Installation Environmental Noise Management Plan
for
Camp Stanley Storage Activity

June 2005

Installation Environmental Noise Management Plan

Prepared for:

Camp Stanley Storage Activity
Boerne, Texas

June 2005

EXECUTIVE SUMMARY

OVERVIEW

The Installation Environmental Noise Management Plan (IENMP) provides a strategy for noise management at Camp Stanley Storage Activity (CSSA). Elements of the IENMP include education, complaint management, noise and vibration mitigation, noise abatement procedures, and noise assessment.

The Installation Compatible Use Zone (ICUZ) program provides a methodology for analyzing exposure to noise and safety hazards associated with military operations and provides land use guidelines for achieving compatibility between the Army and the surrounding communities. The Army has an obligation to United States citizens to recommend uses of land around its installations that will: (a) protect citizens from noise and other hazards; and (b) protect the public's investment in the installation.

The noise impact on the community is translated into noise zones. The program defines three noise zones. Zone I is compatible with most noise-sensitive land uses. Zone II is normally incompatible with noise-sensitive land uses. Zone III is incompatible with noise-sensitive land uses.

CONCLUSIONS

CSSA will continue with its IENMP program to reduce the potential of incompatible land uses around its facilities severely impacting its mission. As a minimum, county and municipal governments are encouraged to support public disclosure of noise zones and noise easements.

Noise modeling results indicate that no incompatible land uses are expected to occur as a result of training activities at CSSA. The incompatible (Zone III) and normally incompatible (Zone II) noise zones are contained within the boundaries of CSSA and Camp Bullis. However, the noise contours represent an annual average, and because the noise environment at CSSA varies daily and seasonally, heightened daily operations may still result in noise levels that generate inquiries from area citizens. Consequently, even though the noise contours do not fall outside the CSSA and Camp Bullis boundary, people living near CSSA could complain about the noise environment. Noise sensitive land uses, including residential, do occur within the one-mile zone of influence surrounding CSSA.

RECOMMENDATIONS

CSSA can only make recommendations for compatible land uses. This Plan's findings indicate that actions are appropriate to guide future development of the adjacent properties. General and specific recommendations for CSSA and the local jurisdictions are provided in Section Five.

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ACRONYMS AND ABBREVIATIONS

AACOG	Alamo Area Council of Governments
ADNL	A-weighted day-night average sound level
AICUZ	Air Installation Compatible Use Zone
AL	A-weighted sound level
ANSI	American National Standards Institute
APZ	Accident potential zone
AR	Army regulation
ARNG	Army National Guard
CSSA	Camp Stanley Storage Activity
CHABA	National Academy of Sciences Committee on Hearing, Bioacoustics, and Biomechanics
CL	C-weighted sound level
COG	Council of government
DA	Department of the Army
dB	Decibel
dBA	Decibel, A-weighted
dBC	Decibel, C-weighted
dBP	Decibel, unweighted peak
DNL	Day-night average sound level
DoD	Department of Defense
DoDI	Department of Defense instruction
DoDD	DoD directive
DNMRL	Onset rate adjusted monthly day-night level
EA	Environmental assessment
EIS	Environmental impact statement
EJ	Environmental justice
FAA	Federal Aviation Administration
FICUN	Federal Interagency Committee on Urban Noise
FW	Fixed wing aircraft
GIS	Geographic information system
Hz	Hertz
ICUZ	Installation compatible use zone
IENMP	Installation Environmental Noise Management Plan
IH	Interstate highway
JLUS	Joint land use study
LAW	Light anti-tank weapon
$L_{Amax}f$	A-weighted fast time integrated maximum level
LEQ	Equivalent sound level
MOU	Memorandum of understanding
MSA	Metropolitan statistical area
NEPA	National Environmental Policy Act
NLR	Noise level reduction
NOE	Nap of the earth
NZ	Noise zone
OEA	Office of Economic Adjustment
PAO	Public affairs officer
PL	Public law
psi	Pounds per square inch
RRAD	Red River Army Depot
SARNAM	Small Arms Range Noise Assessment Model
SJA	Staff Judge Advocate
SLUCM	Standard Land Use Coding Manual

TOC	Technical oversight committee
TRACS	Texas Review and Comment System
USACERL	U.S. Army Construction Engineering Research Laboratories
USAEHA	U.S. Army Environmental Hygiene Agency
USEPA	U.S. Environmental Protection Agency
ZOI	Zone of influence

SECTION 1
INTRODUCTION

One of the goals of the Department of the Army (DA) is to plan, initiate, and carry out actions and programs designed to minimize adverse impacts upon the quality of the human environment without impairing the Army's mission. In keeping with this goal, the Army established an Installation Environmental Noise Management Program (IENMP) as the framework for the control of noise produced by Army activities since noise has been determined by the United States Congress, as recorded in the Noise Control Act of 1972, to "…present danger to the health and welfare of this Nation's population." (Public Law [PL] 92-574 1972). The primary strategy for noise management is the IENMP, of which the Installation Compatible Use Zone (ICUZ) program is a portion.

1.1 HISTORY OF THE NOISE CONTROVERSY

The advent of jet aircraft in the 1950s resulted in significantly greater noise levels around commercial airports that led to an intense outcry from the public. This public outcry caused Congress to revise the Federal Aid to Airports Act to make federal aid contingent upon implementation of programs to resolve noise problems with surrounding neighborhoods. Subsequently, Congress passed the Noise Control Act of 1972 and the Quiet Communities Act of 1978. Under these laws, airports carried out noise control measures such as: outright purchase of adjoining land, working with local communities to ensure zoning which would permit only compatible uses, development of procedures for including noise information in the consumer disclosure documents provided when real estate is sold, altering run-up procedures and locations, and changing approach and takeoff patterns. At the present time, the Federal Aviation Administration (FAA) has specific requirements for community involvement in all airport planning.

The Federal Aid to Airports Act exempted military aircraft, as did portions of the Noise Control Act of 1972. However, the Noise Control Act and the Quiet Communities Act did contain language outlining the responsibilities of Federal agencies in protecting the public from unreasonable noise impacts. Specifically these laws state that:

> *"Federal agencies shall, to the fullest extent consistent with their authority under federal laws administered by them, carry out the programs within their control in such a manner as to.... promote an environment for all Americans free from noise that jeopardizes their health and welfare."*

To comply with the intent of Congress, the Department of Defense (DoD) provided guidance to the military departments regarding the compatible use of public and private lands in the vicinity of military airfields. This DoD instruction (DoDI 1977):

- Defined restrictions on the uses and heights of natural and man made objects in the vicinity of air installations;

- Defined restrictions on land use in the vicinity of air installations to assure compatibility with the characteristics, including noise of military operations; and
- Provided policy as to the extent of the United States Government's interest in retaining or acquiring real property to protect the operational capability of active military airfields.

As a matter of general policy, the military departments were instructed to work toward achieving compatibility between air installations and the neighboring civilian communities through a compatible land use planning and control process conducted by the local civilian community.

Based upon the DoD guidance, DA developed its Installation Environmental Noise Management Program that considers noise from all sources of military activities, not just military airfields. The Army's program is designed to (U.S. Army 1997):

- Control environmental noise to protect the health and welfare of military personnel and their dependents, Army civilian employees, and members of the public on lands adjacent to Army, Army Reserve, and Army National Guard installations; and
- Reduce community annoyance from environmental noise, to the extent feasible, consistent with Army, Army Reserve, and Army National Guard training and materiel testing activities.

1.2 THE THREAT TO MILITARY INSTALLATIONS

Military installations tend to attract activity from the civilian sector. For example, sizeable new communities may grow up near an installation or existing communities may expand toward or around an installation's boundaries. This growth process can place severe limitations upon the ability of a military installation to support training and maintain an adequate level of readiness for assigned units. As noise impacts from military activities increase upon the civilian communities, both litigation and/or political pressures that could result in degradation of the installation's mission also increase. Not only does the number of complaints to installation commanders increase dramatically, but so do the number of complaints to members of Congress.

A consequence of adverse public reaction to military operations is the closing of some military installations and the placement of limitations of operations of others. One of the best examples of the degradation of mission performance due to urbanization occurred at the Naval Air Station (NAS), Los Alamitos, CA. When originally established during World War II, this NAS was in a rural area. With the postwar expansion of southern California, Los Alamitos NAS was eventually surrounded by homes, and the Navy could no longer routinely fly jet aircraft into this property. Today, the airfield serves the needs of the California Army National Guard (ARNG) and the Army Reserve, which compared to the Navy, operates relatively few noisy flights.

In the Army's case, as an example, the size of the explosives used in Combat Engineer field training at Fort Belvoir, VA, was restricted severely making it necessary to move a portion of the training to a less urbanized area at Fort A.P. Hill, VA and Fort Leonard Wood, MO. In yet another

case, limitations were placed upon the types of weapons that could be fired at Fort Dix, NJ, as well as the times the weapons could be fired (U.S. Army undated). In both of these cases, the limitations upon operational activities degraded the installations' capability to support essential training, and forced the movement of the training missions to other installations.

More recently the Senior Readiness Oversight Council, chaired by the Under Secretary of Defense made the following conclusions.

- "Encroachment on DoD ranges and training areas is a serious and growing challenge to the readiness of United States Armed Forces."
- Encroachment issues are many, are complex, and involve multiple federal, state and local agencies, as well as Congress and the public."
- Further, the impact of encroachment is broad—affecting our ability to execute realistic air, ground, and naval training across the nation, as well as beyond its borders."
- "The Department of Defense needs a comprehensive and coordinated approach to addressing encroachment issues. The approach should include an outreach strategy to increase public awareness of how essential, realistic and effective training is to the readiness of United States Armed Forces."

1.3 CONTENDING WITH THE THREAT

The consequences of ignoring the conflicts between noise generated on military installations and the desires of the civilian community regarding use of the land surrounding these installations can be grave. If the military fails to respond to the concerns of the civilian community, the ill will produced by such an approach is quite likely to result in unwillingness within the civilian community to work with the military to regulate land use. This community ill will can result in political pressure or lawsuits that force unilateral concessions on the part of the military without any reciprocal concessions from the community.

To prevent the conflicts between military operations and civilian land use from reaching significant proportions, the Army must work with the local communities to prevent incompatible land use from occurring and to take reasonable steps on the installation to protect the community from noise. Since the regulation of land use on adjoining land is the authority of local communities, the military cannot solve these problems unilaterally. Rather, the military must work with local communities to establish the controls that will prevent noise problems from growing even larger.

1.4 ARMY'S INSTALLATION ENVIRONMENTAL NOISE MANAGEMENT PLAN

The primary strategies for protecting the mission of military installations from the problems of noise incompatibility are long-range land use planning and being a responsible neighbor to surrounding communities. The IENMP addresses these issues in a proactive manner.

The ICUZ program is an element of the IENMP. This element assesses the compatibility of the noise environment with the land uses.

The other elements of the IENMP, include education of both the military and civilian community, management of noise complaints, mitigation of the noise and vibration, and noise abatement procedures. These elements are integral to meeting a goal of being a responsible neighbor to the communities surrounding CSSA.

1.5 STAGES OF THE INSTALLATION ENVIRONMENTAL NOISE MANAGEMENT PLAN PROCESS

Stage 1: Quantify the installation's noise environment.

The primary means of assessing environmental noise is through computer simulations. Computer generated noise contours can be placed on installation land use maps. This information can be incorporated into the installation master plan and used for National Environmental Policy Act (NEPA) (Public Law [PL] 91-190, 1970) documentation. Appendix B contains a detailed discussion of noise modeling.

Stage 2: Identify noise-impacted areas.

During this stage, noise contours are overlaid on maps to determine areas that are currently or potentially impacted by installation noise-producing activities.

Stage 3: Identify existing and potential incompatible land uses.

Using the noise contour overlays, current and future land uses are examined to identify those land areas that are or will be incompatible. This stage requires coordination between the installation and the civilian communities.

Stage 4: Identify alternative actions to mitigate/minimize noise impacts.

This stage generates a wide range of alternative actions that could be taken by the installation or the community to minimize noise impacts. Like stage 3, these actions also require coordination between the installation and the civilian communities.

Stage 5: Evaluate alternative actions.

The impact of the various alternatives identified must be evaluated.

Stage 6: If applicable to study recommendations, develop agreements with local communities and agencies.

Good-faith efforts should be made to negotiate agreements with local communities and agencies that affect or will be affected by the commitments made as a result of the IENMP.

Stage 7: Submit agreements for review by decision-makers.

The installation commander and the elected bodies or decision-makers within the affected civilian communities must ratify all agreements.

Stage 8: Publish final IENMP and implement agreements.

The final IENMP must be made available to the public and contain all elements of the process, including agreement reached. It is at this stage that agreements should begin to be implemented. Expectations regarding timing and sequencing of implementing actions should be defined, so that disagreements do not arise.

Stage 9: Update and review.

Procedures should be established to monitor the agreements and to determine effectiveness of actions taken. Agreements need occasional maintenance. Established procedures for monitoring the agreement are essential to ensure that problems are identified and solved in a cooperative manner. This stage is essential in examining the impact of changes in Army training doctrine and modern weapons technology.

1.6 PURPOSE

The Camp Stanley Storage Activity IENMP assesses the noise environment and provides a plan to manage this environment through land use planning and by being a responsible neighbor.

1.7 OBJECTIVES

The objectives of the IENMP are to:

- Educate the military and civilian communities and improve communications between the two;
- Manage noise complaints so that the potential for conflict between CSSA and the surrounding communities is reduced;
- Assess the compatibility of the noise environment with existing and proposed land uses;
- Mitigate the noise and vibration environments, where feasible, to increase land use compatibility; and
- Use noise abatement procedures.

1.8 CONTENT

This IENMP consists of a discussion and analysis of CSSA and the surrounding communities and the relationships between them. This IENMP presents the concept, policies, and methodologies, and analyzes the effect of CSSA noise, describes the responsibilities of the Army and the communities, and provides recommendations for both the Army and the communities.

SECTION 2
CAMP STANLEY STORAGE ACTIVITY AND THE COMMUNITY

This section examines the relationships between CSSA and the surrounding civilian communities in terms of the histories, populations, activities and needs of what are, in reality, parts of an integrated system rather than separate, independent entities. Since there are few areas in which CSSA and the communities do not depend upon each other, it is important to understand the nature of the mutual interests and concerns which form the basis for both present and future civilian and military cooperative efforts.

CSSA is located approximately 19 miles from downtown San Antonio in south-central Texas (Figure 2.1). CSSA is approximately three miles north of the San Antonio city limits. The City of Fair Oaks Ranch abuts the northwestern boundary of the installation. The installation's eastern boundary and parts of its northern and portions of the southern boundaries are contiguous with the Camp Bullis Military Training Reservation. The Leon Springs Villa and Hidden Springs Estates are adjacent to the remaining portions of the southern boundary. The CSSA is located entirely in northwestern Bexar County, however Kendall and Comal Counties are both located a few miles to the north. The installation is located along State Highway FM 3351, less than a mile east of Interstate Highway (IH)-10. Dietz Elkhorn/Old County road runs along the northern border of the installation.

2.1 CAMP STANLEY STORAGE ACTIVITY

2.1.1 Physical Description

CSSA consists of 4,004 acres of varying terrain. The boundary of CSSA is generally rectangular with approximately 3 miles north to south and 2 miles east to west. The land is a rolling terrain of hills and valleys with a topographic relief of 1,000 feet to 1,500 feet above sea level. Several springs and intermittent creeks are present.

2.1.2 History

In the early 1900s, the land on which CSSA is located was primarily used by settlers for farming and ranching. In 1906 and 1907, six tracts of land were purchased and designated Leon Springs Military Reservation. One of these tracts included most of the southern portion of CSSA.

Over the next several years, the Leon Springs Military Reservation was used for maneuvers by Army and National Guard units. The Third Brigade of the Maneuver Division was headquartered at Camp Stanley in 1911. In 1917, a remount station was established (southwest corner of present-day CSSA) which served to process and maintain horses purchased for use by the mounted arms of the service. In 1917, the reservation was named Camp Stanley in honor of the former commander of the Department of Texas. From 1917 to 1919, field artillery brigades, trench mortar batteries, quartermaster battalions, cavalry regiments, and United States guard battalions were housed at Camp Stanley.

In 1920, a section of the present-day cantonment area at the north end of the Camp was turned over to the ordnance section of the San Antonio General Intermediate Depot. The ordnance department made plans in 1925 to construct a storage area for a 2-year supply of ammunition and components for all combatant troops in the Eighth Corps area. In 1933, a 1,270-acre tract was transferred to the chief of ordnance for the San Antonio Arsenal and an additional 490 acres was transferred to Camp Stanley in 1937.

In preparation to enter World War II, Camp Bullis acquired several tracts of land to support mobilization and training of Army ground forces. A moving-target antitank range and fortified area to familiarize soldiers with combat areas were designed and constructed. These tracts of land were later assigned to Camp Stanley and are presently located in the southeastern section of the camp.

Camp Stanley became part of the Red River Arsenal as CSSA in 1949. In addition to ammunitions storage, the installation had responsibility to test and overhaul ammunition components. In 1953, approximately 2,040 acres were transferred from Camp Bullis to CSSA. An additional 204 acres were assigned to CSSA in 1970 to bring total acreage to its current 4,004 acres.

2.1.3 Installation Command

CSSA is a sub-installation of the U.S. Army Material Command's Red River Army Depot (RRAD), located in Texarkana, Texas. The CSSA and the adjacent Camp Bullis, a sub-installation of Fort Sam Houston (approximately 28,000 square acres), make up a large tract of DoD property formerly referred to as the Leon Springs Military Reservation. Camp Bullis functions and activities include firing ranges, maneuver areas for Army, Air Force, and Marine combat units, and field training of the various medical units from Brooke Army Medical Center at Fort Sam Houston. The Public Affairs Officer (PAO) from Fort Sam Houston supports the CSSA Installation Manager in responding to inquiries from the public related to noise.

2.1.4 Mission

The primary mission of CSSA is receipt, storage, and issuance of ordnance material as well as quality assurance testing of military weapons and ammunition. A secondary mission, weapons training and qualifying also occurs at CSSA.

2.1.5 Training

At CSSA, training occurs year around. This training generates noise that may impact the citizens who live in the surrounding communities. A goal of the IENMP is to achieve a harmonious relationship between the soldiers who live and train at CSSA and those who live and work in the surrounding communities.

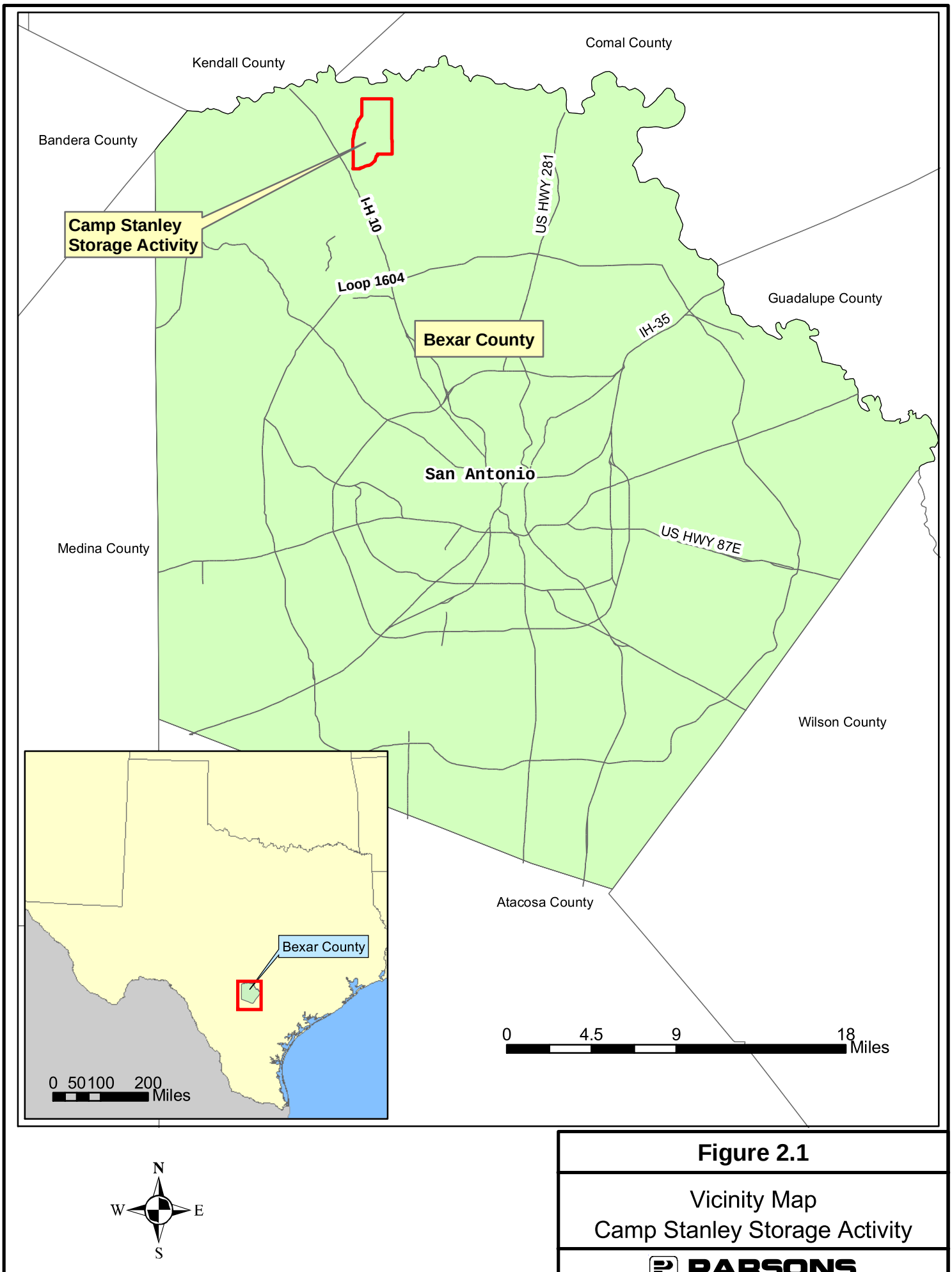

Figure 2.1

Vicinity Map
Camp Stanley Storage Activity

PARSONS

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CSSA is too small to support large scale weapons training or large scale maneuvers. The current major noise sources at CSSA are associated with small arms ranges in the East Pasture (Figure 2.2). All of the small arms activity in Building 90 and Building 44 occurs in an indoor environment that is significantly insulated from the outdoors. The predominant outdoor noise sources are the activities from the East Pasture Small Arms Range and the Rifle Tunnel, as well as the grenades and light anti-tank weapons (LAW) firing areas.

The geophysical characteristics of a site influence the outdoor sound propagation from mission activities. The physical environment of the East Pasture consists of varying topography and vegetative cover, with flatlands and sporadic vegetation comprising the majority of the area. Trees and shrubs are predominantly found along the eastern boundary of the East Pasture and are sparsely scattered along the southern and western portions of the East Pasture. The northern portion of the East Pasture is predominantly small growth vegetation with trees lining the northern boundary. The eastern boundary of the East Pasture is shared with Camp Bullis. The current training facilities are located on the western portion of the East Pasture. The area is generally flat with some gently sloping hills.

The firing operations within the East Pasture Range utilize small arms ammunition including 7.62 millimeter (mm), 9 mm, 45 caliber, and 5.56 mm, as well as grenades, and LAWs used during testing and training activities. Operational data for the East Pasture outdoor training areas include events which use the range rifle tunnel, the covered small arms range, and the grenades/LAWs firing areas. The tunnel is assumed to have no acoustic attenuation because firing points for the tunnel are actually not enclosed.

2.2 THE CIVILIAN COMMUNITY

CSSA lies solely in Bexar County and adjacent to Comal and Kendall Counties. The cities, towns, and communities in the vicinity that should be most concerned with a CSSA IENMP are Fair Oaks Ranch, San Antonio, Leon Springs, and a nearby subdivision, Hidden Springs. These cities/towns/communities are adjacent to the installation. The area of socioeconomic impact, influenced by CSSA, consists of Bexar, Comal, and Kendall Counties.

The San Antonio area has a long history of significant military presence. Camp Bullis, CSSA, and the other major military installations within Bexar County have had a measurable impact upon the overall population and employment levels within the counties, and the cities, towns and communities within those counties. This installation-community relationship results in a number of positive tangible and intangible impacts and mutual benefits.

2.2.1 Population

The City of San Antonio comprises a significant portion of Bexar County and is the major population center in the CSSA area. The adjacent counties of Comal and Kendall are more rural in nature and do not contain large population centers. Population of the three counties between 1990 and 2003 (estimated) is shown in Table 2.1. The IH-10 corridor northwest of San Antonio is one of the highest residential growth corridors in the San Antonio Metropolitan Statistical Area

(MSA). Based on the 2003 estimated population, the three-county area experienced an overall population increase of 27 percent between 1990 and 2003.

Table 2.1 Historic and Estimated Population

Area	1990	2000	2003 estimate
Bexar County	1,185,394	1,392,931	1,471,644
Comal County	51,832	78,021	87,785
Kendall County	14,589	23,743	26,178
Sources: U.S. Census Bureau, 2000			

The San Antonio MSA is composed of eight counties in the San Antonio vicinity: Atascosa, Bandera, Bexar, Comal, Guadalupe, Kendall, Medina, and Wilson. The 2000 population of the San Antonio MSA was 1,711,703 according to the U.S. Census Bureau, with an estimated 2003 population of 1,829,388.

2.2.2 Employment

Employment is a primary factor in analyzing the economic health of a community since comparison of trends reveals strengths and weaknesses and offers direction for actions designed to promote the strengths and to overcome the weaknesses. As shown in Table 2.2, the total labor force in the three-county area increased significantly during the 10-year period from 1990 to 2000.

Table 2.2 Civilian Labor Force

Area	1990	2000
Bexar County	497,202	595,911
Comal County	23,199	36,319
Kendall County	6,851	10,902
	527,152	**633,122**
Sources: U.S. Census Bureau, 2000		

Within the three-county area, the overall unemployment rate has shown a downward trend during the past 10 years. This overall unemployment trend ranged from a high of 8.4 percent in 1980 to 5.7 percent in 2000. In 2000, the overall unemployment was 5.8 percent for the United States and 6.1 percent for Texas.

2.2.3 Income

The income within a community, whether it is measured on a per capita or per family basis, provides another indicator of the community's economic health. Table 2.3 provides data regarding household income within the three-county area. Fair Oaks Ranch, located directly adjacent to CSSA, is a very affluent community with an average household income of $176,981 in 2003.

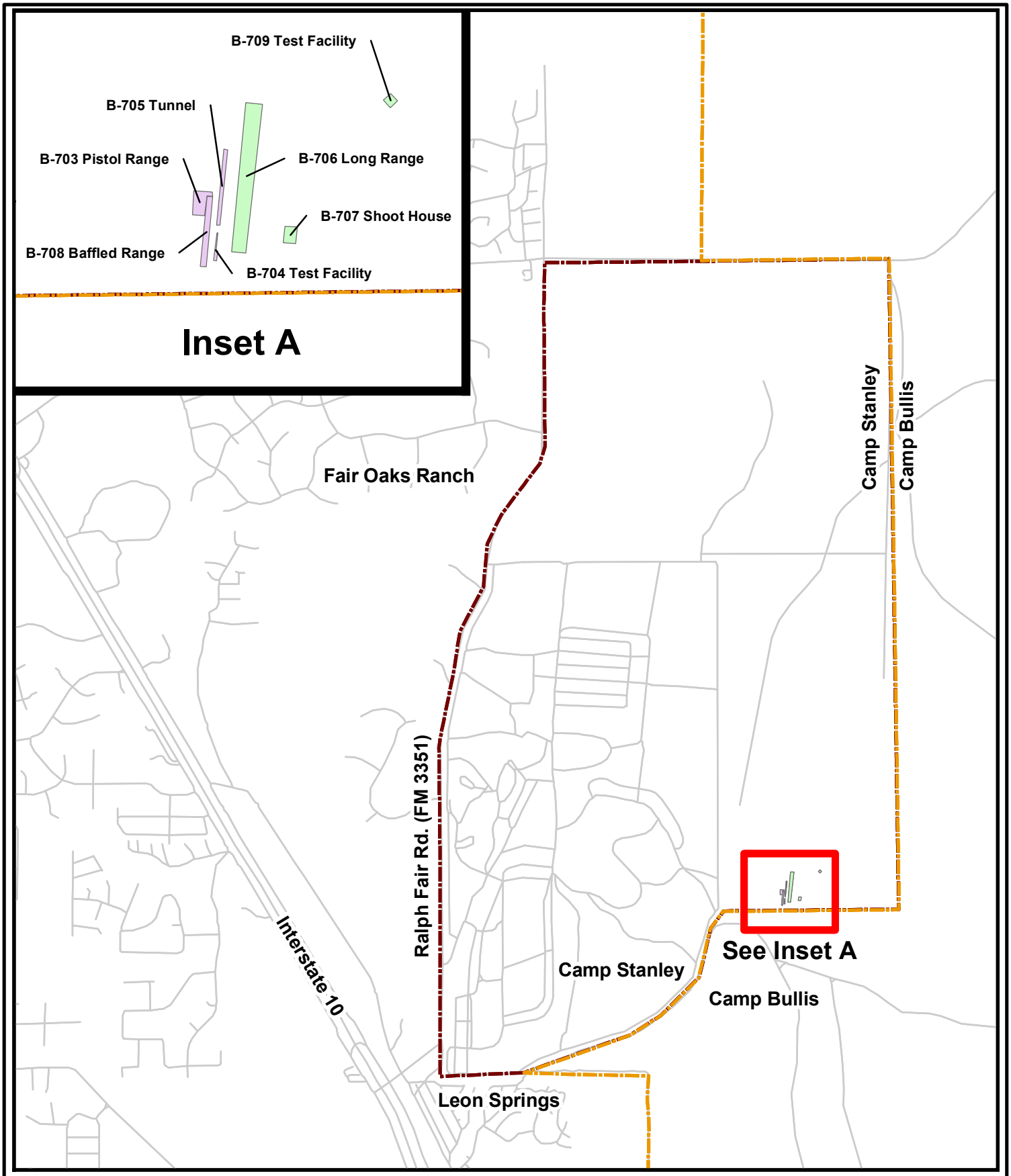

Figure 2.2

Testing and Training Areas

Camp Stanley Storage Activity

PARSONS

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Table 2.3 Average Household Income ($)

Area	1989	1999
Bexar County	32,429	49,021
Comal County	33,741	54,177
Kendall County	32,758	60,186
Sources: U.S. Census Bureau, 2000		

The workforce within the San Antonio MSA is heavily skewed toward white-collar occupations. The 2000 census data on workforce composition is reproduced in Table 2.4.

Table 2.4 San Antonio MSA Employment by Sector, 2000

Sector	Employees	Percentage
Management, professional, and related	224,793	32.7
Service	107,973	15.7
Sales and office	203,006	29.6
Farming, fishing, and forestry	1,596	0.2
Construction, extraction, and maintenance	73,041	10.6
Production, transportation, and material moving	76,605	11.2
Total	**687,014**	**100**
Source: U.S. Census Bureau, 2000		

2.3 ECONOMIC IMPACT

In addition to CSSA and Camp Bullis, four major military installations are located in Bexar County. These include Fort Sam Houston, Randolph Air Force Base, Lackland Air Force Base, and Brooks-City Base. The operations of these military installations, including CSSA, generate substantial revenues to local economies through wage and salary payments to military and civilian employees, construction contractor payments, and operating costs such as rent and lease payments for various types of equipment, utilities, telephone, office supplies, and non-construction contracts. The combined military employment in Bexar County is over 70,000 military and civilian employees which provide a direct economic impact through payroll and purchases of just under $5 billion dollars (San Antonio Chamber of Commerce 2001).

2.4 INSTALLATION-CIVILIAN COMMUNITY RELATIONSHIPS

Residents and military personnel in the San Antonio area have a long history of working together for mutual benefit. Local communities have taken a proactive approach regarding involvement in CSSA plans and community impacted processes. A Joint Land Use Study (JLUS) was completed for Camp Bullis in 1995. This study, which was conducted under the leadership of the Alamo Area Council of Governments (AACOG), explored the powers that local government has in regulating land use around Camp Bullis. Additionally, a Memorandum of Understanding (MOU) between the major DoD installations in the San Antonio area and the AACOG states that both "the DoD installations and the AACOG are interested in consistency and compatibility of all Federal, state, and local plans, programs, and projects in the twelve county AACOG region."

There is an agreement, consistent with military requirements, that any plans, programs, and projects of a DoD installation which may affect the plans, programs, and/or projects of other Federal, state, local, or regional agencies in this twelve county area will be submitted to the AACOG for review.

2.5 SUMMARY

The CSSA IENMP has been developed for the specific purpose of aiding military and civilian officials and planners in the creation of land use plans and policies that promote compatibility between the needs of the civilian sector and CSSA's mission requirements. The concept, program, and methodology behind the Army's program that provides for reports of this nature are discussed in the sections that follow.

SECTION 3
FEDERAL, STATE AND LOCAL LAND USE POLICY AND CONTROL

3.1 FEDERAL

The only direct land use controls available to the federal government in Texas result from fee-owned land and easements related to federal projects.

3.2 STATE

There is limited planning at the state level. The State of Texas, through the Regional Planning Act of 1965, authorized creation of voluntary associations of local governments identified as regional councils or councils of governments (COG). Consequently, Texas has created various local and regional agencies to serve specific planning functions within the state.

3.3 LOCAL/REGIONAL

At the regional level, COGs address the problems and planning needs that cross the boundaries of individual local governments or that require regional attention. Bexar, Comal, and Kendall Counties are members of the Alamo AACOG. The 12 counties that comprise the Alamo Area planning region are Atascosa, Bandera, Bexar, Comal, Frio, Gillespie, Guadalupe, Karnes, Kendall, Kerr, Medina, and Wilson. AACOG is a voluntary association of local governments and organizations that serves its members through planning, information, and coordination activities. The agency is also designated as the regional clearinghouse that reviews and comments upon grant applications submitted for state and federal funding by organizations throughout the region. Further, AACOG provides direct technical assistance to member governments in their planning functions, preparation of applications, and the administration of area-wide programs. Support for these activities is provided through local dues, state appropriations, and state and federal grants that are matched by local monies and other public and private funds.

Texas counties have no zoning authority unless specifically provided through enabling legislation. Municipalities are authorized to cooperate in planning and zoning matters. The City of San Antonio adopted Master Plan Policies which are intended to provide guidance in the evaluation of future decisions on land use, infrastructure improvements, transportation, and other related issues. Additionally, San Antonio has adopted a Unified Development Code which consolidates all of the regulations pertaining to land use, zoning, and development. Fair Oaks Ranch has not adopted a comprehensive plan and does not enforce zoning regulations.

3.4 OTHER PLANNING TOOLS

Historically, the DoD has encouraged communities in the vicinity of military installations to introduce noise planning. Early in the 1970's, the DoD established the Air Installation Compatible Use Zone (AICUZ) Program in response to existing and potential incompatible land development

impacting on the military's missions. Its purpose is to promote community growth that is compatible with the military installation operations. The Army later established the ICUZ program, dropping the "A" since much of the Army's noise generation activities are not caused by aircraft.

In 1985, because AICUZ study recommendations were often not incorporated into local area planning programs, the JLUS Program was initiated. It is designed to provide financial and technical incentives to help military bases and communities, working together to resolve encroachment conflicts while protecting the military mission objectives, community growth patterns, and the public health and safety.

The Camp Bullis JLUS was completed in June 1995, by the AACOG and JLUS Technical Oversight Committee (TOC), for the DoD. The JLUS TOC consisted of city officials, county officials, military leadership, private sector leaders, neighborhood associations, and state officials. The objective of the study was to develop recommendations to alleviate potential land use conflicts and to outline strategies to encourage compatible future development in order to protect the long-range viability of Camp Bullis. The Camp Bullis JLUS identified buffer areas surrounding the CSSA and Camp Bullis boundary. Buffer distances identified were within one, three, and five miles of the military boundaries. The JLUS discussion focused on disclosure within these areas immediately adjacent to the military boundary. Ultimately, the JLUS was published but public disclosure procedures were not agreed upon.

The JLUS program is managed by the DoD Office of Economic Adjustment (OEA) (DoD Directive #3030.1). OEA may provide technical and financial grant assistance directly to state or local governments to help local jurisdictions understand and development controls to resolve community-land development incompatibilities and make informed land use and development decisions. The scope of the program is divided into three major tasks, as listed below.

- Impact analysis provides an in-depth review of existing and proposed land use patterns: drainage, as it affects land use designations; mission encroachment, particularly noise; transportation improvements, existing, and proposed routes; and noise/vibration as presented in the IENMP Study.
- Land use and mission compatibility plan examines the above findings to identify conflicts in land use and provide alternative land use solutions; to project the impact on growth potential for adjacent areas; and to project the impact of military missions on the surrounding jurisdictions.
- Implementation lists a series of actions and proposals for adoption by local jurisdictions to resolve land use conflicts and move toward a compatible land use plan for the installation, the adjacent counties and communities therein. While the study report makes certain recommendations, it must be kept in mind that each participating jurisdiction must decide which recommendations are best suited to their particular needs. Implementation will follow the final recommendations at the discretion of the elected officials in each jurisdiction and the installation military command.

3.5 ARMY POLICY AND ITS APPLICATION AT CAMP STANLEY STORAGE ACTIVITY

It is Army policy to manage lands, facilities, and resources under its control in a manner that provides maximum mission effectiveness while recognizing the importance of the conservation of resources and preservation of the quality of human and natural environments. The Army developed the IENMP and the ICUZ program to provide a mechanism for identifying and addressing issues and concerns between the community and the installation.

3.6 LAND USE PLANNING DETERMINANTS

Compliance with the laws, regulations, executive orders, and guidelines, which are applicable to current operations and to restoration of sites contaminated by previous activities is fundamental to attaining DA goals associated with environmental protection and conservation of natural resources. In this respect, DA has designated the achievement of the following goals, applicable in land use planning, as an integral part of the overall Army mission.

- Demonstrate leadership in environmental protection and improvement.
- Minimize adverse environmental and health impacts while maximizing readiness and strategic preparedness.
- Assure that consideration of the environment is an integral part of Army decision-making.
- Initiate aggressive action to comply with all applicable federal, state, regional, and local environmental quality laws.
- Restore lands and waters damaged through past waste disposal activities.

To achieve the foregoing DA goals, the policy at CSSA, which applies to all subordinate organizations, agencies, and activities, is listed below.

- Comply with Environmental Noise Management Program policy as identified in Army Regulation (AR) 200-1, and all applicable federal, state, and local environmental quality laws, regulations, and other requirements.
- Plan, initiate, and carry out all actions and programs in a manner that will preserve, protect, restore, or mitigate the degradation of human and natural environments.
- Ensure historic, archeological, and cultural sites, structures, and other objects under CSSA's jurisdiction will be preserved, restored, and maintained for the benefit of future generations.
- Eliminate or control environmental degradation resulting from training, operations, maintenance, repair, or construction of real property facilities owned, leased, or supported by CSSA.

3.7 LAND USE COMPATIBILITY

With an overview of CSSA's land, airspace, and facility requirements, the rationale behind the Army's efforts, through the IENMP and the ICUZ program, to achieve compatibility between military operations and private property interests should be apparent. The successful accomplishment of the Army storage and training missions depends upon the positive involvement of local government in all elements of the IENMP, including land use planning and control, if needed.

3.8 ENVIRONMENTAL JUSTICE

Environmental Justice (EJ) is defined by the United States Environmental Protection Agency (USEPA) as "fair treatment of people of all races, cultures, and incomes, regarding the development of environmental laws, regulations, and policies." Over the last decade, attention to the impact of environmental pollution on particular segments of our society has been growing. Concern that minority populations and/or low-income populations bear a disproportionate amount of adverse health and environmental effects, led former President Clinton to issue Executive Order 12898 in 1994, focusing federal agency attention on these issues. To this end, CSSA will insure that the EJ philosophy is embraced in the management of noise from its activities. The location and use of training activities, such as firing ranges, is always based on the operational, safety, and environmental considerations of both the installation and civilian community.

SECTION 4
THE INSTALLATION ENVIRONMENTAL NOISE MANAGEMENT PLAN

In the past, the emphasis of the Army's Environmental Noise Program has been the ICUZ program. The goal of the ICUZ program is to maintain land use compatibility with the installation's noise environment. At many installations, the land uses around the facility are not compatible with the noise environment.

To reduce the potential for conflict between the installation and surrounding communities, the Army developed the IENMP. In addition to the ICUZ, the plan includes education of both installation personnel and surrounding residents, management of noise complaints, mitigation of the noise and vibration, and noise abatement procedures. At installations with noise monitoring capabilities, monitoring system and data management are also included in the plan.

4.1 EDUCATION/AWARENESS

An important element of the IENMP is education. This includes the education of both the noise producers and the noise receivers. The noise producers must be aware of all CSSA policies and regulations dealing with environmental noise. These include the locations of noise-sensitive areas and range safety procedures. The education of the noise producers will include the potential for adverse consequences to CSSA's ability to perform and maintain its mission due to violations of the policies and regulations.

The noise receivers will be made aware of CSSA's mission and its by-products, including noise, through newspaper articles, community displays, public presentations, and other information released to the community. These information releases will address the concerns of the community.

Local government officials must also be informed so that they will be able to accurately assess both sides of the issues before them and factor such information into any decision making process concerning potential land use planning. Use of fact sheets are a good methodology the installation can utilize to provide information to the local community.

4.2 NOISE COMPLAINT MANAGEMENT

The purpose of the Noise Complaint Management Program is to educate first time complainers so that they are aware that CSSA cares about their concerns. In most cases, the courteous and honest treatment of the complainant will reduce the potential for future calls; letters to local, state, and federal government officials; and formation of community action groups. There are two key words to a successful complaint management program: ***integrity*** and ***sensitivity***.

The program will have integrity so that when installation officials tell the community something, the community will believe and trust them. Once you tell the community, they consider the information as policy. The program will also remain sensitive to the impacts of the noise

producing activities to the surrounding community. For example, if installation officials tell the community that there will be no explosive charges before 9:00 a.m., then the installation must adhere to that procedure. If it is necessary to change this procedure, then the community should be informed about the change in procedure before that change takes place.

A successful noise complaint management procedure will assist the installation in avoiding community action against its activities. Like the other elements of the IENMP, this procedure will be proactive. Its purposes are to reduce the potential of noise complaints by keeping the public informed about what is going to happen and to satisfy the complainants so that noise complaints do not escalate into political actions.

4.3 NOISE COMPLAINT PROCEDURE

A noise complaint procedure is required by AR 200-1 (U.S. Army 1997) to log and investigate all complaints. CSSA currently has a proactive procedure in place to address noise inquiries. Noise inquiries at CSSA occur exclusively from grenade and LAW testing operations. CSSA's procedure complies with AR 200-1 policy by responding to all inquiries and complaints in a timely and polite fashion. Maintaining an effective procedure will enable CSSA to sustain a good relationship with the surrounding communities. The CSSA noise inquiry procedure is outlined below.

Pre-notification of grenade/LAW testing operations. Prior to grenade/LAW testing, the PAO at Fort Sam Houston typically notifies local government agencies and area homeowners associations of the upcoming testing operations.

A log/file is maintained of all noise complaints. The file is maintained by the Fort Sam Houston PAO and provided to the CSSA installation commander which identifies the location, date, time, and cause of noise inquiry. The file will help in isolating habitual complainers, will show the effectiveness of mitigation, and will identify the types and times of operations that are most offensive.

Complaints are investigated without delay. By investigating complaints immediately, it may be possible to delay the operation causing the complaint until noise propagation conditions lessen. This action reduces the risk of additional complaints and shows the complainants that CSSA is concerned about their health and welfare.

The complainant is made aware of the installation's mission and that every effort will be made to correct the problem, mission permitting. A CSSA representative or the Public Affairs Officer explains the operation to the complainant, including why it is being performed at this time and at CSSA. They ask the complainant about how the noise environment today compares with the day of the complaint, and try to obtain some insight into why the complaint was generated.

Complaints are routed to the office responsible for the type of activity that resulted in the noise complaint and coordinated with the CSSA installation commander. When complaints occur at CSSA, feedback is given to the noise producer in order to learn how to avoid future complaints.

4.4 INSTALLATION COMPATIBLE USE ZONE

The Army ICUZ program provides a method for evaluating the effect of noise and the hazards associated with training operations that stem from activities at military installations. The purpose of the program is to identify land areas that are exposed to generally unacceptable noise levels and to then recommend uses for the land lying within these areas that are compatible with the needs of the civilian community and the Army.

The ICUZ program considers the land areas, with noise-sensitive land uses, that are exposed to generally unacceptable noise levels. There are three noise zones. Noise Zones (NZ) III, II, and I, ordered from most severe to least, are projected using computer models (for detailed information see Appendix B). Noise-sensitive land uses include, but are not limited to, residences, schools, medical facilities, and churches. At military airfields supporting a substantial volume of fixed wing military aircraft, the safety zones are divided into the Clear Zone, Accident Potential Zone I and Accident Potential Zone II. Because CSSA does not have an airfield, further discussion of the aircraft safety zones is not included in this document.

4.4.1 Noise Zones

Description

- **NOISE ZONE III.** NZ III consists of the area around the source of the noise in which the DNL is greater than 75 decibels (dB), A-weighted (dBA) for aircraft, vehicle, and small arms range noise, or 104 dB peak unweighted sound pressure level (dBP) for small arms, and greater than 70dBs, C-weighted (dBC) for noise from weapon systems larger than 20 mm. The noise level within NZ III is considered so severe that noise-sensitive land uses should not be considered therein.
- **NOISE ZONE II.** NZ II consists of an area where the day-night sound level is between 65 and 75 dBA, between 62 and 70 dBC, or between 87 and 104 dBP. Exposure to noise within this area is considered significant and use of land within NZ II should normally be limited to activities such as industrial, manufacturing, and transportation and resource production. However, if the community determines that land in NZ II areas must be used for residential purposes, then noise level reduction (NLR) features should be incorporated into the design and construction of the buildings. A discussion of NLR features is included in Appendix B.
- **NOISE ZONE I.** NZ I include all areas around a noise source in which the day-night sound level is less than 65 dBA, less than 62 dBC, or less than 87 dBP. This area is usually suitable for all types of land use activities.

Computer Modeling

The primary means of assessing environmental noise is through computer simulations since the direct measurement of noise levels is often impractical, expensive, and inconclusive. Computer

simulations can be summarized on installation land use maps to be incorporated into the installation master plan or IENMP.

During the examination of the environmental noise attributable to CSSA's operations, two commonly used noise measurement metrics are used to evaluate both average and peak sound levels. In this plan, the day-night average sound level (DNL) will always refer to the A-weighted DNL (ADNL) to describe small arms weapons firing. The dBP metric is also included as an alternative to the ADNL metric for small arms noise. The use of both metrics for CSSA noise modeling provides the local community additional information to make better informed land use decisions.

The DNL noise contours represent an annual average that separates the normally incompatible NZ II from the compatible NZ I. Taking all operations that occur at CSSA over the year and dividing by the number of training days generates the contours. Because DNL noise contours may not be the best model to predict annoyance in humans for noise associated with small arms ranges, the dBP metric was also used. The dBP metric is a single event metric which relies on the implicit notion that the events are multiple and periodic. The dBP noise level used to characterize a given small arms range is defined as the maximum level emitted from the loudest source in regular use at the range. The number of rounds fired, and other weapons of less acoustical significance are relatively unimportant.

Army land use planning guidelines provide compatibility criteria for noise levels characterized by these metrics. Land use compatibility guidelines are based on the three noise zones on the basis of the percentage of the population likely to be highly annoyed in each zone, regardless of the metric used to estimate and depict noise levels. These guidelines are summarized in Table 4.1.

Table 4.1 Noise Levels used to Define Noise Zones

Noise Zone	Population Highly Annoyed	Noise Limits	
		Small Arms ADNL	Small Arms dBP
I	<15%	<65 dBA	<87 dBP
II	15-39%	65-75 dBA	87-104 dBP
III	>39%	>75 dBA	>104 dBP

The extent of the noise emanating from Army weapons firing at specific sites will be depicted graphically later in this section. A detailed description of the noise environment and the methodology used in the noise evaluation is provided in Appendix B.

4.4.2 Land Use guidelines

The Federal Interagency Committee on Urban Noise (FICUN) (FICUN 1980) has developed land use guidelines for areas on and/or near noise producing activities, such as highways, airports, and firing ranges. The ICUZ program uses these guidelines.

The ICUZ Program designates noise zones for land use planning. By projecting these zones onto an area map, land use guidelines can be used to help planners develop compatible land uses (Appendix D).

4.4.3 Community Reaction to Noise

Ambient noise is the composite sound associated with the noise environment of a particular site, excluding the sound of the source of interest. The USEPA found that ambient noise, along with previous community exposure and community attitudes, are important considerations in predicting community reaction (USEPA 1974).

The EPA introduced these corrections because they resulted in a better correlation between measured DNL and community response than is observed with measured DNL by itself. These corrections date back to Air Force funded research by Rosenblith and Stevens (1953). This model accounted for the following factors:

- Magnitude of the noise with a frequency weighting relating to human response;
- Duration of the intruding noise;
- Time of year (windows open or closed);
- Time of day noise occurs;
- Outdoor noise level in the community when the intruding noise is not present;
- History of prior exposure to the noise source and attitude toward its owner; and
- Existence of pure tone or impulsive character in the noise.

Correction for these factors were initially made in 5 dB intervals since it is difficult to assess human response accurately for any smaller increment. The Air Force and the FAA later simplified this model for ease of application.

The data indicate that widespread complaints may be expected when the normalized value of the outdoor ADNL of the intruding noise exceeds the ambient noise by approximately 5 dB. Vigorous community reaction may be expected when the excess approaches 20 dB. The standard deviation of these data is 3.3 dB about their means and an envelope of ± 5 dB encloses approximately 90 percent of the cases. Therefore, this relationship between the normalized outdoor day-night sound level and community reaction appears to be a reasonably accurate and useful tool. This tool can be used in assessing the probable reaction of a community to an intruding A-weighted noise.

The methodology applied to arrive at the correlation between normalized ADNL and community complaint behavior is the best available at present to predict the probable community reaction.

To protect the installation training and storage mission, where noise contours do not extend beyond the installation boundary, it is still prudent to identify land areas within a minimum 1.6 kilometers (1 mile) of the military boundary (Figure 4.1). Within the Zone of Influence (ZOI), exposure to noise may be considered significant during periods of increased operations. This zone accounts for the variability of noise levels caused by higher daily numbers of operations than the annual average and shows where levels of annoyance usually associated with Zone II can be found during periods of increased operations. This ZOI provides an additional buffer for long-term sustainable mission accomplishment and is consistent with previous compatible land planning initiatives such as the Camp Bullis JLUS (Section 3.4). Optimally, local communities should disclose to existing and potential landowners within the ZOI of the existence of CSSA and its activities (*e.g.*, weapons firing). This would provide the residents with an understanding of the installation mission and purpose. Thus, informing the community of the installation's existence reduces citizen concerns and any misunderstanding related to noise from unknown installation activities.

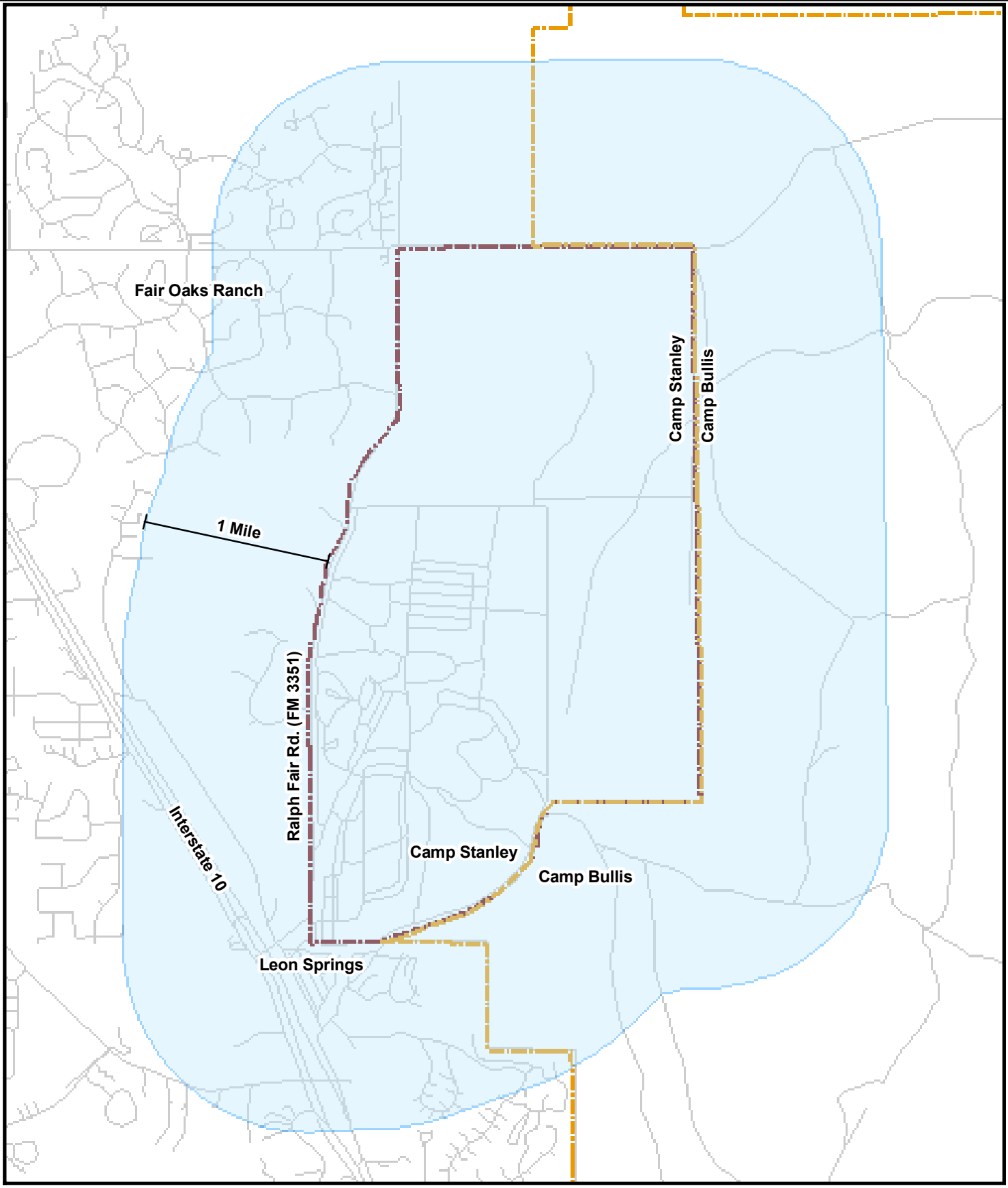
4.4.4 Noise Environment at Camp Stanley Storage Activity

The following discussion of conditions that currently exist within the CSSA area addresses noise generation and land use compatibility. The federal guidelines pertaining to compatible and incompatible land use around military installations have been addressed briefly in other parts of this study. Determining the locations of noise zones and applying the federal guidelines to these zones can evaluate present and future land uses compatibility for various types of activities. The examination of noise conditions will focus on the small arms ranges for CSSA in terms of:

- Noise;
- Current land use;
- Recommended land use under federal guidelines; and
- Compatibilities and incompatibilities in land use.

East Pasture Small Arms Ranges Noise Zones – ADNL (Figure 4.2)

NOISE. Small arms activities from both the covered small arms range and the rifle tunnel are conducted in the East Pasture. Table A-1 (Appendix A) displays the operational data from current operations. The ADNL Zones II and III noise contours from these small arms range activities, generated using the small arms range noise assessment model (SARNAM), do not extend outside CSSA and Camp Bullis land use areas. The noise zones are shown in Figure 4.2. Table 4.2 depicts the areas for Noise Zones II and III.



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Legend

- CSSA Boundary
- Camp Bullis Boundary
- Zone of Influence

Figure 4.1

Zone of Influence

Camp Stanley Storage Activity

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- CSSA Boundary
- Camp Bullis Boundary
- ADNL Noise Level Contours
- Zone III (75 dBA)
- Zone II (65 dBA)

Figure 4.2

Existing Small Arms
ADNL Noise Contours

Camp Stanley Storage Activity

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- **CURRENT LAND USE.** The land within NZs III and II is used for range and training operations.
- **RECOMMENDED LAND USE UNDER FEDERAL GUIDELINES.** Land uses within the Noise Zones II and III meet the federal guidelines.
- **COMPATIBILITIES AND INCOMPATIBILITIES IN LAND USE.** There are no incompatible land uses within the East Pasture small arms range noise contours.

East Pasture Small Arms Ranges Noise Zones – dBP (Figures 4.3, 4.4)

- **NOISE.** The small arms activities that affect the outdoor noise environment are conducted in the East Pasture area. Table A.1 (Appendix A) displays the operational data from current operations. The noise contours for the covered small arms range and the rifle tunnel are shown in Figures 4.3 and 4.4, respectively. The dBP NZ II and NZ III noise contours from these small arms range activities do not extend outside CSSA and Camp Bullis land use areas. Table 4.2 lists the areas for Noise Zones II and III.
- **CURRENT LAND USE.** The land within NZs III and II is used for range and training operations.
- **RECOMMENDED LAND USE UNDER FEDERAL GUIDELINES.** Land uses within the Noise Zones II and III meet the federal guidelines.
- **COMPATIBILITIES AND INCOMPATIBILITIES IN LAND USE.** There are no incompatible land uses within the small arms range noise contours.

Grenades and LAWs Noise Zones – Peak Noise Levels, dBP (Figure 4.5)

- **NOISE.** Noise contours representing noise generated by the use of M79 grenades and the H557 LAW are modeled using the BNOISE model. Table A-1 (Appendix A) displays the operational data from current operations. The noise contours are shown in Figure 4.5. The Zones II and III noise contours from these activities do not extend outside CSSA and Camp Bullis land use areas. Table 4.2 lists the areas for Noise Zones II and III.
- **CURRENT LAND USE.** The land within NZs III and II is used for range and training operations.
- **RECOMMENDED LAND USE UNDER FEDERAL GUIDELINES.** Land uses within the Noise Zones II and III meet the federal guidelines.
- **COMPATIBILITIES AND INCOMPATIBILITIES IN LAND USE.** There are no incompatible land uses within the small arms range noise contours.

4.4.5 CSSA's Future Noise Environment

CSSA proposes to enhance their training and testing capabilities by constructing additional munitions-test facilities in the East Pasture. The East Pasture project has three components. The first of which is the ammunitions test facility, which will be used to test ammunition, in particular grenades. It will be controlled from inside of a Control Booth, which will be located in the Range Area. The second component involves construction of a 200-meter and small arms long range. The third component is a shoot house. All of these components will be located in the East Pasture area. Upon implementation of this proposal, operations are expected to double from current operations. The number of operations is shown in Appendix A.

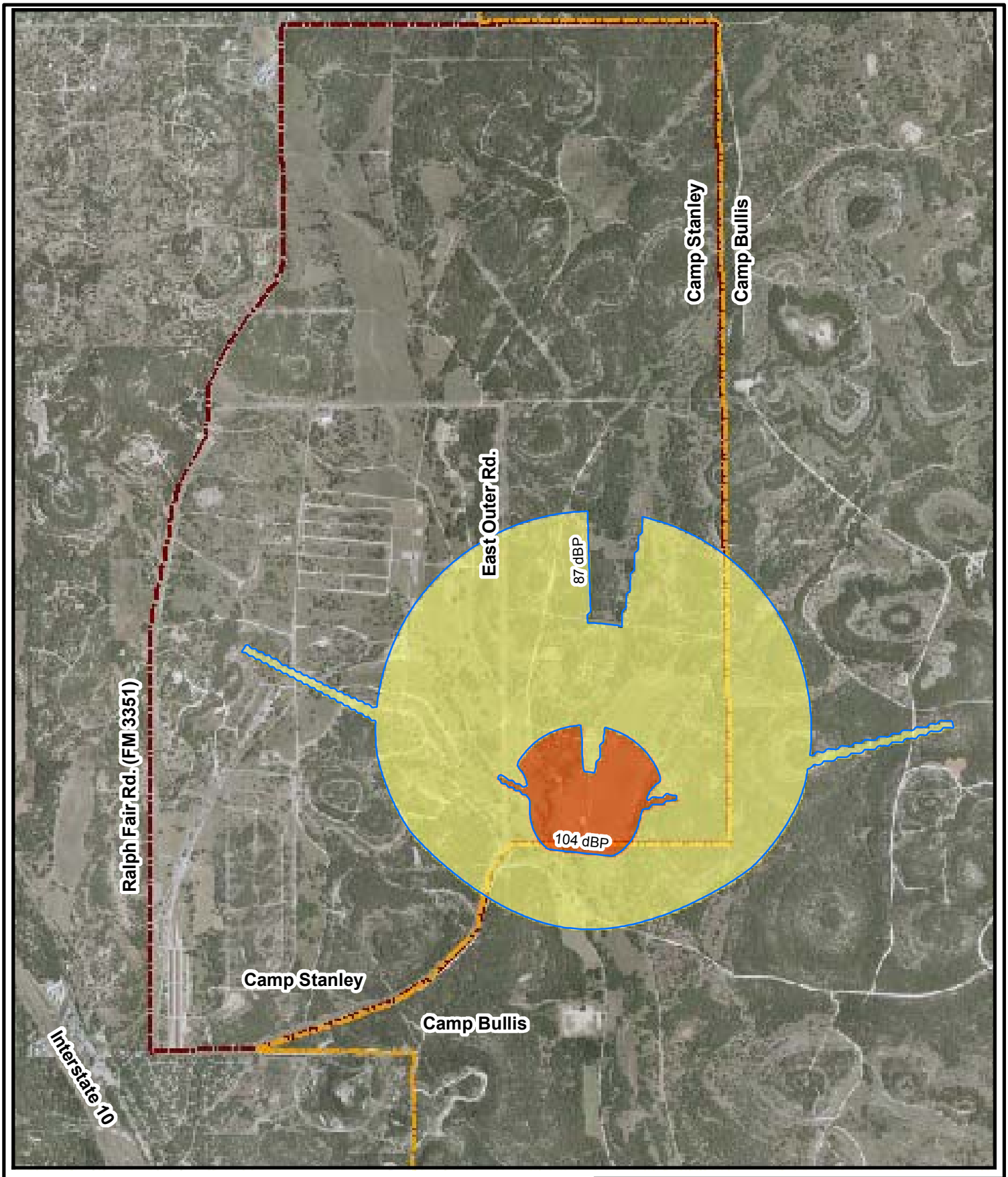
These operations reflect the use of new and existing facilities. It is expected that operations from these facilities would occur sometimes concurrently, depending on the testing and operations requirements. For worst case analysis, all future outdoor operational activities were modeled at the existing outdoor facilities since they are closer to the surrounding residential communities. The future noise contours based on these proposals are shown in Figure 4.6. The peak noise level dBP noise contours would be the same for both existing and future conditions. Therefore, it can be concluded that no Noise Zone II or III noise contours are expected to extend outside military land use areas. Table 4.2 lists the areas for Noise Zones II and III.

Table 4.2 Noise Contour Areas for Zones II and III

Range/Condition	Existing Areas, square meters		Future Areas, square meters.	
	Zone II 65-75 ADNL, or 87-104 dBP	Zone III >75 ADNL or >104 dBP	Zone II 65-75 ADNL, or 87-104 dBP	Zone III >75 ADNL or >104 dBP
East Pasture Small Arms Range and Rifle Tunnel - ADNL	49.1	22.9	93.4	33.3
East Pasture Small Arms Range Peak Noise Levels - dBP	1065.5	113.3	1065.5	113.3
East Pasture Rifle Tunnel Peak Noise Levels - dBP	2818.8	182.7	2818.8	182.7
East Pasture Grenades/LAWs Firing Area Peak Noise Levels-dBP	2459.4	544.4	2459.4	544.4

4.4.6 Current Land Use

The land use surrounding CSSA is largely rural with military, agricultural, residential, and open space being the most significant current uses. The northern portion of San Antonio, including the CSSA area of influence, has experienced significant residential growth over the past decade, resulting in a greater proportion of residential land use in the vicinity. Commercial development is predominantly located along the IH-10 corridor. There are no codes addressing noise compatibility conflicts for the CSSA area.



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- CSSA Boundary
- Camp Bullis Boundary
- Peak Noise Level Contours
- Zone III (104 dBP)
- Zone II (87 dBP)

Figure 4.3

Small Arms Range
Peak Noise Contours

Camp Stanley Storage Activity

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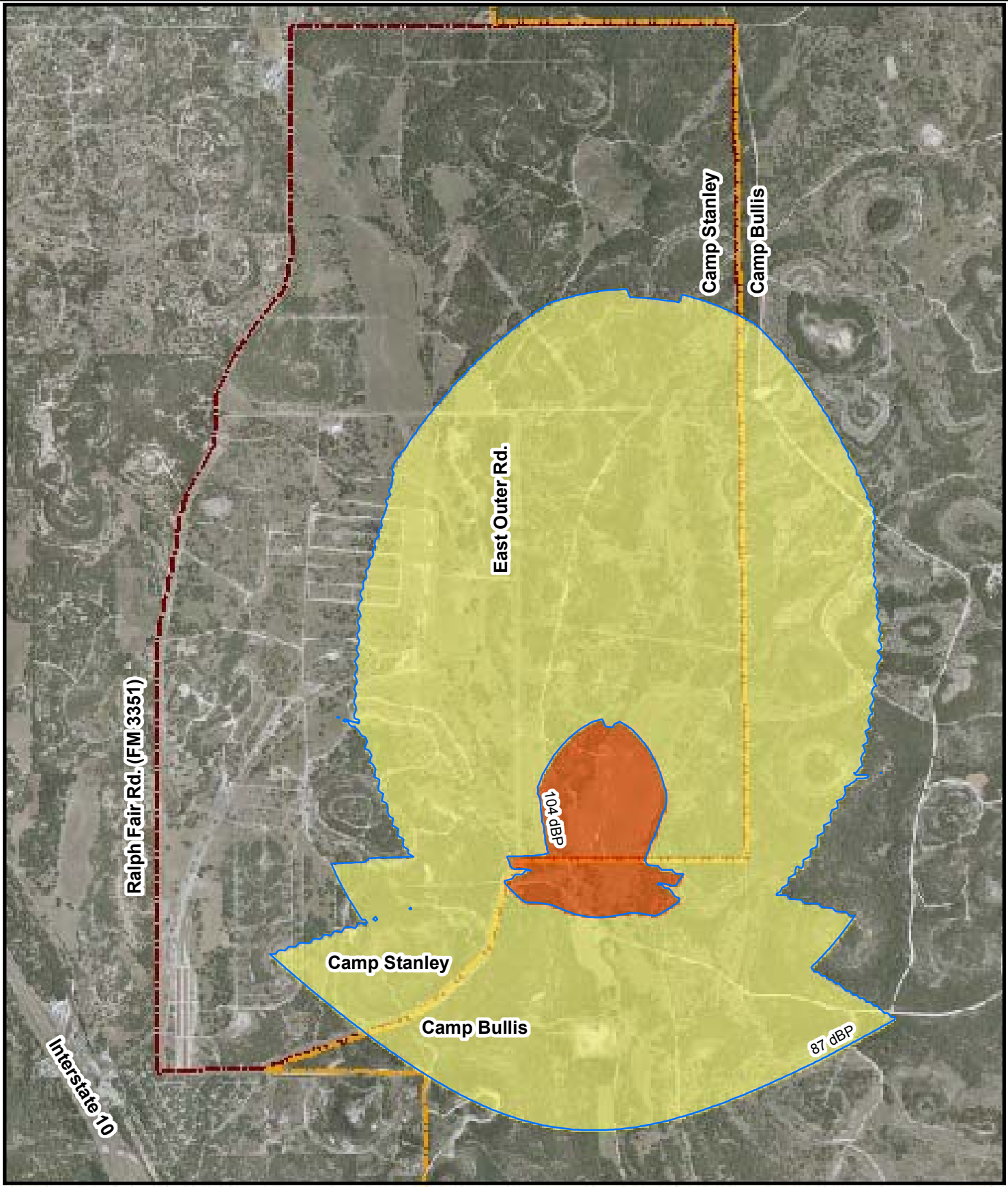

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- CSSA Boundary
- Camp Bullis Boundary
- Peak Noise Level Contours
- Zone III (104 dBP)
- Zone II (87 dBP)

Figure 4.4

100M Tunnel Peak Contours

Camp Stanley Storage Activity

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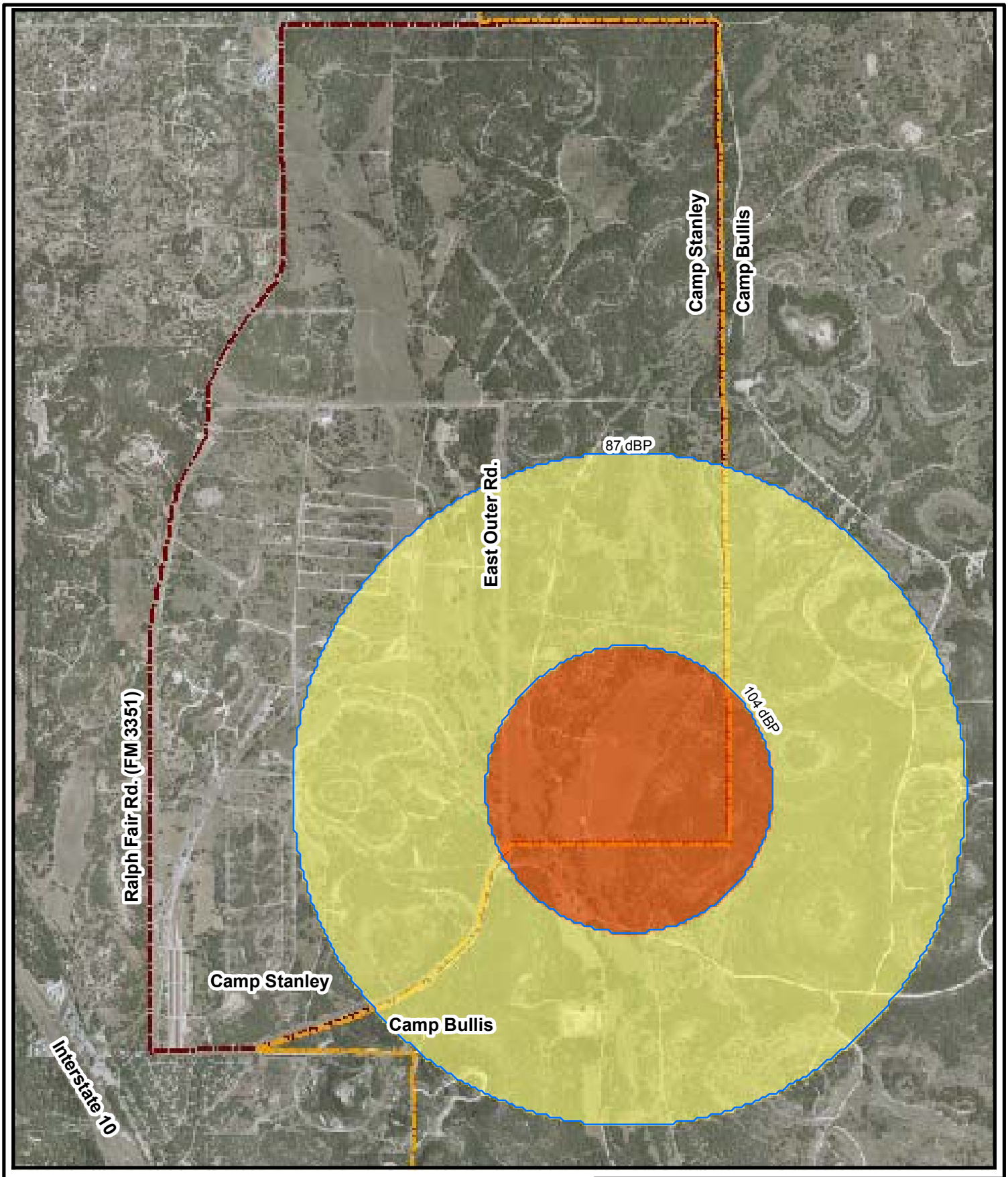

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- CSSA Boundary
- Camp Bullis Boundary
- Peak Noise Level Contours
- Zone III (104 dBP)
- Zone II (87 dBP)

Figure 4.5

East Pasture Grenades/LAWs
Peak Noise Contours

Camp Stanley Storage Activity

PARSONS

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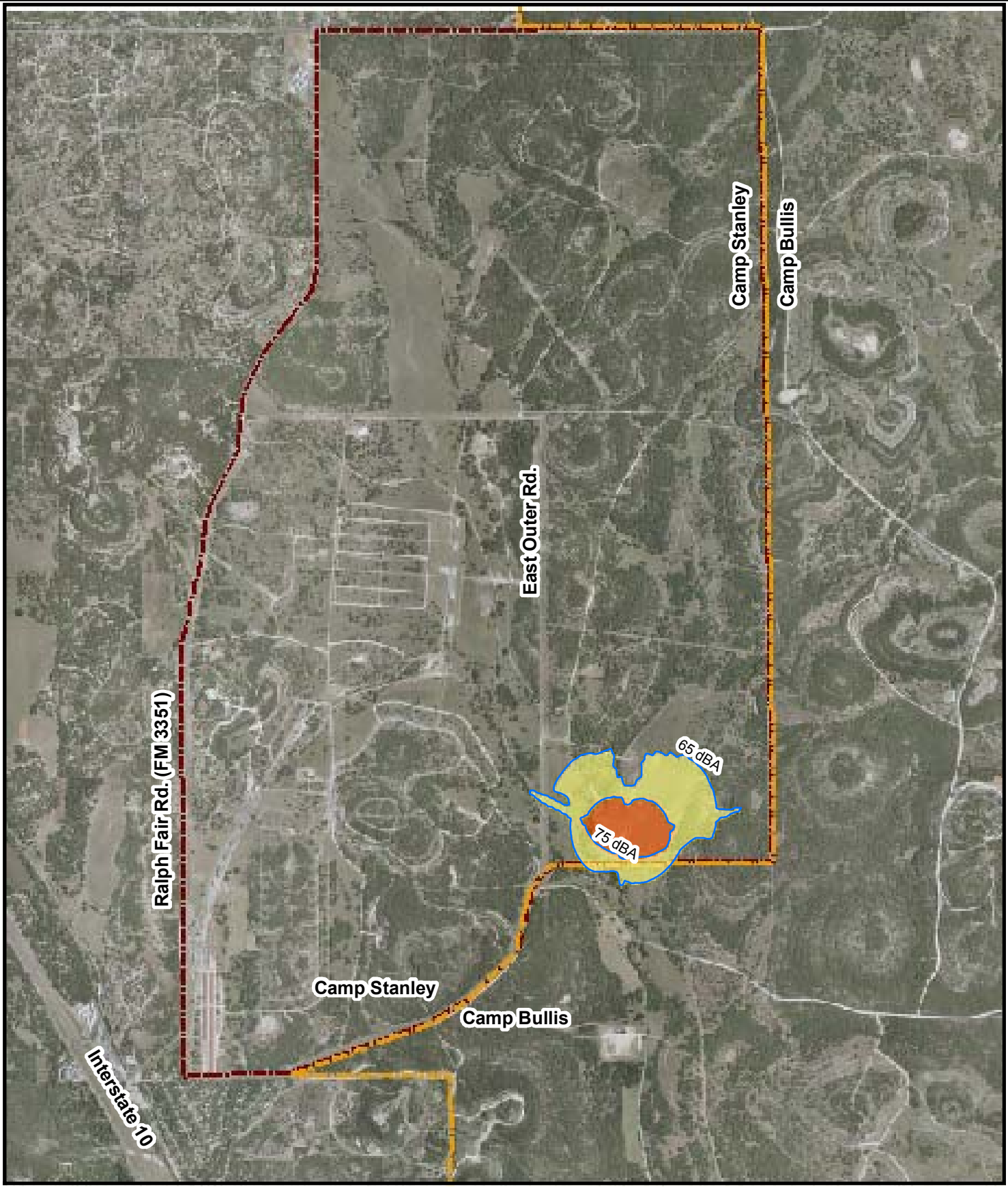

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- CSSA Boundary
- Camp Bullis Boundary
- ADNL Noise Level Contours
- Zone III (75 dBA)
- Zone II (65 dBA)

Figure 4.6

Future Small Arms ADNL Noise Contours

Camp Stanley Storage Activity

PARSONS

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Adjacent communities and subdivisions are identified and described below (Figure 4.7):

- City of Fair Oaks Ranch bordering CSSA on the northwest;
- Jackson Woods, single-family homes bordering CSSA on the west;
- Scenic Oaks a single family residential subdivision across IH-10 from CSSA to the west;
- Hidden Springs Estates and the Dominion, single-family large lot subdivisions to the southeast bordering CSSA and Camp Bullis; and
- Leon Springs Villa, a few small businesses, a single-family subdivision/mobile home park, bordering CSSA on the southwest.

The eastern boundary of CSSA and some of its northern and southern boundaries are shared with Camp Bullis Military Reservation. Directly south of CSSA is the Hidden Springs and Leon Valley Springs Trailer Park. It is triangulated between CSSA, Camp Bullis, and State Highway 3551. The City of Fair Oaks Ranch is located to the west of the installation and consists of large-lot single-family residences. Its boundaries extend into three counties: Bexar, Comal, and Kendall. The 2000 census estimated a 2004 population of 5,220 for Fair Oaks Ranch. A premier country club community, the Dominion, lies to the southeast of CSSA. The Dominion is a Planned Unit Development with many different subsections, a golf course, and building requirements for each housing subsection.

4.4.7 Future Development

Municipalities and communities in the immediate vicinity of CSSA that are affected by noise related to Army training and operational activities are the Cities of San Antonio and Fair Oaks Ranch and the community of Leon Springs. San Antonio has zoning regulations as part of the city's Unified Development Code, while Fair Oaks Ranch does not have land use plans or enforce zoning. The following assessment of future development is based upon development trends.

- **SAN ANTONIO.** In recent years, most of the development in San Antonio has occurred to the north of the city. Consequently, the density of residential and commercial development to the north, west, and south of CSSA is also increasing. In 1998, the City of San Antonio annexed land directly south of CSSA including the Dominion and Leon Springs. The City also recently annexed a strip of land west of IH-10, including the Stage Run subdivision, north of Boerne Stage Road. While all of the land surrounding CSSA falls within San Antonio's extra-territorial jurisdiction (ETJ), there are no plans to annex additional land in the area in the next three years. Existing open space/low-density land use along Ralph Fair Road adjacent to the southwest boundary of CSSA is currently being evaluated by land developers, with the goal of residential development. Residential patterns adjacent to CSSA are typical of suburban developments or planned unit developments with densities of approximately 3 to 5 units per acre. In addition to the residential development, a regional commercial center is proposed at Camp Bullis Road and IH-10 West.

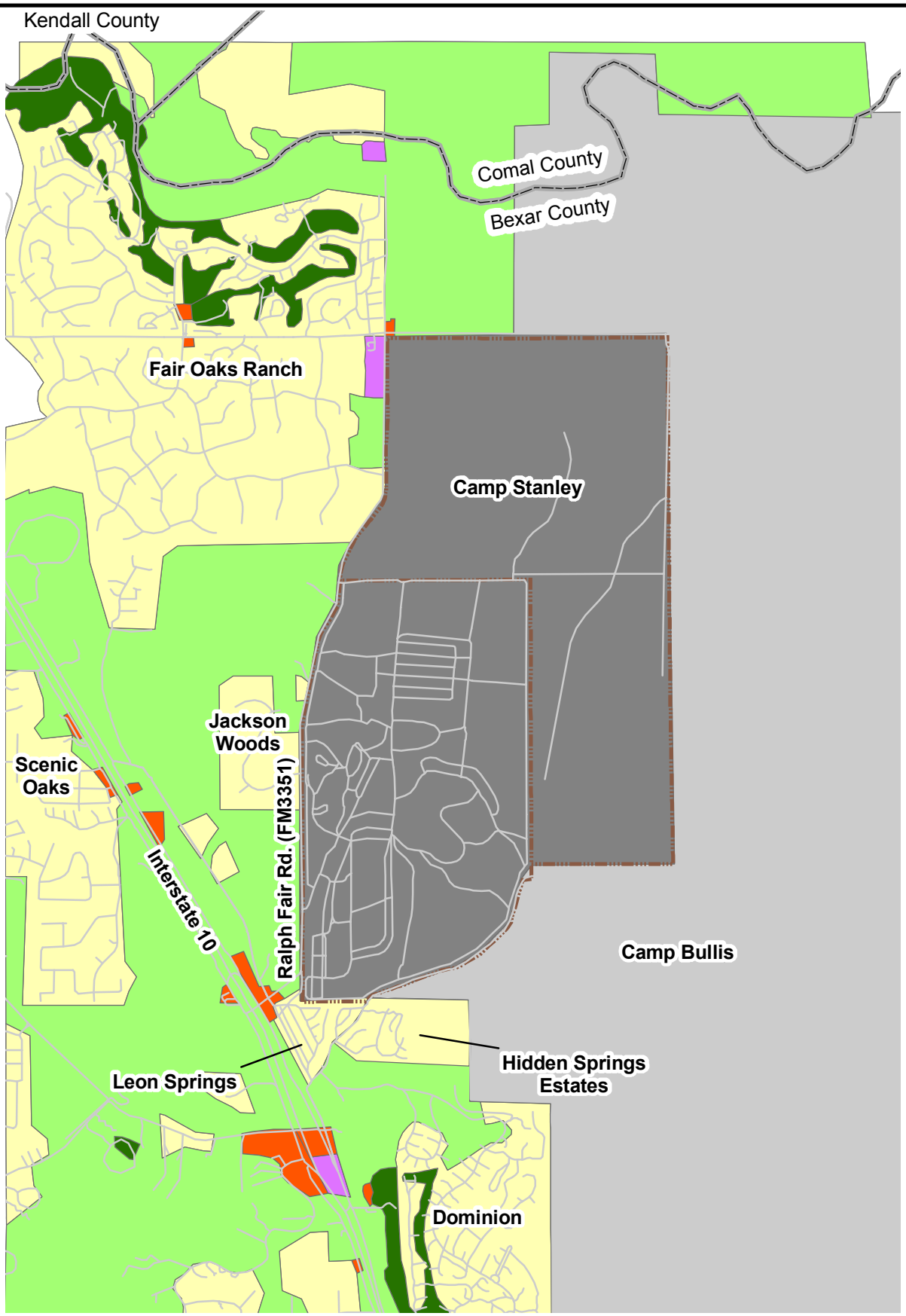
- **FAIR OAKS RANCH.** Fair Oaks Ranch is predominantly a medium to low density residential community with only limited commercial or public land uses. The community continues to expand its residential development, adding approximately 70 new homes every year. The majority of the city's future growth will occur in the northern portion of the city, in Comal and Kendall Counties. Two subdivisions currently under development include Deer Meadow Estates in Kendall County and Cibolo Trails in Comal County.
- **LOCAL COUNTIES.** The majority of land in unincorporated counties is agricultural, open space, or low-density residential development. Land directly west of CSSA is located in Bexar County, outside the San Antonio municipal boundaries. Comal County lies north-northeast of CSSA, with Kendall County property located northwest of the installation. In the majority of residential areas west and north of CSSA, the residential patterns of development are rural in character. The topography necessitates private wells and septic tank systems to service lot size developments. The density of development ranges from ½ acre to 8 acre lots, with the average lot size being approximately 3 acres. Low-density residential development is expected to continue in the CSSA vicinity. Sporadic commercial development is anticipated, mostly along the IH-10 corridor.

4.4.8 Effects of Current Noise on Surrounding Communities

The impact of the noise environment on the communities around CSSA will be discussed in this sub-section. It is worth emphasizing again that the Army has no desire to recommend land use regulations that will render property economically useless. Even so, the Army has an obligation to point out ways in which land around CSSA can be used to protect the people from exposure to high noise levels, and the public's investment in the installation itself.

The surrounding communities illustrate the propensity for growth by civilian communities around military installations since CSSA was established. This development and growth on the part of the civilian communities has included expansion toward the CSSA reservation boundaries. Such expansion has been referred to as urbanization and the process, if left unchecked, can place severe limitations upon the ability of a military installation to assure satisfactory accomplishment of training and other mission essential activities. At the least, the noise generated by weapons firing can become an annoyance to the citizens who live in the vicinity of the installation. At its worst, these military activities can become such an irritant that the citizens might seek relief through legal means. It is in the best interest of all citizens, therefore, to assure compatible development and use of land adjacent to the CSSA boundary.

There was very little urbanization in the immediate vicinity of the installation when CSSA was first established. However, the regional population has consistently grown and, as a consequence, transformed some areas of land that were rural in nature to land with urban characteristics. The areas of concern, that is, those areas where noise-sensitive land uses are expanding toward CSSA, are primarily south and west of the installation.



N
W E
S

0 2,000 4,000 8,000 Feet

Land Use

- Camp Stanley
- Camp Bullis
- Commercial / Industrial
- Open Space / Low Density
- Recreation
- Public / Institutional
- Residential

Figure 4.7

Current Land Use

Camp Stanley Storage Activity

PARSONS

J:\CSSA\environmental_files\gisdata\mxd\cssa_land_use.mxd

4.4.9 Land

Land for development is abundant in some areas and hard to acquire in others; therefore, each county and city need to evaluate their own situation and options. Then, compatible land uses need to be promoted and disclosure of CSSA's presence to existing and potential land owners needs to be made.

Over the years many of the surrounding towns have expanded in the direction toward the northern, western and southern boundaries of CSSA. As a result, noise-sensitive land uses are projected adjacent to the installation boundary. Although these projected noise-sensitive land uses are outside the Zone II and Zone III noise contours, much of this area is within one-mile of the installation boundary.

There is little that can be done about the urbanization that has occurred in the past. However, land use guidelines are meant to ensure compatibility with the noise environment while allowing maximum beneficial use of contiguous property. Although the noise generated by CSSA on adjoining properties is far below the "threshold" for land use restrictions, suggestions are provided later in this plan to assist in the development of the remaining land in a manner that is compatible with the economic needs of the civilian communities and the mission of CSSA. Land use controls are extremely limited since there is no enabling legislation that would allow such restrictions to be put into place. However, land use guidelines in noise zones are included in Appendix D for informational purposes.

4.5 NOISE MITIGATION

Public attitude surveys have shown that noise is considered an "enemy" in urban, suburban, and even rural areas. It is often rated worse than crime, litter, and abandoned buildings, since it seems to infiltrate homes and minds incessantly. As the public, in general, has become less tolerant of noise, the noise from military unique sources - artillery, low-level jet operations, helicopters, and small arms firing has increased both in intensity and frequency. Even though the military departments have made concerted efforts to reduce the noise from training and operations, weapons platforms and systems have become larger and louder.

An essential element of the IENMP is the discussion of noise mitigation. Noise mitigation is the reduction of the adverse impact from noise through changes in training or operations. There are three general categories of mitigation:

- **SOURCE,** in which something is done to reduce the amount of noise being made;
- **PATH,** in which the amount of sound propagating from the source to the receiver is reduced (*e.g.*, increasing distance, adding a barrier, locating upwind); and
- **RECEIVER,** in which the amount of noise is reduced at the ear of the receiver (*e.g.* replacing windows with sound-reducing windows, adding background masking noise).

Of these three categories, CSSA only has the authority to implement mitigation at the source and along the path.

Control Procedures

The adverse impact of the noise from some operations and training at CSSA can be reduced by mitigation methods. In its continuing effort to be a good neighbor, CSSA has implemented the following mitigation.

- No routine firing activities take place at night
- If a larger than normal detonation is scheduled, CSSA notifies the surrounding residential communities.

Other Considerations

Feasible noise mitigation is also investigated during the NEPA process for new operations and proposed changes in existing operations. Computer modeling of new training sites offers the prospect of predicting whether the proposed action will be compatible with adjacent land use. This is a proactive technique in that it offers the opportunity to eliminate sites from consideration before the undesirable effects of noise ever become a factor. It also allows the installation to minimize the noise impact when designing sites.

4.6 ANNOYANCE FROM NOISE

General

The DNL noise contours represent an annual average that separates the normally incompatible NZ II from the compatible NZ I. But the noise environment at CSSA varies daily and seasonally, because operations are not consistent for all 365 days of the year. For residential land uses, depending on attitudes and other factors, an ADNL of 60 dB “may be considered an adverse aspect of the community environment” and up to 9% of the residents may be highly annoyed. Remembrance of past "worst case" exposures is ever present in most public hearings over the noise impact of military training. Analyses of noise complaints received by the Army have shown that short term increases in DNL, not the long-term average, best predict complaints (Luz et and Schomer 1983). Consequently, even though the noise contours do not fall outside the CSSA and Camp Bullis boundary, people living near CSSA may be annoyed and could complain about the noise environment. The amount of annoyance also depends on the time of day the noise takes place, the background noise environment, and whether the person is indoors or outdoors at the time. The annoyance and complaint potential from single events is highly subjective. Data are limited in this area.

The usual complaint pattern is that economic activity unrelated to the installation stimulates increased population and development in the vicinity. Segments of the new population are not economically dependent on the installation, and tend to be annoyed by the noise or other aspects of the government presence. The noise from the ranges provides a specific and undeniable object to complain about. As time goes on, the complainers become more articulate and eventually address

their complaints to higher levels of command and government. When the situation becomes political, the installation's mission can be jeopardized.

Individual response of community members to noise depends on many factors. Some of these factors are the characteristics of the noise, including the intensity and spectral characteristics, duration, repetitions, abruptness of onset or cessation, and the noise climate or background noise against which a particular noise event occurs. Social surveys show that the following are all factors related to complaints and/or annoyance:

- The degree of interference of the noise with activity;
- The previous experience of the community with the particular noise;
- The time of day during which the intruding noise occurs;
- Fear of personal danger associated with the activities of the noise sources;
- Socioeconomic status and educational level of the community; and
- The extent that people believe that the noise output could be controlled.

Small Arms Range Noise

A Swedish study of annoyance caused by noise from shooting ranges (Sorensen and Magnusson 1979) showed the annoyance for this type of noise is low up to a certain threshold, after which it increases relatively quickly. For the A-weighted fast-time integrated maximum level (L_{Amaxf}), this threshold is approximately 63 dBA. At levels below this threshold, less than 2 percent of the population exposed to the noise consider themselves to be highly annoyed. At the threshold level, the percent highly annoyed increases to 10 percent, and continues to increase as the noise level increases (Table 4.3).

Table 4.3 Percentage of Population Highly Annoyed from Small Arms Range Noise

L_{Amaxf}, dBA	Percent Highly Annoyed
<62	2
63	10
65	13
70	21
75	29
80	38

The L_{Amaxf} for the M-16 rifle at several azimuths and distances are shown in Table 4.4. The zero degree azimuth is the direction of fire, while the 180^{o} azimuth is directly behind the weapon.

Table 4.4 Predicted L_{Amaxt} for M-16 (5.56 mm) Rifle

Distance, meters	Predicted Level, dBA Azimuth				
	0°	45°	90°	135°	180°
50	95-107	93-105	88-100	81-93	78-90
100	86-100	84-98	79-93	72-86	69-83
200	77-93	75-91	70-86	63-79	60-76
500	65-83	63-81	58-76	51-69	48-66
1,000	56-76	54-74	49-69	42-62	39-59
2,000	47-69	45-67	40-62	33-55	30-52

The range of levels shown in the table is caused by changes in the sound propagation conditions between the source and receiver. The primary cause of the range in levels is the wind direction. The lower numbers approximate the levels expected when the receiver is upwind of the source, and the higher numbers when the receiver is downwind. The levels listed in the tables do not include any reduction in the noise caused by natural or man-made terrain between the source and receiver, such as hills and berms.

4.7 OTHER

Other areas included in the IENMP are:

- Reviewing Environmental Assessments (EA) and Environmental Impact Statements (EIS) to ensure that the noise impacts of the proposed action are addressed and are consistent with the IENMP; and
- The noise environment is assessed primarily with computer prediction models. Monitoring is used when the noise environment is controversial, when Noise Zone III exists in a noise-sensitive area, and when the noise source is unique and cannot be modeled.

The noise contours are incorporated as a layer on the Geographic Information System (GIS). This layer can be overlayed with other layers; for example, land uses, and used in siting future facilities.

4.8 SUMMARY

This section provided a discussion of the IENMP. The purpose of the IENMP is to assist CSSA in managing its noise environment, with a minimal impact on its mission, while being a good neighbor. The IENMP expands on the ICUZ program to include education, complaint management, and noise mitigation.

The environmental impacts of activities at CSSA extend beyond the military reservation boundary. Therefore, officials at CSSA depend upon the goodwill and cooperation of the civilian

sector to promote public support for and understanding of the installation's mission requirements. Although a number of positive steps have been taken by CSSA to minimize the unfavorable effects of noise and hazards to the public welfare and safety, these unilateral actions do not guarantee that the post will be able to carry out its training and storage mission on into the infinite future.

SECTION 5
ARMY AND COMMUNITY RESPONSIBILITIES

5.1 INTRODUCTION

This section addresses the responsibilities of the Army and the civilian communities around CSSA with respect to the IENMP. In the civilian sector, responsibility for integrating noise considerations and safety of humans and property into the land use planning process rests with state and local governments. Within the military sector, consideration of these noise management issues is the responsibility of the installation manager. Neither can work in isolation. The emphasis of this section is the joint nature of environmental noise management.

Noise is considered to be one of the most important aspects of the environmental quality of life and needs to be considered in the planning process. Failure to do so can only result in irritation, complaints, and possibly legal action, all of which are detrimental to a harmonious relationship between CSSA and the citizens who live in the surrounding areas. Based on the discussion in Sections 2, 3, and 4, CSSA officials have been successful at minimizing noise impacts. Additionally, the incompatible (NZ III) and normally incompatible (NZ II) noise zones generated by CSSA activities are contained within the boundaries of CSSA and Camp Bullis. Consequently, the recommendations in this section are aimed at maintaining the compatibility between the needs of the civilian community and the CSSA mission.

5.2 LAND USE GUIDELINES

Land use guidelines are meant to ensure compatibility with the noise environment while allowing maximum beneficial use of contiguous property. The Army has an obligation to the communities around CSSA and the citizens of the United States to point out ways to protect both the people in adjacent areas and the public investment in the installation.

5.3 ARMY RESPONSIBILITIES

The military officials at CSSA have two primary responsibilities in regard to the IENMP. The first responsibility is to ensure that all possible steps have been taken to minimize the noise and safety impacts generated by military training and operations. The second is to be an active and willing participant in an ongoing cooperative educating and planning process through which compatible land use plans can be developed by local citizens through their elected representatives.

5.4 RESPONSIBILITY FOR PARTICIPATION WITH LOCAL COMMUNITIES

This report is one effort to fulfill CSSA's responsibility to the local communities by notifying elected officials, civic and business organizations, and other interested persons of its willingness to cooperate in noise management and promotion of the safety of humans and property. These responsibilities are detailed below.

- **EDUCATION**. CSSA has the civic responsibility to educate the surrounding communities about its mission and what CSSA is doing to reduce the impact of noise. This education can be accomplished through fact sheets, media releases, public meetings, open houses, and/or the internet website. As part of the education process, the CSSA website could include the noise contour maps and an explanation of what they mean.
- **NOISE COMPLAINT MANAGEMENT**. CSSA has the responsibility to maintain good public relations with its neighbors by being responsive to the concerns of these neighbors. Based on the relatively low noise conditions identified in Section 4.4, only minimal noise complaints are expected related to CSSA activities. Due to the small staff at CSSA and the rarity of noise complaints, the installation manager's policy is to designate the PAO at Fort Sam Houston to receive any noise complaints. The PAO telephone number is (210) 221-1151.
- **LAND USE RECOMMENDATIONS**. The land use guidelines outlined in an ENMP are meant to ensure compatibility with the noise environment while allowing maximum beneficial use of contiguous property. Based on the noise analysis for CSSA described in Section 4, the noise levels on adjoining properties are significantly below the threshold for land use restrictions. However, officials at CSSA stand ready to provide local governments with land use compatibility guidelines and information as set forth in Appendix D.
- **MITIGATIVE ACTIONS**. All reasonable actions to reduce noise during periods requested by local officials, as well as actions to resolve individual complaints, are considered.

5.5 CIVILIAN COMMUNITY RESPONSIBILITIES

Local government planning responsibilities include the protection of the environmental quality of life of the community and protection of individual and community investments. Communities near military installations have the additional responsibility of assisting in maintaining National security by protecting the mission capability of the installation.

Local governments and neighborhood organizations have demonstrated a willingness to work with the local military installations regarding operational and development issues. The communities adjacent to CSSA and Camp Bullis readily supported the Camp Bullis JLUS study in 1994 and 1995. The AACOG served as the local sponsor for the JLUS study. In general, the powers that local governments have in regulating land use around CSSA are limited when compared to those found in many areas of the United States. Even so, there are a number of techniques that can be used to help incorporate noise and safety related issues into land use planning. Techniques that may work in the communities surrounding CSSA include those listed below. (Note: Not all of the techniques will work in all of the communities).

- **PUBLIC AWARENESS**. Local government has a responsibility to inform its citizens when noise levels in an area are intense enough to lower the quality of

life. Because CSSA has successfully managed its training noise, there are no civilian properties where levels are high enough to lower quality of life.

- **CAPITAL IMPROVEMENTS**. Individual owners should be advised of capital improvements most acceptable to noise-sensitive urban activities, thus encouraging noise-sensitive buildings in compatible areas.

5.6 RECOMMENDATIONS

In providing these recommendations, neither the Army nor anyone at CSSA has any desire to make privately owned land economically useless. Although there are currently no incompatible off-installation land uses identified, when the development that has occurred around the CSSA is considered, it becomes apparent that actions are appropriate to guide the future development of the surrounding or adjoining private property. The following recommendations are provided to promote the orderly use and development of land for purposes that are compatible with CSSA's mission requirements and the needs and concerns of the surrounding civilian community.

CAMP STANLEY STORAGE ACTIVITY

- Use the CSSA website to provide the public with access to the noise contour maps and other information about noise levels generated at CSSA.
- Continue to use the Fort Sam Houston PAO as the single point of contact for noise complaints, and publish the noise complaint number on the CSSA website.
- Continue to inform the public about any unusual operations through the Public Affairs Office.
- Use environmental noise modeling capabilities to assess future mission changes and related noise impacts.
- CSSA should distribute and/or present this Installation Environmental Noise Management Plan to the county and municipal governments and ensure that it is filed in the office of official records to become a matter of public records.
- CSSA should continue to educate its personnel in the techniques needed to minimize the noise and safety impact from their training and operations. In addition, CSSA should educate the communities surrounding its facilities on its mission and what it is doing to minimize the negative impacts of its mission on the community.

It can be assumed that federal and state environmental protection legislation will continue to mandate more stringent measures to enhance the safety of humans and property in the near future.

LOCAL COMMUNITIES

- County and municipal governments are encouraged to support public disclosure of noise zones. Disclosure of noise zones enables citizens to make more informed choices regarding the location of homes, businesses, and public facilities. Being so informed, members of the public may be less vocal in voicing their complaints about noise while developers and builders may be more discriminating when siting new construction.
- Comprehensive Land Use Plans, initiated by any county or municipal government, should be coordinated with CSSA to ensure recommendations for adjacent land use are compatible with training and operations at CSSA.

SECTION 6
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SECTION 7
GLOSSARY

A-Weighted Sound Level, A-Level (AL) - The ear does not respond equally to sounds of all frequencies, but is less efficient at low and high frequencies than it is at medium or speech range frequencies. Thus, to obtain a single number representing the sound pressure level of a noise containing a wide range of frequencies in a manner approximating the response of the ear, it is necessary to reduce, or weight, the effects of the low and high frequencies with respect to the medium frequencies. Thus, the low and high frequencies are de-emphasized with the A-weighting.

The A-scale sound level is a quantity, in decibels, read from a standard sound-level meter with A-weighting circuitry. The A-scale weighting discriminates against the lower frequencies according to a relationship approximating the auditory sensitivity of the human ear. The A-scale sound level measures approximately the relative "noisiness" or "annoyance" of many common sounds.

Annual Average Busy Day - The average of the 12 monthly averages of workday operations. This is obtained by computing a workday average over a monthly period for each month and then averaging the 12 values.

Average Busy Day – The average of the 12 monthly averages of workday operations. This is obtained by computing a workday average over a monthly period for each month and then averaging the 12 values.

Average Sound Level - The mean-squared sound exposure level of all events occurring in a stated time interval, plus ten times the common logarithm of the quotient formed by the number of events in the time interval, divided by the duration of the time interval in seconds.

C-Weighted Sound Level, C-Level (CL) - The C-scale sound level is a quantity, in decibels, read from a standard sound level meter with C-weighting circuitry. The C-scale incorporates slight de-emphasis of the low and high portion of the audible frequency spectrum.

Community. Community means those individuals, organizations, or special interest groups affected by or interested in decisions affecting towns, cities, or unincorporated areas near or adjoining a military installation; and officials of local, state and federal governments, and Native American tribal councils responsible for decision making and administration of programs affecting those communities.

Community Involvement Program. Community involvement program means a carefully designed program, using a variety of techniques, which, in addition to informing the public of possible decisions and their potential consequences, provides opportunities for consultation with the public, and considers the public's views before making decisions and taking actions.

Continuous Noise - On-going noise whose intensity remains at a measurable level without interruption over an indefinite or a specified period of time.

Controlled Firing Area - Airspace wherein firing activities are conducted under conditions so controlled as to eliminate hazardous to nonparticipating aircraft and to ensure the safety of persons and property on the ground.

Day-Night Average Sound Level (DNL) - The 24-hour average frequency-weighted sound level, in decibels, from midnight to midnight, obtained after addition of 10 decibels to sound levels in the night from midnight up to 7 a.m. and from 10 p.m. to midnight (0000 up to 0700 and 2200 up to 2400 hours). A-Weighting is understood unless otherwise specified.

Decibels (dB) - The decibel is a logarithmic unit of measure of sound pressure.

Equivalent Sound Level (LEQ) - The level of a constant sound which, in a given situation and time period, has the same energy as does a time varying sound. For noise sources, which are not in continuous operation, the equivalent sound level may be obtained by summing individual sound exposure level (SEL) values and normalizing over the appropriate time period.

Frequency - Number of complete oscillation cycles per unit of time. The unit of frequency is the Hertz (Hz).

Hertz - Unit of frequency equal to one cycle per second.

Impulse Noise (Impulsive Noise) - Noise of short duration (typically less than one second), especially of high intensity, abrupt onset and rapid decay, and often rapidly changing spectral composition. Impulse noise is characteristically associated with such sources as explosions, impacts, the discharge of firearms, the passage of supersonic aircraft (sonic boom) and many industrial processes.

Intermittent Noise - Fluctuating noise whose level falls one or more times to low or immeasurable values during an exposure.

Involvement. Involvement means systematic opportunities for members of the public to know about and express their opinions regarding possible decisions to be made as part of the Installation Environmental Noise Management Program.

Noise - Any sound without value.

Noise Exposure - The cumulative acoustic stimulation reaching the ear of a person over a specified period of time (*e.g.*, a work shift, a day, or a lifetime).

Noise Hazard (Hazardous Noise) - Acoustic stimulation of the ear, which is likely to produce noise-induced permanent threshold shift in some portion of the population.

Noise Level Reduction (NLR) - NLR is the difference in decibels, between the A-weighted sound level outside a building and the A-weighted sound level inside a designated room in the building. The NLR is dependent upon the transmission loss characteristics of the building surfaces

exposed to an exterior noise source, the particular noise characteristics of the exterior noise source and the acoustic properties of the designated room in the building.

Noise Zone (NZ)- NZ III consists of an area around the source of the noise in which the day-night sound level (DNL) is greater than 75 decibels, A-weighted (dBA) or 70 dB, C-weighted (dBC). The noise level within NZ III is considered so severe that noise-sensitive activities should not be conducted therein.

Noise Zone II - NZ II consists of a area where the day-night sound level is between 65 and 75 dBA or 62 and 70 dBC. Exposure to noise within this area is considered significant and use of the land within NZ II should normally be limited to activities such as industrial, manufacturing, transportation and resource production.

Noise Zone I - NZ I includes all areas around a noise source in which the day-night sound level is less than 65 dBA or 62 dBC. This area is usually suitable for all types of land use activities.

Public. Public, for the purposes of this management plan, means the same thing as community.

Public Information Program. Public information program means a carefully designed effort, using a variety of techniques, to inform those people most likely to be interested or affected by actions resulting from the Installation Environmental Noise Management Program and Plan.

Sound Exposure Level - The level of the sound pressure squared, integrated over a given time.

Sound Level Meter - An instrument that provides a direct reading of the sound pressure level at a particular location. It consists of a microphone and electronic amplifier together with a meter having a scale graduated in decibels. Using appropriate built-in electrical filters, it is possible to directly measure the overall A- and C-weighted sound pressure levels. Standard sound level meters must satisfy the requirements of American National Standards Institute (ANSI) Specification for Sound Level Meters, S1.4-1983.

Standard Land Use Coding Manual (SLUCM) - Standard system for identifying and coding land use activities. Published by the United States Department of Commerce, 1965.

Urbanization - The term implies unguided use or development of the land surrounding a military installation.

Vibration - An oscillation where the quantity is a parameter that defines the motion of a mechanical system.

Zone of Influence (ZOI) - The zone of influence consists of land areas within a minimum 1.6 kilometers (1 mile) of the military boundary. The ZOI provides an additional buffer for long-term sustainable mission accomplishment.

APPENDIX A
NOISE CONTOUR OPERATIONAL DATA

INTRODUCTION

This Appendix consolidates the data that was used to generate the noise contours in CSSA's IENMP. Included are data for the noise environment for current operations as well as the data and noise contours resulting from any known future plans. These data were used as input to the BNOISE (large caliber weapons) and SARNAM (.50 caliber and smaller) noise model.

SMALL ARMS FIRING DATA

Inputs to the SARNAM and BNOISE noise models are shown in Table A-1 and A-2.

Table A.1 Existing Outdoor Weapons Firing Data

Range	Weapon	Day Rounds	Night Rounds	Day Rapid Fire	Night Rapid Fire
Small Arms	12 buckshot	200	0	0	0
Small Arms	5.56 mm ball	480,000	0	0	0
Small Arms	9 mm	600,733	0	0	0
Small Arms	10 mm / 40 cal.	23333	0	0	0
Small Arms	45 cal.	23334	0	0	0
Test Range (100m Tunnel)	.30 ball	420	0	0	0
Test Range (100m Tunnel)	.50 api	50	0	0	0
Test Range (100m Tunnel)	5.56 mm ball	230	0	0	0
Test Range (100m Tunnel)	5.56 mm tracer	400	0	0	0
Test Range (100m Tunnel)	7.62 mm ball	2365	0	0	0
Test Range (100m Tunnel)	9 mm	300	0	0	0
LAWS Firing Point	rockets, law	431	0	0	0
Grenades Firing Point	grenade	204	0	0	0
Source: CSSA, 2004					

Table A.2 Future Outdoor Weapons Firing Data

Range	Weapon	Day Rounds	Night Rounds	Day Rapid Fire	Night Rapid Fire
Small Arms	12 buckshot	400	0	0	0
Small Arms	5.56 mm ball	960,000	0	0	0
Small Arms	9 mm	1,201,466	0	0	0
Small Arms	10 mm / 40 cal.	46,666	0	0	0
Small Arms	45 cal.	46,668	0	0	0
Test Range (100m Tunnel)	.30 ball	840	0	0	0
Test Range (100m Tunnel)	.50 api	100	0	0	0
Test Range (100m Tunnel)	5.56 mm ball	460	0	0	0
Test Range (100m Tunnel)	5.56 mm tracer	800	0	0	0
Test Range (100m Tunnel)	7.62 mm ball	4,730	0	0	0
Test Range (100m Tunnel)	9 mm	600	0	0	0
LAWS Firing Point	rockets, law	862	0	0	0
Grenades Firing Point	grenade	408	0	0	0
Source: CSSA, 2004					

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APPENDIX B

DESCRIPTION OF THE NOISE ENVIRONMENT, NOISE EVALUATORS AND NOISE CONTOURING PROCEDURES

INTRODUCTION

Noise is defined as unwanted sound. Sound is the variation of air pressure about a mean (atmospheric) pressure. These changes in the atmospheric pressure [100,000 Pascals (14.7 pounds per square inch) (psi)] vary from approximately 0.0006 Pascals for a whisper at 2 meters to 1,000 Pascals for firing an M16 rifle at the firer's ear. Because of this large range of sound pressure and the fact that the human ear responds more closely to a logarithmic scale rather than a linear scale, sound pressure level is defined as 20 times the common logarithm of the ratio of the sound pressure to the reference pressure (0.00002 Pascal). The sound pressure level is measured in dBs. For example, if the sound pressure doubles from 0.2 to 0.4 Pascals, the level increases by 6 dB from 80 to 86 dB.

A characteristic of environmental noise is that it is not steady, but varies in amplitude from one moment to the next. To account for these variations in the sound pressure level with time, and to assess environmental noise in a consistent and practical manner, a statistical approach has been used to reduce the time-varying levels to single numbers. The currently accepted single-number evaluators are the equivalent sound level (LEQ) and the DNL.

The physical basis of the noise system is the noise source, path, and receiver relationship. Noise emanates from a source, travels along a path, and is perceived by the receiver. The affect of noise on the receiver can be considered the focal point of the entire system.

Before a noise problem can be resolved, however, the nature and intensity of the noise must be quantified. Because of the different types of noise, e.g., fixed- and rotary-wing aircraft flyovers, ground run-up, and explosive detonations, a weighting system was developed to measure these various types of noise.

In environmental noise, the sound pressure level is usually measured using one of the frequency networks of the sound level meter. Since the human ear is more sensitive to sounds of 1,000 Hertz and above than sounds of 125 Hertz and below, it is appropriate to apply a weighting function to the noise spectrum, which will approximate the response of the human ear. The A-weighting frequency network of the sound level meter de-emphasizes the lower frequency portion of the noise spectrum to approximate the human ear's response to the noise. This A-weighting frequency response is specified by an ANSI standard (ANSI 1983). Thus, the A-weighting of the frequency content of the noise signal has been found to have an excellent correlation with the human subjective judgment of annoyance of the noise. The sound pressure levels measured using the A-weighting network are expressed as dBA.

To assess the additional annoyance caused by low frequency vibration of structures, the C-weighting network is used to evaluate the impulsive noise from all weapons larger than small arms. This weighting is also specified by the standard. The sound pressure levels measured using the C-weighting network are expressed as dBC.

HISTORY OF NOISE EVALUATORS

Before the mid 1970's, every organization had its own set of preferred environmental noise evaluators. This resulted in a wide variety of evaluators. Since each evaluator was developed for a specific purpose, a noise environment measured with one evaluator could not be compared with an environment measured using another evaluator.

In carrying out its responsibilities under the Noise Control Act of 1972 (PL 92-574 1972), the USEPA recommended the adoption of a single environmental noise evaluator, the LEQ and its 24-hour version, DNL. The DoD, along with most other United States Government agencies followed the USEPA recommendation. The DNL is the most widely accepted descriptor for environmental noise (FAA 1990) because of the characteristics listed below.

- The DNL is a measurable quantity.
- The DNL is simple to understand and use by planners and the public who are not familiar with acoustics or acoustical theory.
- The DNL provides a simple method to compare the effectiveness of alternative scenarios.
- The DNL is a "figure of merit" for noise impacts, which is based on communities' reactions to environmental noise.
- The DNL is the best measure of noise exposure to identify significant impacts on the quality of the human environment.
- By Federal interagency agreement, the DNL is the best descriptor of all noise sources for land use compatibility planning.
- The DNL is the only metric with substantial body of scientific survey data on the reactions of people to noise.

In recommending the DNL, the EPA noted that most noise environments are characterized by repetitive behavior from day to day, with some variation imposed by differences between weekday and weekend activity, as well as seasonal variation. To account for these variations, an annual average is used.

Since annoyance is caused by long-term dissatisfaction with the noise environment, the annual average is an excellent predictor of the average community annoyance when there is not a large variation in the day-to-day or season-to-season DNL. The annual DNL is not a good predictor of noise complaints, since complaints represent the person's immediate dissatisfaction with the noise environment.

Currently, there are no guidelines for judging the land use compatibility for single noise events. Although much of the early work on annoyance was done on single events, each study was designed differently, and the results cannot be combined in a systematic fashion to form a statistically-valid sample. Most of these studies were either done inside a laboratory or, if done outdoors, in controlled settings. Only recently has equipment become available which would allow subjects to register their annoyance if single events are experienced during their routine activities. There is not enough of this information available to support setting standards on single events.

For impulsive noise, the Department of the Army uses the C-weighted DNL. The use of C-weighting is based on the findings of the National Academy of Sciences Committee on Hearing, Bioacoustics and Biomechanics (CHABA) (CHABA 1981). Studies have been performed by the U.S. Army Construction Engineering Research Laboratory (USACERL) (U.S. Army 1984) to define the average annoyance as a function of the C-weighted DNL. The ANSI (ANSI 1986) has endorsed this method for predicting the annoyance caused by impulsive noise.

Recent research by the USACERL (Schomer 1994) confirms what Luz and Lewis (Luz and Lewis 1979) previously found. Annoyance from impulsive noise does not increase at the same rate as annoyance from continuous noise. It increases twice as fast. That is, if an increase in the continuous noise level causes the annoyance to double, the same increase in the impulsive noise level will cause the annoyance to increase fourfold. At an SEL of 103 dBs, the annoyance from continuous and impulsive noise is equal.

LEQ/DNL NOISE EVALUATORS

The LEQ is defined as the equivalent steady state sound level, which, in a stated period of time, would contain the same acoustic energy as the time-varying sound during the same period. The LEQ is an energy average. The energy average puts more emphasis on the higher sound pressure levels than the arithmetic average. The LEQ is usually computed for a 1-minute, 10-minute, 30-minute, 1-hour, 8-hour or 24-hour segment of environmental noise.

To assess the added annoyance of the environmental noise during the nighttime hours (2200 - 0700 hours), the DNL is used. The DNL is the 24-hour LEQ, with a 10 dB penalty added to the nighttime levels.

By using the LEQ and DNL, the three important determinants of noise annoyance can be described by using a single number. The three determinants are the intensity of the noise event, the duration of the noise event, and the number of times the noise event takes place. Numerous laboratory and field studies have confirmed that the tradeoff between intensity, duration and number is adequately described by averaging the total acoustical energy.

NOISE CONTOURS

Noise contours for all noise sources are generated using the A- or C-weighted DNL. The contours are computed by averaging over the time period of interest, the acoustical energy from the operations of the set of noise sources of interest. The averaging period is usually a busy day, a

training cycle, or a year. The contours, representing the boundaries between the noise zones, are constructed by connecting points of equal acoustical energy.

For example, the contours for an airfield are computed by averaging at many points the acoustical energy arriving at these points from aircraft operations. A 10 dB penalty is added to all nighttime operations. The contours for the airfield are constructed by connecting all points having a total acoustical energy equal to 65 dBA and connecting all points equal to 75 dBA.

IMPULSIVE NOISE

The noise simulation program used to assess heavy weapons noise is MicroBNOISE (U.S. Army 1986). The MicroBNOISE program requires operational data concerning type of weapons fired from each range or firing point including demolitions, the number and type of rounds fired from each weapon, the location of targets for each range or firing point and the amount of propellant used to reach the target. Existing records on range utilization along with reasonable assumptions are used as MicroBNOISE inputs.

AIRCRAFT NOISE.

The noise contours for aircraft activity are generated using the NOISEMAP 6.5 computer program. This program was developed for the U.S. Air Force by Wyle Laboratories (U.S. Air Force 1990a). The required inputs to the program are the location of the flight tracks and the number of each type of aircraft using each flight track. The BASEOPS program (U.S. Air Force 1990b) was used to enter these data into the NOISEMAP input file.

The noise zones for the NOE routes were generated using the NOISESLICE computer program. The NOISESLICE is a simplified version of the NOISEMAP computer program. It was developed to predict the noise from operations at remote landing areas and from nap of the earth routes. The required inputs to this model include the number and type of aircraft using each area and the altitude of the aircraft at the point of interest.

The noise contours for the corridors used for entering and exiting the air to ground range area were generated using ROUTEMAP (U.S. Air Force 1988). The ROUTEMAP is a model developed for the U.S. Air Force by Wyle Laboratories used for predicting noise exposure from aircraft operations on military training routes. The inputs to the model are the altitude, power setting, speed and number of operations by aircraft type for a one month period.

The ROUTEMAP model computes and plots the LEQ, the ADNL, the onset rate-adjusted monthly day-night level (DNMRL), and the probability of high annoyance. These levels are computed for distances perpendicular to the corridor.

SMALL ARMS NOISE

Small arms noise contours were generated using the SARNAM. It incorporates the latest available information on weapons noise source models (including directivity and spectrum), sound propagation, effects of noise mitigation and safety structures (walls, berms, ricochet barriers), and community response protocols for small arms noise. SARNAM uses a more suitable noise metric than has been previously used for small arms in the United States It includes an extensive selection of weapons in the source library, can handle multiple ranges of various types, and is designed to maximize user productivity. The graphical output shows noise contours and range boundaries and can also display installation features.

SINGLE EVENTS

The noise level from a single event, such as artillery firings or explosive detonations, is useful to predict the annoyance and potential complaints caused by these events. To provide this supplemental information, single event levels are included in this assessment. The single event levels from detonations are predicted using the USAEHA's SHOT computer model (Lewis 1994). This model is used to predict the expected mean linear peak sound level and the distribution of the levels about this mean for the proposed detonation weights and selected receiver locations. The effect of topography features between the noise source and the receiver is included.

The inputs to this model are the explosive weight, distance between the source and the receiver, burial depth, and location and height of a barrier, if one exists, between the source and receiver.

The SHOT model is based on an extensive measurement project by the USACERL at Fort Leonard Wood (U.S. Army 1976) and our analysis of these measurements (Luz 1985). These measurements of 5-pound charges are corrected for the different charge weights (U.S. Army 1988b) with the relationship used by CERL in their linear peak sound level model. The accuracy of this model for large detonations was checked with the measurements taken at Sierra Army Depot (U.S. Army 1988a and U.S. Army 1989). For the 29 measurements taken at Sierra, the mean level predicted by the SHOT model underpredicted the measured levels by an average of 1.4 decibels.

The effect of the topography is also included in the SHOT program. The topography model was derived from monitoring at Forts Knox and Indiantown Gap (Raspet and Lewis 1986). This model was verified with the results of extensive monitoring at Picatinny Arsenal (U.S. Army 1991) and Navajo Depot Activity (U.S. Army 1992).

NOISE LEVEL REDUCTION

The outside noise environment can be reduced inside structures with the appropriate construction. Examples of aircraft and vehicle NLR between outside and inside a structure are given in Table B-1 for various types of construction.

Table B.1 Typical Building Construction NLR Values (U.S. Army 1978)

Type of Construction		NLR, dBA
Conventional wood frame	- windows open	15 - 20
	- windows closed	25 - 30
	- no windows or	
0.25 inch glass windows sealed in place		30 - 35
0.125 inch glass windows, sealed in place*		20 - 25
0.25 inch glass windows, sealed in place*		25 - 30
Walls and roof - weighting 20 to 40		
pounds per square foot, no windows*		35 - 40
- weighting 40 to 80		
pounds per square foot, no windows*		40 - 45
- weighting over 80		
pounds per square foot, no windows*		45 – 50

**Assuming a surface area consisting of only this element.*

In addition to the types of construction listed in the Table, the NLR of a structure can be increased by:

- **WALLS**. The NLR of walls can be increased by increasing the mass of the walls, using "dead" air spaces (increasing air space between walls), using staggered studs, sealing cracks and edges, using or increasing insulation, and using acoustic coatings. Also, special attention should be given to openings (electrical outlets, medicine cabinets, etc.) and the use of resilient materials to hold panels to studs.
- **ROOFS**. The NLR of roofs can be increased by increasing the mass of the roof and sealing cracks and edges.
- **CEILINGS**. The NLR of ceilings can be increased by using or increasing insulation, using acoustic coatings or ceilings, and using non-fixed suspension methods.
- **FLOORS**. The NLR of floors can be increased by increasing the mass of the floor, blocking off all joists, and using resilient supports between joists and floor.
- **WINDOWS**. The NLR of windows can be increased by using sealed windows, increasing glass thickness, using double glazed windows, and increasing the volume of "dead" air space in double glazed windows.
- **DOORS**. The NLR of doors can be increased by using solid core doors and using doorframe gaskets.
- **INTERIOR DESIGN.** The NLR of interior spaces can be increased by using heavy drapes and carpets, and using acoustic ceiling treatment.

The Department of Defense has published two guides on reducing noise through architectural mitigation. The first, Guidelines for the Sound Insulation of Residences Exposed to Aircraft Operations (Wyle 1989), was jointly funded by the Naval Facilities Engineering Command and the Federal Aviation Administration. This document describes the options for quieting interior rooms from aircraft noise for 26 different types of residential construction. The second, Expedient Methods for Rattle-Proofing Certain Housing Components (Schomer *et al.*, 1987), was prepared by the Army Construction Engineering Research Laboratory. This report is more limited in its scope. Rather than being a guide on how to reduce the transmission of explosive noise heard inside a house, it analyzes several different building elements to identify individual components contributing to rattle. Eliminating rattle is important because people exposed to the sound of large guns tend to complain about the rattling rather than the sound.

CONCLUSION

A significant amount of noise is produced by military installations. By careful consideration of noise sources, the paths this noise will take and the effect it has on the receiver, adequate land use plans can be designed and adopted for military installations and adjacent land.

By cooperative efforts on the part of military and civilian planners, the communities can be protected from sound levels that could endanger citizens' health, safety and welfare and, at the same time, protect the military mission of the installations that produce this noise

APPENDIX C
RECORD OF COMMUNITY INVOLVEMENT

INTRODUCTION

This appendix presents information related to past cooperation between the military and civilian communities. Past processes addressing noise compatibility in the CSSA area include the publishing of the Camp Bullis Joint Land Use Study (1995), the Installation Compatible Land Use Zone Report for Camp Stanley Storage Activity (1996), and the Environmental Noise Management Plan for Camp Bullis (1999). In addition to these cooperative planning efforts, an MOU (1990) exists between the major DoD installations in the San Antonio area and the AACOG.

MEMORANDUM OF UNDERSTANDING

The MOU states that "the DoD installations and the AACOG are interested in consistency and compatibility of all Federal, state, and local plans, programs, and projects in the twelve county AACOG region." There is an agreement, consistent with military requirements, that any plans, programs, and projects of a DoD installation which may affect the plans, programs, and/or projects of other Federal, state, local, or regional agencies in this twelve county area will be submitted to AACOG for review.

APPENDIX D
GUIDELINES FOR COMPATIBLE LAND USE

Table D.1 Guidelines for Considering Noise in Land Use Planning and Control (FICUN 1980)

SLUCM No.	LAND USE	NOISE ZONES/ADNL LEVELS						
		NZ I		NZ II			NZ III	
		0-55	55-65	65-70	70-75	75-80	80-85	85+
10	**RESIDENTIAL**							
11	Household Units	Yes	Yes*	25[1]	30[1]	No	No	No
12	Group Quarters	Yes	Yes*	25[1]	30[1]	No	No	No
13	Residential Hotels	Yes	Yes*	25[1]	30[1]	No	No	No
14	Mobile Home Parks or Courts	Yes	Yes*	No	No	No	No	No
15	Transient Lodgings	Yes	Yes*	25[1]	30[1]	35[1]	No	No
16	Other Residential	Yes	Yes*	25[1]	30[1]	No	No	No
20,30	**MANUFACTURING**							
21	Food & Kindred Products	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	No
22	Textile Mill Products	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	No
23	Apparel/Other Finished Products	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	No
24	Lumber & Wood Products	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	No
25	Furniture & Fixtures	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	No
26	Paper & Allied Products	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	No
27	Printing, Publishing/Allied Indust.	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	No
28	Chemicals & Allied Products	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	No
29	Petroleum Refining & Indust.	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	No
31	Rubber & Misc Plastic Products	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	No
32	Stone, Clay & Glass Products	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	No
33	Primary Metal Industries	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	No
34	Fabricated Metal Products	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	No
35	Professional, Scientific & Controls	Yes	Yes	Yes	25	30	No	No
39	Miscellaneous Manufacturing	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	No
40	**TRANSPORT, COMMUNICATIONS & UTILITIES**							

SLUCM No.	LAND USE	NOISE ZONES/ADNL LEVELS						
		NZ I		NZ II			NZ III	
		0-	55-	65-	70-	75-	80-	85
		55	65	70	75	80	85	+
41	Railroad, Rapid Rail							
	Transit & Street Rail	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	Yes[4]
42	Motor Vehicle Transportation	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	Yes[4]
43	Aircraft Transportation	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	Yes[4]
44	Marine Craft Transportation	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	Yes[4]
45	Highway & Street Right-of-Way	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	Yes[4]
46	Automobile Parking	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	No
47	Communications	Yes	Yes	Yes	255	30^5	No	No
48	Utilities	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	Yes[4]
49	Other	Yes	Yes	Yes	255	305	No	No
50	**TRADE**							
51	Wholesale Trade	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	No
52	Retail - Building Materials,							
	Hardware/ Farm	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	No
53	Retail - General Merchandise	Yes	Yes	Yes	25	30	No	No
54	Retail - Food	Yes	Yes	Yes	25	30	No	No
55	Retail - Auto, Marine, Aircraft Parts	Yes	Yes	Yes	25	30	No	No
56	Retail - Apparel & Accessories	Yes	Yes	Yes	25	30	No	No
57	Retail - Furniture, Furnishings	Yes	Yes	Yes	25	30	No	No
58	Retail - Eating & Drinking Facilities	Yes	Yes	Yes	25	30	No	No
59	Other Retail Trade	Yes	Yes	Yes	25	30	No	No
60	**SERVICES**							
61	Finance, Insurance &							
	Real Estate Services	Yes	Yes	Yes	25	30	No	No
62	Personal Services	Yes	Yes	Yes	25	30	No	No
62.4	Cemeteries 11	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	Yes[6]
63	Business Services	Yes	Yes	Yes	25	30	No	No
64	Repair Services	Yes	Yes	Yes	Yes[2]	Yes[3]	Yes[4]	No
65	Professional Services	Yes	Yes	Yes	25	30	No	No
65.1	Hospitals, Nursing Homes	Yes	Yes[*]	25[*]	30[*]	No	No	No

SLUCM No.	LAND USE	NOISE ZONES/ADNL LEVELS						
		NZ I		NZ II			NZ III	
		0-55	55-65	65-70	70-75	75-80	80-85	85+
65.1	Other Medical Facilities	Yes	Yes	Yes	25	30	No	No
66	Contract Construction Services	Yes	Yes	Yes	25	30	No	No
67	Government Services	Yes	Yes*	Yes*	25*	30*	No	No
68	Educational Services	Yes	Yes*	25*	30*	No	No	No
69	Miscellaneous Services	Yes	Yes	Yes	25	30	No	No
70	**CULTURAL, ENTERTAINMENT & RECREATIONAL**							
71 Churches	Cultural Activities, Including	Yes	Yes*	25*	30*	No	No	No
71.2	Nature Exhibits	Yes	Yes*	Yes*	No	No	No	No
72	Public Assembly	Yes	Yes	Yes	No	No	No	No
72.1	Auditoriums, Concert Halls	Yes	Yes	25	30	No	No	No
72.11	Outdoor Music Shells, Amph.	Yes	Yes*	No	No	No	No	No
72.2	Outdoor Sports Arenas	Yes	Yes	Yes[7]	Yes[7]	No	No	No
73	Amusements	Yes	Yes	Yes	Yes	No	No	No
74	Recreational Activities	Yes	Yes*	Yes*	25*	30*	No	No
75	Resorts, Groups & Camps	Yes	Yes*	Yes*	Yes*	No	No	No
76	Parks	Yes	Yes*	Yes*	Yes*	No	No	No
79	Other Cultural Entertainment & Rec	Yes	Yes*	Yes*	Yes*	No	No	No
80	**RESOURCE PRODUCT & EXTRACT**							
81	Agriculture (Except Livestock)	Yes	Yes	Yes[8]	Yes[9]	Yes[10]	Yes[10]	Yes[10]
81.5	Livestock Farming &							
81.7	Animal Breeding	Yes	Yes	Yes[8]	Yes[9]	No	No	No
82	Agricultural Related Activities	Yes	Yes	Yes[8]	Yes[9]	Yes[10]	Yes[10]	Yes[10]
83	Forestry Activities & Related Svcs	Yes	Yes	Yes[8]	Yes[9]	Yes[10]	Yes[10]	Yes[10]
84	Fishing Activities & Related Svcs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
85	Mining Activities & Related Svcs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
89	Other Resource Production	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Legend:

SLCUM *Standard Land Use Coding Manual*
Yes *Land use and related structures compatible without restrictions.*
No *Land use and related structures are not compatible and should be prohibited.*

ADNL	*A-weighted day-night sound level*
NZ	*Noise Zone*
Yes[x]	*(Yes with restrictions) Land use and related structures generally compatible; see footnotes.*
25, 30, 35	*Land use and related structures generally compatible; measures to achieve noise level reduction (NLR) of 25, 30 or 35 must be incorporated into design and construction of structure.*
25, 30*, 35**	*Land use generally compatible with NLR; however, measures to achieve an overall NLR do not necessarily solve noise difficulties; additional evaluation is warranted.*
NLR	*Noise level reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.*

Footnotes:

* The designation of these uses as "compatible" in this zone reflects individual Federal agencies' consideration of general cost and feasibility factors as well as past community experiences and program objectives. Localities, when evaluating the application of these guidelines to specific situations, may have different concerns or goals to consider.

[1] (a Although local conditions may require residential use, it is discouraged in 65-70 ADNL and strongly discouraged in 70-75 ADNL. The absence of viable alternative development options should be determined and an evaluation indicating that a demonstrated community need for residential use would not be met if development were prohibited in these zones should be conducted prior to approvals.

(b) Where the community determines that residential uses must be allowed, measures to achieve outdoor to indoor NLR of at least 25 dB (65-70 ADNL) and 30 dB (70-75 ADNL) should be incorporated into building codes and be considered in individual approvals. Normal construction can be expected to provide a NLR of 20 dB, thus the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. Additional consideration should be given to modifying NLR levels based on peak noise levels.

(c) ©NLR criteria will not eliminate outdoor noise problems. However, building location and site planning, design, and use of berms and barriers can help mitigate outdoor noise exposure particularly from ground level transportation sources.

Measures that reduce noise at a site should be used wherever practical in preference to measures that only protect interior spaces.

2 Measures to achieve NLR of 25 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.

3 Measures to achieve NLR of 30 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.

4 Measures to achieve NLR of 35 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.

5 If noise-sensitive, use indicated NLR; if not, use is compatible.

6 No buildings.

7 Land use compatible provided special sound reinforcement systems are installed.

8 Residential buildings require a NLR of 25.

9 Residential buildings require a NLR of 30.

10 Residential buildings not permitted.

11 In areas with ADNL greater than 80, land use not recommended, but if community decides use is necessary, hearing protection devices should be worn by personnel.

APPENDIX E
COMMUNITY INVOLVEMENT

E.1 PURPOSE OF COMMUNITY INVOLVEMENT

The purpose of a community involvement plan is to educate the public, achieve negotiated mutual agreements with neighboring civilian communities and to promote compatible land use in areas around installations. The IENMP objectives are to protect the installation operational capability from the effects of incompatible land use and to assist local, regional, state, and federal officials. Although this IENMP did not identify CSSA generated noise levels which are currently incompatible with surrounding land uses, the community involvement procedures outlined in this appendix are useful in maintaining the established positive relationship with the local community, while ensuring future development and CSSA missions remain compatible.

The purposes of the community involvement plan are to:

- Maintain the installation's position as a good neighbor in the community.
- Inform the community of alternative actions and their potential impacts.
- Solicit information from the public regarding possible impacts, future development in the community, and the acceptability of proposed actions.
- Maintain an open and visible decision-making process that is fair and equitable to different people within the community.

E.2 PURPOSE OF THIS SECTION

The purpose of this section is to:

- Provide a summary of the programs and policies developed by civilian communities to resolve Installation Environmental Noise Management issues presented in this study.
- Document the steps taken to reach agreements between the installation and local communities on matters affecting land use in areas impacted by activities on the military installation.
- Document unresolved land use conflicts.

E.3 INTRODUCTION

The specific techniques to be used for community involvement will be at the discretion of the installation manager and staff, taking into account the unique circumstances of the installation, the degree of controversy surrounding noise and other issues at the installation, and the characteristics of the local political institutions. But the installation manager will be asked to follow a carefully-designed thought process which will help them him through the design of his community involvement programs in an orderly and systematic manner.

Implicit in this thought process is the recognition that people are different. Some people may be concerned because they hold an official position in the community. Others are concerned because the noise or other issues impact directly on them. While others are concerned with how the community is growing. Finally, those holding real estate in noise-impacted areas are concerned about their future development plans. To be credible to the community, any agreement needs to win acceptance not only of elected leaders, but also of those people that see themselves as having a stake in the issue.

The Army's experience with noise and other environmental issues suggests that most people will not be interested in the Installation Environmental Noise Management process unless they are directly impacted by these issues such as, planning regulations, changes in tax rates, or some other direct impact.

But even when dealing with only part of the community, there are differences in the kind of information you can give or get from various people. The number of people that can understand the technical complexities of acoustical measurement is extremely small, but the opinion of this small technical group of people can be very important. They often influence whether public officials accept the IENMP study. Thus, it is important to balance the technical aspects of noise based on the people involved. In other words: "Do not tell people how to build a watch when all they want to know is the time." The general attitudes towards the installation, perceptions of whether or not there is a noise problem, etc., is the key to success or failure.

The reason it is so important to carefully target the people you want to reach is that this determines the techniques you will use. An appropriate technique for reviewing the technical methodology might be a small technical advisory group. But if you want general public perceptions you might hold community workshops in noise-impacted neighborhoods, or conduct a number of interviews.

The person implementing a community involvement program will need to go through this kind of analysis in order to select from the considerable array of community involvement techniques, which have been developed, including:

- Public Meetings
- Public Hearings
- Informal Workshops
- Coffee Klatches
- Interviews
- Field Trips
- Advisory Committees or Task Forces
- Computer-Based Interactive Graphics
- Homepages

- Questionnaires, Response Forms, Polls
- Open Houses
- Brochures
- Newsletters
- Hot Lines
- News Releases

This list is not exhaustive, but simply includes the most frequently used techniques, or techniques which may have particular suitability for noise-related community involvement.

E.4 DESIGNING A COMMUNITY INVOLVEMENT PROGRAM

Installation Environmental Noise Management community involvement programs will usually not be a single event, such as one public hearing, but rather a series of coordinated activities, which provide different kinds of participation opportunities at different times. Like the NEPA process, environmental noise management requires continuous community involvement.

There is no single community involvement program that can be prescribed for all circumstances. A program that has been very successful in one situation may be ineffective in another. The following will provide guidance to assist in identifying a community involvement program suitable to your circumstances. This guidance will include general principles, which will help you approach the design of community involvement programs in a logical manner. It should be remembered, however, that there are a number of special conditions surrounding each installation that can also influence the selection of community involvement techniques. Many of these conditions are described later in this section. These conditions do not negate the thought process, but are in addition to it.

E.5 GENERAL PRINCIPLES

Practical experience with community involvement has lead to four general observations about community involvement programs.

Different people from the community will be involved at different stages of the decision-making process. A community involvement program - unless it lasts only a very short time - is not a simple linear thing. Rather, public participation will expand and contract. During technical phases, participation is likely to be limited to leaders of groups and interests, or staffs of agencies. In those phases where alternatives are being considered, a broader community based group may be involved.

There are appropriate levels of involvement at each step in the decision-making process. It is possible to attempt "too much" community involvement at a particular step in the decision-making process. In particular, many agencies have "burned out" public enthusiasm by creating a very high level of interest at the very beginning of the process - where there is relatively little in which the general public can really get involved - disappointing people who might have

made an important contribution in later stages of decision making. This often leads to them turning off the entire process. While this applies to the general public, opportunities for early participation should certainly be offered to other local, state, and federal agencies, identifiable interest groups, or directly impacted people. The thought process will assist you in identifying the most appropriate stages for more intense involvement of the general public.

The participation of the public will increase as the decision-making process progresses. While participation waxes and wanes, the overall pattern in community involvement is that more and more people will participate as you come nearer to a decision. This is a relatively understandable phenomenon: the closer you get to a decision, the more information there is for people to react to. While representatives of organized groups may be able to participate in the early stages of community involvement, the less organized people will be able to participate more effectively in the later stages of the process. This can be a mixed blessing. While you may feel delighted to receive more participation, you will also spend a lot of time explaining what has already taken place. People seem to assume that the program started the day they first began to participate, and feel a need to re-examine all the assumptions you've been working to build for many months. As a result, it is very important to document how people from the community have participated in the study, so that it is clear what decisions have preceded and who participated in making those decisions.

Community involvement programs must be integrated with the Installation Environmental Noise Management Program. Each step of the community involvement program must be scheduled with an eye to what information is required from the public at each stage. Too often community involvement activities are scheduled "ad hoc," without any awareness of how it fits in the overall scheme of things. The result is that the information received from the public is out of sequence with the decision-making process. Either the information is too late, and can't be used any longer or would require major re-study, or the community involvement is too early and asks for participation before there is really much for the community to "sink its teeth into." In either event there is frustration and damage to the credibility of the community involvement effort. As the thought process below will illustrate, community involvement activities should be designed as an integrated part of the decision-making process itself.

E.6 COMMUNITY INVOLVEMENT PROCESS

The community involvement process must be integrated with and facilitate the IENMP, rather than being added on to it as a final review. To achieve this integration of the IENMP and the community involvement process, it is necessary to think first about how community involvement plan meets those needs and facilitates the IENMP process.

Identify Decision-Making Process

Each of the IENMP stages, as described in paragraph 1.1.5, is logically related to the stages that precedes and follows it. It is important, at the beginning of the development of the community involvement plan for each stage, to decide where in the program the community involvement process will best fit.

Identify the Objectives

Because the community involvement plan must help the IENMP move along rather than impede or stop it, it is important to clearly identify what it is that the plan must achieve at each stage. The identification of program objectives should be specific (for example, an objective might be to update the installation's data base about land use surrounding the facility; another might be to verify public perception of noise in comparison to presumptions about noise impact as portrayed by the contour maps.

Identify Constraints and Opportunities

Before proceeding to identify the more specific community involvement activities, consideration should be given to those factors that might impede or advance the plan. Factors such as program schedule and budget limits, or command support, will affect the scope of community involvement action. Some installations may have considerable community controversy about noise problems, some may not. In some communities there are already groups organized to work on noise problems, in others there are not. The noise problems at some installations may have attracted the attention of powerful political figures, but this may not be so at other places.

All of these special conditions can affect your community involvement planning. Table E-1 summarizes many of the most important of these factors.

Table E.1 How Various Factors May Affect Selection of Community Involvement Techniques

Limited Alternatives	If controversial, look first for approaches to expand the range of alternatives: Limited alternatives may prevent achieving an agreement.
Limited Resources	Attempt to get multiplier effect by getting interest groups to involve their membership. Expend resources on the period after alternatives have been identified but before plan selection.
Duration of Program	Prolonged decision-making processes may require use of techniques to maintain visibility over a prolonged period, e.g., newsletters or an advisory committee.

Table E.1 How Various Factors May Affect Selection of Community Involvement Techniques (*continued*)

Technical Complexity	May need an advisory group that can get thoroughly informed. Need for publications to simplify technical concepts. May have to work most closely with other agencies and interest groups rather than "man on the street."
High Level of Interest	Need to offer a variety of involvement opportunities. Use techniques stressing conflict resolution rather than speechmaking, e.g., workshops rather than hearings.
Low Level of Interest	If interest very low, consider whether a community involvement program is needed. Early part of program includes public information program on how the issue could affect the community.
Interest in Community	Use of techniques aimed specifically at interested people.
Limited to a Few People	Use interviews, workshops, or advisory committees rather than public meetings or hearings.
Community Interest is Very Broad	Use media to inform public. Use highly visible techniques such as meetings, workshops, newspaper inserts, etc.
Noise Issues have High Level of Significance to Groups	Put emphasis on conflict resolution techniques such as small group discussions, workshops, advisory committee, conflict mediation, etc.
Uninformed Community	Requires public information program. Work with interest groups to get them to inform their membership.
Highly Informed Community	Check whether or not they are accurately informed. Public information needs based on this appraisal.
Hostile Community	Create opportunities for ventilation of feelings. May need a series of meetings before things start being productive.
Apathetic Community	Provide public information program so people can decide whether or not to participate.
Unified Community	May be able to work through elected figures.

Table E.1 How Various Factors May Affect Selection of Community Involvement Techniques (*continued*)

Divided Community	Will have to deal with leadership of the various interests. Danger that this issue will get caught up in continuing community controversy.
State or National People Interested	May need to use newsletter or even briefings in state capitol or Washington, DC to keep all people informed.
Highly Representative Local Political Institutions	Potential for dealing through local representatives.
Compact Geographic Area	Potential for meetings, workshops, and face-to-face discussions.
Dispersed Geographic Area	May need to rely on newspaper inserts, mail-in or phone-in responses. Any meetings will have to be repeated in several geographic locations.
Low Credibility of Army	Need to stay with "safe" traditional forms of participation.
Past History of Community Involvement	If successful, either repeats past practices or consider innovative techniques. If unsuccessful, stay with "proven" techniques for that community.

Community Involvement Objectives

There may be more than one objective for community involvement at some stages of the IENMP. It is important to be specific in identifying these objectives.

Here are some examples of community involvement objectives (Table E-2) that may be appropriate to the noise program - but note that the special needs, constraints, and opportunities at each military installation will require the development of a list of objectives that are specific to that facility.

Table E.2 Examples of Community Involvement Objectives

NOISE PROGRAM STAGE	COMMUNITY INVOLVEMENT OBJECTIVES
Identify noise-impacted areas.	Identify the level of community interest in program.
	Identify community perceptions regarding the significance of noise problems at the installation.
Identify existing or potential incompatible land uses.	Identify existing land uses in noise-impacted areas.
	Identify land uses anticipated in the future.
Identify alternative actions to minimize noise impacts.	Identify alternative actions which the community believes could be taken to mitigate existing incompatible uses.
Evaluate alternative actions.	Identify community perceptions about the possible impacts of each of the alternatives.
	Determine the acceptability of each of the alternatives to the community.
Negotiate agreements with local communities and agencies.	Identify mutually acceptable actions to be taken by the communities, and actions to be taken by the installation.
Submit agreements for review decision-makers.	Determine acceptability of draft plans of by decision-makers.
Publish final report describing agreements and documentation.	Inform community of agreements reached.
Implement agreements.	Determine community concerns about how the agreement is implemented.
Update and review.	Identify continuing or new noise problems.

Identify the Information Exchange Which Must Take Place with the Community

In the proceeding, you defined where you wanted to be at the end of each stage of the noise program. In this step, you will need to define what information you will need to exchange with the community in order to complete the IENMP. There is information you must give the community, and information you must get from the community. Thinking first, about what you need to get from the community can help you to define better, and more easily, what it is that you need to give to them. Thinking about this information exchange in a logical/organized sequence can help you avoid information omissions and/or overkill.

Identify the Information Sources in the Community

You will not be dealing with the same people at each stage of the program. And, at some stages, the information from the community may come from different people than those you gave your information to. (For example, you may ask the mayor of a municipality for information about

the local plans and zoning after giving him a briefing on the noise program; but the information you get may come from the Planning Director who is responding to directives from the mayor.)

During relatively technical stages of the program, you may be dealing primarily with a leadership group - governmental staff, technicians, or leaders of interest groups. They may be the only ones with the background information, technical knowledge, or interest to sustain their involvement in the program.

When you are dealing with issues of how things "should" be, then a much larger public may have to be included. To determine the community's attitude about future growth, you may need to deal with a broad cross section of community interests.

Identify the Community Involvement Techniques to Use with the Public

All of the analysis of community involvement has been leading to where you will decide how to get the job done. If you have applied this process at each stage of the IENMP, you will arrive at this step knowing these things:

- What you need to accomplish at each stage of the program, and why you are going to involve the public in doing that work?
- What, specifically, you need to get from the public and what you need to give them to get that?
- Who it is that you need to involve in the information exchange at this stage?

At this point there may be one or several community involvement techniques that might be considered. For each installation, it will be the combination of program needs, program and community involvement constraints and opportunities, size and composition of the people involved, and the character of the information needed from the public that will determine how the community involvement plan is carried out in this step.

Identify When the Information Exchange Activities Should Take Place

In working with the public in community involvement, care must be taken to pick times for involvement activities that take into consideration the people' time schedules and needs, as well as those of the presenters. Daytime meetings may exclude citizens with 9-5 jobs, or with child care responsibilities. On the other hand, daytime meetings may make it possible for a parent to attend who might have to be at home after school hours.

Identify the Place Where the Community Involvement Information Exchange Can Take Place

Community involvement activities must be convenient in location as well as in time, for those you expect to be involved. There may be an ideal physical facility for a large public meeting, or for a small committee meeting on the military installation. If the public is not familiar with the layout of the installation, or if security regulations make access a complicated process, it maybe better to use the facilities at a public building in the community such as a library, school, or town

hall. In some rural communities, the church meeting hall may be a more "comfortable" place to meet as well as convenient to that community.

On-site activities may be very valuable as a means of getting information to the public. The care taken in planning the details of where community involvement might occur can help to improve and maintain relationships between the military and the public, and increase public acceptance and satisfaction with IENMP.