose-Fill Fiberglass Attic Insulation – Recent testing of some brands of low-density loose-fill fiberglass attic insulation has shown that, under cold winter conditions, the R-value of the insulation can fall substantially below the expected values. For example, when the outdoor temperature is -18°F, the R-value of one brand was found to be 35 percent to 50 percent lower than the rated value. This drop has been attributed to heat losses that occur when air circulates through the insulation by natural convection.

Flat Roof Insulation – When a flat roof is being replaced, insulation levels should be increased to conform with the R-values shown in Table 13. When a new roof covering is proposed for installation over the old covering, the addition of insulation between the old and new coverings should be considered. Various types of high-density fiberglass and foamed plastic roof boards are available for use with flat roofs. Chapter 6, *Roof System*, discusses inspection of flat roofs.

WALL INSULATION

For exterior walls that have no insulation, loose-fill insulation can be blown into the wall cavities to the maximum thickness, if the cost meets the payback criterion. Blowing insulation into a large number of houses may be more economically feasible than undertaking several small jobs. An evaluation of the cost effectiveness of added wall insulation should be made before renovation. The labor-intensive process generally requires the drilling of approximately four in.-diameter holes in the interior or exterior wall at every stud cavity. Sometimes two holes are needed at every cavity for full coverage, thus requiring more time to complete the installation.

Uninsulated exterior walls with 2x4 studs can be improved to about R-11 by blowing in insulation in each stud cavity. An insulated

siding system may be installed where economically justified. When insulation levels cannot be cost effectively brought up to the higher levels recommended for cold climates, installation of high-efficiency heating and air conditioning systems should be considered, (see Table 14). However, the type of system and the level of efficiency must be sensitive to local installed costs of the equipment options. As with other expensive energy-efficiency measures described in this chapter, a life-cycle cost analysis based on local conditions should be prepared to determine cost effectiveness.

When the removal of the interior sheetrock or exterior sheathing and siding is planned, R-13 to R-19 insulation should be added to the stud cavities during rehabilitation. In cold regions, when outside sheathing and siding must be removed, both wall insulation and an exterior insulating sheathing should be applied to comply with the R-values presented in Table 13.

FLOOR INSULATION

Floor insulation in unheated basements and crawl spaces should comply with Table 13. These areas are accessible to visual inspections. Unless evidence indicates otherwise, assume a slab-on-grade house has no insulation under the slab.

Retrofitting insulation on basement walls may not be cost-effective unless the basement is a heated space. Retrofitting slab edge insulation for slab-on-grade construction may have a potential payback and should be considered.

WINDOWS AND DOORS

Windows and doors represent important ECOs. Table 13 shows the range of energy-efficient alternatives that guide the selection of replacement windows and doors. The R--values in the table refer to conductive heat losses with no adjustments for reduced infiltration. In general, costs rise with increasing R-value, while higher R-values mean improved insulation and reduced fuel consumption. Solar Heat Gain (SHGC) is also very important in southern hot and humid climates. These coatings reduce solar heat gains, in turn reducing air conditioning energy loads.

Storm doors reduce infiltration. They also create air spaces that have insulating value. A four-in. air space created by a storm door, for example, has an insulating value of about R-2.

Multi-pane replacement windows do save energy but are rarely cost-effective based on energy savings alone. However, there are other reasons to install new multi-pane windows or storm windows, including poor condition of existing windows, increased comfort, reduced infiltration, and reduced moisture condensation and frost on the interior surface. The decision to install new windows should be made on the combination of all benefits, not on energy savings alone. If the windows are to be replaced, install low-E double-glazed windows.

If sliding glass doors should be replaced, install low-E double-glazed doors. If entry doors should be replaced, install either 1 3/4-in.-thick thermally broken insulated metal or solid-core wood doors. Table 13 presents the range of available R-values for entry doors.

AIR INFILTRATION REDUCTION

Every house, however well constructed, experiences infiltration; that is, leakage of air between the outdoors and indoors. The optimum level of natural air infiltration is a matter of debate and is a function of many variables, including the number of occupants, the activity level in the house, and the quantity and nature of indoor pollutants.

Air infiltration can be measured by blower doors. Such tests are necessary to determine both total air infiltration and the entry points of outside air. Pre- and post-retrofit tests and, occasionally, tests at intermediate stages of rehabilitation are desirable to measure improvements. For example, blower doors have been used to help identify major air leakage sites and to help determine when caulking and weatherstripping reach adequate levels.

When several similar units are undergoing rehabilitation, tests of all units may not be required. Results from a representative group of houses may be adequate for creating an air-sealing program for all units. However, this approach may fail to locate some homes that have special air leakage problems.

Blower doors subject the complete building envelope to a uniform air pressure to determine the location of air leaks.

A blower door system generally consists of two components: a door panel system with adjustable height and width and an air flow measurement fan with variable-speed control. The panel system is temporarily installed in an exterior doorway; the primary and storm doors do not need to be removed. Preparation for the test includes turning off combustion appliances, closing all windows and doors to the outside, and opening all doors to heated areas of the building. The door fan is then turned on, forcing air into or out of the house. If air is forced inward, the pressure inside is raised above atmospheric levels and creates a "positive pressure" within the structure. If air is forced outward, depressurization takes place and the pressure inside becomes less than atmospheric or "negative." In either case, the air flow necessary to maintain a certain pressure level in the structure is automatically measured by the blower door instrumentation and then corrected for outdoor temperature and pressure. Readings can be used to estimate the effective leakage area of the house or ACH, while additional test procedures can indicate leakiness of the heating duct system.

Thus, the blower door can be used for inspection and acceptance of work to reduce air infiltration and can be used during work to find the larger and more important leaks.

SPACE HEATING AND COOLING EQUIPMENT

Space heating equipment converts electricity or fuel to thermal energy and transports it to the space to be heated through a heat transfer medium. If the transporting medium is air, the heating equipment is called a furnace; furnaces are employed in forced-air systems. If the transporting medium is water or steam, the heating equipment is called a boiler; boilers are used in hydronic and low-pressure steam systems. Furnaces and boilers can be either fuel-burning or electrically operated. Natural gas, fuel oil, and propane are the most common fuels used to heat residential spaces. When electricity is used, heat pumps and electrical resistance are the means for space heating.

Federal law requires that furnace manufacturers use the Annual Fuel Utilization Efficiency (AFUE) percentage to rate the efficiency of gas- and oil-fired furnaces (Table 14). A higher AFUE means lower fuel use.

When heat is transferred to the occupied space by water or steam, the heating equipment used is a boiler. Boilers can be classified in several ways on the basis of such factors as their working pressure, fuel used, and working fluid (steam or water). All boilers manufactured for use in residential space heating and hot water systems are constructed in compliance with the codes and

standards of the American Society of Mechanical Engineers (ASME).

HEAT PUMPS

In most regions of the United States, space heating by electrical resistance is the most expensive among available alternatives. Thus, when electricity is the heating energy, electric heat pumps should be considered; they can cut electric heating energy costs by 50 percent. Comparisons of seasonal performance are based on the heating season performance factor (HSPF) (Table 14).

Calculation of the HSPF accounts for the energy consumed by defrost cycles, resistance heating modes, and fan motors. For new heat pumps, HSPFs in the range of eight to ten are most common, while HSPFs above 10 are available. The use of heat pumps results in lower operating costs compared to electric resistance heating for most regions of the United States. In regions of extreme hot or cold climates, the merits of heating by heat pump may not be as great. Many local utilities offer guidance on the economy of heat pumps in their geographic area.

In the cooling mode, heat pumps act as conventional air conditioning systems. Their cooling performance is measured by the seasonal energy efficiency ratio (SEER).

GROUND-SOURCE HEAT PUMPS

Air-to-air heat pumps remove heat from the outdoor air in winter and discharge heat to outdoor air during summer. They operate efficiently except when outdoor temperatures are below about 30°F or above about 95°F. Efficiency and capacity decrease as the temperature difference between indoor and outdoor air increases. Most units rely on electrical resistance heaters in the ducts when outdoor temperature is below about 25°F to 30°F.

Ground-source heat pumps (GSHP) were developed to overcome these limitations and may be an attractive choice in localities with very cold winters or very hot summers, provided other criteria can be satisfied. The GSHP is not limited by outdoor air temperature because it uses the moderate, relatively constant-temperature ground or groundwater as the winter heat source and summer heat sink. Average groundwater temperatures in shallow wells in the U.S. range from about 70°F in the Gulf Coast states to 42°F in the most northern states. With the source/sink at these moderate temperatures, the heat pump can operate efficiently throughout the year without requiring auxiliary electric resistance heaters.

During winter, a secondary loop of water or antifreeze is normally used to transfer heat from the ground to the refrigerant system of the heat pump. A groundwater or open-loop system pumps water from a well through a water-to-refrigerant heat exchanger and returns it to the aquifer or to discharge into a stream or pond. An earth-coupled or closed-loop system exchanges heat with the ground through a piping system that is either buried horizontally in shallow trenches (about five ft. deep) or is installed in vertical holes.

Electric energy use and peak demand can be significantly reduced in any region because heating and cooling seasonal performance factors for the GSHPs are higher than for high-efficiency, air-to-air heat pumps. However, the greatest savings with GSHPs is realized in colder climates because auxiliary electric resistance heat is minimized.

Because energy cost savings, installation cost of the ground loop, and price of the heat pump unit vary significantly, cost effectiveness depends on a site-specific analysis. Other important factors include whether the existing duct system is adequate for the large air flows

used with heat pump systems and whether the GSHP is compared to other new HVAC options or to an existing system.

The following conditions are most favorable to cost-effective applications of GSHPs:

Large Land Area. At least a one-half-acre lot is necessary to accommodate a horizontal closed loop for a three-ton unit. Vertical loops use less land and offer minimum disturbance of landscaping, but drilling normally costs more than trenching.

High Fuel Prices or Limited Availability. In general, electric heat pumps are more competitive in areas with relatively high fossil fuel prices and low electric rates. However, if gas or other fossil fuels are not available, then higher electric rates will make higher-efficiency systems more cost-effective. Low utility off-peak power rates, high-demand rates, or incentives for load management will benefit GSHP systems because their peak demand will not usually coincide with the utility peak.

Solid Soil. Solid soil makes trenches or wells more stable, easier to dig, and less expensive. However, ground coils can also be installed in sandy soils and in ponds.

Severe Winters. The GSHP makes high-efficiency heat pump technology viable in areas with subzero winter temperatures, where air-to-air heat pumps depend on auxiliary resistance heat.

Hot Summers. The GSHP maintains high efficiency during the highest summer temperatures, while air-to-air heat pumps and air conditioners lose efficiency and capacity.

Availability of Competent Contractors in the Area. Trained, experienced contractors are required to install and maintain GSHP systems.

THERMALLY ACTIVATED HEAT PUMPS

A thermally activated heat pump is similar to a conventional electric heat pump, except that the electric motor is replaced with a device that burns fuel to drive the refrigeration cycle. In the simplest example, the electric motor is replaced with an internal combustion engine. Another type is the absorption heat pump, in which the vapor compression refrigeration cycle is replaced by an absorption refrigeration cycle that uses the heat of solution of two liquids to transfer heat.

Thermally activated heat pumps may be an economical alternative to conventional electric or gas systems. Waste heat from the combustion process may be used to provide water heating year round, supplementary heating during the heating season, or regeneration of desiccant systems during the cooling season.

COOLING

Most small- to mid-sized residential air conditioning systems are vapor compression refrigeration machines that use electricity to produce cooling. Split-system air conditioning systems are similar to heat pump systems in operation and equipment selection, except that HSPFs do not apply.

DOMESTIC HOT WATER SYSTEMS

Water heating is frequently the second largest energy user in multifamily buildings. Many of the selection criteria for heating equipment apply to domestic water heating as well, but the design process is considerably less complicated. In recent years, residential and commercial water heater manufacturers, like furnace manufacturers, have made significant thermal efficiency improvements. Table 14 presents current and future Federal minimum required efficiencies of gas fired water heater, along with current ENERGY STAR requirements.

WATER HEATER OPTIONS

In revitalization projects, either new, energy-efficient water heaters should be installed or existing water heaters should be upgraded. Additionally, energy losses may be reduced by installing low-flow shower heads.

HIGH-EFFICIENCY GAS WATER HEATERS

A condensing water heater can heat water for both domestic use and space heating. Hot water is pumped from the tank to fan-coil units, where heat for space heating is extracted by blowing air across the coils. This type of water heater is expensive and would be justified only where it serves as a furnace.

An indirect water heater extracts heat from a boiler. Hot water from the boiler is pumped to a heat exchanger in the storage tank. The overall efficiency of indirect heaters depends on the efficiency the boiler.

HEAT PUMP WATER HEATERS

Heat pump water heaters operate on the same principle as conventional heat pumps except that they take heat from the air near the water heater and use it to heat the water. The efficiency of heat pump water heaters exceeds that of electric resistance water heaters. They are relatively expensive; however, they can be cost-effective in regions where electric rates are high.

Because heat pump water heaters take heat from the surrounding air, they act as small air conditioning units and, in cooling-dominated climates, can supplement the cooling and dehumidification of a central air conditioning system. In heating-dominated climates, however, this may not be as desirable.

TANKLESS OR INSTANTANEOUS WATER HEATERS

An alternative to standard models is the tankless or instantaneous heater, which consists of a heat exchanger and a burner. When the hot water tap is turned on, the burner ignites, and, after 10 to 15 seconds, the water leaving the tap is hot. Instantaneous heaters can be more efficient than conventional heaters because standby tank heat losses are eliminated. Tankless heaters typically carry auto igniters with battery backups so there is no loss due to a pilot light.

Gas instantaneous water heaters suitable for a whole house are more expensive than a conventional water heater. However, their life expectancy exceeds that of a conventional heater. Gas instantaneous water heaters do not have problems with accumulation of sediment on the tank bottom. Further, they reduce electrical demand during periods of peak electrical use, and their parts can be cleaned and replaced. In addition to gas models, electric instantaneous water heaters are available.

HEAT RECOVERY WATER HEATERS

A variation on the heat pump water heater is the heat recovery water heater or desuperheater, which may be installed on either a central air conditioning unit or a heat pump. With either of these devices, the fluid that comes out of the compressor is a super-heated vapor. It is cooled to a saturated vapor and then condensed to a liquid in the condenser. The heat recovery water heater uses the heat released by the working fluid as it is cooled from a superheated vapor to a saturated vapor. For air conditioning systems, the waste heat is discharged to the outdoors. For heat pump systems in the heating mode, the waste heat is useful heat.

Heat recovery water heaters appear most appropriate for southern climates such as Florida, where air conditioners run for a large part of the year. Such a device would probably not be justified in more moderate climates.

WATER CONSERVATION

PURPOSE

Water conservation serves as a green measure to reduce water waste. Water and sewer treatment facilities can have a reduced capacity if homes consumption and waste are reduced. Total water efficiency is achieved when every aspect in the home is examined for cost-effective opportunities for savings.

COMMON DEFECTS

From a neighborhood standpoint, water mains can be old and outdated creating leak opportunities in distribution lines. Water mains are not replaced very often, creating an age-associative leak potential. The possibility for the base facilities engineer to do an audit and testing would be promoted every 20 years. This could create substantial water savings if a system is very leaky.

Exterior use including landscaping and car washing can be excessive. Typical base requirements specify local species lawn and shrubs that should be verified or audited yearly. Another savings is a lawn sprinkler system with water sense capabilities. Yet another potential savings is a professional car wash system with recycled and reclaimed water added to the neighborhood/base requirements. Professional car wash systems save up to 50 percent compared to washing at home. The convenience and time savings is very justifiable. As well, the contaminants in washing at home are then distributed into the local watershed. Professional car wash systems often recycle and filter water.

Several defects and deficiencies in the interior of the dwelling are in plumbing fixtures and appliances. Toilets can be lower flow. High Efficiency Toilets (HET), Ultra High Efficiency Toilets (UHET), or even waterless/ composting toilets are available using 1.28 gallons per flush to virtually none. Faucet aerators can be changed to reduce flow as well. A typical low flow faucet produces 1.5 gallons per minute (gpm) or less. Shower heads can also be changed to low flow, yielding a flow rate of 2.0 gpm or less. Shower heads can go as low as 0.8 gpm. Appliances like dishwashers and washing machines can be ENERGY STAR approved as well as having lower water factors.

INSPECTION PROCEDURE

WATER AUDIT

A quick test can be performed on fixtures to calculate water consumption. A bucket test with timer can easily calculate gallons per minute. With a high flow rate, new low flow aerators should be installed at a minimum. Toilets can be checked by model number. With base numbers in hand, the executive order improvement of 16 percent can be achieved by changing certain fixtures or appliances.

WATER CONSERVING OPPORTUNITIES

- *Rain Barrels* – attached to downspouts for distribution
- *Gray Water* – reclaim lavatory and shower drain water for exterior use
- *Base Water Mains Leaky* – possibly the most water waste/savings here

- *Landscaping Materials* – adopt low water use landscaping techniques, use of environmentally appropriate vegetation, limit grass areas, and make use of alternative landscape design, e.g. rock gardens.

BATHROOMS

- Consider EPA Water Sense fixtures
- *Toilets* – High efficiency toilet (HET) 1.28 gpf or less
    - Ultra high efficiency toilet (UHET) 0.75 gpf
    - Dual flush toilet
    - Waterless toilets
- *Faucets* – laser sensors or pneumatic relief valve
- *Shower Heads* – install reduced flow shower heads to decrease water usage.
- *Appliances* – Dishwashers are already ENERGY STAR supplied.
- *Washing Machines* – are now not only ENERGY STAR rated, but also can have a very low water factor. Not supplied to family housing, but can be used in community shared laundries.
- *Exterior Irrigation* – Lawns can have low emitting sprinklers with water sense technology to not waste water.

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