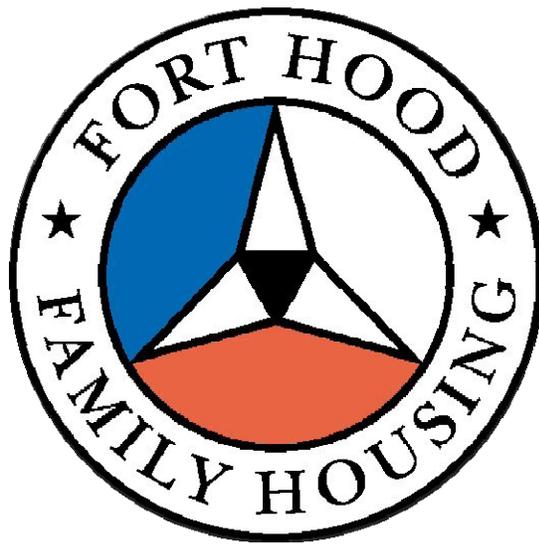


**Supplemental Environmental Assessment
Kouma East Housing Development
Army Residential Communities Initiative
Fort Hood, Texas**



Prepared for:

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March 2011

ENVIRONMENTAL ASSESSMENT ORGANIZATION

This supplemental environmental assessment (SEA) addresses the Proposed Action to implement the Army Residential Communities Initiative at a project site on Fort Hood, Texas. It has been developed in accordance with the National Environmental Policy Act and implementing regulations issued by the Council on Environmental Quality (40 CFR, Parts 1500 to 1508) and the Army (32 CFR, Part 651). Its purpose is to inform decision makers and the public of the likely environmental and socioeconomic consequences of the Proposed Action and alternatives.

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SECTION 6.0: REFERENCES provides the bibliographical information for cited sources of information.

SECTION 7.0: LIST OF PREPARERS identifies persons who prepared this SEA.

SECTION 8.0: PERSONS CONSULTED provides a listing of persons and agencies consulted during the preparation of this SEA.

SECTION 9.0: DISTRIBUTION LIST identifies recipients of this SEA.

**SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT
KOUMA EAST HOUSING DEVELOPMENT
ARMY RESIDENTIAL COMMUNITIES INITIATIVE
FORT HOOD, TEXAS**

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ACRONYMS AND ABBREVIATIONS

ACM	asbestos-containing material
BAH	basic allowance for housing
BCWCID	Bell County Water Control and Improvement District
BFE	base flood elevation
BMP	best management practice
BP	years before present
CEQ	Council on Environmental Quality
CDMP	community development and management plan
CFR	Code of Federal Regulations
CH ₄	methane
CO	carbon monoxide
CO ₂	carbon dioxide
CO _{2e}	carbon dioxide equivalents
dB	composite decibel
dBA	A-weighted decibel scale
DNL	day-night average sound level
DPW	Directorate of Public Works
EA	environmental assessment
EPA	US Environmental Protection Agency
ESMP	endangered species management plan
FEMA	Federal Emergency Management Agency
FHFH	Fort Hood Family Housing
FICUN	Federal Interagency Committee on Urban Noise
FNSI	finding of no significant impact
FPPA	Farmland Protection Policy Act
GHG	greenhouse gas
ICRMP	integrated cultural resource management plan
ICUZ	installation compatible use zone
INRMP	integrated natural resources management plan
LBP	lead-based paint
LEED	Leadership in Energy and Environmental Design
Leq	equivalent noise levels
mgd	million gallons a day
MHPI	Military Housing Privatization Initiative

N ₂ O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NO _x	nitrogen oxides
NRCS	Natural Resources Conservation Service
PCB	polychlorinated biphenyl
PM _{2.5}	particulate matter of less than 2.5µ in diameter
PM ₁₀	particulate matter of less than 10µ in diameter
psi	pounds per square inch
RCI	Residential Communities Initiative
RCRA	Resource Conservation and Recovery Act
RGAAF	Robert Gray Army Airfield
ROI	region of influence
SO ₂	sulphur dioxides
SWPPP	stormwater pollution prevention plan
TCEQ	Texas Commission on Environmental Quality
TCP	traditional cultural property
TPWD	Texas Parks and Wildlife Department
USACE	United States Army Corp of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United State Fish and Wildlife Service
USGS	United States Geological Survey
VOC	volatile organic compound

EXECUTIVE SUMMARY

INTRODUCTION

The Military Housing Privatization Initiative, contained in Section 2801 of the 1996 Defense Authorization Act, gives the Army new alternative authorities for improving and constructing military family housing. Privatization actions taken under the new authority are referred to as the Army Residential Communities Initiative (RCI). Under RCI, installations can leverage scarce public funds to construct, maintain, manage, renovate, replace, rehabilitate, and develop Army family housing and ancillary supporting facilities.

BACKGROUND

Fort Hood is in the central Texas Hill and Lake Country, in Bell and Coryell Counties, 60 miles due north of Austin and 50 miles southwest of Waco. The installation's northern boundary is four miles south of Gatesville, Texas. State Highway 36 is east of Fort Hood and connects Gatesville and Temple. The main entrance is four miles west of Killeen on US Highway 190, which runs along the southern portion of the installation. The installation encompasses 214,351 acres and is characterized by valleys, buttes, and mesas.

Fort Hood is the home of such units as the 1st Army, Division West; 1st Cavalry Division; 3rd Armored Cavalry Regiment; 3rd Air Support Operations Group; 13th Sustainment Command (Expeditionary); 21st Cavalry Brigade (Air Combat); 69th Air Defense Artillery Brigade; 89th Military Police Brigade; 120th Infantry Brigade, 407th Army Field Support Brigade; 504th Battlefield Surveillance Brigade.

The Army RCI program, which was implemented at Fort Hood in 2001, transferred responsibility for providing housing and ancillary support facilities to Fort Hood Family Housing LP (FHFH), a joint venture between Actus Lend Lease of Nashville, Tennessee, and the Army. Fort Hood conveyed to FHFH all 5,622 on-post military family housing units in 14 housing areas and selected ancillary supporting facilities and granted a 50-year ground lease (with an optional 25-year extension) for 1,780 acres on which the housing and facilities are located. Fort Hood also included in the ground lease 420 acres, consisting of six undeveloped areas and two industrial areas, for construction of new housing and ancillary support facilities, for a total of 2,200 acres leased.

As part of the approval and implementation of the Army RCI program, FHFH developed a Community Development and Management Plan (CDMP) in coordination with Fort Hood. The CDMP included increasing the on-post housing inventory to provide an inventory of 6,212 units, thereby addressing the housing deficit in four-bedroom units and providing landscaping improvements, parks, and playgrounds. An environmental assessment (EA) for implementation of the Army RCI program at Fort Hood, as described in the CDMP, was completed in October 2000, with a Finding of No Significant Impact signed December 4, 2000 (US Army Corps of Engineers [USACE] 2000a).

In 2004, Fort Hood and FHFH agreed to expand the RCI footprint by adding two undeveloped areas, totaling 135.415 acres, to support additional construction of housing units. An EA for this action was completed in November 2004, with a Finding of No Significant Impact signed January 24, 2005 (DPW Fort Hood 2004, 2005). Since the implementation of the Army RCI program at Fort Hood in 2001, family housing has undergone significant changes. At the outset of the Army RCI program, 5,622 units were transferred to FHFH, and a final housing inventory of 6,212 units was projected. There are currently 6,432 units on the installation, and the final housing inventory is now projected to be 5,912 units.

The Initial Development Phase of the RCI program was completed in 2006, and FHFH is now working to implement the out-year construction phase (years six through 50 of the program). The current CDMP called for renovating the 674 homes in Chaffee Village to begin in 2008 as part of the out-year development phase. However, during the design stage, FHFH determined that renovating Chaffee Village was no longer cost effective or desirable because it would increase the cost far more than had been planned. FHFH also determined that in order to provide adequate on-post housing, it was desirable to accelerate the schedule for Chaffee Village replacement, which would not have occurred until the 2030s, based on the current out-year model. In a Department of the Army Major Decision Memorandum, dated May 13, 2009, Fort Hood and FHFH proposed replacing the units instead of renovating them and accelerating the schedule (Department of the Army 2009a). Part of the proposal was approved by the Deputy Assistant Secretary of the Army (Installations and Housing) on December 9, 2009 (Department of the Army 2009b).

PROPOSED ACTION AND ALTERNATIVES

Under the Proposed Action, FHFH would construct approximately 100 units of family housing on a 67-acre parcel of undeveloped land within a phased construction plan. Future development

might include approximately twenty units as a second phase for this specific location, but that would depend on availability of funding at that time. The 67-acre parcel is east of Kouma Village (hereinafter referred to as Kouma East). FHFH would construct, operate, and maintain approximately 100 new family housing and ancillary supporting facilities on the parcel. The purpose of the Proposed Action is to provide affordable quality housing and ancillary supporting facilities to military families.

The Major Decision Memorandum (Department of the Army 2009a) for the replacement of 318 of the 674 1950s-era Chaffee Village outlines a two-phase project. FHFH would replace Chaffee Village units one for one over time, as ultimately determined by periodic review of cash flow availability. In Phase I, an estimated 100 new units would be constructed on the proposed 67-acre parcel known as Kouma East Site 14, located east of the Kouma Village housing (land is in the existing ground lease). In Phase II, an estimated 218 replacement units would be constructed on land added at a later date to the ground lease with FHFH. 2013, a stop-hold decision would be required to review the financial viability of continuing with replacement units or to renovate the 356 remaining Chaffee Village units. From 2019 to 2021, 318 Chaffee Village units are slated to be demolished, which would bring the project back to 5,912 total units, in accordance with the 2001 CDMP (Department of the Army 2009b). If Phase II and the demolition of Chaffee Village are approved by the Army and were to proceed, additional NEPA reviews would be conducted at that time. The Proposed Action would not result in a net gain or loss of housing units but would provide housing that better meets today's standards and the needs of today's military families. FHFH would construct, operate, and maintain the new family housing and ancillary support facilities on the parcel.

As specified in the CDMP, Fort Hood and FHFH would minimize the impact and promote environmental stewardship by taking such actions as preserving landscaping where possible, landscaping with native plants, designing to conserve water and energy, incorporating sustainable design measures, and respecting natural systems of topography, vegetation, and drainage. FHFH would operate and maintain the housing units and ancillary supporting facilities for the time remaining in the 50-year ground lease, including associated parking lots, sidewalks, playgrounds, parks, walking trails, and other amenities, in accordance with the quality standards established in the CDMP and the terms of the ground lease. At Fort Hood's option, the Army may extend the period of operation and maintenance and the leases of land supporting family housing for an additional 25 years. This extension would be subject to NEPA review.

One alternative, the No Action Alternative, was analyzed in this supplemental environmental assessment (SEA).

ENVIRONMENTAL CONSEQUENCES

This SEA evaluates potential effects on land use and recreation, aesthetics and visual resources, air quality, noise, geology and soils, water resources, biological resources, cultural resources, socioeconomics (including environmental justice and protection of children), transportation, utilities, and hazardous and toxic substances. For each resource, the anticipated effects from both the Proposed Action, identified as the Army's preferred alternative, and the No Action Alternative are briefly described below.

Consequences of the Proposed Action

Land Use and Recreation. The Proposed Action is expected to have less than significant beneficial impacts on land use and recreation. Minor beneficial effects on installation land use are expected as a result of the Proposed Action. Although development would occur on a previously undeveloped land parcel, the projected land use is consistent with uses classified in the area. The parcel land use is designated as family housing and is in FHFH's ground lease. Improvements would include new residential units, improved storm drainage systems, native landscaping, and placement of buffers between living spaces and noise sources. Minor beneficial effects on public recreation are expected as a result of the Proposed Action with improved access ways to water for fishing.

Aesthetics and Visual Resources. The Proposed Action is expected to have less than significant impacts on aesthetics and visual resources. Effects during construction include a visible increase in traffic from construction vehicles and an increase in activity at the site from construction workers. During construction, disturbed ground, construction equipment, and construction materials would contribute to a disorganized and generally unappealing visual character. However, these effects would be limited to the duration of construction and to the site and surrounding area. The Proposed Action would have a long-term minor beneficial effect on the visual character of the site and its surroundings because construction of modern housing with recreation trails and playgrounds, open green space, and well-maintained native landscaping would contribute to the aesthetic and visual appeal of the site and surrounding area. It would also have a long-term, minor, adverse effect by diminishing nighttime darkness. However, because the

surrounding area is already substantially developed, this impact would likely be noticeable only in the immediate area and would be offset by the public safety benefits of nighttime lighting.

Air Quality. The Proposed Action is expected to have less than significant impacts on air quality. Additional sources of air pollutants that would be introduced under the Proposed Action are construction equipment and soil disturbance, which would produce vehicle emissions and fugitive dust. Additional vehicular pollutants would be introduced from the construction workers commuting to the Proposed Action site. All emissions would be local and short term (i.e., for the duration of construction).

Noise. The Proposed Action is expected to have less than significant impacts on noise. The Proposed Action would result in additional sources of noise from construction equipment and construction activities in general. Noise produced by construction equipment varies considerably, depending on the type used and its operation and maintenance. The minor adverse effects associated with noise would usually be confined to the daytime, Monday through Saturday. Construction should be limited to daylight to reduce noise and annoyance on residents. During construction, wildlife might experience some annoyance from noise, but the noise would be short and intermittent. Wildlife living in the wetlands are acclimated to suburban noise and would not be adversely affected by the proximity of the residential setting after construction.

Geology and Soils. The Proposed Action is expected to have less than significant impacts on geology and soils. Construction may include clearing, grading, and paving. Developing the land would remove these soils from future biological and potential agricultural production. Short-term minor adverse effects and long-term minor beneficial effects are expected. In the short term, increased runoff and erosion would occur during site construction due to removal of vegetation, exposure of soil, and increased susceptibility to wind and water erosion. However, these effects would be minimized by the use of appropriate best management practices (BMPs) for controlling runoff, erosion, and sedimentation. In addition, all work would cease during heavy rains and would not resume until conditions were suitable for moving equipment and material; consequently, the adverse effects would not be significant.

Water Resources. The Proposed Action is expected to have less than significant impacts on water resources. Part of the Proposed Action would manage stormwater runoff for flood control and aesthetics. The project may require a permit from the Texas Commission on Environmental Quality for modifying the stream channels and coordination with the USACE for Section 404

requirements. In the short term, construction would disturb the soil and may increase erosion and dissolved solid and sediment content in the water, in turn reducing water quality. Development of the property would require a National Pollutant Discharge Elimination System construction general permit. A stormwater pollution prevention plan would be developed before implementation of the Proposed Action to reduce adverse effects on water quality. BMPs, such as erosion and sedimentation controls, would be in place during construction to manage and control sedimentation or erosion impacts to areas outside the Proposed Action site. No effects on groundwater are expected because of the depth to groundwater. The floodplain would be altered, but the floodplain development would be limited to passive uses, such as recreation, in order to reduce the risks to human health and safety.

Biological Resources. The Proposed Action is expected to have less than significant effects on biological resources. Proposed construction of housing would have minor adverse effects on native vegetation and wildlife. To minimize the loss of native vegetation, areas disturbed by the Proposed Action would be limited to the housing footprint and a minimal amount of adjacent construction staging area. The appropriate use of BMPs, such as erosion control practices and tree protection devices at all proposed construction sites, would protect vegetation and habitat next to the construction areas. The use of erosion control practices around the proposed site would prevent indirect adverse effects from erosion and sedimentation on the pond, reservoir, and the vegetation surrounding these areas.

Approximately 67 acres of grassland would be eliminated by developing green space and parks and planting native landscaping. This would likely cause some temporary and some permanent displacement of wildlife, fragmentation of habitat, and modification or elimination of wildlife corridors. Fish are not anticipated to be affected by the Proposed Action. Construction would occur outside a 50-foot buffer from the bank of the Waters of the US. Proposed construction is expected to occur with a minimum setback of 50-feet from the emergent wetland. Short-term, minor, adverse effects are expected on wetlands and the stream.

Cultural Resources. The Proposed Action is expected to have less than significant impacts on cultural resources. No cultural resources have been identified in the project area. If an artifact were unearthed, then all work would stop in the area and the Fort Hood archaeologists would be contacted to evaluate the find.

Socioeconomics. The Proposed Action is expected to have a less than significant beneficial impact on socioeconomics. Short-term minor beneficial effects on economic development are expected. In the short term, the expenditures and employment associated with housing construction would increase the sales volume, employment, and income in the region of influence. Long-term effects on the local area housing would be beneficial. The availability of affordable, quality family housing is a key function of quality of life for Soldiers and their families. The Proposed Action would increase the number of quality housing units on-post for military personnel and their dependents. No effects on the protection of children are expected. During construction, safety measures stated in 29 CFR, Part 1926, Safety and Health Regulations for Construction, Army Regulation 385-10, Army Safety Program, and Actus' "Global Minimum Requirements," would be followed to protect the health and safety of residents on Fort Hood, as well as construction workers. The Proposed Action would have no effects on demographics and would not result in disproportionate adverse environmental or health effects on low-income or minority populations.

Transportation. The Proposed Action is expected to have less than significant impacts on transportation. Short-term, minor, adverse effects on local traffic are expected. The highways are well designed and are capable of handling the types and volumes of vehicles associated with operations at Fort Hood. However, during construction, traffic could be congested locally, particularly during the morning and evening peak traffic hours as construction vehicles enter and exit the construction site and as construction debris is transported from the project site to the landfill in the main cantonment.

Utilities. The Proposed Action is expected to have no significant impacts on utilities because there would be no increased demand on the resources, based on the no net gain of housing in the long term. There may be short-term minor adverse effects during construction and any unforeseen short-term resident population fluctuations during housing transitions. The new housing would meet Leadership in Energy and Environmental Design (LEED)-H Silver certification requirements in an effort to minimize effects on energy and resource use. The Proposed Action includes the installation of new infrastructure (water, wastewater, gas, and electricity) as construction progresses. The project site would receive new delivery lines in the development area, providing improved water delivery and reduced water exfiltration and loss. Construction areas would receive new wastewater collection lines in the development area and new lift stations. This would improve the long-term efficiency of the wastewater collection system.

Construction of the Proposed Action would generate waste during the build-out phase of the plan and thus would increase waste loads depositing into the Fort Hood landfill. LEED requires a 50 percent diversion rate of solid waste that would go to the landfill. Project estimates are that there would be 7.46 pounds of debris per gross square foot, or 10.53 pounds per net square foot, going to the landfill. As there is no net long-term gain in housing units under the Proposed Action, there would be no long-term increase in consumption of utility resources. With the exception of the long-term indirect effects on the landfill, all effects would be short term.

Hazardous and Toxic Substances. The Proposed Action is expected to have less than significant impacts from hazardous and toxic substances. Short-term, minor, adverse effects are expected from hazardous materials used for construction. The construction contractors would be responsible for preventing paint and fuel spills and for cleaning up any that occur. Spills could be prevented by properly storing and handling these materials, by paying attention to the task at hand, and by driving safely. No adverse effects from the suspected hazardous materials associated with construction are expected if proper precautions are taken. There are no structures on the project site, so no hazardous waste is expected to be generated.

Consequences of the No Action Alternative

Aesthetic and Visual Resources. Minor adverse effects on aesthetic and visual resources are expected as a result of the No Action Alternative. The 67-acre Kouma East parcel would remain undeveloped and would have a natural yet stark appearance.

Geology and Soils. No effects are expected on geology, seismicity, mineral resources, prime farmland, or soils as a result of the No Action Alternative since the Proposed Action and associated ground disturbances would not occur.

Noise. No effects are expected as a result of the No Action Alternative since the area would remain open space.

Air Quality. No effects are expected on air quality as a result of the No Action Alternative. The 67-acre Kouma East parcel would not be developed, so air emissions would not change from current levels and trends.

Water Resources. No effects on surface water, groundwater, or floodplains are expected as a result of the No Action Alternative since the Proposed Action and associated ground disturbances would not occur.

Biological Resources. No effects are expected on biological resources as a result of the No Action Alternative since the Proposed Action and associated ground disturbances would not occur. The proposed site would remain undeveloped, and there would be no effects on vegetation, wildlife, or sensitive species.

Cultural Resources. No effects are expected on cultural resources as a result of the No Action Alternative since the Proposed Action and associated ground disturbances would not occur.

Socioeconomics. Minor adverse effects on socioeconomics would be expected as a result of the No Action Alternative. There would be a continuation of modern military family's unmet demand for new on-post housing. The economic development aspects of construction would not be realized. Other socioeconomic factors are not expected to be affected because conditions would remain unchanged.

Transportation. No effects are expected on traffic and transportation as a result of the No Action Alternative because conditions would remain unchanged. The construction would not occur, so there would be no changes in traffic patterns and volume.

Utilities. No effects on utilities are expected as a result of the No Action Alternative because conditions would remain unchanged.

Hazardous and Toxic Substances. No effects are expected from hazardous and toxic substances as a result of the No Action Alternative because no construction would occur, and conditions would remain unchanged.

Table ES-1 summarizes the predicted effects for each resource area from both the Proposed Action and the No Action Alternative.

Table ES-1
Summary of Potential Environmental and Socioeconomic Consequences

Resource	Environmental and Socioeconomic Consequences	
	Proposed Action	No Action Alternative
Land use and recreation	Minor beneficial	None
Aesthetics and visual resources	Short-term minor adverse; long-term minor beneficial	Minor adverse
Air quality	Short-term minor adverse	None
Noise	Short-term minor adverse	None
Geology and soils		
• Geology and topography	None	None
• Seismicity	None	None
• Mineral resources	None	None
• Prime farmland	None	None
• Soils	Minor adverse	None
Water resources		
• Surface water	None	None
• Groundwater	None	None
• Floodplains	None	None
• Water quality	None	None
Biological resources		
• Vegetation	Minor adverse	None
• Fish and wildlife	Minor adverse	None
• Threatened and endangered species	None	None
• Wetlands	Short-term minor adverse	None
Cultural resources	None	None
Socioeconomics		
• Economic development	Short-term minor beneficial	Minor adverse
• Demographics	None	None
• Housing	Minor beneficial	Minor adverse
• Environmental justice	None	None
• Protection of children	None	None
Transportation	Short-term minor adverse	None
Utilities		
• Potable water supply	None	None
• Sanitary wastewater	None	None
• Stormwater	Short-term minor adverse	None
• Energy	None	None
• Communications	None	None
• Solid waste	Minor adverse	None
Hazardous and toxic substances		
• Construction activities	Short-term minor adverse	None
• Site contamination and cleanup	None	None
• Polychlorinated biphenyls, asbestos-containing materials, and lead-based paint	None	None
• Lead in soils	None	None
• Pesticides	None	None
• Radon	None	None
• Other conditions of concern	None	None

MITIGATION

BMPs for the proposed Army RCI project and Fort Hood management plans and standard operating procedures have been incorporated into the CDMP and Proposed Action. These measures would reduce, avoid, or compensate for most adverse effects. Therefore, no mitigation measures are included in this SEA.

CONCLUSIONS

Based on the analysis performed in this SEA, implementing the Proposed Action would have no significant direct, indirect, or cumulative effects on the quality of the natural or human environment. Preparation of an environmental impact statement is not required, and issuance of a Finding of No Significant Impact is appropriate.

SECTION 1.0

PURPOSE, NEED, AND SCOPE

1.1 BACKGROUND

Congress enacted Section 2801 of the Fiscal Year 1996 Defense Authorization Act (Public Law 104-106, codified at Title 10 of the United States Code [USC], Sections 2871-2885). Also known as the Military Housing Privatization Initiative (MHPI), this provision of law creates alternative authorities for improving and constructing military family housing. The legislative intent of Congress in enacting these additional authorities was to enable the military to obtain private sector funding to satisfy family housing requirements. By leveraging scarce public funding, the Army can obtain private sector funds for constructing, maintaining, managing, renovating, replacing, rehabilitating, and developing Army family housing and ancillary supporting facilities.¹ The Army's implementation of the MHPI authorities is known as the Residential Communities Initiative (RCI).

The Army RCI program was implemented at Fort Hood, Texas, in 2001. Under the program, Fort Hood transferred responsibility for providing housing and ancillary supporting facilities to Fort Hood Family Housing (FHFH), LP, a joint venture between Actus Lend Lease of Nashville, Tennessee, and the Army. Fort Hood conveyed to FHFH all 5,622 on-post military family housing units in 14 housing areas, selected ancillary supporting facilities, and granted a 50-year ground lease (with an optional 25-year extension) for 1,780 acres of land on which the housing and facilities are located. Fort Hood included in the ground lease an additional 420 acres, consisting of six undeveloped areas and two industrial areas, for construction of housing and ancillary supporting facilities, for a total of 2,200 acres leased.

As part of the approval and implementation of the Army RCI program, FHFH developed a Community Development and Management Plan (CDMP) in coordination with Fort Hood. The CDMP details the private developer's plans to develop, redevelop, construct, maintain, and operate the housing at Fort Hood. Development of the CDMP was an iterative process that was fine-tuned to meet Fort Hood's housing needs for attaining affordable quality housing and other facilities, as well as minimizing or avoiding any potential environmental impacts. The CDMP included increasing the on-post housing inventory to provide an inventory of 5,912 units

¹According to 10 USC, Section 2871, ancillary supporting facilities are those related to military housing units, including those to provide or support elementary or secondary education, child care centers, day care centers, tot lots, community centers, housing offices, dining facilities, unit offices, and similar facilities for the support of military housing.

(Quinney 2010), addressing the housing deficit in four-bedroom units, and providing landscaping improvements, parks, and playgrounds.

An environmental assessment (EA) for implementing the Army RCI program at Fort Hood, as described in the CDMP, was completed in October 2000, with a Finding of No Significant Impact (FNSI) signed December 4, 2000 (USACE Fort Worth District 2000a).

In 2004, Fort Hood and FHFH agreed to expand the RCI footprint and modify the ground lease by adding two undeveloped areas, totaling approximately 135 acres, to the ground lease in order to support housing construction. An EA for this action was completed in November 2004, with a FNSI signed January 24, 2005 (Directorate of Public Works [DPW] 2004, 2005).

The findings of the 2000 EA and the 2004 EA are incorporated by reference into this SEA.

1.2 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

Under the Proposed Action, Fort Hood and FHFH would revise the “out-year plan” by constructing approximately 100 units of family housing on a 67-acre parcel of undeveloped land east of Kouma Village. FHFH would construct, operate, and maintain approximately 100 new family housing and ancillary supporting facilities on the parcel (Quinney 2010). The Proposed Action would include revising the current out-year plan and scope of work regarding Chaffee Village but would not include remodeling the units as originally planned. The purpose is to provide affordable quality housing and ancillary supporting facilities to military families. Specifically, the two-bedroom one-bath homes in Chaffee Village were constructed in the 1950s and are significantly undersized by today’s standards. In addition, the homes have several issues that would complicate remodeling, including roof decks that would not support reroofing, and would cost far more than originally estimated.

1.3 SCOPE OF ANALYSIS

This SEA has been developed in accordance with the National Environmental Policy Act (NEPA) and implementing regulations issued by the Council on Environmental Quality (CEQ) (Title 40 of the Code of Federal Regulations [CFR], Parts 1500-1508) and the Army (32 CFR, Part 651). Its purpose is to inform decision makers, government agencies, and the public of the potential environmental consequences of implementing the Proposed Action and alternatives.

In 2000 an EA was completed for the implementation of the RCI program at Fort Hood. In order to meet the needs developed in the CDMP for attaining affordable, quality housing, Fort Hood

proposed to provide FHFH with a 50-year lease of approximately 1,780 square acres, conveying 5,622 dwelling units in 14 housing areas. An additional 400 acres of post property was to be leased to FHFH for construction of family housing units and ancillary supporting facilities and water management structures.

Fort Hood also conveyed 10 acres of land operated by its contractor (TECOM), totaling 2,200 acres of land leased to FHFH. Under the 50-year lease FHFH operates and maintains all family housing as well as construct, operate, and maintain the ancillary supporting facilities. Implementation would include increasing the on-post housing inventory by 290 units to provide an inventory of 5,912 units. The retained units would be renovated or improved and would be provided with landscaping improvements, parks, and playgrounds. FHFH was to demolish approximately 21 units, to construct approximately 974 units, and to revitalize approximately 4,950 units. Development was scheduled to begin in the undeveloped areas of Montague Village III in July 2001, Comanche Village IV in September 2001, Comanche Village IIIA in November 2001, and Kouma Village in January 2002. An EA for implementing the Army RCI program at Fort Hood, as described in the CDMP, was completed in October 2000, with a FNSI signed December 4, 2000.

An EA was completed in November 2004 for the extension and addition of 232 single-family homes at Patton Park and Wainwright Village Housing. FHFH was to lease the two lands totaling 135.42 acres. Patton Park consisted of 149 single-family homes and Walker Village would include 83. Both developments included supporting streets, detention ponds, landscaping, and open green space at the new housing. Demolition would remove road material, golf cart paths, and an 8-inch water line at Patton Park. Both developments followed the CDMP established with the RCI lease. The FNSI was signed January 24, 2005.

In continuing support of the RCI program at Fort Hood, FHFH is preparing this SEA for the proposed construction of approximately 100 units of family housing on 67 acres of undeveloped land at Fort Hood (the Proposed Action). This land is already within the original ground lease to FHFH. The Proposed Action was conceived as part of a replacement effort for Chaffee Village. Demolishing and replacing Chaffee Village units will take place at the end of a multiphased comprehensive program but is not part of the immediate Proposed Action. An additional NEPA evaluation will be conducted if plans for demolishing Chaffee Village are put forward. The findings of the 2000 EA and the 2004 EA are incorporated by reference into this SEA.

In this SEA, the potential environmental effects of implementing the Proposed Action (construction of approximately 100 homes on the 67-acre parcel east of Kouma Village) are identified, documented, and evaluated. Section 2.0 is a description of the Proposed Action. Section 3.0 is a description of the alternatives to the Proposed Action, including a No Action Alternative and a description of alternatives considered but not carried forward. Section 4.0 includes a description of the environmental conditions at Fort Hood that could be affected by the Proposed Action and the potential environmental and socioeconomic effects that could occur with the implementation of each of the alternatives. Section 5.0 presents summary and conclusions regarding the potential environmental effects of the Proposed Action and alternatives.

An interdisciplinary team of environmental scientists, biologists, geologists, planners, archaeologists, historians, project managers, and military personnel reviewed the Proposed Action in light of existing conditions, and team members have identified relevant beneficial and adverse effects associated with the action. This SEA is an analysis of the reasonably foreseeable direct effects (those caused by the Proposed Action and occurring at the same time and place) and indirect effects (those caused by the Proposed Action and occurring later or farther away, but still reasonably foreseeable). The potential for cumulative effects is also addressed, and mitigation measures are identified, where appropriate.

1.4 PUBLIC INVOLVEMENT

The Army at Fort Hood invites public participation in the NEPA process. Consideration of the views and concerns of all interested persons promotes open communication and enables better decision making. All agencies, organizations, and members of the public having a potential interest in the Proposed Action, including minority, low-income, disadvantaged, and tribal groups, are urged to participate in the decision making process.

The public review period will be 30 days, beginning on the date that the notice of availability is printed in the *Killeen Daily Herald* and the *Federal Register*. This SEA and draft FNSI will be available for review at the Killeen Public Library, at 205 E. Church Street, Killeen, Texas 78544, and through the Environmental Division, Directorate of Public Works, Fort Hood, Texas. The documents are also available online through the Fort Hood Directorate of Public Works website at <http://www.hood.army.mil/dpw/HTML/pnotice.aspx>.

1.5 FRAMEWORK FOR DECISION MAKING

A decision on whether to proceed with the Proposed Action will be based on numerous factors, such as the Army's mission requirements for Fort Hood, the schedule for project implementation and completion, availability of funding, and environmental considerations. In addressing environmental considerations, the Army is guided by several relevant statutes (and implementing regulations) that establish standards and provide guidance on environmental and natural resource management and planning. These are NEPA and the following regulations: Clean Air Act, Clean Water Act, Migratory Bird Treaty Act, Noise Control Act, Endangered Species Act, Farmland Protection Policy Act, National Historic Preservation Act, Archaeological Resources Protection Act, American Graves Protection and Repatriation Act, American Indian Religious Freedom Act, Resource Conservation and Recovery Act, and the Toxic Substances Control Act. Also relevant to the Proposed Action are the following Executive Orders: 11593 (Protection and Enhancement of the Cultural Environment), 11988 (Floodplain Management), 11990 (Protection of Wetlands), 12088 (Federal Compliance with Pollution Control Standards), 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations), 13045 (Protection of Children from Environmental Health Risks and Safety Risks), and 13423 (Strengthening Federal Environmental, Energy, and Transportation Management).

To provide a better understanding of project issues, key provisions of these statutes and Executive Orders are described in more detail in the text of the SEA.

SECTION 2.0

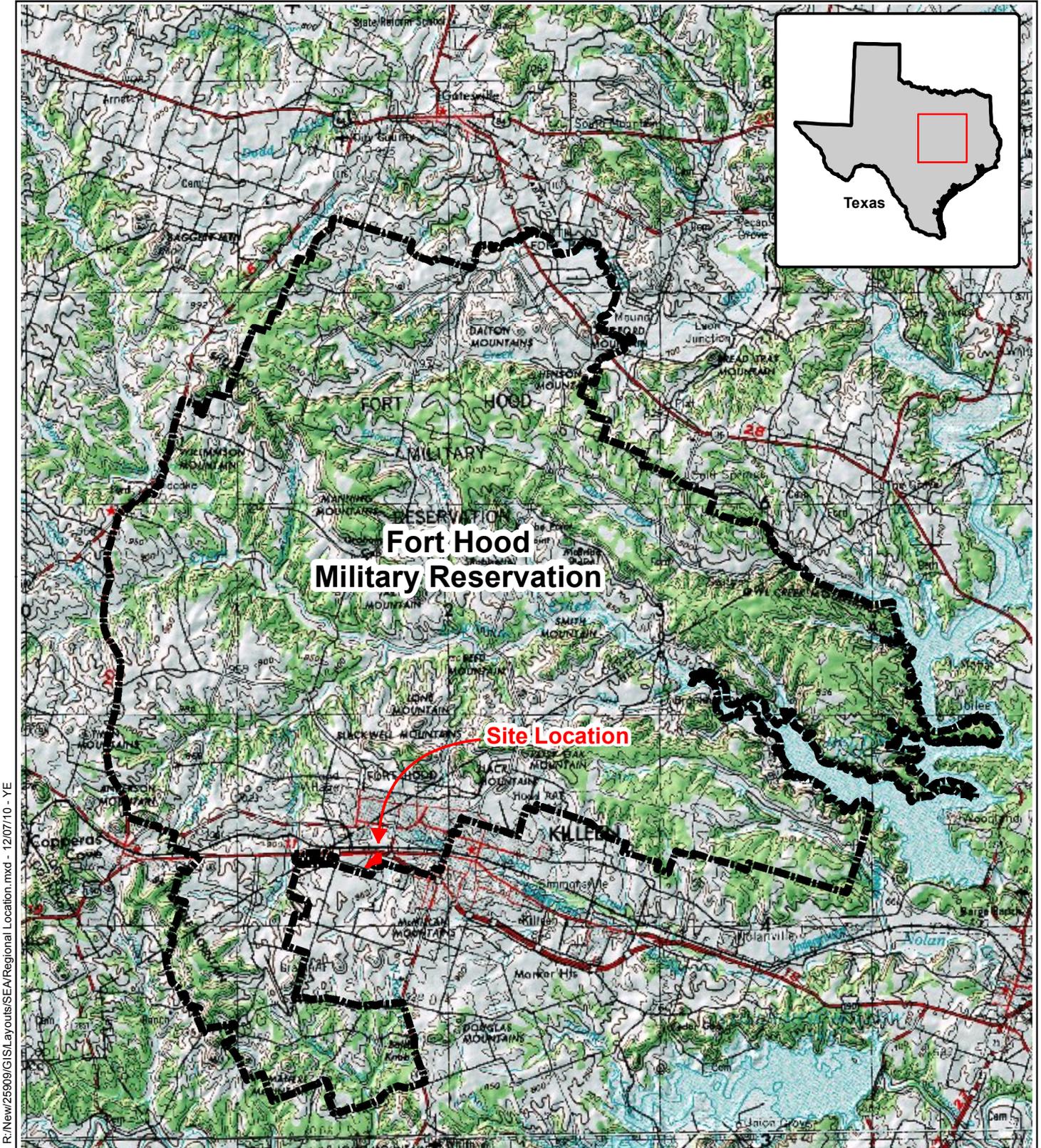
PROPOSED ACTION

This section presents information on Fort Hood and FHFH's Proposed Action, the preferred alternative. Other alternatives are presented in Section 3.0.

Under the Proposed Action, FHFH would construct approximately 100 units of family housing on a 67-acre parcel of undeveloped land within a phased construction plan. Future development might include approximately twenty units as a second phase for this specific location, but that would depend on availability of funding at that time. The 67-acre parcel is east of Kouma Village (hereinafter referred to as Kouma East). FHFH would construct, operate, and maintain approximately 100 new family housing and ancillary supporting facilities on the parcel. The purpose of the Proposed Action is to provide affordable quality housing and ancillary supporting facilities to military families.

As part of FHFH's out-year work phase, 674 Chaffee Village homes were scheduled for renovation over eight years, beginning in 2008. These homes are 52 to 54 years old. After significant review of potential design solutions, FHFH determined that the current remodel budget per unit will not be sufficient to adequately address the goals of FHFH. If renovations were to move forward, these homes would remain 1950-vintage two-bedroom units and would not meet the current needs of military residents (Department of the Army 2009a). In lieu of the costly remodeling of Chaffee Village, FHFH is proposing instead to construct housing on the Kouma East parcel. As discussed in Section 1.0, no demolition of Chaffee Village is planned, and additional NEPA evaluation would be conducted if that action were pursued.

The regional location of Fort Hood is shown on Figure 2-1; the RCI footprint, including the 67-acre undeveloped parcel of the proposed Kouma East housing development, is shown on Figure 2-2; the 67-acre Kouma East parcel is shown in more detail in Figure 2-3.



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Regional Location

Fort Hood
Killeen, Texas

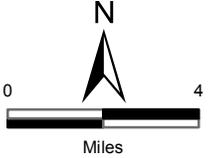
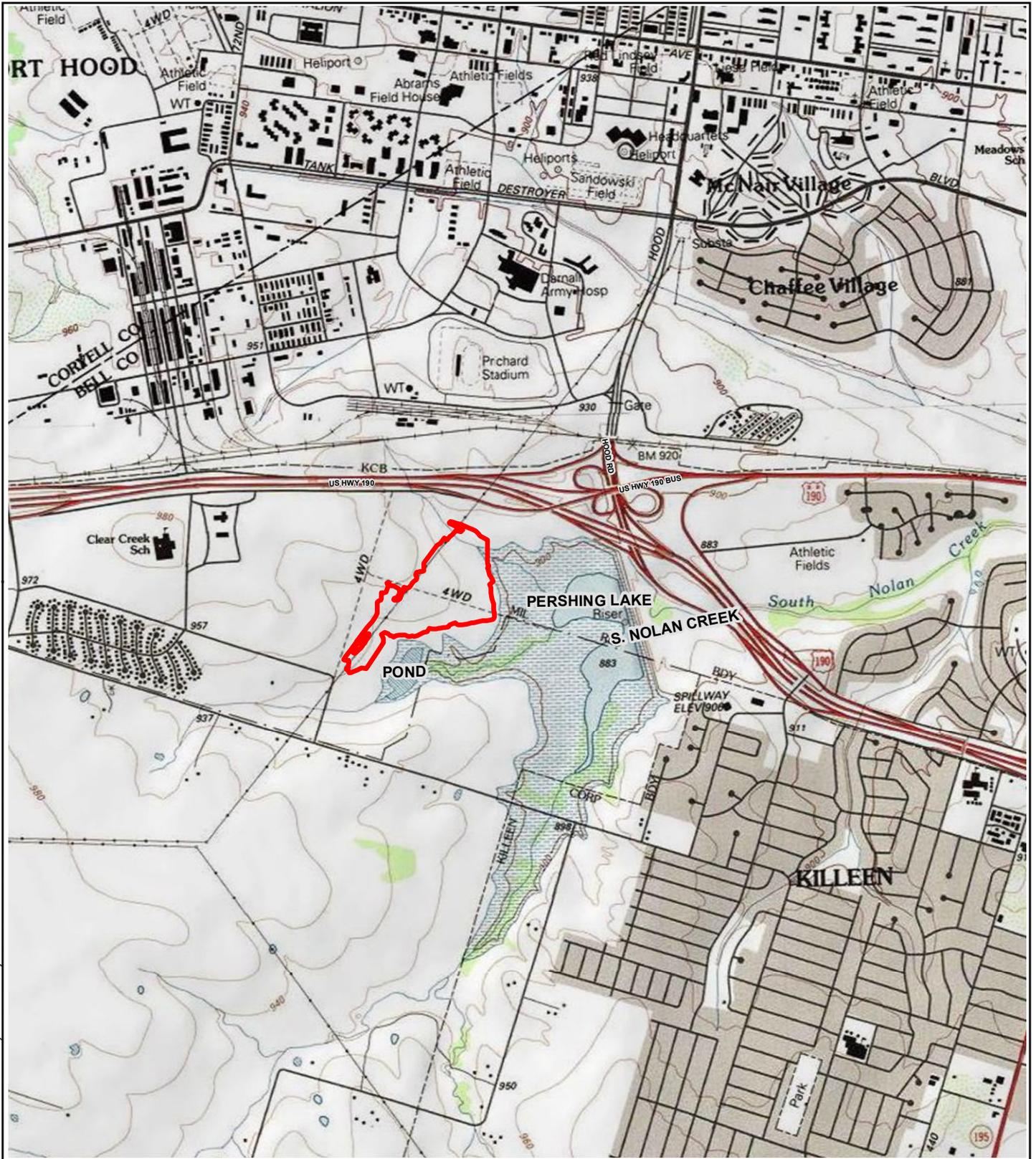
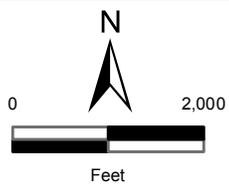


Figure 2-1



Project Location

Fort Hood
Killeen, Texas



Legend

Site Boundary (approximate)



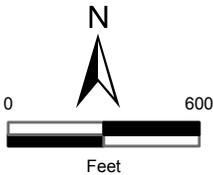
Figure 2-2

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Detailed Site Location 67 Acre Kouma East Parcel

Fort Hood
Killeen, Texas



Legend

 Site Boundary (approximate)



Figure 2-3

Source: ESRI, i-cubed, USDA FSA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGP 2010

2.1 EXISTING CONDITIONS

2.1.1 Fort Hood

Fort Hood, shown in Figure 2-1, is a 339-square-mile military installation in Bell and Coryell Counties, adjacent to Killeen, Texas. It is the largest active-duty military installation in the United States. Fort Hood is 60 miles north of Austin and 50 miles southwest of Waco and is characterized by valleys, buttes, and mesas. The RCI footprint, which consists of housing areas and undeveloped areas, is shown in Figure 2-2.

2.1.2 Kouma East Housing Development/Chaffee Village Replacement Project

The initial development phase of the RCI program was completed in 2006, and FHFH is working to implement the out-year construction phase. The current CDMP calls for renovating the 674 Chaffee Village homes as part of the out-year development phase. During the design stage, FHFH determined that renovating Chaffee Village does not meet the current needs of today's military families. In order to provide on-post housing that would meet the needs of military families, it is desirable to replace Chaffee Village before the 2030s, based on the 2001 closing out-year model. In a Major Decision Memorandum dated May 13, 2009, Fort Hood and FHFH proposed replacing the units instead of renovating them and accelerating the schedule (Department of the Army 2009a). Part of the proposal was approved by the Deputy Assistant Secretary of the Army (Installations and Housing) on December 9, 2009 (Department of the Army 2009b).

The Major Decision Memorandums (FHFH's proposal dated May 13, 2009, and the Army's subsequent approval of Phase I of the proposal dated December 9, 2009) for the replacement of Chaffee Village outlines a two-phase project. Under Phase I, approximately 100 units, would be constructed on the proposed 67-acre project site. Under Phase II, 218 units would be constructed on new land to be included in the RCI footprint. At the end of the project (from approximately 2019 to 2021) the Kouma East housing would be equivalent to the 318 1950s-era Chaffee Village units that were slated for remodeling. The remaining Chaffee homes would be reevaluated and replaced if funding permits. If funding does not permit, then these remaining homes would be remodeled. A one-for-one replacement-to-demolition would take place as a last step under all phases. The Proposed Action would not result in a net long-term gain or loss of units but would provide housing that better meets today's standards and the needs of today's military families, in accordance with the purpose and need described in Section 1.2. Once the final disposition of the Chaffee Village units is decided, an additional NEPA evaluation will be made.

2.1.3 Project Site

The project site is undeveloped 67-acre parcel consisting of predominantly of grassland, with scattered shrubs and trees, and a small drainage feature that runs northwest to southeast (Figure 2-3). The site slopes gently to the east. The easternmost portion of the site and land to the east is within a 100-year floodplain of South Nolan Creek. Two transmission lines cross the northern and eastern site boundaries near US Highway 190, and a transmission line is next to the site's western boundary.

There are several unimproved roads on the project site, including Willow Springs Road, that are used to access Pershing Reservoir east of the parcel and an unnamed pond to the south. These surface water bodies provide stormwater retention and are used for recreation, such as fishing. Wetlands, as defined by Fort Hood Department of Public Works, Environmental Division are next to the pond and on a small portion of the parcel.

Kouma Village family housing borders the project site on the west. Undeveloped land and US Highway 190 border the site on the north.

2.1.4 Kouma East Housing Development

The construction of family housing on this 67-acre undeveloped parcel would be a change to the original out-year plan that calls for remodeling Chaffee Village units. The plan has been reconsidered due the cost of remodeling, which in the end, would not meet the needs of the today's military family (two-bedroom units). In 2009, the Department of the Army approved a proposal to construct approximately 100 homes as part of the Chaffee Village replacement proposal (Department of the Army 2009a). The new housing on the 67-acre Kouma East parcel would be funded entirely from FHFH's reinvestment account and would not have any negative effects on FHFH's other out-year development scope (Department of the Army 2009b).

The CDMP would not need to be modified because it contains all details of the proposed project, including construction data, environmental stewardship provisions, financing arrangements, and schedules. Many of the provisions of the CDMP would be unchanged and would apply to the new construction. For example, the CDMP specifies that new housing would be designed and developed with "understanding and respect for natural systems." As specified in the CDMP, Fort Hood and FHFH would minimize impact and promote environmental stewardship by such actions as preserving landscaping where possible, landscaping with native plants, designing to conserve

water and energy, incorporating sustainable design measures, and respecting natural systems of topography, vegetation, and drainage.

CDMP provisions would remain unchanged and would apply to the Proposed Action, including the following:

Rental Rates and Payments. The rental rate to be paid by any Soldier would not exceed his or her basic allowance for housing (BAH). Fort Hood would continue to categorize family housing by grade group (for example, company grade officer and junior noncommissioned officer).

Occupancy Guarantee. Fort Hood would not guarantee FHFH the level of occupancy of the housing units. Under special circumstances, such as large-scale long-term deployments, FHFH could rent vacant family housing units to tenants other than service members with dependents, in accordance with the CDMP, at rental rates that are no less than what a Soldier of the appropriate grade would be charged for the unit. In such a case, the Garrison Commander would have to approve FHFH's basic lease agreement.

Regulatory Controls. FHFH would comply with all regulatory requirements and standards agreed to in the CDMP. FHFH created the CDMP to adopt the current edition of the International One- and Two-Family Dwellings Code by the International Code Council, Inc., with standardized requirements for building, plumbing, mechanical, and electrical by incorporating data from multiple national and international model codes.

Utilities. The Army and FHFH have developed a utility program that promotes energy conservation and reduced utility consumption. Under this program, FHFH would pay for household utilities (electric, water, sewage disposal, natural gas, and trash removal) up to a predetermined cap, with the Army paying any costs incurred above the cap.

Police and Fire Protection. Fort Hood would provide police and fire protection to FHFH for a negotiated rate. Currently, the rate is \$143 per housing unit annually (Quinney 2010).

Jurisdiction. Fort Hood has historically been an exclusive federal legislative jurisdiction enclave. This means that only federal laws have been enforced on the installation. For instance, all crimes under federal law (e.g., shoplifting in the post exchange) are prosecuted only in federal court. Fort Hood would retain legislative jurisdiction.

2.1.5 *Ground Lease*

The 67-acre undeveloped parcel (east of Kouma East) is included in FHFH's ground lease, which also includes clauses addressing the following, which would apply to the new construction:

Prohibit FHFH from storing hazardous wastes (above those quantities generated in routine operations and immediately disposed of) or from taking any actions that would irreparably injure the land. FHFH would be required to comply with all federal, state, interstate, and local applicable laws, regulations, conditions, and instructions affecting its activities. The Army also would include clauses in the leases permitting its periodic inspection to ensure the property's safe condition and proper use;

Prohibit the discharge of waste or effluent from the premises that would contaminate soils, streams, or other bodies of water or otherwise would become a public nuisance, by obtaining and implementing a municipal, separate, stormwater sewer system permit for daily operations and preparing and implementing a stormwater pollution prevention plan (SWPPP) for individual construction projects;

Require the prompt reporting of any leakage, blockage, or other malfunction of the sanitary sewer lateral leading to the sanitary sewer system;

Prohibit the removal or disturbance of, or causing or permitting to be removed or disturbed, any historical, archaeological, architectural, or other cultural artifacts, relics, remains, or objects of antiquity. If such items were discovered, FHFH would be required to immediately notify the Garrison Commander or designated representative and to protect the site and the material from further disturbance until the Garrison Commander or designated representative gives clearance to proceed;

Require all soil and water conservation structures be maintained and take appropriate measures to prevent or control soil erosion on the premises. These measures would be addressed in permits (e.g., under Section 404 of the Clean Water Act) and in a SWPPP;

Prohibit timber cutting, mining, removing sand, gravel, or like substances from the ground, burying waste of any kind or in any manner substantially changing the contour or condition of the premises, except as authorized through permits or by the Garrison Commander or designated representative; and

Require compliance with institutional controls and land use restrictions to preclude the possibility of creating a detriment to human health and the environment.

2.1.6 Construction of Family Housing Units

As part of the Proposed Action, FHFH would construct approximately 100 housing units on the subject parcel (Figure 2-4). All units would have one-car garages, and additional parking would be provided along roadways. The community would include sidewalks, lighting, and open space. All units would be constructed outside of the 100-year floodplain.

New family housing and ancillary supporting facilities must adhere to the Uniform Federal Accessibility Standards and the Americans with Disabilities Act Accessibility Guidelines promulgated by the Access Board (formerly known as the Architectural and Transportation Barriers Compliance Board), in accordance with the Architectural Barriers Act of 1968, the Rehabilitation Act of 1973, and the Americans with Disabilities Act of 1990. These standards require that at least five percent of new family housing be designed and built to be adaptable, for access, by persons with physical disabilities. Five of the total estimated 100 units would be designed and built to be adaptable for persons with physical disabilities. The homes would be leased in accordance with all applicable laws, including the Fair Housing Act.

Construction standards to be applied to development are specified in the CDMP. Construction of housing units would be based on sustainable design and development concepts. This RCI project would be consistent with Army environmental standards and would be designed and constructed to a Leadership in Energy and Environmental Design - Housing (LEED-H) silver rating. The LEED process, which is based on sustainable design and development concepts, assesses the degree to which a building is constructed on a sustainable site and that its design successfully incorporates such matters as water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality. Using the LEED process improves the environmental and economic performance of facilities by using established and advanced industry principles, practices, materials, and standards.

2.1.7 Operation and Maintenance of Family Housing Units

FHFH would operate and maintain the additional housing units and ancillary supporting facilities for the time remaining in the 50-year ground lease, including associated parking lots, sidewalks, playgrounds, parks, walking trails, and other amenities, in accordance with the quality standards established in the CDMP and the terms of the ground lease. At Fort Hood's option, the Army may

extend the period of operation and maintenance and the leases of land supporting family housing for an additional 25 years. This extension would be subject to NEPA review.

All residents would be provided with a guide outlining policies and services applicable to the RCI housing areas.

2.1.8 Implementation Commencement

Implementation of the Proposed Action would begin in March 2011, and construction would last for approximately 24 months.

SECTION 3.0 ALTERNATIVES

The Army at Fort Hood has identified the Proposed Action as the preferred alternative. In addition, Fort Hood has considered a No Action Alternative to its Proposed Action.

3.1 PREFERRED ALTERNATIVE

Implementing the Proposed Action, as described in Section 2.0, is Fort Hood's preferred alternative and would achieve the purpose of and need for the action, as described in Section 1.2.

3.2 NO ACTION ALTERNATIVE

Inclusion of the No Action Alternative is prescribed by the CEQ regulations and serves as a baseline against which the impacts of the Proposed Action and alternatives can be evaluated. The No Action Alternative is evaluated in detail in Section 4.0.

Under the No Action Alternative, Fort Hood would not implement the Proposed Action. Fort Hood and FHFH would continue to implement the Army RCI program and CDMP at Fort Hood in accordance with the current plan to remodel Chaffee Village units. FHFH would not construct, operate, or maintain approximately 100 additional family housing units on the undeveloped 67 acres of land of the Kouma East Site 14 parcel. Chaffee Village housing would be remodeled but at a much higher expense than originally estimated and would remain insufficiently sized to accommodate the needs of the modern military family.

SECTION 4.0

AFFECTED ENVIRONMENT AND CONSEQUENCES

This section contains information about the affected environment and an analysis of the environmental consequences or impacts of the Proposed Action described in Section 2.0. This section was prepared in accordance with NEPA and the CEQ regulations and guidelines.

The affected environment establishes an environmental baseline for each resource category and the conditions on and next to the project area at the time this document was prepared.

The environmental consequences provide an analysis of the potential adverse and beneficial environmental impacts that could result from implementing the Proposed Action, as compared to the No Action Alternative.

Environmental resources and impacts related to the RCI program at Fort Hood have also been analyzed in two previous EAs, which were completed in October 2000 (USACE Fort Worth District 2000a) and November 2004 (DPW 2004). The findings of the 2000 EA and the 2004 EA are incorporated by reference into this SEA.

The following resources are addressed in the sections that follow:

- Land use and recreation;
- Aesthetics and visual resources;
- Air quality;
- Noise;
- Geology and soils;
- Water resources;
- Biological resources;
- Cultural resources;
- Socioeconomics;
- Transportation;
- Utilities; and

- Hazardous and toxic substances.

Unless otherwise stated, the region of influence (ROI) for the Proposed Action is defined as the project site (the 67-acre undeveloped Kouma East parcel) and adjacent lands.

Section 4.13, Cumulative Effects Summary, presents the impacts of the Proposed Action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over time.

4.1 LAND USE AND RECREATION

4.1.1 Affected Environment

4.1.1.1 Regional Setting

Fort Hood is in central Texas in Bell and Coryell Counties, 60 miles due north of Austin and 50 miles southwest of Waco (US Army 2009); its northern boundary is four miles south of Gatesville. State Highway 36 is east of Fort Hood and connects Gatesville and Temple. Fort Hood's main entrance is four miles west of Killeen on US Highway 190. Killeen is southeast and east of the installation, and the town of Copperas Cove borders Fort Hood on the west and southwest.

The installation encompasses 214,968 acres (US Army 2009) and is characterized by valleys, buttes, and mesas. Elevations in the region range from approximately 600 to 800 feet above sea level. Fort Hood is in the Texas Hill and Lake Country, and its terrain consists of partly dissected plains from which the remnants of old plateaus rise.

4.1.1.1 Installation Land Use

Installation land use is divided among three cantonment areas, two instrumented airfields, maneuver areas, and live-fire training (impact) areas. The three cantonment areas are the Main Cantonment, West Fort Hood, and North Fort Hood. They are essentially urban and contain all housing, administrative, command, industrial, maintenance, warehousing, logistical, billeting, and other installation support land uses. The Main Cantonment at the southern edge of the training area and next to Killeen is composed of the entire developed portion of the post. The Main Cantonment has extensive motor pools that support all of the post's motorized operations along its northern edge. Most of the family and single Soldier housing, including all of the housing areas that are the subject of this SEA, are in the Main Cantonment. Family housing areas in the southern portion of the Main Cantonment are mostly surrounded by compatible land uses, primarily open space and community facility land uses (USACE Fort Hood District 1995). US Route 190, a major roadway, passes close to Venable Village/Pershing Park, Liberty Village/Kouma East, and Montague Village. The Belton Lake Outdoor Recreation Area is at the southeastern edge of the installation.

The remainder of the installation outside the cantonments is used primarily for training and preparedness. More than 60 percent of the land is used for maneuver training. This involves

combat, combat support, and combat service support elements integrated into formations to conduct multi-echelon combined arms training to simulate battlefield conditions. The live-fire training (impact) area occupies 29 percent of the land area. Training includes infantry, mechanized infantry, armored units, artillery, and air support with helicopters, fixed-wing tactical aircraft, and high-speed interceptors.

Table 4-1 provides a summary of land uses at Fort Hood.

**Table 4-1
Fort Hood Land Use Summary**

Primary Land Uses	Acreage
Maneuver Areas	136,094
Live Fire Impact	63,000
Cantonment Areas	15,874
Total Acreage	214,968

Source: US Army 2009

4.1.1.2 Surrounding Land Use

Residential areas and isolated farms and ranches surround Fort Hood. Two urban areas, Copperas Cove and Killeen, are in the western and eastern parts of the installation, respectively.

Past, current, and future development in the ROI

The area immediately south of Fort Hood is undergoing rapid urban growth, thus reducing the amount of available agricultural land. Development and improvement of regional transportation routes has accompanied this growth, especially along the Interstate Highway 35 and US Highway 190 corridors. The road system and adjacent railroad lines have added to the urban opportunities of the region and have shaped the expansion into a crescent-shaped corridor that extends from Copperas Cove on the west to Temple on the east. In 2005, a new joint use civilian element was added to Robert Gray Army Air Field (RGAAF), which opened the airfield to commercial flight operations in the area of West Fort Hood. The Killeen-Temple Metropolitan Transportation Plan predicts the region will grow by 69 percent by 2020 (Killeen-Temple Urban Transportation Study [K-TUTS] 1999).

4.1.1.3 Project Site

The project site consists of a 67-acre undeveloped parcel east of Kouma East in West Fort Hood. The project site consists predominantly of grassland, with scattered shrubs and trees, and a small drainage feature that runs northwest to southeast. To the east of the parcel is Pershing Reservoir,

and to the south is an unnamed pond. The public uses unimproved roads and trails on the parcel to access these two water bodies for such activities as fishing.

4.1.2 Consequences

Impacts on land use were assessed based on whether the proposed activities were consistent with installation, site-specific, and surrounding land uses. The evaluation of potential impacts on land use was based on the project's consistency with existing and planned land uses and unique characteristics of the geographical area, such as surrounding water bodies.

4.1.2.1 Proposed Action

Overall, minor beneficial effects on installation land use are expected as a result of the Proposed Action. Although development would also occur on a previously undeveloped land parcel, which currently serves as open space, the projected land use is consistent with uses classified in West Fort Hood. The parcel land use is designated as family housing and is in FHFH's ground lease. The housing development would be designed to preserve the natural features and to maintain the water bodies and their buffers to ensure the aquatic and wetland habitats are not impacted by development. The housing would not be developed within the floodplain on the parcel, and the water bodies would be preserved. This parcel would contain new residential units, as well as such amenities as recreation areas and village centers, which would enhance the quality of life for residents. Other improvements (for instance, native landscaping and buffers between living spaces and noise sources) would also improve the quality and suitability of the residential areas for the designated land use. Additional multifamily housing on-post would also provide the opportunity for Soldiers to live closer to where they work. The Proposed Action would be a compatible land use to the area as the adjacent land uses are also residential. The addition of these amenities and on-post military family housing would result in an overall positive benefit.

Minor beneficial effects on public recreation are expected as a result of the Proposed Action. As with previous FHFH developments, this Proposed Action would construct additional recreation facilities as part of the Proposed Action. The enhancement of public access walkways to surrounding water bodies and the addition of several recreation facilities would result in an overall positive benefit.

4.1.2.2 No Action Alternative

No effects are expected under the No Action Alternative. No changes to land use designations would occur; residential areas would be maintained as they currently are, with no changes or improvements anticipated to existing conditions, other than those undertaken during normal maintenance.

4.2 AESTHETICS AND VISUAL RESOURCES

4.2.1 Affected Environment

Aesthetic, or visual, resources consist of the natural and man-made landscape features that appear indigenous to the area and give a particular environment its aesthetic characteristics. Aesthetic resource issues exclude questions of style, taste, design concept, and urban amenity.

No scenic highways or visually sensitive, federally protected areas have views to any part of Fort Hood. The 862-acre Belton Lake Outdoor Recreation Area, which is approximately 13 miles east-northeast of Fort Hood, has vista points with views of Killeen and Fort Hood's Main Cantonment (USACE Fort Worth District 2000a). Killeen and the Main Cantonment are highly built out, with mature landscaping in some areas and some green space, primarily around surface water features.

The Main Cantonment is built on gently rolling terraces. Buildings vary in size, style, and year of construction. Large, open, grassy areas separate the buildings, with the older buildings having more established landscaping than the newer ones. Undeveloped areas are mostly open and not landscaped. The overall impression of the Main Cantonment is one of functional efficiency and order. Because the buildings and grounds generally receive regular maintenance, there is little trash and an overall appearance of cleanliness (USACE Fort Worth District 2000b).

The 67-acre project site is generally characterized by a flat, open, barren landscape. Brown and gray grass, unimproved roads and trails, and a general lack of shrubs, trees, and other green vegetation give the site a stark character. A strip of larger and greener vegetation is found in the south-central portion of the site, along a drainage that crosses the site and empties into a pond to the southeast.

The project site is bordered by Kouma East on the west. To the north lies a strip of open land and US Highway 190 near the interchange with the North Central Texas Expressway and Hood Road. Undeveloped land, much of which is more vegetated than the project site, and two surface water bodies border the site on the east and south. Beyond this land lies residential and limited commercial development in Killeen.

Figures 4-1, 4-2, and 4-3 depict the project site and surrounding properties. Figure 4-1 depicts the visual character of much of the project site. Overhead electrical lines and Kouma East, which border the project site on the west, are visible in the background. Figure 4-2 also shows Kouma



Figure 4-1 Project site, facing west.



Figure 4-2 Western portion of project site, facing north.



Figure 4-3 Project site, facing south.

East and transmission lines west of the project site. Transmission lines on the north portion of the project site and US Highway 190 are visible in the background. Figure 4-3 shows a typical unimproved road on the project site, the pond south of the site, and residential development in Killeen in the background.

4.2.1.1 Regulatory Considerations

The primary guidelines and requirements that affect the aesthetics and visual resources of the Proposed Action are as follows:

- Fort Hood Installation Design Guide;
- Current RCI standards for construction;
- Current Actus design standards;
- Community (central Texas) design and construction standards for comparable housing;
and
- US Green Building Council LEED-H Silver Certification.

Development in the project site is subject to these and other applicable design, construction, and maintenance guidelines and requirements for project structures, facilities, and landscaping.

4.2.2 Consequences

Impacts on aesthetics and visual resources were assessed based on whether the proposed activities would result in any of the following:

- Have a substantial adverse effect on a scenic vista, which is defined as a distant view of a broad area that is visually or aesthetically pleasing;
- Substantially degrade the visual character or quality of the site and its surroundings;
- Create a new source of substantial light or glare that would adversely affect day or night views in the area;
- Include structures or land alterations visually incompatible or obtrusive to the visual setting and landscape; or
- Conflict with regulations and policies governing aesthetics and visual resources.

4.2.2.1 Proposed Action

Short-term, minor, adverse effects would occur during construction. Effects include a visible increase in traffic from construction vehicles and an increase in activity at the project site from construction workers. During construction, disturbed ground, construction equipment, and construction materials would contribute to a disorganized and generally unappealing visual character. However, these impacts would be limited to the duration of construction and to the project site and surrounding area.

The Proposed Action would have no significant effect on scenic vistas. The only scenic vistas in the area are of development in Killeen and the Main Cantonment, which would not be noticeably altered by implementing the Proposed Action.

The Proposed Action would have a long-term, minor, beneficial effect on the visual character of the project site and its surroundings because construction of modern housing with recreation trails and playgrounds, open green space, and well-maintained native plant landscaping would contribute to the aesthetic and visual appeal of the project site and surrounding area. In addition, houses would be designed to be visually compatible with existing on-post housing and local Killeen housing and to conform to current standards for visually appealing home design, contributing to a beneficial impact on the visual character of the area. The homes and ancillary features at the project site would be designed and constructed in accordance with relevant and

current regulations, policies, and standards for aesthetic and visual resources, including those presented in Section 4.2.2.1.

Due to the size, nature, and design of the buildings and other structures proposed for the project site, the Proposed Action would not create a significant source of glare or daytime lighting. Implementing the Proposed Action would contribute additional nighttime lighting to the area in the form of streetlights, interior and exterior home lighting, and vehicle headlights when vehicles are operating on new roads at the project site. Nighttime lighting at the project site would have a long-term, minor, beneficial effect on public safety because it would allow people to maneuver safely in the area after dark and would discourage unlawful activity. It would also have a long-term, minor, adverse effect by diminishing darkness; however, since the surrounding area is already substantially developed, this effect would likely be noticeable only in the immediate area and would be offset by the public safety benefits of nighttime lighting.

4.2.2.2 No Action Alternative

Minor adverse effects are expected as a result of the No Action Alternative. The project site would remain undeveloped and would have a natural yet stark appearance. Since there is no designated access route to Pershing Reservoir and the pond southeast of the project site, unmaintained and unimproved roads and trails used to access these water features could proliferate, degrading vegetation and contributing to an undesirable appearance.

4.3 AIR QUALITY

4.3.1 Affected Environment

The ROI for air quality varies according to the type of air pollutant being discussed. Primary pollutants, such as carbon monoxide and directly emitted particulate matter, have a localized region of effect, generally restricted to the immediate vicinity of the source of emissions. Secondary pollutants, such as ozone, have a broader region of effect.

Air pollutants that are covered by adopted federal ambient air quality standards are called criteria air pollutants. Federal ambient air quality standards have been adopted for six criteria pollutants—ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, suspended particulate matter (inhalable particulate matter [PM₁₀] and fine particulate matter [PM_{2.5}]), and airborne lead. In addition to the six criteria air pollutants covered by federal ambient air quality standards, a large number of compounds have been designated as hazardous air pollutants, which are regulated primarily by emission limits on specific types of industrial emission sources. Greenhouse gases (GHGs) are another air pollutant category of general concern. They are compounds in the atmosphere that absorb infrared radiation and radiate a portion of it back to earth, thus trapping heat and warming the atmosphere. The most important GHG compounds are carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). The overall global warming potential of GHG emissions is typically presented in terms of carbon dioxide equivalents (CO₂e), using equivalency factors developed by the Intergovernmental Panel on Climate Change.

Fort Hood is in Bell and Coryell Counties, which are in the Austin-Waco Intrastate Air Quality Control Region (40 CFR, Part 81.175). Ambient air quality for the Austin-Waco Intrastate Air Quality Control Region is an unclassifiable/attainment area for all criteria pollutants. Unclassifiable areas are those that have not had ambient air monitoring and are assumed to be in attainment with National Ambient Air Quality Standards (NAAQS). An ambient air quality monitoring station has recently been established in Killeen. Fort Hood is under the jurisdiction of the EPA Region VI and the Texas Commission on Environmental Quality (TCEQ).

4.3.1.1 Fort Hood Air Emissions

Fort Hood is considered a major source for criteria pollutants because of its calculated potential to emit criteria pollutants and is under the jurisdiction of the USEPA Region VI. Emissions from industrial facilities and electric utilities, motor vehicle exhaust, gasoline vapors, and chemical solvents are some of the major sources of criteria pollutant emissions. Fort Hood is also

designated as a major source of hazardous air pollutants, so its air emission sources are subject to Maximum Achievable Control Technology standards. The TCEQ approved the renewal of Fort Hood's Title V Federal Operating Permit on February 27, 2007, and conducts annual compliance inspections at Fort Hood. Based on this audit mechanism, Fort Hood has implemented the required programs to maintain compliance with federal and state air regulations.

Point sources of air emissions at Fort Hood include boilers, fuel storage and dispensing areas, solvent degreasers, paint spray booths, engine testing areas, motor pools, and air conditioner maintenance shops.

Table 4-2 summarizes the major point source emissions at Fort Hood. Boilers primarily use natural gas, and there is some use of No. 2 fuel oil.

Table 4-2
1999 Actual Criteria Pollutant Emissions from Stationary Sources at Fort Hood
(provided in tons per year)

SO ₂	NO _x	CO	VOCs	PM ₁₀	Lead
0.9951	37.313	45.0277	69.1317	29.1984	1.050

SO_x = sulphur dioxides; NO_x = nitrogen oxides; CO = carbon monoxide; VOCs = volatile organic compounds; PM₁₀ = particulate matter of less than 10 microns in diameter. Source: TCEQ 2010

Mobile sources of air pollutants at Fort Hood include military vehicles (trucks, cars, tanks) and fixed-wing and rotary-wing aircraft. In dry summer periods, dust is sometimes a problem on tank trails, in heavily trafficked areas, and around rotary-wing aircraft landing sites (USACE Fort Worth District 1992, cited in USACE Fort Worth District 2000a). Dust is considered a periodic nuisance in the cantonment areas, but it has not been identified as a problem off-post. Much of the dust is generated on the fringes of the artillery impact area, and winds push it into the cantonment areas, where it settles. Construction-related dust is temporary and subsides at the completion of construction. Effects from construction dust are mitigated by on-site control measures.

4.3.2 Consequences

Factors considered in determining if the Proposed Action or the No Action Alternative would have a significant impact on air quality are the following:

- Whether a reasonable potential exists to violate an ambient air quality standard and
- Whether potential emissions are localized and temporary.

4.3.2.1 Proposed Action

Construction associated with the Proposed Action would produce exhaust emissions from equipment, fugitive dust emissions from site disturbance, and exhaust emissions from highway traffic associated with construction employee commutes and construction-related truck traffic.

The implementation of the Army RCI program at Fort Hood in 2001 included the construction of approximately 990 new units, demolition of approximately 390 units, and revitalization of approximately 4,950 units. Table 4-3 describes the results of the emissions analysis for the 2001 RCI program at Fort Hood. Implementation of the Proposed Action would result in similar quantities of pollutant emissions during the construction period.

**Table 4-3
Summary of the 2000 Quantified Direct and Indirect Emissions Under the RCI Program**

Emission source category	Estimated Total Emissions (tons/year)				
	VOC	NO _x	PM ₁₀	CO	SO _x
Total direct and indirect emissions	3.5	41.1	142.7	31.0	3.93

SO_x = sulfur oxides

Source of emissions calculations: USACE Fort Worth District 2000a

The quantities of emissions would be controllable, in part, by the use of best management practices BMPs, such as watering work sites to reduce dust, scheduling construction to limit the number of vehicles visiting construction sites per day, covering trucks used to transport construction materials likely to create dust, and removing spills or tracked dirt from roads. Any necessary modifications to the Title V Federal Operating Permit would be made as required. A consumption report of all products and associated Material Safety and Data Sheets used in construction of the facilities associated with this project must be submitted to the US Army Directorate of Public Works Environmental Division at Fort Hood for tracking and emissions calculation purposes.

The increase in emissions due to construction projects are already calculated and are considered in the Fort Hood Air Program's emissions inventory each year (Alexander 2010b). Therefore, the effects on air quality as a result of the Proposed Action are anticipated to be short term and minor adverse.

In addition to criteria pollutants, construction would be a temporary source of GHG emissions. State and federal agencies have not yet established impact significance criteria for GHG emissions. In February 2010, the President's Council on Environmental Quality issued draft

guidance for consideration of GHG emissions in NEPA documents (CEQ 2010). CEQ suggests that 25,000 metric tons per year CO₂e can serve as a general indicator of when a project-specific estimate of GHG emissions may be warranted but that this value should not be interpreted as a recommended threshold of significance. Construction associated with the Proposed Action are unlikely to generate more than 25,000 tons per year of GHG emissions.

Because the Proposed Action would not increase personnel at Fort Hood, there would be no significant change in operational emissions associated with occupancy of the new housing units; occupants would simply be changing their residence location at Fort Hood. In addition, the new housing units would be designed for greater energy efficiency than the units being replaced.

4.3.2.2 No Action Alternative

No effects are expected on air quality as a result of the No Action Alternative. The 67-acre Kouma East parcel would not be developed, so air emissions would not change from current levels and trends.

4.4 NOISE

4.4.1 Affected Environment

Sound is caused by vibrations that generate waves of minute air pressure fluctuations. Air pressure fluctuations from 20 to 20,000 times per second can be detected as audible sounds of different frequencies. In general, sound waves travel away from the noise source as an expanding spherical pulse; consequently, the energy contained in a sound wave is spread over an increasing area as it travels away from the source. This results in a decrease in loudness at greater distances from the noise source. Sound level meters typically report measurements as a composite decibel (dB) value. Decibel scales are a logarithmic index based on ratios between a measured value and a reference value.

Human hearing varies in sensitivity for different sound frequencies in the audible range. Because human hearing is not equally sensitive to all sound frequencies, various frequency weighting schemes have been developed to approximate the way people hear sound. The A-weighted decibel scale (dBA) is normally used to approximate human hearing response to sound. Varying noise levels are often described in terms of the equivalent constant decibel level. Equivalent noise levels (Leq) are used to develop single-value descriptions of average noise exposure over various periods. Average noise exposure over 24 hours is often presented as a day-night average sound level (DNL), which are calculated from hourly Leq values, with the Leq values for the nighttime (10 PM to 7 AM) increased by 10 dB to reflect the greater disturbance potential from nighttime noises.

Because noise levels decrease as the distance from the source increases, the ROI for noise issues is generally more limited than for other resources. Localized noise sources, such as construction, typically have an ROI extending no more than half a mile. Loud noises may have an ROI extending up to a mile from the source. High intensity blast noises can have an ROI extending a few miles from the source, with terrain and weather conditions exerting a significant influence on the size of the ROI.

4.4.1.1 Department of Defense Noise Guidelines

The Department of Defense uses guidelines developed by the Federal Interagency Committee on Urban Noise (FICUN) to evaluate whether existing and proposed land uses are compatible with prevailing noise levels. The FICUN guidelines address land use incompatibility and recommended building design considerations according to the following noise level categories (FICUN 1980):

- Zone I = DNL levels below 65 dB;
- Zone II = DNL levels of 65-75 dB; and
- Zone III = DNL levels above 75 dB.

All land uses are considered generally compatible with Zone I noise levels. Educational and residential land uses generally are not compatible with Zone II noise levels unless special acoustic treatments and designs are used to ensure acceptable interior noise levels. Residential and educational land uses are not compatible with Zone III noise levels. Industrial and manufacturing land uses may be acceptable in Zone III areas if special building designs and other measures are implemented.

4.4.1.2 Existing Noise Conditions

Seven types of operations at Fort Hood could lead to annoying levels of noise at existing homes or developable land (Acentech, Inc. 1990, cited in USACE Fort Worth District 1999):

- Daily helicopter operations at Hood Army Air Field;
- Low-level jet flights during training;
- Daily helicopter operations and touch-and-go training by large transport aircraft at RGAAF;
- Tank gunnery at several multipurpose range complexes;
- Demolitions associated with combat engineer training;
- Firing of heavy artillery, including the 155-mm howitzer;
- High-explosive artillery rounds detonating in the impact area.

The aircraft at Fort Hood are stationed at either Hood Army Air Field or RGAAF. Most noise complaints at the installation are in reference to unusually noisy four-jet transport aircraft or low-flying helicopters straying from their usual routes (Acentech, Inc. 1990, cited in USACE Fort Worth District 1999). Only a few complaints are received annually in reference to range activity, and they are usually in reference to damage done to structures or facilities due to startled livestock, rather than to direct noise effects on people.

In 1990, a comprehensive Installation Compatible Use Zone (ICUZ) noise study was prepared by Fort Hood, as required by AR 210-20 as part of the US Department of the Army Installation Master Planning Program. The study provides a method for assessing noise effects from military training at Fort Hood and provides land use guidelines for achieving compatibility between the installation and surrounding communities. Ground transportation, stationary equipment, and other noise generation from the Main Cantonment were not considered in the ICUZ study because of the dominance of the aircraft and blast noise in the noise environment (USACE Fort Worth District 1992, cited in USACE Fort Worth District 1999). AR 200-1 discusses environmental noise in terms of three noise zones, rather than in terms of decibels:

- Zone I—Acceptable;
- Zone II—Normally Unacceptable;
- Zone III—Unacceptable.

Based on the ICUZ study, the project site lies outside of the noise contour zones. The project site is approximately three miles northeast of the RGAAF, so aircraft noise is considered to be acceptable.

4.4.2 Consequences

Factors considered in determining if the Proposed Action or alternatives would have a significant noise impact are the following:

- Whether land use compatibility problems would be created in terms of Army guidelines (AR 210-20) or
- Whether impulse or other short-term event noise levels would be likely to significantly annoy exposed individuals at public locations.

4.4.2.1 Proposed Action

Short-term, minor, adverse effects are expected. Implementing the Proposed Action would result in additional sources of noise during construction due to the operation of construction equipment and construction in general. Noise produced by construction equipment varies considerably, depending on the type of equipment used and its operation and maintenance. The receptors closest to the construction include persons occupying the housing in Kouma East and the nearest schools. The minor adverse effects associated with noise would usually be confined to daytime

during the normal work week, Monday through Friday. Construction noise might distract schoolchildren initially. Construction should be limited to daylight to reduce noise stress and annoyance.

During the construction phase, wildlife might experience some annoyance from noise, but the noise would be short and intermittent. Wildlife living in the wetlands are acclimated to a suburban noise environment and would not be adversely affected by the proximity of the new residential setting.

4.4.2.2 No Action Alternative

No effects are expected as a result of the No Action Alternative since the area would remain open space.

4.5 GEOLOGY AND SOILS

4.5.1 Affected Environment

4.5.1.1 Geologic and Topographic Conditions

Geology and Topography. The strata underlying Fort Hood, with the exception of the recent alluvium and river terrace deposits, are consolidated sedimentary rocks of Cretaceous age and belong to the Comanche Series. The erosion of these Cretaceous rocks over the past 70 million years and the deposition of unconsolidated materials along the major streams have produced the present landscape of Fort Hood (USACE and Fort Hood 1997). Solution caves occur in some of the types of limestones that outcrop at Fort Hood (USGS 1970). The major strata beneath Fort Hood are the Glen Rose formation, Paluxy Sand, Walnut Clay, Comanche Peak formation, Edwards Limestone-Kiamichi Clay complex, Denton Clay-Fort Worth Limestone, and Duck Creek Limestone complex. The major floodplains are filled with alluvium and river terrace deposits (USACE and Fort Hood 1997).

The project site is on the Walnut Clay formation. Of all the formations outcropping at Fort Hood, the Walnut Clay formation covers the greatest area, forming extensive rolling plateaus. It has relatively low permeability and good load-bearing capabilities, except where the marl predominates (USACE and Fort Hood 1997).

The major floodplains consist of unconsolidated silt, clay, and some sand and gravel. The unconsolidated condition makes these deposits very permeable, with low slope stability and minimal load-bearing capacity (USACE and Fort Hood 1997).

Seismicity. No record of major seismic activity has been reported in the immediate vicinity of Fort Hood. The Balcones Fault Zone is east of the installation, trending north/southwest. Over geologic time, the land to the northwest of this zone (the land Fort Hood occupies) has been elevated by as much as 500 feet. Subsequent erosion of this elevated land created the relatively irregular, steeply sloping terrain features on the installation (USACE and Fort Hood 1997).

Mineral resources. The only known on-post mineral resources are topsoil and construction materials (i.e., sand, gravel, and road base materials). The Army owns the mineral rights to the land (Bodkin 1999, cited in TRC Mariah Associates 2000). Fort Hood discourages exploration for oil, natural gas, and other mineral resources.

4.5.1.2 Soils

Fort Hood has the typical shallow to moderately deep clayey soils found in a humid subtropical region, underlain by limestone bedrock. The six soil associations on the entire Fort Hood property contain several soil types or mapping units, each with a relatively wide range of qualities. Parent materials consist primarily of calcareous clay and clayey limestone; however, in a small area of the installation the Paluxy Sand is the parent material. The soil associations range from shallow to deep and from nearly level to undulating. Some surface soils are slightly acidic, but most are mildly to moderately alkaline. Soils are well drained, with slow to moderate permeability. Surface textures include silty clays, silty clay loams, clay loams, and some clays and fine sandy clay loams. Some surface soils are cobbly or stony. Caliche layers are present in some soils. Soils on Fort Hood are calcareous and generally low in available nitrogen and phosphorus (USACE Fort Worth District 1992).

According to the Soil Survey for Bell County published by the US Department of Agriculture Natural Resources Conservation Service (NRCS), specific soil types occurring on the Chaffee Village Replacement Project Area property include the Denton silty clay, the Slidell silty clay, the Quarry association, and the Topsey clay loam (Carter et al. 1977; McCaleb 1985). Brief descriptions of the specific soils found on the Chaffee Village Replacement Project Area are as follows:

The Denton silty clay underlies a large portion of the Chaffee Village Replacement Project Area property. It is composed of silty clay and forms on ridges. This soil is a clayey residuum weathered from limestone (NRCS 2010).

The Slidell silty clay is composed of silty clay and forms on ridges. This soil is a clayey slope residuum, which is a deep, gently sloping soil in valley fill areas along drainage ways. Typically, the surface layer is a moderately alkaline, dark gray silty clay about six inches thick. The subsurface to a depth of 18 inches is dark gray silty clay. The soil is well drained, permeability is slow, and available water capacity is high (NRCS 2010).

The Quarry association is a relict of quarry pit operations (NRCS 2010).

The Topsey clay loam, classified as severely eroded, underlies a small portion of the Chaffee Village Replacement Project Area property. It is composed of clay loam at the surface, with gravelly loam and silty clay loam at depth. This soil type forms on ridges and is a loamy

residuum weathered from shale and siltstone. Topsey soil is well drained, with moderately low permeability and medium water capacity. It has medium runoff and severe erosion (NRCS 2010).

4.5.1.3 Prime Farmland

Prime farmland soils are protected under the Farmland Protection Policy Act (FPPA) of 1981, which minimizes the extent to which federal programs contribute to the unnecessary or irreversible conversion of farmland soils to nonagricultural uses. The FPPA also ensures that federal programs are administered in a manner that, to the extent practicable, will be compatible with private, state, and local government programs and policies to protect farmland. The NRCS is responsible for overseeing compliance with the FPPA and has developed the rules and regulations for its implementation (see 7 CFR, Part 658, revised January 1, 1998).

Though 41 to 50 percent of the land in Bell County is considered prime farmland, no soils in the project area are identified as such (Carter et al. 1977; McCaleb 1985). A Phase I environmental site assessment conducted on the proposed project area did not identify farmland as a historic property use (Tetra Tech 2010). Therefore, a Farmland Conversion Impact Rating (Form AD-1006) of the project area is not warranted, and no further action is required under the FPPA.

4.5.2 Consequences

Potential impacts on geology or soils are considered significant if the Proposed Action would result in the following:

- Expose people or structures to major geologic hazards;
- Cause substantial erosion or siltation;
- Cause substantial land sliding;
- Remove Prime Farmland from production; or
- Cause substantial damage to project structures and facilities.

4.5.2.1 Proposed Action

No effects on geology, seismicity, mineral resources, or prime farmland are expected under the Proposed Action.

Soils. Construction is proposed on approximately 67 acres and could include clearing, grading, and paving and removing these soils from future biological and agricultural production. Short-

term, minor, adverse and long-term, minor, beneficial effects are expected. In the short term, increased runoff and erosion would occur during site construction due to removed vegetation, exposed soil, and increased susceptibility to wind and water erosion. However, these effects would be minimized by the use of appropriate BMPs for controlling runoff, erosion, and sedimentation. Recommended BMPs to reduce soil erosion and sedimentation are silt fences, straw bale dikes, diversion ditches, riprap channels, water bars, and water spreaders. A SWPPP would be prepared in accordance with EPA National Pollutant Discharge Elimination System (NPDES) regulations. This SWPPP would describe the use of and implementation procedures for the suggested BMPs. In addition, all work would cease during heavy rains and would not resume until conditions are suitable for moving equipment and materials. Consequently, the adverse effects would be less than significant.

4.5.2.2 No Action Alternative

No effects are expected on geology, seismicity, mineral resources, prime farmland, or soils as a result of the No Action Alternative since the Proposed Action and associated ground disturbances would not occur.

4.6 WATER RESOURCES

4.6.1 Affected Environment

4.6.1.1 Surface Water

Fort Hood is in the Brazos River Basin, and its surface waters generally flow southeasterly toward the Brazos River. The surface configuration of the land is generally the result of the dissection of numerous small to moderate streams. Several moderate streams and corresponding watersheds drain Fort Hood, including, from north to south, the Leon River, Owl Creek, Cowhouse Creek, North and South Nolan Creeks, and Reese Creek. All creeks that drain the installation, excluding Nolan Creek and Reese Creek, flow into Belton Lake, an impounded reservoir that borders Fort Hood on the east. Fort Hood has approximately 200 miles of named intermittent and perennial streams, with numerous additional tributaries of those features. Fort Hood contains more than 200 water impoundments constituting approximately 692 surface-acres. Additionally, Fort Hood shares 43 miles of shoreline with Belton Lake (Bump 2010).

Two small unnamed ephemeral tributaries of South Nolan Creek flow southeasterly through the project site (Figure 4-4; TRC Mariah Associates 1999). There are two surface water bodies east and southeast of the proposed project area. Pershing Reservoir, the larger water body to the east, is approximately 39 acres and was created specifically for stormwater detention. The smaller unnamed eight-acre pond to the southeast does not provide much stormwater detention capacity but does provide water quality control as a settling pond with vegetation that can take up nutrients in the water (Figure 4-4; Lend Lease 2000). These surface waters are used for recreation, such as fishing. Reservoir and pond visitors access the area via unauthorized road access through the proposed project area (Alexander 2010a).

Stormwater runoff in the area of the project area drains into the water bodies east and southeast of the project area via unnamed tributaries of South Nolan Creek. Discharge from these reservoirs enters South Nolan Creek, empties into Nolan Creek, and ultimately flows to the Leon River below Belton Lake.



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Legend

- Site Boundary (approximate)
- Ephemeral
- Intermittent
- Perennial
- 50-Foot Buffer of Waterways

Surface Water

Fort Hood
Killeen, Texas

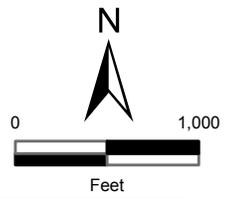


Figure 4-4

Source: ESRI, i-cubed, USDA FSA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGP 2010

Stormwater flows, which may be exacerbated by high proportions of impervious surfaces associated with buildings, roads, and parking lots, are important to managing surface water. Stormwater is important to surface water quality also because of its potential to introduce sediments and other contaminants into lakes, rivers, and streams (DPW 2004). Soil erosion from Fort Hood has resulted in decreased water quality and substantial sedimentation in portions of Belton Lake, as well as the smaller water bodies on Fort Hood (USACE 2003).

Sources of water quality impacts in the Fort Hood area include wash rack effluent and vehicle parking lots. The wash rack effluent has sand and oil interceptors, and there are settlement ponds near the outfalls that reduce suspended solids concentrations in the effluent. The effluent is routinely sampled and rarely exceeds permit limits. The vehicle parking lots contribute small amounts of fuel, oils, grease, antifreeze, and other contaminants due to leakage and routine activity (TRC Mariah Associates 2000).

4.6.1.2 Groundwater

The principal source of groundwater in the vicinity of the subject property is the Trinity aquifer, which contains abundant groundwater found deep in the Cretaceous limestone and sandstone layers. The Trinity aquifer is at the surface in most of this area in Texas, and the many seeps, springs, and local streams provide water, mostly during spring and winter (NRCS 2010).

The Travis Peak formation is the deepest and hydrologically the most important stratigraphic unit in the Fort Hood Region. The deep aquifer is approximately 1,000 feet beneath Fort Hood (USACE 1995). The Hosston and Hensell Members of the Travis Peak formation comprise the confined aquifer system and are separated by the Pearsall Member, which is not an aquifer (USACE 1995). Fort Hood previously mined water from this aquifer for installation use in North Fort Hood but in 1981 stopped doing so because of excessive drawdown from regional overuse (TRC Mariah Associates 2000). The water table at Fort Hood occurs at depths of 50 feet and greater (Bodkin 1993, cited in TRC Mariah Associates 2000). No major groundwater resources outside of the installation are affected by recharge from Fort Hood, and recharge in Fort Hood affects only the small, shallow, groundwater supplies that remain there (USACE 1999). Most of the water supply for Fort Hood comes from surface reservoirs, such as Belton Lake (USACE 1995; SAIC 2000).

Smaller sources of groundwater are potentially available from shallower geologic units that overlie the Travis Peak formation, including the Glen Rose, Paluxy, and Edwards formations.

However, the Glen Rose Formation contains water with a high mineral content and might contaminate wells tapping the underlying Travis Peak Formation (USACE and Fort Hood 1987b, cited in TRC Mariah Associates 1998b). Potentially sensitive groundwater areas of the Fort Hood region are the outcrop areas of the Paluxy formation and recent alluvial materials within and next to Cowhouse Creek, Henson Creek, and the Leon River, as well as the karst or cave systems found throughout the installation. None of these potentially sensitive areas are in or near the proposed project area.

4.6.1.3 Floodplains

Floodplains are areas of low elevation along a river or stream channel. Such lands may be subject to periodic or infrequent inundation due to rain. Flood potential is evaluated by the Federal Emergency Management Agency (FEMA), which determines the floodplain for 100-year and 500-year floods. Federal, state, and local regulations often limit floodplain development to passive uses, such as recreation and preservation, in order to reduce the risks to human health and safety. Floodplains can be a resource themselves, but the primary concern is the hazard posed to any development that occurs within them.

Approximately five percent of Fort Hood's lands may be classified as alluvial floodplain, or land areas that may become covered with water during times of intense or above normal rainfall (USACE 1995; TRC Mariah Associates 1999). Several of the intermittent streams flowing through Fort Hood have extensive floodplains, including between and within the Comanche Village housing areas, west and north of Darnall Army Hospital (west of Chaffee Village), south and east of and in Chaffee Village, and west of and in the Pershing Park housing area. Development is limited in these areas (USACE and Fort Hood 1987, cited in TRC Mariah Associates 2000).

Geographic information system coverage of digitized 100-year FEMA maps were analyzed to determine if any of the proposed project area are in a floodplain. The FEMA Flood Insurance Rate Map for Panel 0260E, which includes the proposed project area, indicates that most of it is in FEMA Flood Zone X, which is classified as a moderate to low risk area. All Zone X areas are defined as being protected from "1-percent annual chance (100-year) floodplain by levee, dike, or other structures subject to failure or over topping during larger floods." The eastern portion of the proposed project area and the land immediately east of the proposed project area are in FEMA Flood Zone A, which is classified as areas subject to inundation by the one percent annual chance

flood, generally determined using approximation. Because detailed hydraulic analyses have not been performed, no base flood elevations or flood depths are available (FEMA 2008).

4.6.1.4 Appropriated Water

Texas is an appropriated water state, in that water use and consumption are regulated and allotted by a state agency. Fort Hood's water allotment is regulated by the Brazos River Authority because the installation lies within the Brazos River watershed (USACE 1995; SAIC 2000). The Brazos River Authority has allotted the Bell County Water Control Improvement District (BCWCID), the county water distribution facility, 42,800 acre-feet of water annually from Belton Lake, 12,000 acre-feet of which is reserved for the exclusive use of Fort Hood. The BCWCID guarantees Fort Hood a delivery of 16.0 million gallons per day (mgd) (USACE Fort Worth District 1999, cited in SAIC 2000).

4.6.1.5 Waters of the United States

Section 404 of the Clean Water Act authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for discharging dredged or fill material into waters of the US, including deepwater habitats, special aquatic sites, and wetlands. The USACE has the authority to make decisions regarding the jurisdictional status of waters and wetlands (see Section 4.7.1.5). According to the Fort Hood DPW, construction on the site requires a 50-foot buffer from the bank of the Waters of the US (this includes jurisdictional wetlands) (Alexander 2010b).

The two unnamed streams that traverse the proposed project area are considered jurisdictional Waters of the US. These streams run through the proposed project area from Kouma East to both the adjacent Pershing Reservoir and the unnamed pond to the southeast, which are also jurisdictional waters of the US. The USACE is the permitting agency under Section 404. Any construction project that may affect US waterways (i.e., water impoundment structures or channel modifications) would require coordination with the USACE. The TCEQ is also a reviewing agency for Section 404 permits (Bump 2010).

4.6.2 Consequences

Potential impacts on water resources, including surface water and groundwater, are considered significant if the Proposed Action would result in any of the following:

- Irreversibly diminish water resource availability, quality, and beneficial uses;

- Reduce water availability or interfere with a potable supply or water habitat;
- Create or contribute to overdraft of groundwater or exceed a safe annual yield of water supply sources;
- Result in an adverse effect on water quality or an endangerment to public health by creating or worsening adverse health hazard conditions;
- Result in a threat or damage to unique hydrological characteristics; or
- Violate an established law or regulation.

Potential impacts that would be considered significant related to floodplain management are potential damage to structures in the floodplain and changes to the extent, elevation, or other features of the floodplain as a result of flood protection measures or other structures being silted in or removed from the floodplain.

4.6.2.1 Proposed Action

Surface water. No effects are expected on surface water. Part of the Proposed Action would manage stormwater runoff for flood control and aesthetic purposes. The Army and FHFH would determine the need for an USACE Section 404 permit and coordination with the TCEQ to modify the stream channels and should coordinate with the USACE for Section 404 requirements.

In the short term, construction would disturb the soil and may increase erosion and dissolved solid and sediment content in the water, in turn reducing water quality. Development of the property would require a Texas Pollutant Discharge Elimination System Construction General Permit. Implementation of BMPs, such as erosion and sedimentation controls, would be required and would be in place during construction to manage and control sedimentation or erosion impacts on areas outside the proposed project area. BMPs, such as silt fencing to trap waterborne sediments and eventual reseeding and revegetation following construction, should be used to minimize adverse effects on water quality. Failure to implement erosion control and revegetation during and following construction could decrease water quality. A SWPPP would be developed before implementation of the Proposed Action to reduce adverse effects on water quality. The SWPPP and BMPs (such as silt fencing) would ensure that there are no adverse effects on surface water.

Groundwater. No effects on groundwater are expected. No groundwater would be used during construction, and groundwater is not used as a potable source by Fort Hood. None of the potentially sensitive areas, as discussed in Section 4.6.1.2, are within or near the proposed project area.

Floodplains. No effects on the floodplain areas are expected. Floodplain development would be limited to passive uses, such as recreation and preservation, in order to reduce the risks to human health and safety. The Proposed Action would develop housing outside of the 100-year floodplain. Wetland areas would not be directly impacted by the Proposed Action. Proposed construction would be within a minimum setback of 50 feet from the emergent wetland and pond. The wetland vegetation and habitat surrounding the pond would not be directly affected by construction. The use of BMPs (e.g., silt fencing) to prevent sediment-laden stormwater from draining into the pond would minimize the indirect adverse effects of construction near the reservoir, pond, and wetland areas. Waters of the US will be impacted by installing a culverted crossing on the southernmost stream on the project area. This action would require Section 404 permitting by the USACE but should fall under Nationwide Permit 14 (Bump 2010). Minimal effects are expected on waters of the US, including the streams across the proposed project area, but erosion control during and following construction should reduce adverse effects on waters of the US. The SWPPP and BMPs would ensure that there are no adverse effects on surface water.

Appropriated water. No effects on appropriated water are expected. Fort Hood and its surrounding communities have a sufficient water allotment to serve current needs and anticipated growth as a result of the Proposed Action. The Proposed Action would not have to maintain use in line with the water appropriation for Fort Hood.

4.6.2.2 No Action Alternative

No effects on surface water, groundwater, or floodplains are expected as a result of the No Action Alternative since the Proposed Action and associated ground disturbances would not occur.

4.7 BIOLOGICAL RESOURCES

4.7.1 Affected Environment

4.7.1.1 Vegetation

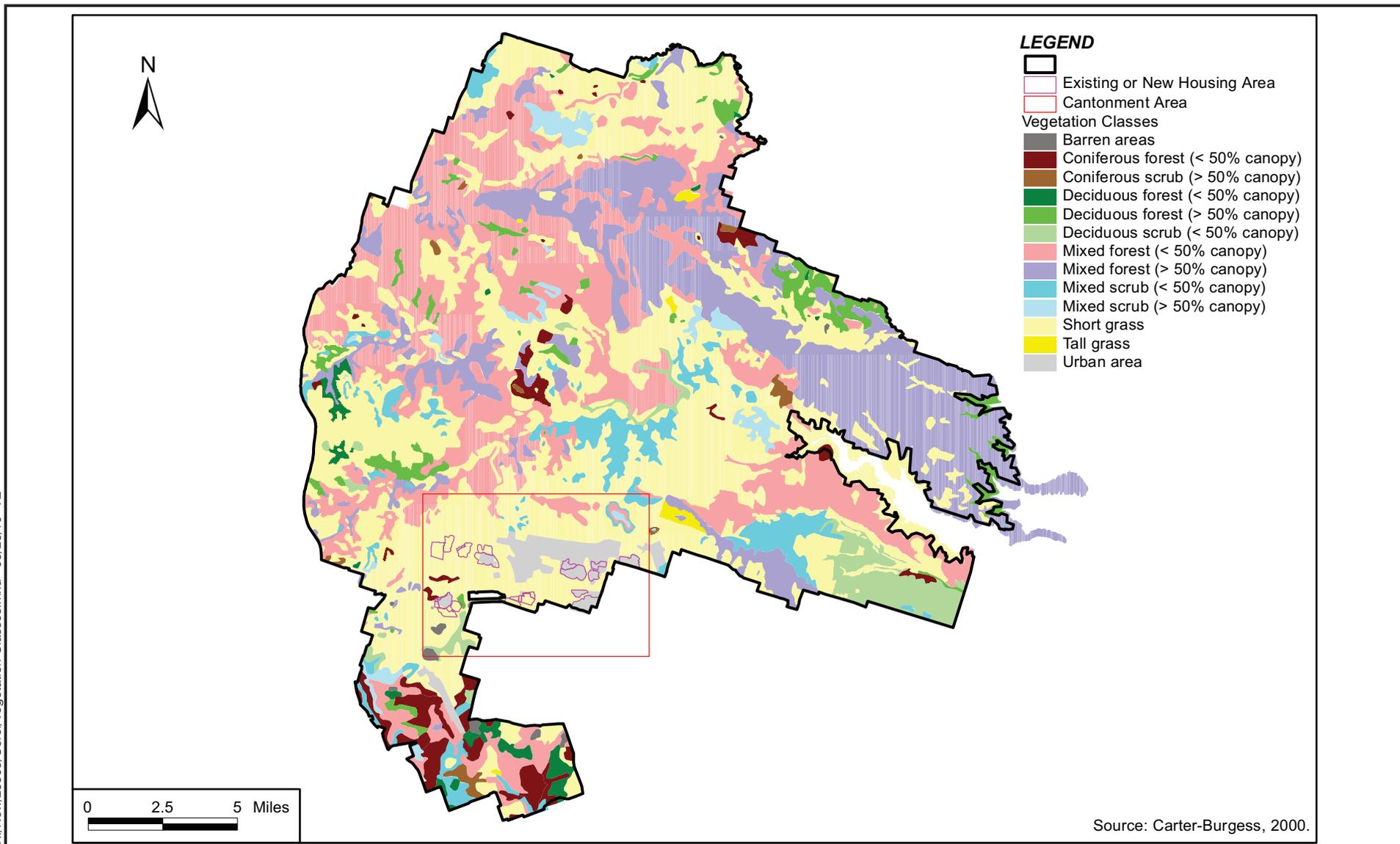
Fort Hood lies on the eastern fringe of the Edwards Plateau Ecoregion and the southernmost Cross Timbers and Prairies Ecoregion of central Texas (see Table 4-4). Scrub forests dominated by Ashe juniper, Texas oak, and live oak are characteristic of the Edwards Plateau ecological region. Grasslands of tall and mid-grass species are characteristic of the Cross Timber and Prairies region. Tall grasses, such as the bluestems, sideoats, and switchgrass of the Blackland Prairie, are also associated with this area. In its original climax condition,² the vegetation on Fort Hood would include tall and mid-grass prairie and oak woodlands. Sixty-five percent of the installation is considered perennial grasslands, and 31 percent is forest and shrub (woodland) communities (see Figure 4-5). Broadleaf woodlands comprise 39 percent of Fort Hood's woodland sites, and coniferous and mixed woodlands comprise 61 percent (Tazik et al. 1992). Vegetation at the project site consists predominantly of native grasses, with scattered trees and shrubs.

Table 4-4
Vegetation Common to the Cross-Timbers, Edwards Plateau, and
Blackland Prairies of Central Texas

Cross-Timbers Area	Edwards Plateau	Blackland Prairies
Post oak	Bluestems grass	Bluestems
Eastern cottonwood	Gamma grass	Sideoats
Burr oak	Indian grass	Switchgrass
Sycamore	Switchgrass	
Black walnut	Wildry	
Black hickory	Curly mesquite	
Pecan	Buffalograss	
Sugarberry	Live oak	
Green ash	Shinnery oak	
Red oak	Juniper	
Flameleaf sumac	Mesquite	
Green hawthorne		
Black cherry		
American elderberry		
Bald cypress		
Buttonbush		

Source: Texas Parks and Wildlife Department (TPWD) 2000a, 2000b

²A stable plant community that is self-perpetuating and in equilibrium with the physical habitat. Examples: tall-grass prairie or post oak-blackjack oak woodland.



Vegetation Classes

Fort Hood
Killeen, Texas

Perennial grassland. Grasslands are found throughout most of the installation. Because of current activity and wildfires, most grasslands are confined to the Western Maneuver Area and the live-fire zone/impact area (USACE and Fort Hood 2006). The grassland species composition of Fort Hood includes a variety of perennial herbaceous plants, such as little bluestem (*Schizachyrium scoparium*), hairy grama (*Bouteloua hirsuta*), sideoats grama (*B. curtipendula*), Texas wintergrass (*Stipa leucotrichia*), blue grama (*Bouteloua gracilis*), seep muhly (*Muhlenbergia reverchoni*), silver bluestem (*Bothriochloa saccharoides*), prairie-tea (*Croton monanthogynus*), broomweeds (*Amphiachyris* sp.), ragweed (*Ambrosia artemisiifolia*), three-awn (*Aristida* sp.), meadow dropseed (*Sporobolus compositus*), prairie dropseed (*S. asper*), and snow-on-prairie (*Euphorbia bicolor*).

The installation's grasslands are dominated by Texas wintergrass (29 percent), prairie dropseed (18 percent), and little bluestem (9 percent). Most of the grasslands provide a dense or closed vegetation cover (Tazik et al. 1992). Tall grass prairie species occur in small isolated patches and are dominated by little bluestem, yellow indiagrass (*Sorghastrum nutan*), and big bluestem (*Andropogon gerardii*) (USACE Fort Worth District 2000a; USDA-NRCS 1998).

Forest and shrub communities. Three types of forest and shrub communities are found on Fort Hood: coniferous, deciduous, and mixed forest and shrub. The coniferous woodlands on the installation are dominated by Ashe juniper (*Juniperus ashei*), the only coniferous species on the installation. Species composition of this community also includes flameleaf sumac (*Rhus lanceolata*), Texas ash (*Fraxinus texensis*), live oak (*Quercus fuisiformis*), and a variety of grasses and broomweeds (*Xanthocephalum* spp.). Coniferous communities are relatively uncommon on the installation (USACE Fort Worth District 2000a). Woody plant species, typical of the deciduous woodlands on Fort Hood, include live oak, post oak (*Quercus stellata*), pecan (*Carya illinoensis*), elm (*Ulmus* sp.), netleaf hackberry (*Celtis reticulata*), and sycamore (*Platanus occidentalis*). Understory species include supple-jack (*Berchemia scandens*), elbow-bush (*Foresteria pubescens*), buttonbush (*Cephalanthus occidentalis*), Texas persimmon (*Diospyrus texana*), prairie-tea, broomweed, silver bluestem, prairie three-awn (*Aristida olintha*), and mist flower (*Eupatorium coelestinum*). Deciduous forests and shrubs are generally found in lowlands and protected slopes and are relatively uncommon on the installation (USACE Fort Worth District 2000a).

The most common community on Fort Hood is mixed forest and shrub. Dominant woody plants of this community include Ashe juniper, live oak, and Texas oak (*Quercus buckleyi*). In some

cases, Ashe juniper will dominate over the oaks, in other cases live oak or Texas oak will dominate over Ashe juniper. Understory species composition includes a combination of the species found in the coniferous and deciduous communities (USACE Fort Worth District 2000a).

4.7.1.2 Wildlife

Mammals. Mammal species common to Fort Hood are identified in Table 4-5. The white-tailed deer is the most common big game animal on the installation and is managed for recreation.

Table 4-5
Mammal Species Common to Fort Hood

Scientific Name	Common Name
<i>Procyon lotor</i>	Raccoon
<i>Odocoileus virginianus</i>	White-tailed deer
<i>Lepus californicus</i>	Black-tailed jackrabbit
<i>Peromyscus maniculatus</i>	Deer mouse
<i>Sigmodon hispidus</i>	Hispid cotton rat
<i>Neotoma floridana</i>	Eastern wood rat

Source: Department of the Army 1979, cited in USACOE 2000a

Birds. The installation supports a variety of birds, including passerine (perching) songbirds, woodpeckers, and wading birds (Table 4-6). Passerine birds are most common in the deciduous woodland and coniferous and mixed woodland areas. Winter waterfowl populations remain low due to lack of suitable habitat and distance from major routes of the Central Flyway (Fort Hood 2000, cited in USACOE 2000a).

Table 4-6
Birds Common to Fort Hood

Scientific Name	Common Name	Scientific Name	Common Name
<i>Bubulcus ibis</i>	Cattle egret	<i>Spinus tristis</i>	American goldfinch
<i>Ardea alba</i>	Great egret	<i>Aix sponsa</i>	Wood duck
<i>Egretta thula</i>	Snowy egret	<i>Anas platyrhynchos</i>	Mallard
<i>Anas discors</i>	Blue-winged teal	<i>Aythya americana</i>	Redhead
<i>A. cyanoptera</i>	Cinnamon teal	<i>A. collaris</i>	Ring-necked duck
<i>A. acuta</i>	Northern pintail	<i>A. affinis</i>	Lesser scaup
<i>A. crecca</i>	Green-winged teal	<i>Oxyura jamaicensis</i>	Ruddy duck
<i>Coracyps atratus</i>	Black vulture	<i>Pelecanus erythrorhynchos</i>	American white pelican
<i>Cathartes aura</i>	Turkey vulture	<i>Phalacrocorax auritus</i>	Double-crested cormorant
<i>Fulica americana</i>	American coot	<i>Leucophaeus pipixcan</i>	Franklin's gull
<i>Cardinalis cardinalis</i>	Northern cardinal	<i>Larus delawarensis</i>	Ring-billed gull
<i>Charadrius vociferus</i>	Killdeer	<i>Sterna forsteri</i>	Forster's tern

Table 4-6
Birds Common to Fort Hood

Scientific Name	Common Name	Scientific Name	Common Name
<i>Calidris mauri</i>	Western sandpiper	<i>Columba livia</i>	Rock pigeon
<i>C. melanotos</i>	Pectoral sandpiper	<i>Zenaida asiatica</i>	White-winged dove
<i>Zenaida macroura</i>	Mourning dove	<i>Corvus brachyrhynchos</i>	American crow
<i>Coccyzus americanus</i>	Yellow-billed cuckoo	<i>Eremophila alpestris</i>	Horned lark
<i>Chordeiles minor</i>	Common nighthawk	<i>Petrochelidon pyrrhonota</i>	Cliff swallow
<i>Tyrannus verticalis</i>	Western kingbird	<i>Hirundo rustica</i>	Barn swallow
<i>T. forficatus</i>	Scissor-tailed flycatcher	<i>Parus carolinensis</i>	Carolina chickadee
<i>Vireo griseus</i>	White-eyed vireo	<i>Baeolophus atricristatus</i>	Black-crested titmouse
<i>V. atricapilla</i>	Black-capped vireo	<i>Thryothorus ludovicianus</i>	Carolina wren
<i>Thryomanes bewickii</i>	Bewick's wren	<i>Regulus calendula</i>	Ruby-crowned kinglet
<i>Sialia sialis</i>	Eastern bluebird	<i>Poliopitila caerulea</i>	Blue-gray gnatcatcher
<i>Mimus polyglottos</i>	Northern mockingbird	<i>Anthus rubescens</i>	American pipit
<i>Turdus migratorius</i>	American robin	<i>Bombycilla cedrorum</i>	Cedar waxwing
<i>Sturnus vulgaris</i>	European starling	<i>Vermivora celata</i>	Orange-crowned warbler
<i>Dendroica coronata</i>	Yellow-rumped warbler	<i>Pipilo maculatus</i>	Spotted towhee
<i>D. chrysoparia</i>	Golden-cheeked warbler	<i>Spizella passerina</i>	Chipping sparrow
<i>Spizella pusilla</i>	Field sparrow	<i>Ammodramus savannarum</i>	Grasshopper sparrow
<i>Pooecetes gramineus</i>	Vesper sparrow	<i>Zonotrichia albicollis</i>	White-throated sparrow
<i>Chondestes grammacus</i>	Lark sparrow	<i>Junco hyemalis</i>	Dark-eyed junco
<i>Aimophila cassinii</i>	Chipping sparrow	<i>Passer domesticus</i>	House sparrow
<i>Passerculus sandwichensis</i>	Savannah sparrow	<i>Molothrus ater</i>	Brown-headed cowbird
<i>Agelaius phoeniceus</i>	Red-winged blackbird	<i>Passerina cyanea</i>	Indigo bunting
<i>Sturnella magna</i>	Eastern meadowlark	<i>P. ciris</i>	Painted bunting
<i>Xanthocephalus xanthocephalus</i>	Yellow-headed blackbird	<i>Quiscalus mexicanus</i>	Great-tailed grackle
<i>Quiscalus quiscula</i>	Common grackle		

Source: USACE and Fort Hood 2006

Reptiles and amphibians. A species composition study of herpetofauna was completed for Fort Hood in 1997. Table 4-7 lists the herpetofauna species common to Fort Hood.

Table 4-7
Amphibians and Reptiles Common to Fort Hood

Scientific Name	Common Name	Scientific Name	Common Name
<i>Acris crepitans</i>	Blanchard's cricket frog	<i>Sceloporus olivaceus</i>	Texas spiny lizard
<i>Bufo debilis</i>	Eastern green toad	<i>Scincella lateralis</i>	Ground skink
<i>B. punctatus</i>	Red-spotted toad	<i>Cnemidophorus</i> sp.	Telid lizards
<i>B. valliceps</i>	Gulf coast toad	<i>Elaphe obsoleta</i>	Texas rat snake
<i>Rana berlandieri</i>	Rio Grande leopard frog	<i>Masticophis flagellum</i>	Western coachwhip

**Table 4-7
Amphibians and Reptiles Common to Fort Hood**

Scientific Name	Common Name	Scientific Name	Common Name
<i>Gastrophryne olivacea</i>	Great plains narrowmouth toad	<i>Nerodia</i> sp.	Water snakes
<i>Kinosternon flavescens</i>	Yellow mustard turtle	<i>Opheodrys aestivus</i>	Western rough green snake
<i>Terrapene ornata</i>	Ornate box turtle	<i>Thamnophis proximus</i>	Redstripe ribbon snake
<i>Trachemys scripta</i>	Red-eared slider	<i>Micrurus fluvius</i>	Texas coral snake
<i>Cophosaurus texanus</i>	Texas earless lizard	<i>Agkistrodon contortrix</i>	Broad-banded copperhead
<i>Phrynosoma cornutum</i>	Texas horned lizard	<i>Crotalus atrox</i>	Western diamondback rattlesnake

Source: Johnson 1997

Fish. An ecological assessment of the fish of Fort Hood was completed in 1994, when 32 species were collected. Table 4-8 lists the fish species common to Fort Hood. Largemouth bass (*Micropterus salmoides*), channel catfish (*Ictalurus punctatus*), and bluegill (*Lepomis macrochirus*) are managed for recreation and are native to the Fort Hood area. The rainbow trout is not native and is stocked in winter. The trout are fished out each year or die in the summer as a result of the increased water temperature. Largemouth bass and channel catfish are stocked to supplement the population. Lakes where fish populations are managed include Nolan, Heiner, Larned, Engineer, Gray, Bratcher, Cantonment B, 22A, Copperas Cove #3, and Cantonment A (Fort Hood 2000).

**Table 4-8
Native Fish Common to Fort Hood Lakes**

Scientific Name	Common Name	Scientific Name	Common Name
<i>Aplodinotus grunniens</i>	Freshwater drum	<i>Lepisosteus osseus</i>	Longnose gar
<i>Dorosoma cepedianum</i>	Gizzard shad	<i>Lepomis auritus</i>	Redbreast sunfish
<i>D. petenense</i>	Threadfin shad	<i>L. cyanellus</i>	Green sunfish
<i>Campostoma anamalum</i>	Central stoneroller	<i>L. humilis</i>	Orange-spotted sunfish
<i>Carpoides carpio</i>	River carpsucker	<i>L. macrochirus</i>	Bluegill
<i>Cyprinum carpio</i>	Common carp	<i>L. megalotis</i>	Longear sunfish
<i>Notemigonus crysoleucas</i>	Golden shiner	<i>L. microlophus</i>	Redear sunfish
<i>Notropis buchanani</i>	Ghost shiner	<i>L. punctatus</i>	Spotted sunfish
<i>Cyprinella lutrensis</i>	Red shiner	<i>L. gulosus</i>	Warmouth
<i>C. venustus</i>	Blacktail shiner	<i>Micropterus punctulatus</i>	Spotted bass
<i>Pimephales vigilax</i>	Bullhead minnow	<i>M. salmoides</i>	Largemouth bass
<i>Ameiurus melas</i>	Black bullhead	<i>Moxostoma congestum</i>	Gray redbhorse
<i>A. natalis</i>	Yellow bullhead	<i>Pomoxis annularis</i>	White crappie

Table 4-8
Native Fish Common to Fort Hood Lakes

Scientific Name	Common Name	Scientific Name	Common Name
<i>Ictalurus punctatus</i>	Channel catfish	<i>Etheostoma spectabile</i>	Orangethroat darter
<i>Pylodictus olivaris</i>	Flathead catfish	<i>Percina caprodes</i>	Logperch
<i>Fundulus notatus</i>	Blackstripe topminnow	<i>P. carbonaria</i>	Texas logperch
<i>Gambusia affinis</i>	Mosquitofish	<i>P. sciera</i>	Dusky darter
<i>Menidia beryllina</i>	Tidewater silverside		

Source: USACE and Fort Hood 2006

Several projects are ongoing and planned to maintain or improve fish habitat, including new lake construction, lake renovation, silt removal dredging, bottom contouring, shoreline improvement, aquatic weed management, and dam and spillway repair (USACE and Fort Hood 2006).

Aquatic habitats near the project area include tributaries to South Nolan Creek, Pershing Reservoir, and an unnamed pond. Fish species that could occur in South Nolan Creek are members of the minnow family (Cyprinidae; DPW 2004).

4.7.1.2 Sensitive Species

The current Endangered Species Management Plan (ESMP) for Fort Hood provides comprehensive guidelines for maintaining and enhancing populations and habitats of federally listed and species of concern, while maintaining mission readiness consistent with Army and federal environmental regulations (Cornelius et al. 2007). The ESMP describes conservation actions for protecting, managing, monitoring, and researching listed species known to occur on the installation. Natural resource managers and leaders of training operations on Fort Hood will oversee the conservation actions and the objectives of the ESMP, while maintaining mission readiness in a manner consistent with the Army. An important feature of the ESMP is the designation of core and noncore habitat areas, as well as the modification of training restrictions and habitat protection measures based on these designations. Core habitats are blocks of viable habitat where potential conflicts of mission assignments are minimal and active management and habitat protection activities will be enhanced. Noncore habitats are fragmented habitats where conflicts of mission assignments are high; training restrictions in noncore habitat will be relaxed.

The ESMP focuses on two federally listed endangered species, one federal species of concern, and cave-adapted fauna (Table 4-9; Cornelius et al. 2007). The ESMP also addresses the probable new salamander subspecies (*Plethodon albagula*) that has been collected from caves in the

northeast training ranges of Fort Hood. In addition, three federally listed migratory birds are included in the ESMP as species that occur either by accident or as transients on Fort Hood (Table 4-9; Cornelius et al. 2007). The federally listed species known to occur on Fort Hood are discussed further below.

**Table 4-9
Federal Threatened and Endangered Species on Fort Hood**

Common Name	Scientific Name	Federal Listing Status ^a	Fort Hood Status ^b
Federally Listed Species			
Bald eagle	<i>Haliaeetus leucocephalus</i>	Delisted August 9, 2007	B
Black-capped vireo	<i>Vireo atricapillus</i>	E	A
Golden-cheeked warbler	<i>Dendroica chrysoparia</i>	E	A
Whooping crane	<i>Grus americana</i>	E	B
Candidate Species			
Salado salamander	<i>Eurycea chisholmensis</i>	C	C
Smalleye shiner	<i>Notropis buccula</i>	C	C
Species of Concern			
Peregrine falcon	<i>Falco peregrinus anatum</i>	N/A	B
Texabama croton	<i>Croton alabamensis</i> var. <i>texensis</i>	N/A	A
Salamander (new species)	<i>Plethodon albagula</i>	N/A	A
Cave invertebrates	See Table 4-11	N/A	A

^aFederal listing status: E=Endangered, T=Threatened, C=Candidate

^bStatus refers to population status on Fort Hood according to the following definitions:

A—Population established on Fort Hood. Recent information documents an established breeding population (even if small) or regular occurrence on the installation. This includes those species for which research and management are ongoing and several endemic cave invertebrates.

B—Recently recorded on Fort Hood, but there is no evidence of an established population. This includes species considered to be transient, accidental, or migratory (e.g., some birds may use the installation as a stopover site during migration to and from their wintering grounds). For some species in this category, further inventory may reveal breeding populations.

C—Not known to occur on Fort Hood.

Source: Cornelius et al. 2007

Federal Endangered, Threatened, Candidate Species, and Species of Concern

The federally listed endangered or threatened species known to occur on Fort Hood or in the vicinity include the golden-cheeked warbler (*Dendroica chrysoparia*), black-capped vireo (*Vireo atricapillus*), and whooping crane (*Grus americana*; Cornelius et al. 2007). The bald eagle (*Haliaeetus leucocephalus*) is also known to occur on Fort Hood; this species was removed from the federal list of threatened and endangered species on August 9, 2007, but is still protected under the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, and the Lacey Act (US Fish and Wildlife Service [USFWS] 2010). Federal species of concern known to occur on Fort Hood are American peregrine falcon (*Falco peregrinus anatum*), Texabama croton (*Croton alabamensis* var. *texensis*), the probable new salamander species (*Plethodon albagula*),

and cave invertebrates (Cornelius et al. 2007). Currently, there is no habitat on Fort Hood designated as critical habitat by the USFWS (USACE and Fort Hood 2006). The project site does not contain suitable habitat for any of the federally listed species (Hammer 2010).

The golden-cheeked warbler and the blacked-capped vireo, both neotropical migrants, are of particular concern at Fort Hood. The golden-cheeked warbler is the only North American bird whose breeding range is limited to one state, Texas (Cornelius et al. 2007). Warbler occurrence has been documented in suitable habitats on the installation. The ESMP estimates that approximately 52,935 acres of suitable warbler habitat is available on Fort Hood, 36,767 acres of which can be designated as core habitat subject to Fort Hood Endangered Species Training Guidelines.³

Black-capped vireo occurrence is typically limited to isolated territories in golden-cheeked warbler habitat (Cornelius et al. 2007). Vireo habitat is shrubby hardwood, usually exhibiting a clumped vegetation structure. Previously burned habitat or sites mechanically cleared for military activity are preferred habitat of the vireo on Fort Hood. Based on surveys conducted in 2002 and 2003, the current estimate of suitable black-capped vireo habitat on Fort Hood is 17,216 acres (Cornelius et al. 2007). Approximately 10,339 acres are designated as Ce Habitat subject to Fort Hood Endangered Species Training Guidelines.²

Whooping cranes are known to occur on infrequent stopovers during April and October migrations. Whooping cranes may stop at Lake Belton during migration. Bald eagles winter regularly on Lake Belton and the shoreline along the eastern boundary of Fort Hood (Cornelius et al. 2007). Wintering populations range from two to seven adults, subadults, and juveniles. Eagles arrive to Fort Hood during mid to late October and leave around the end of March. Bald eagle nests have not been found on the installation (Cornelius et al. 2007).

Reports of peregrine falcons have been recorded on Fort Hood. Nests have not been found, and sightings are likely transitory migrants (Cornelius et al. 2007). The American peregrine falcon is a federal species of concern and is also state listed as threatened.

³Training guidelines for use of endangered species habitat are implemented at two levels. Level 1 applies from September 1 through February 28; Level 2 is more restrictive and applies from March 1 through August 31. The hierarchical structure allows greater use of habitat when the endangered species are not present, while providing adequate protection during the nesting period. Guidelines should be used in conjunction with a 1:50,000 training area map with a current endangered species habitat overlay.

No federally listed endangered or threatened plant species are known to occur on Fort Hood (Cornelius et al. 2007). In 1989 a variety of the Alabama croton (*Croton alabamensis* var. *alabamensis*) was found on Fort Hood. Alabama croton is a species of concern that was formerly listed as a category 2 candidate for federal listing. The variety discovered has been described and designated as Texabama croton (*Croton alabamensis* var. *texensis*) (Cornelius et al. 2007).

Several endemic and currently undescribed cave invertebrate species and one probable new subspecies of salamander are known to occur on Fort Hood. Table 4-10 provides a list of cave-associated species on Fort Hood (Cornelius et al. 2007).

**Table 4-10
Cave-Associated Species on Fort Hood**

Common Name	Species	Status
Spiders	<i>Cicurina (Cicurella) caliga</i>	Species of Concern
	<i>C. (Cicurella) coryelli</i>	Species of Concern
	<i>C. (Cicurella) hoodensis</i>	Species of Concern
	<i>C. (Cicurella) mixmaster</i>	Species of Concern
	<i>C. (Cicurella) troglobia</i>	Species of Concern
	<i>Neoleptoneta paraconcinna</i>	Species of Concern
Pseudoscorpions	<i>Tartarocreagris hoodensis</i>	Species of Concern
Centipedes	<i>Gosibius (Abatobius) new speices</i>	Species of Concern
Millipedes	<i>Speodesmus castellanus</i>	Species of Concern
Silverfish	<i>Texoreddellia</i> probable new species	Species of Concern
Ground Beetles	<i>Rhadine reyesi</i>	Species of Concern
	<i>Batrisodes (Babnormodes) new species No. 1</i>	Species of Concern
Ant-like Litter Beetles	<i>B. (Babnormodes) new species No. 2</i>	N/A
	<i>B. (Babnormodes) new species No. 3</i>	N/A
	<i>B. (Babnormodes) feminiclypeus</i>	Species of Concern
	<i>B. (Babnormodes) gravesi</i>	Species of Concern
	<i>B. (Babnormodes) waroni</i>	Species of Concern
Salamander	<i>Plethodon albagula</i>	N/A

Source: USACE and Fort Hood 2006

State Listed Species

Suitable habitat for state-listed species is not present on the proposed project site (Hammer 2010). However, one state-listed threatened species, the Texas horned lizard (*Phrynosoma cornutum*), is known to occur in the western portion of the installation. This particular lizard is not included in the ESMP; however, a small population is established on Fort Hood (Johnson 1997). This species prefers arid to semiarid habitats with minimal vegetation (DPW 2004).

4.7.1.3 Wetlands

Section 404 of the Clean Water Act authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredged or fill material into US waters, including deepwater habitats, special aquatic sites, and wetlands. The USACE has the authority to make decisions regarding the jurisdictional status of waters, including wetlands. Potential jurisdictional wetlands are delineated using the three-parameter approach for a routine on-site determination, as defined by the USACE.

The proposed site is next to a small pond and Pershing Reservoir. In addition, two streams are on the site and drain into the pond and reservoir. A wetland delineation of the proposed site was conducted by Fort Hood DPW (DPW 2009). Wetlands were identified next to the pond and on a small portion of the site (Figure 4-6). According to Fort Hood DPW (2010), construction on the site requires a 50-foot buffer from the bank of the Waters of the US (including the jurisdictional wetlands). Wetland areas delineated on the site and the vicinity are described further below.

The Fort Hood data identifies the pond as palustrine open water and the wetland as palustrine emergent (DPW 2009). Palustrine emergent wetlands are small, nontidal, freshwater areas. Emergent wetlands are generally characterized by herbaceous vegetation adapted to temporarily flooded conditions (Mitch and Gosselink 1993). A site visit conducted as part of the 2000 RCI EA preparation (USACE 2000) indicated a water line approximately 20 to 30 feet from standing water. The site visit for the 2000 RCI EA found that the vegetation within the bounds of the water line was dominated by hydrophytic plant species (Table 4-11), including cattail (*Typha* sp.), rushes (*Juncus* sp.), button bush (*Cephalanthus occidentalis*), and flatsedge (*Cyperus* sp.). Cockle-bur (*Xanthium strumarium*) and great ragweed (*Ambrosia trifida*) were also abundant within the water line. Soils are characteristic of a dark-colored clay, referred to as black gumbo. Mottling and hydric soil characteristics were not noted (USACE 2000). Two drainage ditches to the north and northwest drain stormwater into the pond. Willow trees (*Salix* sp.) were growing in and around the drainage ditches. The pond has standing water year-round and has a hydrologic connection to a reservoir to the east. Half of the reservoir (Pershing Lake) is on Fort Hood property (Bump 2010).

The pond and wetland area next to the project site provides suitable habitat for a variety of wildlife, including fish, crawfish, egrets and herons, and wintering waterfowl.



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- Legend**
-  Site Boundary (approximate)
 -  PEM (Palustrine Emergent)
 -  POW (Palustrine Open Water)
 -  50-Foot Buffer Around Wetlands

Wetlands

Fort Hood
Killeen, Texas

Figure 4-6



Source: ESRI, i-cubed, USDA FSA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGP 2010

Table 4-11
Hydrophytic Plants Indicators for Dominant Plants
Adjacent to Proposed Project Site

Species	Hydrophytic Plant Indicator
Rushes (<i>Juncus</i> sp.)	FACW or OBL*
Flatsedge (<i>Cyperus</i> sp.)	FACW or OBL*
Button bush (<i>Cephalanthus occidentalis</i>)	OBL
Cattail (<i>Typha</i> sp.)	OBL
Cockle-bur (<i>Xanthium strumarium</i>)	FAC-
Great ragweed (<i>Ambrosia trifida</i>)	FAC

Indicator categories: OBL = obligate, plants occur almost always under natural conditions in wetlands; FACW = facultative wetland, plants usually occur in wetlands but are occasionally found in non-wetlands; FAC = equally likely to occur in wetlands or non-wetlands. A negative sign attached to FAC or FACW indicates the plant is less frequently found in wetlands.

*Depending on the specific species.

4.7.2 Consequences

The significance threshold for biological resources includes a substantial reduction in ecological processes, communities, or populations that would threaten the long-term viability of a species or would result in the substantial loss of a sensitive community that could not be offset. Potential impacts on biological resources are considered significant if the Proposed Action would result in any of the following:

- Affect threatened or endangered species;
- Substantially diminish habitat for a plant or animal species;
- Substantially diminish a regionally or locally important plant or animal species;
- Interfere substantially with wildlife movement or reproductive behavior;
- Result in a substantial invasion of exotic plant or animal species; or
- Cause the destruction, loss, or degradation of jurisdictional wetlands (as defined by Section 404 of the CWA).

4.7.2.1 Proposed Action

Any construction activity that would affect vegetation, fish, and wildlife habitat would observe the regulations set by Fort Hood. In addition, any activity that would affect streams and riparian areas and require a stream mitigation plan would be coordinated with Fort Hood and the USACE.

Vegetation

Minor adverse effects are expected as a result of the Proposed Action. Approximately 67 acres of grassland would be eliminated by the Proposed Action. Green space, parks, and native landscaping would be included as part of the project, but most of the area would no longer be available for vegetation given that it would be built up. Housing construction on the proposed site would have minor adverse effects on native vegetation and wildlife. To minimize the loss of native vegetation, areas disturbed by the Proposed Action would be limited to the housing footprint and a minimal amount of construction staging area in the 67-acre parcel. Associated roads, surface water bodies, wetlands, and large blocks of native vegetation would be preserved, where feasible, as buffers and wildlife travel corridors. Once construction is completed, all areas that were disturbed by the Proposed Action would be reseeded with native species or landscaped accordingly. Landscaping would include drought-tolerant native trees and grasses, as designed by a professional landscape architect/designer to meet the LEED-H Silver design standards and the Fort Hood tree policy. Native trees and grasses would be planted near homes, in parks, in open spaces, and around the stormwater management structures. LEED is a green building program with an initiative designed to promote the transformation of the home building industry toward more sustainable practices, with best practice environmental features (US Green Building Council 2007). In addition, the implementation of management measures consistent with the Fort Hood Integrated Natural Resources Management Plan (INRMP) and the Installation Design Guide would minimize further degradation of the vegetation.

The appropriate use of BMPs, such as erosion control practices and tree protection devices at all proposed construction sites, would protect vegetation and habitat next to the construction areas. The use of erosion control practices around the proposed site would prevent indirect adverse effects from erosion and sedimentation on the pond, reservoir, and the vegetation surrounding these areas. Tree protection would include the use of BMPs that prevent erosion of exposed tree roots from increased stormwater runoff volume and velocity due to new impervious surfaces.

Fish and Wildlife

Short-term and long-term, minor, adverse effects are anticipated as a result of the Proposed Action. The Proposed Action would result in the loss of grassland habitat, which would likely cause temporary, and some permanent, displacement of wildlife, fragmentation of habitat, and modification or elimination of wildlife corridors. Removal of grassland habitat would have minor effects on wildlife as the Proposed Action is in a metropolitan area where wildlife species are limited. In addition, wildlife species known to occur on the installation are highly adaptable, and

the native landscaping planned as part of the Proposed Action would minimize anticipated disturbances to wildlife. Fish are not anticipated to be affected by the Proposed Action.

The Proposed Action would create an increased level of human disturbance, such as noise, vehicular traffic, and construction equipment. These effects would be most intense during the first phase of the Proposed Action. Due to the increase in human presence, the effects from the construction activities would remain beyond implementation of the action at the new housing site.

The planting of native trees and grasses and the presence of the water bodies next to the site would help mitigate some of the minor adverse effects on wildlife (for those species adapted to urban environments and human presence).

Threatened and Endangered Species

There are no known threatened or endangered species or suitable habitat on the proposed site (Hammer 2010), so the Proposed Action would have no adverse effects on endangered, threatened, or species of concern that are known to occur on Fort Hood. Consequently, the Fort Hood DPW Environmental Division will not submit a Section 7 Consultation request to the USFWS for concurrence.

The Proposed Action would have an effect on undisturbed grassland throughout the site. If migratory birds were found to be in the project area, mitigation measures would be used to ensure that the provisions in the Migratory Bird Treaty Act are adequately followed. Birds and their nest contents are protected by the Migratory Bird Treaty Act and the memorandum of understanding between the USFWS and the Department of Defense.

Wetlands. Short-term, minor, adverse effects are expected as a result of the Proposed Action. An emergent wetland and pond is approximately south and southeast of the proposed site. Proposed construction activities are expected to occur with a minimum setback (to be established) from the emergent wetland and pond. The wetland vegetation and habitat surrounding the pond would not be directly affected by construction. The use of such BMPs as silt fencing to prevent sediment-laden stormwater from draining into the pond would minimize the adverse effects of construction on the pond and wetland. Should plans change, coordination with the USACE may be required for potential Clean Water Act Section 404 dredge or fill permit requirements. Other land areas subject to the Proposed Action do not have wetlands.

4.7.2.2 No Action Alternative

No effects are expected on biological resources as a result of the No Action Alternative since the Proposed Action and associated ground disturbances would not occur. The proposed site would remain undeveloped, and there would be no effects on vegetation, wildlife, or sensitive species.

4.8 **CULTURAL RESOURCES**

4.8.1 *Affected Environment*

Cultural resources are locations of human activity, occupation, use, or of importance to a group. They include expressions of human culture and history in the physical environment, such as archaeological sites, buildings, structures, objects, districts, or other places. Other categories of cultural resources are natural features, plants, or animals that are considered important to a culture, subculture, or community, as well as traditional lifeways and practices.

Prehistoric resources are recognized as those attributed to Native American groups who occupied the region before contact with Europeans; historic resources are those associated primarily with Europeans and Americans but also include resources of Native Americans following contact. These resources are more than 50 years old but date to after the time of contact between Native Americans and Europeans.

The term Native American resources can refer to prehistoric sites of significance to modern Native American populations or to ethnographic and ethnohistoric resources. Ethnographic resources are those sites that were in use at the time of European exploration and later settlement of the area, while ethnohistoric resources are those areas used by Native Americans following exploration and settlement by non-Native Americans. Sites or artifacts of particular significance to modern Native Americans are often kept secret by those groups to protect the sites from disturbance, looting, overuse, or other defamations. These groups often consider sacred ceremonial sites or objects, burials and associated grave goods, or places referred to in traditional folklore.

Sacred sites that sometimes qualify as traditional cultural properties (TCPs) eligible for listing on the National Register of Historic Places are associated with the cultural practices or beliefs of a living community. These sites are rooted in the community's history and are important in maintaining cultural identity. Examples of TCPs for Native American communities include natural landscape features, trail systems, places used for ceremonies and worship, places where plants are gathered, places where artisan materials are found, and places and features of traditional subsistence systems, such as hunting areas.

4.8.1.1 Regulatory Context

There are numerous federal regulations, executive orders, and policies that direct management of cultural resources on federal lands and by federal agencies. The following is a discussion of the most pertinent laws affecting the proposed project and impact analysis.

The material expressions of past human activities and the types of areas used by people vary across the project region, where cultural resources are managed in accordance with laws, regulations, and guidelines. The principal federal law addressing cultural resources is the National Historic Preservation Act of 1966, as amended (16 USC, Section 470), and its implementing regulations (36 CFR, Part 800), which primarily address compliance with Section 106 of the act. The regulations describe the process for identifying and evaluating historic properties, for assessing the effects of federal actions on historic properties, and for consulting to avoid, reduce, or minimize adverse effects. The term historic properties refers to cultural resources that meet specific criteria for eligibility for listing on the National Register of Historic Places.

Fort Hood complies with Section 106 requirements through the Historic Properties Component (HPC) of their Integrated Cultural Resource Management Plan (ICRMP) (Department of the Army 2010). The HPC is specific to resources determined to be eligible for listing on the National Register of Historic Places, while the ICRMP provides general guidance for managing cultural resources within the overall operations of Fort Hood and outlines legal requirements. The HPC also outlines several standard operating procedures that are incorporated into installation undertakings. A program comment by the Advisory Council on Historic Preservation regarding treatment of Capehart and Wherry era Army buildings, structures, and landscape features (*Federal Register* 2002) is also applicable to this project and is discussed further below.

Other applicable laws and regulations include the American Indian Religious Freedom Act, the Antiquities Act, the Archaeological Resources Protection Act, the Native American Graves Protection and Repatriation Act, Executive Order 13007 (Native American Sacred Sites), Executive Orders 13084 and 13175 (Consultation and Coordination with Tribal Governments), a presidential memorandum regarding government-to-government relations with Native American tribal governments, and the Department of Defense's American Indian and Alaskan Native Policy.

4.8.1.2 Cultural Context

A general overview of the prehistory and history of the Fort Hood area is included in the Integrated Cultural Resource Management Plan and Historic Properties Component (Department of the Army 2010), as are summaries of documented cultural resources on the installation.

Human Occupation

Human occupation in the region extends back to approximately 10,000 years before present (BP) and continued until the 1700s. Prehistoric inhabitants were organized into a hunter-gatherer society. Site types on Fort Hood from this period include artifact scatters, hearths, habitation sites, caves or sink holes, medicine wheels, open camps, mounds, procurement areas, and rock shelters. The tribes that are associated with the area today are the Apache Tribe of Oklahoma, Caddo Nation, Comanche Nation, Kiowa Tribe of Oklahoma, Mescalero Apache, Tonkawa Tribe of Oklahoma, Wichita and Affiliated Tribes (Keechi, Waco, and Tawakonie), and the Tapilam Coahuiltecan Nation (San Antonio Mission Indians). The Leon River Medicine Wheel is the only identified TCP on base and is used today by Native Americans.

European settlement of the area began in the early 1800s and continued until 1942 when land for Camp Hood (now Fort Hood) was acquired. Site types on Fort Hood related to historic settlement and use of the area are cattle ranches, farms, community structures, cemeteries, artifact scatters, bridges, culverts, refuse dumps, livestock features, quarries, railroad tracks, rock walls, school buildings, and water features. Notable historic buildings from this period are the Reynolds House, built in 1915 for a prominent businessman in the agricultural and rural development of central Texas, and Building 53, a Camp Hood post chapel and one of only a handful of remaining original Camp Hood buildings. Previous residents of the Fort Hood property as well as their descendants are considered consulting parties and still express interest in the historic-era resources of the base.

4.8.1.3 Identified Cultural Resources

Archaeological Resources

The area proposed for development next to Kouma East was surveyed for archaeological resources in 1991 (Thomas 1993; Jones 2010). No cultural resources have been identified in the development area, and Fort Hood cultural resources staff consider the potential for subsurface deposits as low. The ground surface is eroded, and subsurface sediments are older than prehistoric occupation of this region.

Built Environment Resources

The 67-acre parcel proposed for development is undeveloped, and no architectural resources exist in its boundaries.

Native American Resources

An inventory of TCPs is in progress at Fort Hood (Department of the Army 2010; Wood 2010). At this time, no known TCPs, sacred areas, or traditional use areas exist within or next to the overall project area.

4.8.2 Consequences

4.8.2.1 Proposed Action

The Proposed Action is expected to have no effects on cultural resources. No cultural resources have been identified in the project area.

Archaeological and Native American resources are considered unlikely to occur in the project area, including subsurface resources. In the event unanticipated subsurface resources are encountered during implementation of the project, Standard Operating Procedure 11 of the ICRMP (Inadvertent Discoveries and Emergency Actions) would be followed. Further, Standard Operating Procedure 12 of the ICRMP (Government-to-Government Consultation with Tribes) would be followed in order to ascertain any Native American concerns regarding the Proposed Action. As such, the Proposed Action is expected to have no effects on archaeological and Native American resources.

4.8.2.2 No Action Alternative

No effects are expected on cultural resources as a result of the No Action Alternative since the Proposed Action and associated ground disturbances would not occur.

4.9 SOCIOECONOMICS

4.9.1 Affected Environment

4.9.1.1 Economic Development

This section describes the contribution of Fort Hood to the economy and the sociological environment in the region. The socioeconomic indicators used for this study include regional economic activity, population, housing, and schools. In addition, recreation and community facilities and public and social services are discussed. These indicators characterize the ROI.

An ROI is a geographic area against which social and economic impacts of project alternatives are analyzed. The criteria used to determine the ROI are the residency distribution of Fort Hood employees, commuting distances and times, and the location of businesses providing goods and services to Fort Hood, its personnel, and their dependents. Based on these criteria, the ROI for the social and economic environment is defined as Bell County and Coryell County, Texas, an area of 2,112 square miles.

Regional economic activity. In 2008 employment in the ROI was almost exclusively nonagricultural. The primary sources of employment were management, sales, and service occupations, which together account for more than 75 percent of regional employment (US Census Bureau 2008). Table 4-12 shows ROI employment by industry category.

Table 4-12
Fort Hood ROI Employment by Industry

Employment Sector	2000 ROI Employment (Percent of Total Employment)	2008 ROI Employment (Percent of Total Employment)
Total	111,308	131,174
Management, professional, and related occupations	33,522 (30.1%)	41,690 (31.7%)
Service occupations	19,978 (17.9%)	25,537 (19.4%)
Sales and office occupations	30,044 (26.9%)	34,296 (26.1%)
Farming, fishing, and forestry occupations	556 (.49%)	356 (.27%)
Construction, extraction, maintenance, and repair occupations	11,855 (10.6%)	15,133 (11.5%)
Production, transportation, and material moving occupations	15,353 (13.7%)	14,162 (10.7%)

Source: US Census Bureau 2008

The unemployment rate in the region was 3.6 percent in 2008, which was slightly up from the 2000 unemployment rate of 3.4 percent. The per capita personal income in the ROI was \$20,920 in 2008, an increase of 24.4 percent since 2000 (US Census Bureau 2008). Slight increases in the percentage of employment in the sectors of management, services, and construction occupations have occurred since 2000, while employment in farming and sales has slightly decreased.

4.9.1.2 Demographics

Population characteristics in the ROI are provided for the most recent year for which data are available. To illustrate population trends, Table 4-13 shows data for 1990, 2000, and 2009. In 2009 the ROI population was 358,316, an increase of 12.6 percent since 2000. Between 1990 and 2000 the ROI population increased by 18.4 percent (US Census Bureau 2009).

Table 4-13
Fort Hood ROI Population Trends

	Population 1990	Population 2000	Population 2009
Bell County	191,088	237,974	285,787
Coryell County	64,213	74,978	72,529
Total ROI	255,492	313,189	358,316

Source: US Census Bureau 2009

4.9.1.3 Housing

On-Post Housing. Fort Hood has over 6,000 homes in 13 housing areas. These include both single-family and multifamily homes, from two to five bedrooms. These housing areas include community facilities, such as schools, community centers, swimming pools, and child development centers. The housing villages also provide community halls, sports facilities, parks, and playgrounds. Retail facilities are present in several of the villages. A post exchange and commissary are on both Clear Creek Road on the west side of the installation and on Warrior Way Road on the east side. On-post housing is typically fully occupied, though some units may be temporarily unavailable to allow maintenance to be completed between tenants. Guest housing, transient housing, and single Soldier barracks also account for on-post housing.

Off-Post Housing. There were 136,807 housing units in the ROI in 2008. Most off-post Fort Hood military and civilian personnel live in Killeen and Harker Heights in Bell County and in

Copperas Cove in Coryell County. Vacancy rates have increased since 2000, from 8.1 percent to 14.8 percent.

Table 4-14
ROI Housing Quantity and Quality

	Bell County	Coryell County	ROI
Total housing units	113,117	23,577	136,807
Occupied housing units	95,646	20,221	115,867
Owner-occupied	57,823	11,751	69,574
Renter-occupied	37,823	8,470	46,293
Vacant housing units	17,471	3,356	20,827
Vacant housing units percent of total	15.4%	14.2%	14.8%
Rental vacancy rate	17.3%	14.9%	16.1%
Lacking complete plumbing facilities	484	55	539
Lacking complete kitchen facilities	612	174	786

Source: US Census Bureau 2008

4.9.1.4 Environmental Justice

On February 11, 1994, President Clinton issued Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations. The Executive Order is designed to focus the attention of federal agencies on the human health and environmental conditions in minority and low-income communities. Environmental justice analyses are performed to identify potential disproportionately high and adverse impacts from Proposed Actions and to identify alternatives that might mitigate these impacts.

The ROI has a greater percentage of minority residents than Texas and the United States as a whole, as shown in Table 4-15. In 2008, 66.4 percent of the ROI population was white and 19.6 percent was black. All other racial groups combined totaled approximately 3.4 percent of the population, while 15.2 percent were of Hispanic ethnicity. In Texas, 71.4 percent of the population was white, 11.5 percent was black, and 4 percent was of another minority racial group; 35.9 percent was of Hispanic ethnicity. In the United States as a whole, 74.3 percent of the population was white, 12.3 percent was black, and 5.3 percent was of other minority racial groups; approximately 15.1 percent of the US population was Hispanic. The percentage of Hispanic population is not part of the total ethnic percentage because the population of Hispanic origin could be of any race.

Table 4-15
2008 Race, Ethnicity, and Poverty Status for the
Fort Hood ROI, Texas, and the United States

	ROI	Texas	United States
White	66.4%	71.4%	74.3%
Black	19.6%	11.5%	12.3%
American Indian, Eskimo, Aleut	0.6%	0.5%	0.8%
Asian, Pacific Islander	2.8%	3.5%	4.5%
Hispanic*	15.2%	35.9%	15.1%
Living in Poverty**	13.5%	16.3%	13.2%

Source: US Census Bureau 2008

*Persons of Hispanic Origin may be of any race.

**Threshold of annual amount of cash income minimally required to support an individual.

The Census Bureau bases the poverty status of families and individuals on 48 threshold variables, including income, family size, number of family members under the age of 18 and over 65 years of age, and amount spent on food. In 2008, approximately 13.5 percent of the ROI residents were classified as living in poverty, somewhat lower than in Texas, yet slightly higher than the United States as a whole.

4.9.1.5 Protection of Children

Executive Order 13045 seeks to protect children from disproportionately incurring environmental health or safety risks that might arise as a result of Army policies, programs, activities, and standards. Historically, children have been present at Fort Hood as residents and visitors (e.g., users of recreation facilities, family housing, and schools). On such occasions, the Army has taken precautions for their safety by a number of means, including installing fencing, limiting access to certain areas, and providing adult supervision.

Previous investigations identified hazardous substances (asbestos-containing material [ACM], lead-based paint [LBP], possibly polychlorinated biphenyls [PCBs], and pesticides) in many of the housing units on Fort Hood. These materials were widely used in the building products industry and for housing maintenance for many years. However, their presence in the housing units has been determined to not constitute a health hazard under normal circumstances, and the materials are being removed or encapsulated as units are renovated.

4.9.2 Consequences

Each of the project alternatives was reviewed and evaluated to identify potential beneficial or adverse impacts on conditions in the ROI. For the Proposed Action, impacts on population, employment, housing, and quality of life were evaluated. Factors considered in determining whether a project alternative would have a significant impact on socioeconomics are the extent or degree to which its implementation would change the following:

- Population;
- Employment and total income in the ROI;
- Demand on housing; or
- Demand on public services, such as schools, fire, and security services.

4.9.2.1 Proposed Action

Economic development. Short-term, minor, beneficial effects are expected. In the short term, the expenditures and employment associated with construction of new housing would increase the ROI sales volume, employment, and income. The economic benefits would last only for the duration of construction. These changes in specific economic parameters would fall within historical fluctuations and are considered minor.

Demographics. No effects are expected. The Proposed Action would replace the existing 318 Chaffee Village homes and would not increase or decrease the population at Fort Hood.

Housing. Long-term effects on local housing would be beneficial. The proposed development would increase the quality of the ROI housing stock because availability of affordable, quality family housing is a key function of quality of life for Soldiers and their families. The Proposed Action would increase the quality of housing units on-post for military personnel and their dependents. There would be little effect on off-post housing because, when the program is complete, the total number of units would not increase on-post.

Environmental justice. The Proposed Action would not result in disproportionate adverse environmental or health effects on low-income or minority populations. The Proposed Action would improve the quality of living at Fort Hood and would result in dividing any community with disproportionate or minority population. Thus, the environmental justice impacts would be less than significant.

Protection of children. No effects on children are expected as a result of the Proposed Action. Construction sites can entice children, and, although only authorized personnel would be allowed on the project construction site, there is the potential for unauthorized entry in which children would be exposed to safety risks. The Army and Actus have safety requirements that minimize these and other risks. During construction, safety measures stated in 29 CFR, Part 1926, Safety and Health Regulations for Construction, and Army Regulation 385-10, Army Safety Program, and Actus's Global Minimum Requirements would be followed to protect the health and safety of residents on Fort Hood, as well as construction workers. Barriers and "authorized entry only" signs would be placed around construction sites to deter children from entering the site and playing there. Construction vehicles, equipment, and hazardous materials would be secured when not in use. With these safety measures in place, there would be no adverse effect on the protection of children. There may be a minor beneficial effect because the living conditions for families would be improved, and play areas would increase in the housing area.

4.9.2.2 No Action Alternative

There would be minor adverse effects on socioeconomics under the No Action Alternative. The modern military family's unmet demand for new on-post housing would continue, and the economic development aspects of construction would not be realized. Other socioeconomic factors are not expected to be affected because existing conditions would remain unchanged.

4.10 TRANSPORTATION

4.10.1 Affected Environment

The transportation systems that support Fort Hood include roadway, rail, and air systems. The following discussion describes these systems and their relative uses.

4.10.1.1 Roadways and Traffic

On-post highways and roads. All roadways throughout Fort Hood are classified as primary, secondary, or tertiary, according to their relative importance and function as part of the roadway network. Primary roadways are all installation roads and streets that serve as the main distribution arteries for all traffic originating outside and within the installation and that provide access to and between various areas. Secondary roadways include all installation roads and streets that supplement the primary roadways by providing access to, between, and within the various areas (USACE 1995).

A number of primary streets are routed continuously through the southern part of the Main Cantonment and function primarily to collect and distribute traffic within Fort Hood (see Figure 2-1). These roads are constructed largely of concrete or asphaltic concrete and are considered to be in good condition. They are Hood Road and Clear Creek Road, which provide access to US Highway 190 to the south; Tank Destroyer Boulevard, which provides access to Killeen to the east and Copperas Cove to the west; Battalion Avenue, which primarily facilitates east-west movement in the Main Cantonment and provides access to Killeen via the Central Drive post entrance; and Warrior Way Road, which transitions into the one-way pair of Park Avenue and Central Avenue, just west of Martin Drive, both of which terminate at Clear Creek Road to the west. The principal street providing access to West Fort Hood is Clarke Road, which runs north-south from Turkey Run Road on the north to Grey Drive on the south. All of these roadways, except Clarke Road, are multilane for most of their length in the Fort Hood study area.

A number of primary streets are routed continuously through the southern part of the Main Cantonment and function primarily to collect and distribute traffic within Fort Hood. These roads are constructed largely of concrete or asphaltic concrete and are considered to be in good condition.

Off-post highways and roads. Serving Fort Hood are US Interstate 35, US Highway 190, US Highway 183, US Highway 84, and State Highway 36. These arteries provide excellent means to

get to and from the Waco and Dallas/Fort Worth areas to the north, the Austin/San Antonio region to the south, western Texas, and other nearby communities and cities, including those in the southeast. Road compositions range from heavy-duty asphaltic concrete to medium-duty asphalt (USACE Fort Worth District 1995).

4.10.2 Consequences

Factors considered in determining whether an alternative would have a significant impact include the degree to which its implementation would cause or result in the following:

- Increases in vehicle trips on local roads that would disrupt or alter local circulation patterns;
- Lane closures or impediments that would disrupt or alter local circulation patterns;
- Activities that would create potential traffic safety hazards; or
- Increased demand on public transportation in excess of planned or anticipated capacity at the time of increase.

4.10.2.1 Proposed Action

Roadways and traffic. Short-term, minor, adverse effects are expected. The highways are well designed and are capable of handling all types and volumes of vehicles associated with operations at Fort Hood. However, during the construction phase, traffic congestion could occur locally, particularly during the morning and evening peak traffic hours, as construction vehicles enter and exit the construction site and Fort Hood. Construction vehicle access is restricted to the Clarke Road gate, so there would be a minor increase in traffic on the roadways leading in and out of the gate. This includes equipment and supplies deliveries, commuting workers, and other construction-related traffic. Construction debris is likely to be disposed of at the Fort Hood landfill, so routes to and from it would experience minor and infrequent increases in traffic. Effects on traffic would be minimized with the implementation of a traffic management plan to coordinate construction traffic with existing transportation and traffic flows to minimize disruptions. The traffic management plan would anticipate such issues as the traffic flow, pedestrian access, site access and parking, roadway and intersection traffic control, and travel demand management and transit service planning (US DOT 2009).

Public transportation. The proposed residential area expansion would not affect public transportation services.

4.10.2.2 No Action Alternative

No effects are expected on traffic and transportation as a result of the No Action Alternative because conditions would remain unchanged. The construction would not occur, so there would be no changes in traffic patterns and volume.

4.11 UTILITIES

4.11.1 Affected Environment

4.11.1.1 Potable Water Supply

Water is distributed on the installation by three separate water supply systems: the Main Cantonment system, the Belton Lake Recreation Area system, and the North Fort Hood system (Guernsey 1999, cited in USACOE 2000a). Most of the water serving Fort Hood is purchased from the BCWCID, which draws water from Belton Lake, approximately 16 miles northeast of Fort Hood's Cantonment Area. Water supplying the North Fort Hood system is purchased from Gatesville. Since the Fort Hood RCI project affects West Fort Hood, this section generally discusses and analyzes the utilities at Fort Hood.

Water is fed through a 54-inch main to the Main Cantonment system, which also serves West Fort Hood and the family housing areas in South Fort Hood. An estimated 2.2 billion gallons per year (average daily throughput of 6.02 mgd) of water is provided. Fort Hood is allotted a maximum of 16 mgd of potable water. In an average year, BCWCID produces 11.5 billion gallons of potable water. In addition to supplying water to Fort Hood, BCWCID serves Belton, Copperas Cove, Killeen, Harker Heights, 439 Water Supply, and Bell County WCID No. 3 (Atkinson 2011). BCWCID's highest peak day in history occurred in July 2008, in which total demand from the facility reached 67 mgd. The facility design was expanded in 2008 to provide service for a peak demand of an additional 10 mgd, allowing for a maximum demand of 90 mgd (Atkinson 2011). The peak demand is the highest amount of water usage during a given period of time, or the maximum capacity or demand. Water storage facilities at the Main Cantonment consist of a system of 15 elevated and 7 ground-level storage tanks, for a total storage capacity of 9.9 million gallons (USACE Fort Worth District 1995).

Inside the Main Cantonment, water mains are made mostly of bell and spigot cast iron or ductile iron of various sizes, ranging from 3-inch diameter to 24-inch diameter. Pressures in the distribution systems are maintained at 30 pounds per square inch (psi) or better (USACE Fort Worth District 1995).

Treatment facilities in the Main Cantonment are adequate to support pumping capacities. Because these facilities can be readily expanded, they are not considered a system constraint when considering long-range planning and development (USACE Fort Worth District 1995).

4.11.1.2 Sewer

The Main Cantonment (including West and South Fort Hood), North Fort Hood, and the Belton Lake area have individual wastewater systems (Guernsey 1999, cited in USACOE 2000a). Because the Proposed Action affects only West Fort Hood, this section generally discusses and analyzes sanitary sewer collection systems at Fort Hood.

Wastewater for most of Fort Hood is treated through a contract with BCWCID, which is capable of handling 8.8 mgd of wastewater and a total maximum capacity of 3.2 billion gallons annually from Fort Hood. In an average year, BCWCID treats 5.5 billion gallons of wastewater, including 1.1 billion gallons of wastewater annually from Fort Hood. The average wastewater production by Fort Hood is 3 mgd. In addition to Fort Hood, BCWCID also serves Killeen, with an average of 4.4 billion gallons a year. The BCWCID sewage collection system was renovated in 2006 (Atkinson 2011). Most of the Fort Hood sewage collection system consists of lines made from vitrified clay, with some cast iron, ductile iron, reinforced concrete, cement, and PVC lines. They range in size from 4 to 30 inches, excluding force mains and building service lines. The system also includes 1,840 manholes (USACE Fort Worth District 1995) and 31 lift stations (Guernsey 1999). The system discharges into four main trunk sewers. The maximum capacity of this collection system is 13.0 mgd (USACE Fort Worth District 1995). The sewage collection system in West Fort Hood consists of PVC piping, two lift stations, and two trunk sewer systems. This system is reportedly in good condition (Quinney 2010).

4.11.1.3 Stormwater

The topography at Fort Hood is gently to moderately rolling. The surface water of the area flows into the South Nolan Creek watershed (see Figure 4-4), which ultimately feeds into the Brazos River system. Fort Hood's drainage system is made up of natural streams, improved channels (natural and concrete), and underground storm drain pipes, all of which direct runoff away from the residential areas (USACE Fort Worth District 1995).

Most channels at Fort Hood adequately convey waters from a 10-year storm. Four ponds are considered adequate to handle a 10-year storm: the stormwater management basin in Comanche I, the pond just east of Comanche I, the pond east of the helipad, and Pershing Lake (USACE Fort Worth District 1995). The stormwater system at Fort Hood is designed to handle a 10-year storm, but some nuisance flooding occurs during these storms (Preston 2000, cited in USACOE 2000a). The underground storm sewers in the "satellite" housing areas have been found inadequate for the

10-year storm in almost every case. Most of the surface systems in these areas are adequate for the 10-year storm to convey runoff away from residences safely; exceptions are the southwest corner of Chaffee Village and Tiguas Street in Comanche I (USACE Fort Worth District 1995).

4.11.1.4 Energy Sources

Electricity. Oncor, the transmission and distribution entity, supplies electricity to Fort Hood through two 138,000-volt transmission lines. Under the Proposed Action, Fort Hood would continue to use these lines and associated power substations for any new facilities. By contract, current retail energy provider, Reliant Energy, Houston, Texas, supplies an annual demand maximum of 674,520,000 kilowatt-hours to Fort Hood. Oncor is capable of supplying 77,000 kilowatts peak demand to Fort Hood through two 138,000-volt transmission lines. Fort Hood currently uses approximately 433,650,256 kilowatt-hours annually (Thomas 2010).

The electrical system is divided into two distribution systems that serve the two distinct and separate Main Cantonment and North Cantonment. Oncor supplies 1,380 kilovolts to the Main Cantonment and 68 kilovolts to the North Cantonment through the substations. The substations then transform the power to a 12,470-volt distribution system. The Main Cantonment is serviced by Main, Clark, and West Fort Hood Substations. The Main Fort Hood Substation, is currently at 75 percent capacity. Clark Fort Hood Substation is currently at 50 percent of capacity. West Fort Hood Substation is currently at 55 percent of capacity. North Cantonment and Ranges are serviced by the North Fort Hood Substation, which is at 69 percent of capacity (Hernandez 2011).

Natural gas. The natural gas distribution system at Fort Hood serves most of the installation's heating, domestic hot water, institutional hot water requirements for cooking and drying laundry, and some cooling requirements (USACE Fort Worth District 1995). Atmos Energy guarantees an annual delivery of 1,300,000 cubic feet of natural gas to Fort Hood. Under the Proposed Action, Fort Hood would continue to use this service for any new facilities, but individual utility connections to each lot would need to be installed.

Fort Hood uses approximately 961,258 million metric British thermal units of natural gas annually (Thomas 2010). The gas supply for the installation is fed by a 10-inch high-pressure line (400 psi) and then distributed throughout the installation via three medium-pressure lines (65 psi) and several low-pressure lines (30 psi), ranging from 4 to 10 inches in diameter (Guernsey 1999, cited in USACOE 2000a).

4.11.1.5 Communications

Telephone service to the family housing areas is provided by CentryLink. Because phone service is available to all residents who request it, additional capacity requirements were assessed with respect to the current demand.

Time Warner Cable provides cable service to the installation. For residential units built under the Proposed Action, outlets for telephone, cable TV, and satellite TV (three separate systems) would be installed in the family room, living room, and all bedrooms and desk areas.

4.11.1.6 Solid Waste

Solid waste is defined as any garbage or refuse, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility. It includes other discarded material, such as solid, liquid, semisolid, or contained gaseous material from industrial, commercial, mining, and agricultural operations and from community activities. Construction and demolition (C&D) debris (which, in this case, includes renovation-generated debris) is defined as uncontaminated solid waste from the construction, remodeling, repair, and demolition of utilities, structures, and roads and uncontaminated solid waste from land clearing. Such waste includes bricks, concrete, and other masonry materials, soil and rock, wood (including painted, treated, and coated wood and wood products), land clearing debris, wall coverings, plaster, drywall, plumbing fixtures, asbestos-free insulation, roofing shingles and other roof coverings, asphalt pavement, glass, plastics that are not sealed in a manner that conceals other wastes, empty buckets of 10 gallons or less and having no more than one inch of residue on the bottom, electrical wiring and components containing no hazardous liquids, and pipe and metals that are incidental to any of the above. Solid waste that is not C&D debris (even if it results from the construction, remodeling, repair, and demolition of utilities, structures, and roads, and land clearing) includes asbestos waste, garbage, corrugated container board, electrical fixtures containing hazardous liquids (such as fluorescent light ballasts or transformers), fluorescent lights, carpeting, furniture, appliances, tires, drums, containers greater than 10 gallons, any containers having more than one inch of residue on the bottom, and fuel tanks (Franklin Associates 1998 cited in USACOE 2000a). Under Texas regulation, C&D debris may contain lead-based painted materials and ACM only if those materials are part of a building demolition (e.g., floor tiles). The project site does not have any structures.

The Fort Hood landfill, in Bell and Coryell Counties, is a government-owned, contractor-operated Class I municipal solid waste facility, operating under Permit Number 1866. Solid waste is

collected under contract with a private refuse company. Fort Hood also has a recycling facility and a compost facility, which reduce the amount of materials going to the landfill.

4.11.2 Consequences

Effects on infrastructure are considered in terms of increases in system demands and the ability of the systems to meet those demands. Effects on the environment could occur if the systems are insufficient to handle the increased demands, requiring system expansion or construction and operation of a new system that could affect the environment. Utility demands include both construction and operations use.

4.11.2.1 Proposed Action

The Proposed Action includes the installation of new infrastructure (water, wastewater, gas, and electricity) as construction progresses. The design includes the requirements of the RCI minimum design standards and the Actus Design Standards and would use products that meet the LEED-H Silver Requirements for Actus Purchasing Agreements. Fort Hood would not gain personnel as a result of the Proposed Action, which would not result in a net long-term gain of housing units. Fort Hood residents would relocate to the new housing from older and smaller units. The vacated units would remain unoccupied until a decision is made as to remodel or demolish them (see the Proposed Action discussion in Section 2). Any increases in residents or utility consumption would be temporary because the final number of housing units under FHFH contract would remain the same. Thus, the population at Fort Hood and demand on utilities would not increase as a result of the Proposed Action. Utility use should remain about the same under the Proposed Action as it is now. No significant impacts on utilities are expected.

Potable water supply. No effects on the water supply are expected as a result of the Proposed Action. There would be no increase in personal at Fort Hood, but residents would be relocated from existing older housing on-post. Potable water comes from the same aquifer and is purchased by Fort Hood from Bell County and the City of Killeen. The proposed site would receive new delivery lines in the development area, providing improved water delivery and reduced water exfiltration and loss, which is a slight beneficial effect. The incorporation of several sustainable design features would further help to conserve water. For example, the use of rainwater collection systems would be encouraged to water lawns instead of using potable water. Therefore, no effects are expected under the Proposed Action because potable water demand at Fort Hood would not increase.

Sanitary wastewater. No effects are expected. Construction areas would receive new wastewater collection lines, and one new lift station and one upgraded lift station are being proposed (Alexander 2010b). Treated effluent from wastewater that could result from the Proposed Action would be discharged into South Nolan Creek after treatment by BCWCID. The treatment plant operates within the requirements of its National Pollutant Discharge Elimination System permit and rarely affects downstream surface water resources (TRC Mariah Associates 1999).

There would be no increase in demand on the sanitary wastewater system with the new housing, and there is sufficient capacity at Fort Hood. Since the Proposed Action would not result in more people using the available resources, impacts would likely remain the same as under current conditions. Wastewater would only be relocated; the same number of people living at Fort Hood and surrounding communities is not expected to change as a result of the Proposed Action, and they are already likely using the current wastewater system. Local systems might be affected, but overall it would be the same number of personnel and their families but living in a different area at Fort Hood; thus, no effects are expected.

Stormwater. Construction of the Proposed Action would impact stormwater temporarily. A SWPPP would be prepared in accordance with the National Pollutant Discharge Elimination System regulations. This SWPPP would describe the use of and implementation procedures for the suggested BMPs. In addition, all work would cease during heavy rains and would not resume until conditions are suitable for moving equipment and materials; consequently, the adverse effects would be less than significant.

No negative effects are expected on stormwater after construction. The project would be out of the 100-year floodplain (Quinney 2011). Section 438 of Energy Independence and Security Act of 2007 would be followed, making the site improved or the same as when it started, as it is required by law. The construction of new stormwater management structures would provide engineered stormwater infrastructure and flood control measures, which would be a change from the current natural flood control system; however, there are no significant effects expected as a result of the Proposed Action.

Long-term minor beneficial effects are expected. The renovation and construction strategy would address flood occurrence areas on a case-by-case basis and would ensure new construction areas would be provided with proper stormwater infrastructure (Musser 2011). Currently, all basins in the cantonment areas are considered either marginally or fully adequate to carry runoff loads

associated with 10-year storms. New development design is expected to handle the five-year storm by building proper pipe infrastructure and to ensure that the 100-year storm design does not exceed capacity within the rights-of-way. The new design is also expected to handle a 100-year storm without flooding homes (Preston 2000, cited in USACOE 2000a).

Energy. No effects are expected. The installation of energy-saving devices in the new housing units and energy-efficient interior and exterior lighting fixtures and controls in selected locations would help offset the typical demand for energy consumption. The housing units would include energy-efficient major appliances (ranges, ovens, water heaters, and furnaces) that meet Energy Star efficiency standards and LEED-H Silver design standards.

Communications. No effects are expected. The same infrastructure would be used, but with new extensions into the proposed housing area. There would be no increase in demand on communications systems under the Proposed Action.

Solid waste. Short-term, minor, adverse direct effects and long-term, minor, adverse indirect effects are expected. Debris from construction, demolition, and renovation of family housing would increase substantially over five years, relative to the solid waste generated annually by the installation. The debris would be hauled to the on-post municipal landfill, whose time of useful capacity is expected to decrease by an estimated 1.84 years (see Table 4-16 for debris generation calculations). There is sufficient capacity in the Fort Hood landfill to accommodate project-related debris and sufficient capacity in regional landfills to accept solid waste from construction and demolition.

Table 4-16
Estimates of Construction Debris Generated as a Result of the Proposed Action on Fort Hood – Phase I Design

Housing Unit Type	Average Gross Square Footage	Number of Units	Gross Square Footage	C&D Factor in Pounds per Square Foot	Waste in Pounds	Waste in Tons
3-bedroom	1,630-1,750	54	94,500	7.46	1,425,606	10.3
4-bedroom	1,940-2,100	46	96,600	7.46	1,425,606	10.3
TOTAL					20.6	

Source: Quinney 2010

Construction under the Proposed Action would generate waste during the build-out phase, but solid waste quantities would return to just above current levels following this phase. The Proposed Action would not result in a net long-term gain of housing (see Section 2 for discussion

on the Proposed Action), so the amount of domestic solid waste is not expected to increase significantly.

The short-term, minor, adverse effects would be from an increase in construction vehicles hauling debris to the landfill. Care would be taken in the transport process to ensure that debris would not fall onto the roadways and create traffic hazards and litter. Also, building materials and debris would be secured on-site so as not to be blown off outside of construction and demolition areas. This would minimize any potential effects on visual and aesthetic resources and hazards on children and wildlife. Overall, because the Proposed Actions does not result in a long-term gain of people at Fort Hood using the available resources and because the housing would be built to LEED-H Silver criteria, effects are likely to remain close to the same as under current conditions. Therefore, no effects are expected.

4.11.2.2 No Action Alternative

No effects on utilities are expected as a result of the No Action Alternative because existing conditions would remain unchanged. The FHFH would not construct, operate, or maintain the proposed family housing units on the project's 67 acres.

4.12 HAZARDOUS AND TOXIC SUBSTANCES

4.12.1 Affected Environment

Specific environmental statutes and regulations govern hazardous material and hazardous waste management at Fort Hood. For this analysis, hazardous waste, hazardous materials, and toxic substances are those defined as hazardous by the Comprehensive Environmental Response, Compensation, and Liability Act, the Resource Conservation and Recovery Act (RCRA), or the Toxic Substances Control Act. In general, these are substances that, because of their quantity, concentration, or physical, chemical, or toxic characteristics, may present substantial danger to public health or welfare or the environment when released into the environment.

Tetra Tech (2010) completed a Phase I Environmental Site Assessment (ESA) of the 67-acre Kouma East parcel, a summary of which is included in the following sections.

4.12.1.1 Uses of Hazardous Materials

The proposed project area is undeveloped, and no hazardous materials are stored or are suspected to be present in the proposed project area (Tetra Tech 2010).

4.12.1.2 Storage and Handling Areas

A number of hazardous materials and specialty chemical storage areas are used for small-quantity chemicals on Fort Hood RCI properties. These areas are limited to the Family Housing Operations and Maintenance complex, bounded by 72nd Street, Terminal Avenue, 77th Street, and Warehouse Avenue (including Buildings 4301, 4303, 4313, 4319, and 4321), and a carpentry/paint shop in north central Walker Village (Building 8480). These buildings typically stored construction material for renovating housing. The materials identified that could pose an environmental concern were paints, solvents, detergents, waxes, and pesticides, all of which were stored in separate buildings. Each of these buildings and storage areas has been constructed to Occupational Safety and Health Administration standards for structural integrity, spill containment, and personnel exposure prevention.

It is unlikely that environmental releases have occurred in the proposed project area because there were no indications that hazardous materials had been spilled, stored, or disposed of on or near this area (Tetra Tech 2010). No hazardous materials storage or evidence of hazardous materials were observed on the proposed project area during the Phase I ESA (Tetra Tech 2010).

4.12.1.3 Hazardous Waste Disposal

Normal operations at Fort Hood generate wastes defined as hazardous by RCRA and state statutes. A variety of hazardous wastes are generated from the normal maintenance and operations of Army programs at Fort Hood. To facilitate disposal of the solid waste material, both hazardous and nonhazardous, Fort Hood has a RCRA permit to operate three hazardous waste storage units, including a solid waste landfill with a Class I disposal cell. As a large-quantity generator, Fort Hood produces more than 1,000 kilograms (2,200 pounds) of hazardous waste in a calendar month. The post's DPW is responsible for managing these wastes, which are temporarily placed in satellite accumulation points for less than 90 days at the installation before being transported to an approved RCRA disposal facility.

The Fort Hood Environment and Natural Resources Standing Operating Procedure (USACE and Fort Hood 1997) prescribes policies, assigns responsibilities, and establishes procedures for protecting the environment, preserving natural resources, and managing hazardous materials and hazardous waste. This document provides requirements for waste identification, storage and handling, transportation, and disposal and for hazardous waste minimization for Fort Hood personnel, including residents.

Each quarter, a Hazardous Material/Hazardous Waste Amnesty Weekend is held to allow Fort Hood residents to bring suspected hazardous materials to a central location for disposal. Residents typically bring paint, gasoline, solvents, pesticides, and lead-acid and nickel-cadmium batteries for proper disposal.

No satellite accumulation points or less than 90-day storage areas are in or near the proposed project area.

4.12.1.4 Site Contamination and Cleanup

The Fort Hood military reservation is regulated under RCRA as a hazardous waste management facility and is permitted to operate three hazardous waste storage units. The RCRA permit requires that the Fort Hood personnel perform a RCRA facility investigation for the solid waste management units (SWMUs) listed in the permit. These SWMUs are distributed across the military reservation, in the Main Cantonment, West Fort Hood, and North Fort Hood. They include former solid waste landfill and burial sites, former and inactive underground storage tank locations, active wash rack/sewer systems, effluent ponds, and a sanitary sewer network. Between

November 1996 and March 1997, 35 of the SWMUs were investigated as part of the RCRA facility investigation. There are no SWMUs at or next to the 67-acre Kouma East parcel site.

4.12.1.5 *Special Hazards*

PCBs are industrial compounds used in electrical equipment, primarily capacitors and transformers, because they are electrically nonconductive and stable at high temperatures. Because of their chemical stability, PCBs persist in the environment, bioaccumulate in organisms, and become concentrated in the food chain.

PCBs are regulated by the Toxic Substances Control Act for the removal and disposal of PCB-contaminated equipment at concentrations greater than 50 parts per million (ppm).

In 1994, Fort Hood conducted surveys of all 3,680 electrical transformers throughout the installation and sampled the mineral oils in 230 of these transformers (TRC Mariah Associates 1995). Of the 230 transformers sampled, the technicians identified 10 transformers having PCB concentrations greater than 500 ppm and 19 transformers having PCB concentrations between 50 ppm and 499 ppm. The remaining 201 transformers were classified as non-PCB transformers (<50 ppm PCB). The transformers identified to contain PCBs were subsequently removed, recycled, or replaced (TRC Mariah Associates 1995).

Fluorescent light fixtures potentially containing PCBs were identified in nearly all of the residences, typically in the kitchens (TRC Mariah Associates 1998a). The conclusions made were that these fixtures are not likely to pose an environmental hazard as long as they remain intact.

There are no structures or transformers on the proposed project area, so no PCBs are likely at the project site.

Asbestos. Remediation for ACM is regulated by the EPA and the Occupational Safety and Health Administration. Asbestos fiber emissions into the ambient air are regulated in accordance with Section 112 of the Clean Air Act, which established the National Emissions Standards for Hazardous Air Pollutants. These standards address the demolition or renovation of buildings with ACM.

Two categories are used to describe ACM. Friable ACM is defined as any material containing more than one percent asbestos (as determined by polarized light microscopy) that, when dry, can

be crumbled, pulverized, or reduced to powder by hand pressure. Nonfriable ACM is material that contains more than one percent asbestos and does not meet the criteria for friable ACM.

Records relating to asbestos identification, control, and removal are maintained by a Fort Hood asbestos coordinator and are made available on request. Supervisors, maintenance workers, facility managers, project engineers, and contractors at Fort Hood are required to review these asbestos records before starting any maintenance, repair, renovation, or demolition. All ACM subject to disturbance in such projects must be abated by trained and qualified asbestos personnel before a work order can be submitted to maintenance personnel or a general contractor. ACM will be encapsulated or removed, in accordance with the Operations and Maintenance Plan, Fort Hood (Radian 1997). This plan includes notification requirements and details the requirements for abating asbestos, using vacuums with high-efficiency particulate air filters, wearing personal protective equipment, wetting the surfaces before removal, and bagging the ACM for disposal.

There are no structures on the proposed project area, so no ACM is likely to be present at the project site.

Lead-based paint. Army policy calls for controlling LBP by managing it in-place (as opposed to mandated removal). In-place management prevents deterioration over time for those surfaces likely to contain LBP, followed by replacement as necessary. Maintenance staff and residents are given instructions on routine cleaning procedures leading to capture LBP fragments from suspected locations. As there are no structures on the proposed project area, so LBP is not likely.

Pesticides. There are no structures on the proposed project site, and the property has not been used for agriculture. There is no record of pesticide application or presence in soils at the project site (Quinney 2011).

Radon. Radon is a naturally occurring, colorless, and odorless radioactive gas that is produced by the decay of naturally occurring radioactive material, such as potassium and uranium. Atmospheric radon is diluted to insignificant levels, but, when concentrated in enclosed areas, radon can present human health risks. As there are no structures on the proposed project area, radon has not been an issue investigated at the site.

4.12.2 Consequences

Potential impacts on hazardous materials and hazardous waste management are considered significant if the Proposed Action were to result in the following:

- Be out of compliance with applicable federal and state regulations or
- Increase the amounts of generated or procured hazardous materials beyond current permitted capacities or management capabilities.

4.12.2.1 Proposed Action

Short-term, minor, adverse effects would be expected if hazardous materials were used for construction. Construction in areas susceptible to radon would include engineered controls, such as subfloor venting or barriers, to minimize or eliminate radon accumulation. Such materials as paints, asphalt, fuels, and motor oils for vehicles would likely be on-site during construction. Persons working with or near these materials would be expected to use proper personal protective equipment and handling procedures. During construction, vehicles and equipment would be inspected to ensure correct and leak-free operation, and no maintenance would be conducted on the site. Appropriate spill containment material would be kept on-site, and all fuels and other materials would be contained in the equipment or stored in appropriate containers. Persons working with or near fresh paint and asphalt should protect themselves by wearing appropriate clothing, washing their hands before eating or smoking, and bathing at the end of each workday. Construction contractors would be responsible for preventing paint and fuel spills by properly storing and handling these materials, by paying attention to the task at hand, and by driving safely.

Some materials, while essentially inert under normal conditions, can be hazardous in specific circumstances. Wood and dry concrete can generate airborne particulates as they are cut or sanded. To protect against adverse effects of such particulates, workers should wear face masks and safety glasses when performing these tasks. Also, wood and other construction materials are flammable. Establishing dedicated smoking areas and prohibiting open flames near flammable materials would greatly reduce the risk of fire. All materials would be removed from the site on completion of construction.

A SWPPP would be developed in accordance with state standards before any construction work that is likely to impact waterways. Accepted BMPs would be used to minimize erosion and contamination of run-off. No adverse effects from the suspected hazardous materials associated with construction are expected if proper precautions are taken.

4.12.2.2 No Action Alternative

No effects are expected from hazardous and toxic substances as a result of the No Action Alternative because no construction would occur and existing conditions would remain unchanged.

4.13 CUMULATIVE EFFECTS SUMMARY

4.13.1 Introduction

The cumulative effects of the Proposed Action are identified in this section. They are defined in the 40 CFR, Part 1508.7 as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.” Only those resources with similar and comparable types of environmental effects from both the Proposed Action and the cumulative projects are considered to have cumulative effects.

Unless otherwise specified, the ROI for a particular resource in the cumulative analysis is the same as the ROI for that resource in the analysis of the environmental effects from the Proposed Action.

This is an analysis of the effects of the Proposed Action, as evaluated in detail in Chapter 4, when combined with the effects of other past, present, and future actions in the affected region. Current or reasonably foreseeable actions that have been identified are described below.

4.13.2 Cumulative Actions

The actions listed in this section were identified by contacting representatives of Fort Hood and the Killeen Planning Department.

4.13.2.1 Implementation of the RCI at Fort Hood

In order to meet the needs developed in the CDMP for attaining affordable quality housing, Fort Hood proposed to provide the FHFH with a 50-year lease of approximately 1,780 square acres, conveying 5,622 existing dwellings in 14 housing areas. An additional 400 acres of post property was to be leased to FHFH for construction of family housing, ancillary facilities, and water management structures. Fort Hood would also convey 10 acres of land operated by its contractor (TECOM), totaling 2,190 acres to be leased to FHFH. Under the 50-year lease, FHFH would operate and maintain all family housing and would construct, operate, and maintain the ancillary facilities. Implementation would include increasing the Fort Hood housing inventory by 290 units to provide an inventory of 6,212 units. The retained units

would be renovated or improved and would be provided with landscaping improvements, parks, and playgrounds. FHFH was to demolish approximately 390 units, construct approximately 990 new units, and revitalize approximately 4,950 units. Development was scheduled to begin in the undeveloped areas of Montague Village III in July 2001, Comanche Village IV in September 2001, Comanche Village IIIA in November 2001, and Kouma East in January 2002. An EA for implementing the Army RCI program at Fort Hood, as described in the CDMP, was completed in October 2000, with a FNSI signed December 4, 2000.

4.13.2.2 Patton/Wainwright Expansion

An EA was completed in November 2004 for the extension and addition of 232 single-family homes at Patton Park and Wainwright Village Housing. FHFH was to lease the two lands totaling about 135.42 acres. Patton Park would consist of 149 single-family homes and Walker Village would have 83 single-family homes. Both developments would include supporting streets, detention ponds, landscaping, and open green space. Demolition would include the removal of road material, golf cart paths, and an 8-inch water line at Patton Park. Both developments would follow the CDMP established with the RCI lease.

4.13.2.3 Privatization of Army Lodging (PAL)

The PAL program started in 2006 and allows a private developer to lease land on the installation to construct, renovate, maintain, and operate privatized, short-term, and long-term lodging. Several areas have been identified by Fort Hood Master Planning and PAL developers, and leasing actions are underway. Plans include renovating lodging around the post and constructing a building at the corner of Tank Destroyer and Clear Creek Roads, which is approximately 1.5 miles northwest of the site of the Proposed Action. PAL will increase construction, which will increase sedimentation, landfill debris, and possibly hazardous materials. Currently, plans are in place to renovate several PAL buildings on Fort Hood, specifically Keith Ware Hall and the Poxon House, which are in the Main Cantonment. An EA for this project was completed in March 2008.

4.13.2.4 Army Campaign Plan Acceleration Projects

Under this initiative, current plans include six projects, as follows:

- Project number (PN) 68412 establishes a footprint to house a brigade north of Hood Army Airfield, which is underway;

- PN 68670 will construct one vehicle maintenance shop and four company operations facilities;
- PN 69127 will construct one company operations facility and a vehicle maintenance shop east of Robert Gray Army Airfield; construction is underway;
- PN 68793 will construct a new barracks;
- PN 69300 will construct four vehicle maintenance shops, 21 company operations facilities, one brigade, six battalions, a dining facility, and 1,441 unaccompanied enlisted public housing units; and
- PN 69340 will relocate the Deployment Readiness and Reaction Facility and Contractor Yard that will be disturbed during the construction of PN 69300.

4.13.2.5 Walker Village Child Development Center

Plans are being developed to construct a child development center in the vicinity of Walker Village. The center will be constructed on approximately four acres west of Warrior Way at the northeast corner of Walker Village. An EA for this project was completed in September 2008.

4.13.2.6 Montague Village Child Development Center and Youth Center

Plans are being developed to construct a child development center and youth center. The centers will be constructed on approximately six acres on the northeast corner of the intersection of Clark Road and Clement Drive at the western end of Montague Village. An EA for this project was completed in September 2008.

4.13.2.7 Kouma Village Child Development Center

Plans are being developed to construct a child development center toward the south side of Kouma Village, west of the proposed expansion associated with the Proposed Action. The acreage of the developed site would likely be between five and ten acres. Construction would include parking, play areas, and a vertical facility required for child development center operations. Measures to minimize sedimentation and erosion would be used to protect the groundwater and receiving waters in the area and to limit the potential for erosion. The timeframe for implementation would likely be within the next five years. An EA for this project was completed in September 2008.

4.13.2.8 Construction on US Highway 190

Immediately north of the site for the Proposed Action is ongoing construction on US Highway 190. Construction includes widening and resurfacing the roadway. In addition, the Texas Department of Transportation is developing plans to construct a bypass west of the Main Cantonment, northwest of the Proposed Action location. The bypass would provide a means for travelers to exit US Highway 190 and cut through Fort Hood in a northwesterly direction and eventually link up with a road north of Copperas Cove. The Texas Department of Transportation is responsible for the NEPA documentation for these projects.

4.13.2.9 New AAFES Post Exchange

Plans are being developed to construct a new post exchange at the southeast corner of Clear Creek Road and Tank Destroyer Boulevard, which is approximately 1.5 miles northwest of the Proposed Action site. The footprint of the new construction is anticipated to be approximately 25 acres. The existing post exchange building is anticipated to remain in place and be used for other unknown operations. An EA is being developed for this project.

4.13.2.10 Replacement Hospital at Fort Hood

Plans are underway to construct a new hospital on Fort Hood, just south of the existing hospital. This action would occur across US Highway 190, north of the Proposed Action. The area of disturbance for the new hospital and associated facilities is anticipated to be approximately 90 acres. The timeframe for implementation would likely be within the next five years. An EA was completed for this project in August 2009.

4.13.2.11 Stadium at Fort Hood

A new stadium will be constructed west of the existing post exchange building, off Clear Creek Road, northwest of the Proposed Action. The estimated area of disturbance for that project is approximately 25 acres. The timeframe for implementation would likely be within the next three years. An EA was completed for this project in August 2009.

4.13.2.12 Second Runway at Robert Gray Army Airfield

The City of Killeen is proposing to construct a second runway south of the RGAAF, which is approximately four miles southwest of the Proposed Action site. The RGAAF is a small joint-use military and commercial airport that is also known as the Killeen-Fort Hood Regional Airport. It currently has one runway. This project is being assessed with an environmental impact statement

(EIS). The Notice of Intent to prepare an EIS was published in the *Federal Register* on October 24, 2008. Initial assessment indicates that an EIS is warranted because the proposed action would involve construction that could have a significant effect on habitat for the federally listed black-capped vireo and golden checked warbler.

4.13.3 Cumulative Impacts

The projects listed above, in conjunction with the Proposed Action, are not anticipated to have a significant adverse effect on the environment. Each action increases Fort Hood's capacity to perform its mission by providing for the infrastructure necessary for growth. In anticipation of long-term beneficial effects, BMPs and promotion of the programs aimed at reducing sedimentation and preserving lands, such as the INRMP, the ICRMP, the Industrial Design Guide, and the Sustainable Range Program, would be used during construction. RCI actions evaluated in previous EAs are also past, present, or reasonably foreseeable future actions and are therefore considered as part of the cumulative analysis. Additionally, future projects would be addressed individually for environmental impacts in separate documentation.

4.13.3.1 Land Use and Recreation

Several construction projects are proposed for Fort Hood that could run concurrently with the Proposed Action. Some of these other projects described above, such as the US Highway 190 construction and the Kouma Village Child Development Center, would be relatively close to the area of the Proposed Action. Minor adverse cumulative effects are possible as the Proposed Action contributes to a loss of open space. However, this is not expected to be a significant cumulative adverse impact because the area would be converted into a residential community that would include park space, common areas, landscaping, and recreational features for the residents.

4.13.3.2 Aesthetics and Visual Resources

The cumulative actions listed involve construction, demolition, and renovation. Construction sites and the surrounding area have a visible increase in traffic and activity and generally would have a disorganized and unappealing visual character in the short term. Construction could diminish the visual character of the area, but these cumulative effects would be short term and minor because the duration and affected area would be limited.

The cumulative actions listed reflect the relatively substantial amount of past, present, and reasonably foreseeable residential, commercial, and industrial development and redevelopment at

Fort Hood and Killeen. The cumulative actions could result in a visible loss of the natural environmental and natural open space and an increase in density of the built environment. The cumulative actions could include structures or land alterations visually incompatible or obtrusive to the visual setting and landscape, thereby diminishing the visual character of the area. However, many of the cumulative actions could result in structures or land alterations that have an appealing modern design and a clean well-maintained appearance. Because the area is already substantially developed and because the Proposed Action and many cumulative actions would be visually compatible and appealing, cumulative effects would be less than significant.

The cumulative actions listed could introduce new sources of light and glare, thereby diminishing nighttime darkness. The adverse impact of diminishing darkness occurs slowly and becomes more adverse with time as new sources of light accumulate in the area. Because the area is already substantially developed, nighttime darkness is already diminished. Although the Proposed Action would contribute to an incremental loss of darkness, only long-term moderate adverse effects are expected.

4.13.3.3 Air Quality

Cumulative air quality impacts occur when multiple projects affect the same geographic areas at the same time or when sequential projects extend the duration of air quality impacts on a given area over a longer period. The air quality impacts of the Proposed Action are primarily due to temporary construction. Air quality issues include local fugitive dust and more regional issues related to ozone precursor emissions from construction equipment engine exhaust. Because projects are expected to use BMPs to ensure that their projects comply with air quality standards, cumulative air quality impacts from the Proposed Action and other local and regional projects are considered less than significant.

GHG emissions from sources associated with the Proposed Action would combine with the GHG emissions from other cumulative projects. As noted above, state and federal agencies have not yet established impact significance criteria for GHG emissions.

4.13.3.4 Noise

Cumulative development projects, in particular the Kouma Village Child Development Center and US Highway 190, would increase local noise levels from construction, but the noise would be temporary and intermittent. The increases in vehicle traffic due to cumulative development also would increase noise levels. However, the Proposed Action's increase in vehicle traffic would be

in an area bounded on some sides by other family housing areas, and the increase in neighborhood vehicle traffic is not expected to create a significant cumulative noise impact in the long term.

4.13.3.5 Geology and Soils

There are no significant effects on geology and soils identified as a result of the Proposed Action. There would be no significant cumulative effects on geology or soils if the action were implemented when accounting for other projects. The Proposed Action would include approximately 67 acres of land disturbance, which would expose the soil to erosion factors during construction. However, the proper use of BMPs with the implementation of SWPPPs would mitigate these effects below a level of significance and are not expected to have a significant cumulative effect.

4.13.3.6 Water Resources

There are no significant effects on water supplies or water availability identified as a result of the of the Proposed Action. However, the additional demand on water for household use with more housing constructed on Fort Hood would add to a cumulative effect when considering other projects that also increase demand. This cumulative effect is not expected to be a significant impact on water supplies or availability as all the projects on Fort Hood would have to be within the water allocation amount. Short-term, minor, adverse effects would be associated with increased suspended sediment loads during demolition, renovation, and construction. These effects could collectively result in significant effects. However, the proper use of BMPs with the implementation of SWPPPs, as well as sustainable design features, would mitigate these effects below a level of significance.

4.13.3.7 Biological Resources

Although there are plans for various construction activities, the use of BMPs and the implementation of programs designed to reduce sedimentation and preserve lands, including the INRMP, Installation Design Guide, and LEED program, would help create a balance to sustaining the environment on Fort Hood. Therefore, the projects listed above, in conjunction with the Proposed Action, are not anticipated to have a significant effect on the environment.

4.13.3.8 Cultural Resources

When analyzing cumulative impacts on cultural resources, an assessment is made of the impacts on individual resources as well as the inventory of cultural resources in the cumulative impact analysis area. For this project, the cumulative impact analysis area consists of Fort Hood and the surrounding similar geographic area. In addition, the cumulative impacts analysis for cultural resources takes into account the potential for altering the historic and cultural landscape of the analysis area.

The cumulative projects described in Section 4.13 involve construction and ground-disturbing activities. In at least one cumulative project, implementation of RCI at Fort Hood requires demolishing historic-era buildings. The construction represented by the cumulative projects may be in the historic landscape of historic properties. These activities would likely impact the cultural resources of the cumulative impact analysis area through direct disturbance, demolition, and effects on historic landscapes. However, it is likely that these projects are being completed in compliance with the Fort Hood ICRMP (Department of the Army 2010) and have incorporated BMPs that would reduce impacts on cultural resources to less than significant. The Proposed Action does not affect historic buildings and is not identified as having cultural significance. Thus the Proposed Action is not expected to contribute to a cumulative effect on cultural resources.

4.13.3.9 Socioeconomics

No adverse cumulative effects on socioeconomics are expected to result from the various proposed projects occurring in the ROI. Minor, long-term, beneficial, cumulative effects on quality of life are expected as a result of additional proposed development projects, such as widening US Highway 190 and building a new stadium, several child development centers, and a new hospital.

4.13.3.10 Transportation

Several construction projects are proposed for Fort Hood that could run concurrently with the Proposed Action. Some of these projects, such as the US Highway 190 construction and the Kouma Village Child Development Center, will be relatively close to the Proposed Action site. Minor adverse cumulative effects on transportation could be expected from additional development projects occurring in the vicinity of the Proposed Action. Additional traffic congestion in the surrounding community could indirectly affect traffic flow at or to the installation. However, these potential affects would be minimal and limited to the construction

phase. The expansion of US Highway 190 and connection of State Highway 195 to Fort Hood should facilitate traffic flow in the region. Therefore, the cumulative impacts on traffic and transportation are anticipated to be less than significant.

4.13.3.11 Utilities

Minor adverse effects on the utility systems are expected from the projects in the area due to the increase in use in conjunction with the above projects. However, the systems are expected to accommodate the additional loads, which could be minimized by the use of more efficient sustainable design methods. No significant cumulative impacts are expected as a result of the Proposed Action.

4.13.3.12 Hazardous and Toxic Substances

Collectively, there may be minor long-term adverse effects from hazardous materials used in the construction. However, strict controls over the handling, storage, and disposal of hazardous and toxic substance would be implemented. The Proposed Action would involve construction but is not expected to contribute a significant cumulative impact from hazardous and toxic substances.

SECTION 5.0

FINDINGS AND CONCLUSIONS

5.1 INTRODUCTION

This SEA identifies, documents, and evaluates the potential environmental effects of implementing the Proposed Action (constructing housing on an undeveloped 67-acre parcel east of Kouma East) and the No Action Alternative at Fort Hood. Section 4.0 describes existing environmental conditions at the project area that could be affected by the Proposed Action and identifies potential environmental effects that could occur if the alternatives were implemented. The following resources were addressed in Section 4.0:

- Land use and recreation;
- Aesthetics and visual resources;
- Air quality;
- Noise;
- Geology and soils;
- Water resources;
- Biological resources;
- Cultural resources;
- Socioeconomics;
- Transportation;
- Utilities; and
- Hazardous and toxic substances.

The following section summarizes the findings and conclusions regarding the potential environmental effects of the Proposed Action.

5.2 Findings

Section 4.0 depicts the affected environment and environmental considerations associated with the Proposed Action. Implementing the Proposed Action would result in a combination of less

than significant adverse effects and beneficial effects. Table 5-1 summarizes the expected effects for each resource area from both the Proposed Action and the No Action Alternative.

**Table 5-1
Summary of Potential Environmental and Socioeconomic Consequences**

Resource	Environmental and Socioeconomic Consequences	
	Proposed Action	No Action Alternative
Land use and recreation	Minor beneficial	None
Aesthetic and visual resources	Short-term minor adverse; long-term minor beneficial	Minor adverse
Air quality	Short-term minor adverse	None
Noise	Short-term minor adverse	None
Geology and soils		
Geology and topography	None	None
Seismicity	None	None
Mineral resources	None	None
Prime farmland	None	None
Soils	Minor adverse	None
Water resources		
Surface water	None	None
Groundwater	None	None
Floodplains	None	None
Water quality	None	None
Biological resources		
Vegetation	Minor adverse	None
Fish and wildlife	Minor adverse	None
Threatened and endangered species	None	None
Wetlands	Short-term minor adverse	None
Cultural resources	None	None
Socioeconomics		
Economic development	Short-term minor beneficial	Minor adverse
Demographics	None	None
Housing	Minor beneficial	Minor adverse
Environmental justice	None	None
Protection of children	None	None
Transportation	Short-term minor adverse	None
Utilities		
Potable water supply	None	None
Sanitary wastewater	None	None
Stormwater	Short-term minor adverse	None
Energy	None	None
Communications	None	None
Solid waste	Minor adverse	None
Hazardous and toxic substances		
Construction activities	Short-term minor adverse	None
Site contamination and cleanup	None	None
PCBs, ACM, and LBP	None	None
Lead in soils	None	None
Pesticides	None	None

Table 5-1
Summary of Potential Environmental and Socioeconomic Consequences

Resource	Environmental and Socioeconomic Consequences	
	Proposed Action	No Action Alternative
Radon	None	None
Other conditions of concern	None	None

5.3 *Conclusion*

Based on the findings in this SEA, implementing the Proposed Action would have no significant direct, indirect, or cumulative impacts on the resources analyzed. Thus, an environmental impact statement need not be prepared. This SEA supports the issuance of a finding of no significant impact.

SECTION 6.0

REFERENCES

- Alexander, Jill. 2010a. Environmental Division, Directorate of Public Works. Fort Hood, Texas. Personal communication with Nikki Scheinost, Tetra Tech. May 24, 2010.
- _____. 2010b. Environmental Division, Directorate of Public Works. Fort Hood, Texas. Personal communication with George Redpath, Tetra Tech. June 29 2010.
- Bump, Vicky. 2010. Environmental Division, Directorate of Public Works. Fort Hood, Texas. Personal communication with George Redpath, Tetra Tech. June 29, 2010.
- Carter, William T., Jr., H. G. Lewis, and H. W. Hawker. 1977. Soil Survey of Bell County, Texas. US Department of Agriculture, Soil Conservation Service.
- Atkinson, Jerry. 2011. General Manager at Bell County Water Control and Improvement District No. 1. Personal communication via e-mail with Nikki Scheinost, Tetra Tech. February 2011.
- Cornelius, John D, Timothy J Hayden, and Patrick A. Guertin. 2007. Endangered Species Management Plan for Fort Hood, Texas: FY-6-10. May 2007.
- CEQ (Council on Environmental Quality). 2010. Draft NEPA Guidance on Considering the Effects of Climate Change and Greenhouse Gas Emissions.
- Department of the Army. 1979. Ecological Baseline. Fort Hood, Texas.
- _____. 2000. Fort Hood Integrated Natural Resources Management Plan, Fort Hood, Texas. April 2000.
- _____. 2009a. Major Decision Memorandum: Revisions to Out-Year Plan for Replacement of Chaffee Village and Walker Village Unaccompanied Personnel Housing (UPH). May 18, 2009.
- _____. 2009b. Major Decision Memorandum: Revisions to Out-Year Plan for Replacement of Chaffee Village and Walker UPH. December 9, 2009.
- _____. 2010. Integrated Cultural Resource Management Plan (ICRMP) and Historic Properties Component (HPC) for US Army Garrison Fort Hood. US Army Garrison, Fort Hood, Texas. April 2010.
- DPW (Directorate of Public Works), Fort Hood. 2004. Final Environmental Assessment, Fort Hood Family Housing Patton/Wainwright Expansion at Fort Hood, Texas. November 2004.
- _____. 2005. Finding of No Significant Impact, Fort Hood Family Housing Patton/Wainwright Expansion. January 24, 2005.
- _____. 2008. Environmental Assessment, for the Construction of Three Child Development Centers on Fort Hood, Texas. September 2008.
- _____. 2009. Natural Resources Management Branch. Proposed Jurisdictional Determination: Liberty Greenspace, Fort Hood, Texas. Prepared by Environmental Research Group, LLC. October 2009.

- FEMA (Federal Emergency Management Agency). 2008. Flood Insurance Rate Maps 48027C0260E, Panel No. 0260E, Bell County Unincorporated & Incorporated Areas. September 28, 2008. Internet website: <http://msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1>
- Federal Register*. 2002. Advisory Council on Historic Preservation - Program Comment for Capehart and Wherry Era Army Family Housing and Associated Structures and Landscape Features (1949-1962). Vol. 67, No. 110, June 7, 2002.
- Hammer, Mary. 2010. Environmental Division, Directorate of Public Works. Fort Hood, Texas. Personal communication with Nikki Scheinost, Tetra Tech. May 10, 2010.
- Hernandez, Ryan, 2011. Personal communication via email from Ryan Hernandez, Electrical Engineer DPW Engineering Services, to Kimberly Musser, DPW NEPA Specialist. February 1, 2011.
- Johnson, Kenneth. 1997. Species Composition, Frequency of Encounter, and Distribution of the Herpetofauna on Fort Hood, Texas.
- Jones, Rich. 2010. Re: Kouma Project Area. Letter to Erin King, Tetra Tech Archaeologist, from Rich Jones, Fort Hood Cultural Resource Manager. May 14, 2010
- K-TUTS (Killeen-Temple Urban Transportation Study). 1999. Killeen-Temple Metropolitan Transportation Plan, May 19, 1999. As cited in Fort Hood 2004.
- Lend Lease Actus. 2000. Fort Hood Community Development Management Plan. Lend Lease Actus, Napa, California.
- McCaleb, Nathan L. 1985. Soil Survey of Coryell County, Texas. US Dept. of Agriculture, Soil Conservation Service.
- Mitch, William J., and James G. Gosselink. 1993. *Wetlands*. 2d ed. Van Nostrand Reinhold, New York, New York.
- NRCS (Natural Resource Conservation Service). 2010. Official Soil Series Descriptions, Topsey Series. Internet website: <http://www2.ftw.nrcs.usda.gov/osd/dat/T/TOPSEY.html>. Accessed: March 30, 2010.
- Preston, J. C. 2000. Project Administrator, Lend Lease Actus, Napa, California. Personal communication. September 22. Cited in USACE Fort Worth District 2000a.
- Quinney, Mack. 2010. Fort Hood Family Housing. LP. Personal communication with Tetra Tech personnel. April 2010 through December 2010.
- _____. 2011. Fort Hood Family Housing. LP. Personal communication with George Redpath, Tetra Tech. January 2011.
- Radian International, LLC. 1997. Fort Hood Base-Wide Asbestos Survey Database and Utilities, Photographs, and Buildings 1 through 80012 (software). Radian International, LLC, Austin, Texas. September 1997.

- Science Applications International Corporation (SAIC). 2000. Draft Environmental Assessment for Grazing Outlease at Fort Hood, Texas. Science Applications International Corporation, Dublin, Ohio. June 2000.
- Stevens, Carl. 2000. Bell County Water Control and Improvement District. Personal communication. September 22. Cited in USACE Fort Worth District 2000a.
- Tazik, David J., John D. Cornelius, Dennis M. Herbert, Timothy J. Hayden, and Billy R. Jones. 1992. Biological Assessment of the Effects of Military Associated Activities and Endangered Species at Fort Hood, Texas. USACE, Fort Hood, Texas.
- Tetra Tech. 2010. Phase I Environmental Site Assessment. Kouma II, Fort Hood, Texas. Tetra Tech, Inc., San Francisco, California. Draft subject to revision. April 2010.
- TCEQ (Texas Commission on Environmental Quality). 2010. 2007 State Sum. Internet website: <http://www.tceq.state.tx.us/implementation/air/industeipsei/psei.html>. Accessed May 24, 2010.
- Thomas, Walter. 2010. Personal communication via email from Walter Thomas, P.E. DPW Real Property Planning Division, to Jill Alexander, DPW NEPA Specialist. May 24, 2010.
- TPWD (Texas Parks and Wildlife Department). 2000a. Region 3: The Blackland Prairies. Texas Parks and Wildlife Division. Internet website: <http://www.tpwd.state.tx.us/nature/ecoreg/pages/blkp.htm>. Accessed September 2000.
- _____. 2000b. Region 7: The Edwards Plateau. Texas Parks and Wildlife Division. Internet website: <http://www.tpwd.state.tx.us/nature/ecoreg/pages/edward.htm>. Accessed September 2000.
- Thomas, Alston V. 1993. Archaeological Survey at Fort Hood, Texas, Fiscal Years 1991 and 1992 – The Cantonment and Belton Lake Periphery Areas. Department of the Army, Fort Hood, Archaeological Management Series, Research Report No. 27.
- TRC Mariah Associates, Inc. 1995. Phase I – Transformer Sampling and Phase II – Transformer Inventory Project for Fort Hood Army Post, Texas. TRC Mariah Associates, Inc., Austin, Texas. December 1995.
- _____. 1998a. Environmental Baseline Survey for Selected Properties at Fort Hood, Texas. TRC Mariah Associates, Inc. Austin, Texas. February 1998.
- _____. 1998b. Final Supplemental Environmental Impact Statement for the Fort Hood Mission, Fort Hood, Texas. February.
- _____. 1999. Draft Environmental Assessment for the Fort Hood Housing Privatization Initiative. April 1999.
- _____. 2000. Final Environmental Baseline, Fort Hood, Texas. Prepared for US Army Corps of Engineers, Fort Worth District, and Directorate of Engineering and Housing Fort Hood, Texas, by TRC Mariah Associates, Inc., Austin, Texas. September 2000.
- US Army. 2009. Fort Hood Fact Sheet No. 0703. Internet website: <http://www.hood.army.mil/facts/FS%200703%20-%20Fort%20Hood%20Overview.pdf>. Accessed August 2, 2010.

- USACE (US Army Corps of Engineers) and Fort Hood. 1987. The Installation Master Plan for Fort Hood, Texas, Master Plan Report, Future Development Plan, USACE Fort Worth District, Fort Worth, Texas. Prepared by Nakata Planning Group, Inc. Cited in TRC 1997.
- _____. 1997. Environment and Natural Resources. USACE Fort Worth District and Fort Hood Regulation 420-2, Fort Hood, Texas. August 1997.
- _____. 2006. Integrated Natural Resources Management Plan. March 2006. Fort Hood, Texas.
- USACE Fort Worth District. 1995. Real Property Master Plan for Fort Hood, Texas. Long-Range Component, Fort Worth, Texas.
- _____. 1992. Draft and Final Environmental Impact Statement, Realignment of the 5th Infantry Division (Mechanized) from Fort Polk, Louisiana, to Fort Hood, Texas. Fort Worth, Texas. Cited in TRC, 1997.
- _____. 1999. Environmental Assessment for the Fort Hood Housing Privatization Initiative. USACE Fort Worth District and DPW Fort Hood, Texas. April 1999.
- _____. 2000a. Final Environmental Assessment of Implementation of the Army Residential Communities Initiative at Fort Hood, Texas. October 2000.
- _____. 2000b. Department of the Army Headquarters III Corps and Fort Hood. Environmental Baseline, Fort Hood, Texas. USACE Fort Worth District and DPW, for Hood, Texas. September 2000.
- _____. 2003. Fort Hood Utility Study, Water Distribution Study and Waste water Collection Study. USACE Fort Worth District. October 2003.
- US Census Bureau. 2008. American FactFinder: Bell and Coryell Counties, Texas. Internet website: <http://factfinder.census.gov>. Accessed May 18, 2010.
- _____. 2009. Factsheet: United States. Internet website: http://factfinder.census.gov/home/saff/main.html?_lang=en. Accessed May 2010.
- USDA-NRCS (US Department of Agriculture-Natural Resource Conservation Service). 1998. Fort Hood Vegetative Resource Inventory. Fort Hood, Texas.
- US DOT (US Department of Transportation, Federal Highways Administration). 2009. Traffic Management Plan Checklist. Internet website: http://ops.fhwa.dot.gov/publications/psechecklists/checklist_3.htm. Accessed December 2, 2010. Last modified: May 12, 2009.
- USFWS (US Fish and Wildlife Service). 2010. Current Legal Protections for Bald Eagle. Internet website: <http://www.fws.gov/midwest/eagle/>. Accessed May 2010.
- USGS (US Geological Survey). 1970. The National Atlas of the USA. US Department of the Interior, Geological Survey, Washington, DC. Cited in TRC, 1997.
- US Green Building Council. 2007. LEED for Homes Program, Pilot Rating System. Version 1.11a. January.

Wood, Sunny. 2010. Archaeologist, Cultural Resources Management Program, Fort Hood. Personal communication with Erin King, Archaeologist, Tetra Tech. May 13, 2010.

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