Defending the Sound of Freedom

Joint Land Use Study Report

Prepared for

The Cities of Benbrook, Fort Worth, Lake Worth, River Oaks, Westworth Village and White Settlement and Tarrant County

North Central Texas
Council of Governments

U.S. Department of Defense, Office of Economic Adjustment

Prepared by

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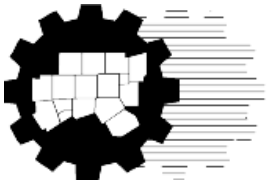
March 2008

What is NCTCOG?

The North Central Texas Council of Governments is a voluntary association of cities, counties, school districts, and special districts which was established in January 1966 to assist local governments in **planning** for common needs, **cooperating** for mutual benefit, and **coordinating** for sound regional development.

It serves a 16-county metropolitan region centered around the two urban centers of Dallas and Fort Worth. Currently, the Council has **233 members**, including 16 counties, 165 cities, 23 independent school districts, and 29 special districts. The area of the region is approximately **12,800 square miles**, which is larger than nine states, and the population of the region is over **6.2 million**, which is larger than 35 states.



NCTCOG's structure is relatively simple; each member government appoints a voting representative from the governing body. These voting representatives make up the **General Assembly** which annually elects a 15-member Executive Board. The **Executive Board** is supported by policy development, technical advisory, and study committees, as well as a professional staff of 235.

NCTCOG's offices are located in Arlington in the Centerpoint Two Building at 616 Six Flags Drive (approximately one-half mile south of the main entrance to Six Flags Over Texas).

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NCTCOG's Department of Transportation

Since 1974, NCTCOG has served as the Metropolitan Planning Organization (MPO) for transportation for the Dallas-Fort Worth area. NCTCOG's Department of Transportation is responsible for the regional planning process for all modes of transportation. The department provides technical support and staff assistance to the Regional Transportation Council and its technical committees, which compose the MPO policy-making structure. In addition, the department provides technical assistance to the local governments of North Central Texas in planning, coordinating, and implementing transportation decisions.

Prepared in cooperation with the United Sates Department of Defense.

"The contents of this report reflect the views of the authors who are responsible for the opinions, findings, and conclusions presented herein. The contents do not necessarily reflect the views or policies of the United States Department of Defense."

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The authors wish to especially thank the Policy Committee without whose insight and assistance the successful completion of this project would not have been possible.

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Abstract

TITLE: Joint Land Use Study

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DATE: October 2007

SUBJECT: The Joint Land Use Study (JLUS) is an initiative of Benbrook, Fort Worth, Lake Worth, River Oaks, Westworth Village, White Settlement and Tarrant County. The U.S. Department of Defense, Office of Economic Adjustment is the project manager and the North Central Council of Governments is the study sponsor. The purpose of this Joint Land Use Study is to evaluate the current status of the implementation of recommendations issued in the 2002 Air Installation Compatible Use Zone Study and to make recommendations for additional actions by local governments designed to improve land use decisions that may affect the mission of the base.

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ABSTRACT: The Navy took over as host of the installation on Oct.1, 1994, from the Air Force and has since invested over $220 million to modernize and prepare for its various tenants, many of which came from the closure of Naval Air Station Dallas. The result is base organization and operations that have been developed cooperatively among all the services onboard and created a real success story. In doing so, taxpayer dollars are being used more effectively and efficiently.

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PREAMBLE

Naval Air Station Joint Reserve Base Mission Statement

The mission of Naval Air Station Joint Reserve Base Fort Worth (NAS JRB) is to provide a high quality training environment for active duty and Reserve components of all branches of the Armed Services; to reduce redundancy and overhead by developing joint doctrine and operating procedures that create seamless functionality amongst host and tenant commands in base support and community service programs. (*Naval Air Station Joint Reserve Base Website*)

The Joint Land Use Study (JLUS) is an initiative of Benbrook, Fort Worth, Lake Worth, River Oaks, Westworth Village, White Settlement and Tarrant County. The U.S. Department of Defense, Office of Economic Adjustment is the project manager and the North Central Council of Governments is the study sponsor. The purpose of this Joint Land Use Study is to evaluate the current status of the implementation of recommendations issued in the 2002 Air Installation Compatible Use Zone Study and to make recommendations for additional actions by local governments designed to improve land use decisions that may affect the mission of the base. The objective of the consulting team hired to prepare this assessment was to recommend actions that will improve the compatibility of land uses around the NAS JRB now and in the future.

Improving the compatibility of land uses surrounding the base will help support the retention and expansion of NAS JRB Fort Worth in future Base Realignment and Closure Commission considerations.

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EXECUTIVE SUMMARY

Entrance Sign to NAS/JRB Fort Worth (Carswell Field)
(*U.S. Air Force Photo*)

EXECUTIVE SUMMARY

Naval Air Station Joint Reserve Base Fort Worth, Texas

The Naval Air Station Joint Reserve Base (NAS JRB) is located on the site of the former Carswell Air Force Base located in Fort Worth, Texas. The site has been a military installation since 1941. NAS JRB was created as part of the 1993 Base Realignment and Closure (BRAC) process by consolidating many U.S. Navy, Air Force, Marine Corps Reserve and Texas Air National Guard units displaced from other closing and realigning bases.

The Navy took over as host of the installation on October 1, 1994, from the Air Force and has since invested over $220 million to modernize and prepare for its various tenants, many of which came from the closure of Naval Air Station Dallas. The result is base organization and operations that have been developed cooperatively among all the services onboard and created a true success story. In doing so, taxpayer dollars are being used more effectively and efficiently.

According to its website, the primary mission of NAS JRB is “to provide a high quality training environment for active duty and Reserve components of all branches of the Armed Services; to reduce redundancy and overhead by developing joint doctrine and operating procedures that create seamless functionality amongst host and tenant commands in base support and community service programs”. (*https://www.cnic.navy.mil/fortworth/index.htm*)

This study defines the impact that economic growth and expansion have and could have on the operational capabilities of NAS JRB. The study also provides an analysis of the impact of the current mission and possible future mission changes on the surrounding communities of Benbrook, Fort Worth, Lake Worth, River Oaks, Westworth Village, White Settlement and Tarrant County.

Since NAS JRB employs approximately 11,000 personnel who have an approximate $1.3 billion annual economic impact on the local economies, any actions that adversely affect NAS JRB’s ability to continue to meet its assigned mission requirements will have a direct and significant effect on both the base and the surrounding communities. Of the 11,025 personnel on NAS JRB, 2,139 are active duty military, 1,799 civilian employees, and 7,087 are reserve/guard personnel according to NAS JRB data.

Role of the U.S. Department of Defense

Recently, the U.S. Department of Defense (DOD) has increased its scrutiny of areas outside the installation fence line that are affected by military preparations or that are home for sensitive and/or endangered species found adjacent to the base. Operations within the installation have been clearly and seriously impacted by changes in environmental resources and conditions outside the fence line.

Timely action is needed to protect the military's ability to test and train as the accelerating pace of development exacerbates such impacts. Dealing with regional environmental issues and natural resources requires the DOD to work with numerous governmental entities, private organizations, and the public. Managing the nation's natural resources will require ongoing cooperation, planning, and partnership with government and private organizations.

The DOD has launched numerous efforts to promote compatible land use. Programs such as the Air Installation Compatible Use Zones (AICUZ) were established in the 1970s, and more recently authorized programs that promote conservation partnerships have enjoyed success as well.

For decades, the DOD has been encouraging compatible land use efforts. During the late 1940s and early 1950s, the DOD built many military installations outside of existing urbanized areas. To fulfill the needs of the employees and the logistical, supply, and construction needs of the military, these installations became centers of employment and attracted urban growth. As local populations moved closer to the military installations, a rise in the complaints about noise from military operations caused problems by prompting undesirable operational changes that affected mission readiness.

Therefore the DOD services began efforts to address the growing conflict between land development and its missions. Efforts in use today range from the Air Force's "greenbelt" program, which creates a buffer zone -- a generalized rectangle -- around the installation, to other more durable compatible land use programs like the DOD's AICUZ program, Noise Program, and Joint Land Use Study (JLUS) program. In addition, Congress has made it easier to acquire conservation easements near military installations and ranges in partnership with non-governmental organizations (NGOs).

The purpose of the JLUS program is to encourage both present and future land development and land use decisions to be made in a cooperative environment. The program aims to lessen the effects of military operations on lands near installations; restrict incompatible development in areas having accident potential or high exposure to noise; safeguard operational capability by encouraging compatible land use; and ensure pilots are not exposed to flight hazards, bird strikes, and interference from visual as well as electromagnetic sources.

JLUS Program Overview

The reasons for undertaking a JLUS at NAS JRB closely parallel the reasons why the DOD established the program. According to the Secretary of Defense Office of Economic Adjustment (OEA), the program was established because:

> *"Most military installations were originally located in remote areas, distant from urban areas due largely to the availability of land and for defense and security purposes. Over time, however, installations drew people and businesses closer and closer to take advantage of civilian job opportunities offered by installations and to provide the goods and services to support the installation's operations. As*

urban growth and development increased near and around military installations, land use conflicts between base operations and civilian development increased.

Conversely, urban development near the perimeter of active military bases impacts operational effectiveness, training, and readiness missions.

Urban encroachment near a military base, if allowed to go unregulated, can compromise the utility and effectiveness of the installation and its mission. For example, certain types of land use activities, such as homes, places of assembly (i.e. schools or religious centers), childcare centers, nursing homes, hospitals, restaurants, theaters, shopping centers, etc. often are not compatible uses/activities if located close to military operations."

In response, the JLUS program was developed as a cooperative land use planning effort between affected local government (s) and the military installation.

Air Installations Compatible Use Zones (AICUZ) Overview

The Air Installations Compatible Use Zones (AICUZ) program was initially established by DOD in response to the Noise Control Act of 1972 to promote an environment with reduced noise that may jeopardize public health or welfare. Each Navy and Marine Corps air installation designated by the Chief of Naval Operations or the Commandant of the Marine Corps has an AICUZ study prepared by the Naval Facilities Engineering Command, Southern Division. The study includes a detailed analysis of aircraft noise, accident potential, land use compatibility, operational alternatives, and recommended strategies to address existing and potential incompatible development in the vicinity of the air installation.

The most recent AICUZ study for NAS JRB was completed in 2002. This study was an update of the 1986 (amended) AICUZ. The basis of the update was the Aircraft Noise Study for NAS JRB prepared by Wyle Laboratories, Inc. and distributed in May 1999. More recently, Wyle Labs updated the noise model in 2004 and those results were the basis for this JLUS.

The initial step in the AICUZ process is preparation of a noise study to define noise exposure contours. The noise contours are developed by a computerized simulation of aircraft activity at the installation and reflect site-specific operational data; e.g. flight tracts, type and mix of aircraft, aircraft profiles (airspeed, altitude, power settings), and frequency and times of operations. AICUZ program experience indicates that future year planning is necessary to consider the effects of expected changes in mission, aircraft, operational levels, et cetera.

Aircraft related noise conditions on and around an airport/military installation are visually depicted using noise exposure contours. These contours are a series of lines placed on maps for purposes of estimating the average noise impact on certain locations and for assessing land use compatibility in the vicinity of an airport/military installation.

NAS JRB operational noise levels were calculated scientifically by Wyle Laboratories, engaged by the Navy. The results are called Day-Night Levels (DNL) and represent the average for a 24-hour period. DNL recognizes that frequent, medium intensity noise events are more obtrusive

than infrequent, high intensity ones. It also considers that people are more sensitive to noise at night than during the day. DNL is commonly used to quantify noise exposure and is an invaluable tool in assessing land use compatibility.

The calculations include a 10-decibel "penalty" for operations taking place after 10 p.m. when there is less ambient noise and when people tend to be in their homes engaged in quiet activities such as sleeping, reading and watching television. DNL does not precisely define noise impacts relative to specific locations at a specific time, but rather provides an indication of the degree of annoyance for a given population.

NAS JRB Capabilities

An assessment conducted by the most recent BRAC found that NAS JRB could not only support its current mission, but that it was also capable of supporting additional military activity based on the following:

- **Hangars:** Hangars are adequate to meet current needs with some excess space available for projected future requirements.
- **Apron Space:** Apron space exists for 168 aircraft, depending on size, thus affording capacity for future additional units.
- **Runway:** The runway can support current and future operations.
- **Airspace:** The airspace is adjacent to the Dallas Fort Worth International Airport (DFW). No limitations were identified regarding air traffic de-confliction or encroachment due to the FAA's implementation of the Metroplex Plan during the mid-1990s. All military training areas are west and northwest of the DFW and NAS JRB airfields.
- **Maintenance, training and administrative space:** All buildings used in these capacities are fully utilized. The demand for these facilities were recognized to increase as more responsibilities and mission requirements are placed on the reserve forces.
- **Building Infrastructure:** There is land available on the base to construct additional buildings. Overall, the facilities at NAS JRB are used at approximately 90 percent capacity to support the active levels of its current tenants.

NAS JRB is a facility in transition. The evolution from its use as Carswell Air Force Base, to projected closure and redevelopment by the local communities, to its current configuration as a combined Naval Air Station and Reserve Training Facility has brought about major shifts in the local economy and housing demands.

While Naval forces may have decreased in number due to BRAC activities, the requirement for installations has not. Today's higher performance aircraft and ships employ weapons of greater capability, with greater complexity and unique delivery tactics. The combination of capability, complexity, and tactics translates into the need for unfettered runway and airspace access.

As a result of the 1993 BRAC, Congress established NAS JRB as the nation's first Joint Reserve Base, and it is considered the "model" for future military consolidations. As pressures to further reduce base infrastructure costs are felt, additional units may seek to relocate to NAS JRB. The North Central Texas region is one of the best areas in the country for supporting the demographic requirements for a Reserve base. The base has both hangar and ramp space to accommodate additional squadrons. Co-location with Lockheed Martin and its manufacturing of the F-35 Joint Strike Fighter (JSF) and the F-16 makes NAS JRB an excellent choice as a future site for Navy, Marine Corps or Air Force squadrons, as well as a centralized JSF training center.

The installation strives to create the most efficient and effective organization to manage the shore establishment for the 21st Century. All services are streamlining and refining their force structures, while initiating studies to evaluate alternate approaches to provide services to their customers. The completion of an approved Joint Navy/Air Force Functionality Assessment in 2003 assisted with the transition to a more efficient joint organization, by creating a joint operational environment, eliminating duplicate functions, and increasing efficiency of operation, thereby producing significant savings for both services. This approach fostered a joint environment for others to model and is truly a win/win for all DOD customers, employees of NAS JRB, and the Navy and Air Force teams.

NAS JRB's current mission involves the use of multiple aircraft types, variance of flight and maintenance hours, and a unique blend of service components (U.S. Navy, Air Force, Marines, and U.S. T.A.N.G.) with an aircraft manufacturing facility operated by Lockheed Martin and a depot maintenance function. It is this diverse mission that has produced a need for development of programs and positions that will ensure a continued compatibility between the local population needs and the ability of NAS JRB to complete its mission.

Statement of the Problem

The ability of a military facility to complete its mission is vital to its continued existence. A major deterrent to successful mission completion is incompatible land use surrounding the installation. Encroachment is normally a result of development that establishes commercial businesses, housing areas, and support services (schools, hospitals, etc.) in unsafe or detrimental proximity to a military facility.

Military installations must be able to conduct various operations, including military training and testing, while taking into consideration the welfare of the community and the protection of the environment.

Encroachment negatively affects readiness and is often gradual, going unnoticed, until its impacts cumulatively erode the military's ability to complete the mission of training and deploying combat ready troops and equipment.

A booming population along with the growing problem of urban sprawl is reducing the total rural land available and is causing military areas, which are needed for testing and training, to be encroached upon by the nation's neighborhoods. As a decrease in open space between installations and settled areas occurs, the prevention of infringement on one another is harder to avoid. These growing metropolitan areas consume open space in ways that hamper use of the area's natural resources and may limit the effective use of the installations.

Development of areas neighboring military installations can create friction in several aspects such as interference with air routes due to construction of power lines, cell towers or other structures; more competition for data and communication frequencies; concerns expressed by adjacent locales on noise and safety; faster use of critical ground and surface water resources; increased air emissions threatening to exceed emission thresholds; and displacement of other life forms, including endangered species, to remaining open space available on military ranges.

Encroachment has the potential to affect mission accomplishment by:

- Reducing the number of available training days
- Reducing training realism as tactics are modified (departure and arrivals routes, time of day, types of operations) to comply with local laws, safety requirements, and noise abatement procedures
- Causing modifications to facility access (temporary or permanent)
- Decreasing scheduling flexibility
- Increasing force security demands

To ensure continued operation of NAS JRB, changes will need to be made to planned, existing, and future land uses in the noise and safety zones surrounding the installation.

Findings

Study findings can be divided into four major areas:

- **Safety**: Areas beyond the ends of the runway are generally segregated into three zones. The Clear Zone (CZ), Accident Potential Zone I (APZ I) and Accidental Potential Zone II (APZ II). Each of these zones has varying degrees of accident potential and is routinely overflown in the course of aircraft operations in support of the base mission.

- **Height Hazards**: Flight takes place in a vertical environment; therefore, this space that includes the three aforementioned zones and other critical zones such as Federal Regulation Title 14 Federal Aviation Regulations Part 77 (FAR Part 77) and Terminal Instruments Procedures (TERPS) must be kept clear of natural or manmade objects that penetrate the airspace.

- **Noise:** The measurable sound generated by aircraft flight or ground operations could be perceived by those on the ground as annoying and could possibly have detrimental health effects. Excessive noise levels have the potential to result in physical impairment or in some cases, simply inhibit a person's ability to concentrate on tasks such as learning in a school environment.

- **Communications:** The development, implementation and execution of a communication program is the foundation of a successful partnership. During the course of this study, a comprehensive public involvement plan was developed, with emphasis on proven communication tools. Recommendations include methods for NAS JRB and the community to support one another.

General Land Development Recommendations

The following steps are recommended for immediate implementation:

- Establish an Oversight Committee to monitor changes and to work closely with the base on land use and encroachment issues
- Revise and continue to enforce current regulatory requirements such as zoning and building codes to minimize encroachment and noise issues
- Institute noise level reduction measures and a sound attenuation program for those incompatible structures located in the 65 dB DNL (denotes average day/night noise levels) noise contour or higher
- Establish a real estate advisory service for the noise affected area
- Initiate land protection and/or acquisition in the CZ

A major obstacle to the continued development of the base would be unabated growth and development without serious recognition of the possible consequences. This report provides a comprehensive plan for correction of current encroachments, procedures for circumventing future encroachments, and compatible land use development.

Summary of Specific Recommendations for Consideration by Local Governments

- Investigate use a comprehensive regulatory body structured similar to the Meacham Zoning Board to modify land use plans and existing comprehensive plans through the use of zoning ordinances, building codes, capital improvement plans, and subdivision requirements to ensure compatibility with NAS JRB and its operations.

- Work with local realtors and builders to follow state law regarding disclosure of noise levels and safety issues, if any, prior to the sale of buildings in the area and development and/or incompatible structures.

- Adopt noise attenuation requirements and recommendations in the 65 dB DNL noise contour or higher around NAS JRB in conjunction with the cities and the county and urge full cooperation and coordination among all cities, the county and the base related to new development around the base.

- Produce and distribute (through websites) maps showing the CZ, the Accident Potential Zones and the noise contours surrounding the base for distribution to the public.

- Establish an on-going committee for the cooperation between the cities, the county, and the base. Coordinate with the various municipalities, school districts, and the public. surrounding the base on an on-going basis to keep the public informed of base operations.

- Encourage NAS JRB to appoint a full-time Community Planning Liaison Officer that can work with the municipalities around the base to discuss and inform each other of encroachment issues related to new and future development.

- Develop a sound mitigation program for the cities and structures affected by the 65 dB DNL or higher noise contour which will allow homeowners to sound insulate their house on a voluntary basis and at that time designate these homes as sound attenuated, certified by the respective city building inspection department.

- Set up a program for homebuilders in the area to comply with building codes, sound attenuation on new construction and to certify new construction as being “certified sound attenuated”. This will encourage the builders to use the materials to sound attenuate. It will also make the houses more marketable in the area and will inform the public at the same time that there are noise and aircraft issues on the property.

- Pursue voluntary acquisition of incompatible structures in the CZ. Possible secondary acquisition in the APZ I or purchase of avigation easement and sound attenuation.

- Pursue funding for DOD Conservation Land purchase in the ACUIZ footprint surrounding NAS JRB.

- Review and adopt new regulations regarding the installation and use of outdoor lighting within a five-mile radius of NAS JRB.

- Marker buoys should be placed in Lake Worth to demarcate the CZ area, in addition to the existing buoys marking the Explosive Safety Quantity Distance (ESQD).

- A resolution was adopted on September 24, 2007 in support of the overall goals of this study. (see Appendix A)

GLOSSARY

Acronyms

AFB	Air Force Base
AICUZ	Air Installation Compatible Use Zone
ANSI	American National Standards Institute
APA	American Planning Association
APZ	Accident Potential Zone
AT/FP	Anti-Terrorism and Force Protection
BMP	Best Management Practices
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CPLO	Community Planning Liaison Officer
CTOL	Conventional Takeoff and Landing
CV	Aircraft Carrier Version
CZ	Clear Zone
dB	Decibel
DHS	Department of Homeland Security
DNL	Day-Night Average Sound Level
DOD	U.S. Department of Defense
EAP	Encroachment Action Plan
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESQD	Explosive Safety Quantity Distance
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FEMA	Federal Emergency Management Agency
GMP	Growth Management Plan
GOCO	Government-Owned Contractor-Operated
HUD	U.S. Department of Housing and Urban Development
JLUS	Joint Land Use Study
JRB	Joint Reserve Base
LID	Low Impact Development
LUCG	Land Use Compatibility Guidelines
MOU	Memorandum of Understanding
NAS	Naval Air Station
NCTCOG	North Central Texas Council of Governments
NED	National Economic Development
NGO	Non-Government Organization
OEA	Office of Economic Adjustment
PUD	Planned Unit Development
RDA	Residential Development Authority
SERDP	Strategic Environmental Resources and Development Program

SLR	Sound Level Reduction
SPEA	Standard City Planning Enabling Act
STC	Sound Transmission Class
STOVL	Short-Takeoff/Vertical Landing
TDR	Transfer of Development Rights
TERPS	Terminal Instruments Procedures Tools
TXDOT	Texas Department of Transportation
USFWS	U.S. Fish and Wildlife Service

SECTION I

COMMUNICATION STRATEGIES

Air Force Reservists participate in opening ceremonies at Rangers Ballpark. Air Force reservists with the 301st Fighter Wing, 10th Air Force and 610th Regional Support Group practice unfurling a 90-foot continental U.S.-shaped American flag for the Texas Rangers 2007 opener at the Rangers Ballpark in Arlington.
(*U.S. Air Force Photo/Laura Dermarderosian-Smith*)

COMMUNICATION STRATEGIES

The development, implementation and execution of a communications plan is the foundation of a successful partnership. To support the adoption of recommendations of the Joint Land Use Study by multiple jurisdictions, the public involvement plan that was put into place at the beginning of this study should be enhanced and carried forward by both the community and NAS JRB in an unprecedented partnership. By adopting the communication strategies recommended herein, the NAS JRB and the community together send a powerful message to the U.S. Department of Defense and Congress that the base is extremely important to the active and reserve military personnel serving here as well as their families; the retired servicemen and their families living in the area; the thousands of persons who are employed in the aerospace industry in the region, and the general economy that has grown to support these populations. Merely a simple suggestion that the NAS JRB could be closed in the future should be hastily discredited by the unique relationship that the base and community continue to strengthen, to a great degree, through open communication and advocacy.

Public Involvement Plan

Over the course of the Joint Land Use Study, a comprehensive public involvement plan was developed, and then modified, in order to inform and educate the general public and stakeholders about the study's importance and how its recommendations will provide a blueprint for compatible development around the NAS JRB. Given that the Fort Worth area and the Carswell military installation have enjoyed a synergistic relationship since the 1940s, it is difficult for the general public to comprehend a local environment without the base. There is little understanding of what a Base Realignment and Closure process could mean to this region at this time. Thus, the on-going public involvement plan is critical to the successful implementation of the study recommendations.

Communication tools that have been utilized to date include: public meetings of the Policy Committee; constantly updated, detailed information on the website at www.nctcog.org/jlus; public meeting notices in daily and community newspapers; multiple direct mailings to approximately 17,000 residents or businesses in the study area; briefings to area city councils and Tarrant County Commissioners Court; briefings to the leadership teams of the Fort Worth Board of Realtors and Greater Fort Worth Builders Association; development and comprehensive use of a graphic presentation for the study including the theme, Defending the Sound of Freedom; and news release distribution to broadcast and print media in the region.

With the publication of the draft report, outreach is scheduled to continue. Other stakeholders who are being encouraged to become involved are area veterans, smaller chambers of commerce and economic development corporations working with the Fort Worth Chamber of Commerce, and employees of the area's aerospace industry.

The following table summarizes the activities that have, or will have occurred through the completion of this study.

	JLUS Activity Time Line 2007		2006		2007										
			Oct	Dec	Jan	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	POLICY MEETINGS														
1	Policy Committee Meeting	2006: 10/1, 12/18, 2007: 1/22, 3/19, 4/2, 4/3, 4/16, 5/21, 6/18, 7/16, 8/27, 9/24, 10/15, 11/19, 12/17	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**
	PUBLIC														
2	Public Meeting	4/2, 4/3, 8/27,9/24					**x**				**x**	**x**			
3	Westworth Village City Council public meeting	5/24, 9/4						**x**				**x**			
4	Tarrant County Commissioners Court public meeting	6/12, 9/11							**x**			**x**			
5	Builder/Realtor hosted by Fort Worth Chamber	20-Jun							**x**						
6	Sansom Park City Council	21-Jun							**x**						
7	JLUS Technical Committee Briefing	27-Jul								**x**					
8	Greater Fort Worth Builders' Association Government Affairs Task Force	3-Aug								**x**					
9	Lockheed Martin Lunch and Learn Program (2 presentations)	14-Aug									**x**				
10	Rotary Club of Western Fort Worth	23-Aug									**x**				
11	Benbrook City Council public meeting	6-Sep										**x**			
12	River Oaks City Council public meeting	11-Sep										**x**			
13	White Settlement City Council public meeting	13-Sep										**x**			
14	Fort Worth City Council pre-council meeting	18-Sep										**x**			
15	Lake Worth City Council public meeting	18-Sep										**x**			

	JLUS Activity Time Line 2007		2006		2007										
			Oct	Dec	Jan	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	MEDIA/OUTREACH														
16	Notice for April public meeting mailed NCTCOG lists and zip codes 76127 & 76135	10-Mar				x									
17	City Page announcement for April public meeting	3/26, 4/2				x	x								
18	Reminder post card for April public meeting distributed NCTCOG lists and zip codes 76127 & 76135	27-Mar				x									
19	Yard signs for April public meeting	2-Apr					x								
20	Cable TV taping of April public meeting	3-Apr					x								
21	Public Meeting video shown in 6 time slots on Fort Worth Community Cable TV	5/15, 5/16, 5/17, 5/18						x							
22	Mailer for 8/27 public meeting distributed to veterans, builders, realtors, chambers' mailing list plus NCTCOG lists and zip codes 76127 & 76135	7-Aug									x				
23	News Release for 8/27 public meeting	6-Aug									x				
24	Cable TV for 8/27 public meeting	August									x				
25	City Page announcement for 8/27 public meeting	August									x				
26	Personal letter from Policy Committee to City Staff for 8/27 public meeting	August									x				
27	Letters to the Editor for 8/27 public meeting	August									x				

	JLUS Activity Time Line 2007		2006		2007										
			Oct	Dec	Jan	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
28	Community Newspaper advertising	August									x				
29	LMRA advertising	August									x				
30	NAS news advertising	August									x				
31	Mailer for 9/24 public meeting distributed 9/10 to master database	10-Sep										x			
32	Opinion Page Article in Star Telegram	September										x			
33	Outreach to veterans	September										x			
34	News release; 9/24 public meeting	10-Sep										x			
35	City Page Announcement for 9/24 public meeting	September										x			
36	Letters to the Editor	September										x			
37	News Release for 10/15 public meeting	1-Oct											x		

Recommendations for the Community in Support of NAS JRB

Since the 1950s, business leaders in this area have come together in several organizations to support what was first Carswell Air Force Base and is now the Naval Air Station, Joint Reserve Base, Fort Worth at Carswell Field. These nonprofit organizations include, but are not limited to, the Fort Worth Air Power Council, the Fort Worth Civic Leaders Association, and the Fort Worth Council of the Navy League of the U.S.

Scheduled for October 13, 2007 is the Air Power Council's Sky Ball V, an annual event that raises approximately $500,000. The Council uses these funds to provide financial assistance to military families on a case by case basis, to support deployment and welcome home receptions and comfort gatherings for families of deployed military, and to support individuals with care packages who are recovering from injuries sustained in military conflicts.

The Civic Leaders Association, a nonprofit organization, hosts an annual barbeque lunch in the spring for all military and civilian personnel and their families.

The Navy League is also a nonprofit civilian organization that seeks to educate the public about the Armed Forces. With a close relationship to NAS JRB, the Council has adopted the Lone Star Squadron of the Naval Sea Cadets in addition to adopting three vessels in its Adopt-a-Ship Program. Its website states that it has a $10,000-a-year budget.

Youth are often the beneficiaries of partnerships between NAS JRB and other entities. For example, the U.S. Department of Justice sponsors a week-long program annually called DEFY (Drug Education for Youth). Junior ROTC cadets attend summer boot camps on base, and students10-years and older may tour with organized groups during certain months of the year. Participants from throughout the Metroplex come to the base to participate in the Marine Mud Run, a 5-K obstacle course.

According to the NAS JRB public affairs office, only nonprofit organizations, whose primary mission is to support the military, can participate in activities on base or contribute financial or in-kind services to activities or programs on the base. It was noted that in 2006, community support made possible the conversion of a bowling alley into a small theater and computer game arcade. But, should this type of support be offered by community nonprofit groups whose primary mission is not focused on the Armed Services, then it could not be accepted. As a part of this JLUS report, it is recommended that these rules and regulations be reviewed to determine if the limitations can be lifted or modified.

To facilitate even greater involvement and support than described above for NAS JRB at all levels of the community is the strong recommendation to create a new nonprofit organization that enhances the relationship the base and community enjoy through education and participation. As *Friends of the Base*, the organization should solicit membership from young and old, individuals and businesses. Emphasis should be on recruiting thousands of members and support from the organizations named above. Membership categories should be considered for families, seniors and students.

The *Friends of the Base* should seek opportunities to create the following activities or programs:

- Coordinate a billboard campaign, in which businesses donate billboard space for a period of one or two months on which the message is delivered that "we support our base." As many as 12 businesses could be recruited to participate in order to keep costs relatively low
- Create the organization's own identity through the development of a logo and marketing slogan for use on all materials
- Work with NAS JRB to create an annual base open-house for the public, with tours and military documentaries being shown at the movie theater. Charge a nominal amount in order to offset costs
- Design and produce a coloring book for youngsters through which they are introduced to NAS JRB in a patriotic way
- Develop and maintain a website for members that gives periodic updates about the base
- Evaluate other low-ticket, if not free, activities for the general public, complementing the higher ticket prices of events like those listed above which have already proven to be successful
- Partner with retired military and veterans organizations to sponsor specific programs that celebrate the mission of NAS JRB and salute the Armed Forces

As an adjunct to the nonprofit *Friends of the Base* organization, the creation of a 501-C6 (or similar IRS designation) is recommended to allow for advocacy of NAS JRB before the federal legislative and executive branches as well as at the local and state government levels is recommended. This organization, that complies with all federal and state lobbying regulations, should consider being an active voice for:

- Expansion of operations that are assigned to NAS JRB in order to strengthen its role in national defense and its contributions to the area's economy
- Regional transportation improvements in the area of the base
- Workforce development programs that are state or federally funded geared to help spouses and adult children of military personnel who are assigned to NAS as well as retirees who are seeing employment
- Keeping NAS JRB open if and when BRAC activities begin
- Opposing predatory lending and other unsavory business practices at the Texas Legislature in support of military families
- Limiting encroachment of incompatible development near NAS JRB

Recommendations for NAS JRB Involvement in the Community

The Naval Air Station Joint Reserve Base enjoys a degree of recognition and respect in the greater Fort Worth area due to the base's long history here. However, given this region's population growth, the community's historical memory appears to decrease as the occurrences resulting from the BRAC of the 1990s are separated by year after year of successful economic development in the immediate area. Research and general discussions with citizens who live in West Tarrant County indicate that fewer and fewer persons are remembering the closing of Carswell Air Force Base, the months of inactivity at what was once a thriving military installation, and the reopening of the facility as a joint reserve base.

For this reason, it is imperative that NAS JRB's leadership, working within the community, educate area citizens and business leaders about the installation's importance. Emphasis in this general tutorial initiative must be on the mission of NAS JRB; that being (as previously stated):

To provide a high quality training environment for active duty and reserve components of all branches of the Armed Services; to reduce redundancy and overhead by developing joint doctrine and operating procedures that create seamless functionality among host and tenant commands in base support and community service programs.

An equally important message that should be reiterated time and time again is the positive economic impact of NAS JRB; i.e. today's economic impact of the base is $1.3 billion.

The level of current resources—both financial and personnel—could hamper community education and involvement by military representatives/activities in the short-term. However, the following are low cost recommendations that, if implemented, most assuredly would strengthen the military's presence in North Central Texas and, in turn, create additional bonds between the military and civilian communities and lead to many positive experiences:

- NAS JRB should build upon its existing relationships with such exemplary groups as the Fort Worth Air Power Council, Fort Worth Civic Leaders Association, and the Fort Worth Navy League, by informally making business leaders and the general public aware of its willingness to become involved in the community itself.

- NAS JRB's one-person public affairs office should be supported in such a way that its activities are pro-active, not reactive. Consideration should be given to developing a team approach to public affairs, public information and community relations, with both military and civilian personnel being involved. In this way, information sharing is enhanced.

- NAS JRB should develop and maintain its own website that provides general information about the base to the public on an around-the-clock basis. Posted on an as-needed basis should be the explanation of training operations as they begin and their duration so that the public can understand what is occurring and how long specific operations will continue, thereby alleviating concerns. A full explanation of the mission of a joint reserve base, general economic impact data, and military preparedness information should also be posted.

- NAS JRB should provide monthly updates about base activities, personnel awards, and other recognition to the general public via the website described above as well as the Star-Telegram and local community papers. The base should consider contracting for space at government rates with the area's daily newspaper. (Examples of this practice include regular columns provided by the City of Fort Worth, Tarrant County, and Fort Worth ISD.)

- NAS JRB should create a Speakers Bureau that is made up of the Base Commander, commanders of each service branch, the base planning officer, etc. with the purpose of educating the community about the overall economic and military importance of the base. The Speakers Bureau should be coordinated by the public affairs office, organized in the way recommended in this listing. Audiences should include Chambers of Commerce, Rotary Clubs, Lions Clubs, Optimist Clubs, and other civic organizations.

- NAS JRB should seek to brief, at least once a year, area City Councils and Tarrant County Commissioners Court in what could be described as a "state-of-the-base" address; i.e. what has occurred recently, what can be expected in the short-term; and capital improvements to the base.

- NAS JRB should seek to enhance its mutual aid agreements with cities adjacent to the base and to encourage these cities to promote the fact that the base and the municipality are primed to support each other in emergencies.

- NAS JRB should create a Military Preparedness Recognition Day through area public school systems by working with high school principals to schedule a program on each campus presented by a military representative. The students would learn about the positive impact that the NAS JRB has within the military system and in the North Central Texas region. The program could be linked to civics curriculum and current events in general.

- NAS JRB should encourage participation by military personnel in community activities such as Adopt-a-School through public school systems, Adopt-a-Highway through the Texas Department of Transportation, and Adopt-a-Park through area municipal park and recreation departments.

- NAS JRB should seek to offer volunteer assistance when a disaster occurs in a general area, neighborhood or business corridor. An example would be to provide help in clearing debris immediately after a severe storm.

- NAS JRB should encourage volunteers in general clean-up efforts in areas where illegal dumping has occurred or around lakes and other waterways in the area.

- NAS JRB should create a series of community spirit awards that recognize volunteerism on the part of civilian individuals and groups who go above and beyond in supporting the military.

As a service to the development and realtor sectors of the community, NAS JRB through DOD's real estate section and Office of Economic Adjustment should consider publishing a summary of the JLUS land use recommendations. This piece should include (1) a graph showing land use compatibility with noise zones and APZs; (2) a chart showing sound levels of common sounds and noise environments; (3) explanations and examples of compatible development, and (4) an area map outlining accident potential and noise zones. The information piece should be distributed through the Greater Fort Worth Builders Association, Tarrant County Board of Realtors, area Chambers of Commerce and municipal development offices.

SECTION II

RECOMMENDATIONS AND IMPLEMENTATION

Energy improvements also reduce sound.
(*Department of Energy*)

RECOMMENDATIONS AND IMPLEMENTATION

Background

There are three critical areas in which airfield land use compatibility issues occur:

- ***Safety***: Areas beyond the ends of the runway and other areas of the community routinely flown over by aircraft to and from the airport; these are the sites where accidents are statistically more probable.
- ***Height Hazards***: Flight takes place in a vertical environment, therefore, this space must be kept clear of natural or built objects that penetrate this airspace; these are areas surrounding an airfield or under low level air routes where the penetration of structures will create hazards to aerial navigation.
- ***Noise*:** The measurable sound generated by aircraft flight or ground operations perceived by those on the ground as annoying or having detrimental health effects.

When balance is not achieved between these three areas, land use challenges occur:

Safety concerns, in general, present the greatest challenge to land use decision-makers. Since a majority of aircraft accidents occur within 5,000 feet of a runway, the ability of the pilot to bring the aircraft down in a manner that minimizes the severity of an accident is often dependent upon the type of land use existing within the area adjacent to an airfield. It is the responsibility of local government to protect the health, safety and general welfare of its citizens. Local governments should demonstrate that they have exercised due diligence in permitting certain land uses adjacent to airfields.

Height hazards contribute to the loss of navigable airspace due to non-aviation uses and construction, particularly within the flight critical airspace to an airfield approach or departure, which creates a hazard to flight activity, and to people and property on the ground. Additionally, these obstructions inhibit safe and efficient aircraft operations, in general.

The Federal Aviation Administration (FAA) has limited authority and scope to insure that imaginary surfaces are free of obstructions. Although FAA authority is limited in that its findings are generally advisory in nature, it still has the ability to affect the status of a development or construction projects around airfields. For example, should a determination of a hazard be issued for a structure requiring a Federal Communications Commission (FCC) license, and the structure would eliminate the FAA's ability to modify the approach to an airport, the FCC may deny the permit.

Noise is the most common negative impact associated with airports and military bases. The most simple definition of noise is unwanted sound. Sound can be accurately measured, while noise is a perceptual concept, and as such subject to considerable variability.

The perception of a particular sound event as noise is not subject to objective measurement. Most research attempts to focus on acceptability to the whole community rather than individuals.

In addition to this subjective parameter of noise, there are two main aspects of sound/noise that affect noise regulation decisions. They are:

- Physiological: Temporary effects include startled reactions and sustained sleep interference; permanent effects would include actual physical injury such as deafness.
- Behavioral: Usually measured by interference in activities, speech interference and the interruption of listening pleasure are the most common effects cited; interruption of concentration and sleep disruption are also included.

A wide range of recommended tools related to noise mitigation was evaluated based on criteria such as: feasibility; likely effectiveness; the availability of resources for implementation; the ability to protect military missions and installation sustainability; the ability to protect the economic health of the region and individual property rights; and the overall ability to protect health, safety, welfare, and quality of life. These tools are also intended to address a variety of possible land use and operational issues, including: physical adjacency to NAS JRB; conservation or natural resource value, noise, vibration, dust, smoke, air safety (both for people on the ground and for pilots); the physical security of the installations; the need for flexibility to accommodate expanding existing and future military missions; and visual compatibility.

A summary of the approximate acreage of existing land uses located within the 2004 Wyle Noise Study contour boundaries is as follows:

65-dB DNL Contour:	15,048 acres
70-dB DNL Contour:	6,698 acres
75-dB DNL Contour:	3,083 acres
80-dB DNL Contour:	1,484 acres
85-dB DNL Contour:	774 acres
Total Acreage	27,087 Acres
(Includes base and bodies of water)	

As shown, the estimated acreage figures were divided into five noise contour intervals ranging between DNL 60 dB DNL and 85+ dB DNL in order to illustrate potential conflicts that may exist between various land uses as noise levels increase. These contours can be further consolidated into noise "zones."

Noise Zone I:	60-64 dB DNL
Noise Zone II:	65-74 dB DNL
Noise Zone III:	75-85 dB DNL and higher

This report will address both: the base's maximum mission capability area, based on the 27,087 acres defined in the 2004 Aircraft Noise Study, and the base's existing mission capability area, restricted to the APZ/CZ and Noise Zone III areas. The maximum mission area incorporates the assumption that the flight patterns from additional aircraft from other bases or from Lockheed Martin activities could vary from or even extend beyond Noise Zone III and/or current flight patterns.

Recommendations: Existing Mission

The recommendations for supporting the existing mission focus on implementing a strategy designed to minimize or eliminate development within the CZs and significantly restrict development in the APZs. Addressing these issues is of primary importance for the existing mission; exercising this action also serves to support future and maximum mission capabilities as well.

The footprint of the 2004 Wyle Labs Noise Study noise contours represents the area affected by noise for current aircraft activities at NAS JRB. With the exception of two small areas in the 65 dB DNL on the north and south sides, most of these areas are completely developed with a mix of compatible and incompatible land uses and lie within a 70 dB DNL or higher noise contour. Figures 2.1-2.4 illustrate the level and rate of development over the past few decades.

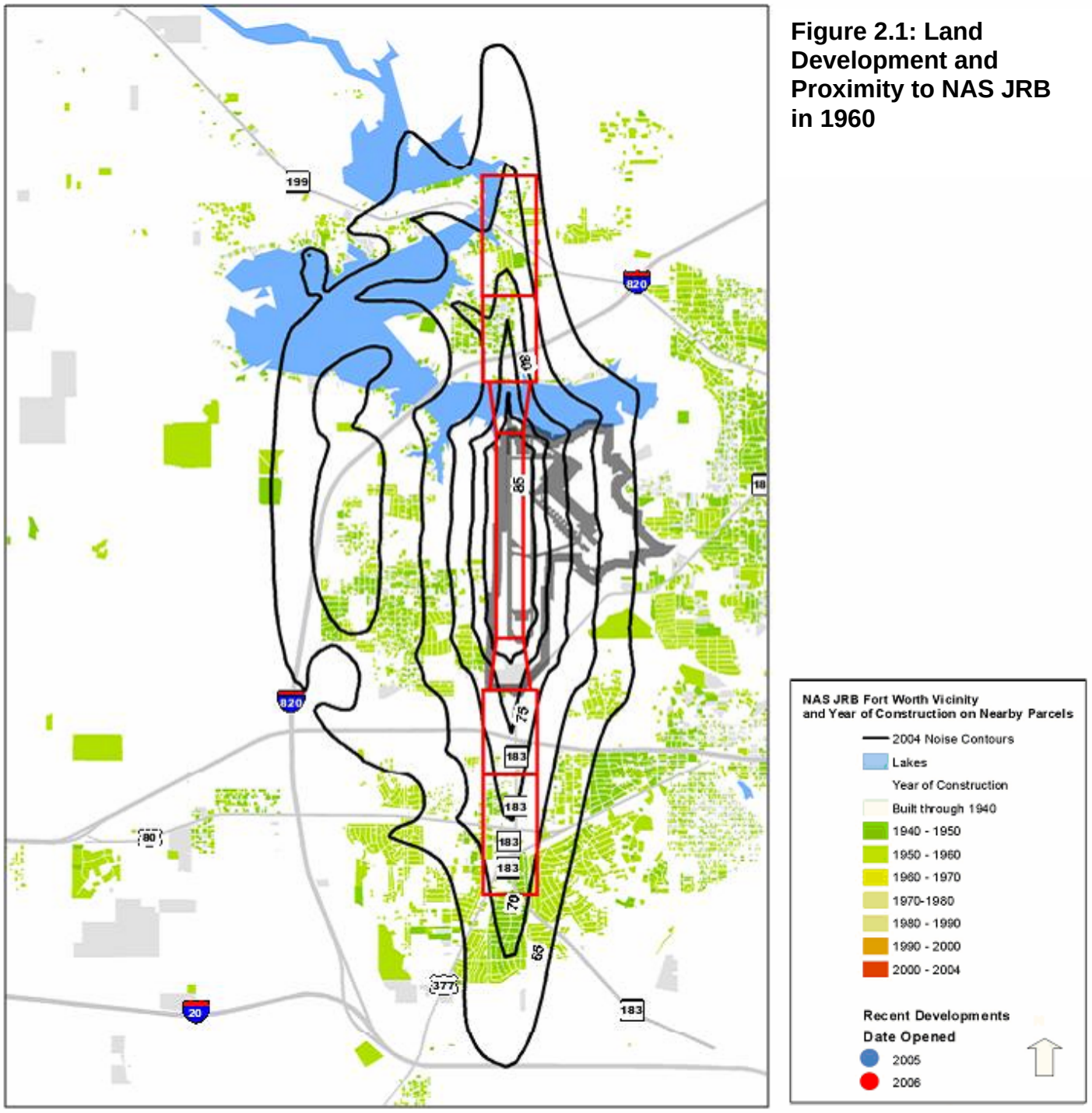


Figure 2.1: Land Development and Proximity to NAS JRB in 1960

Source: NCTCOG

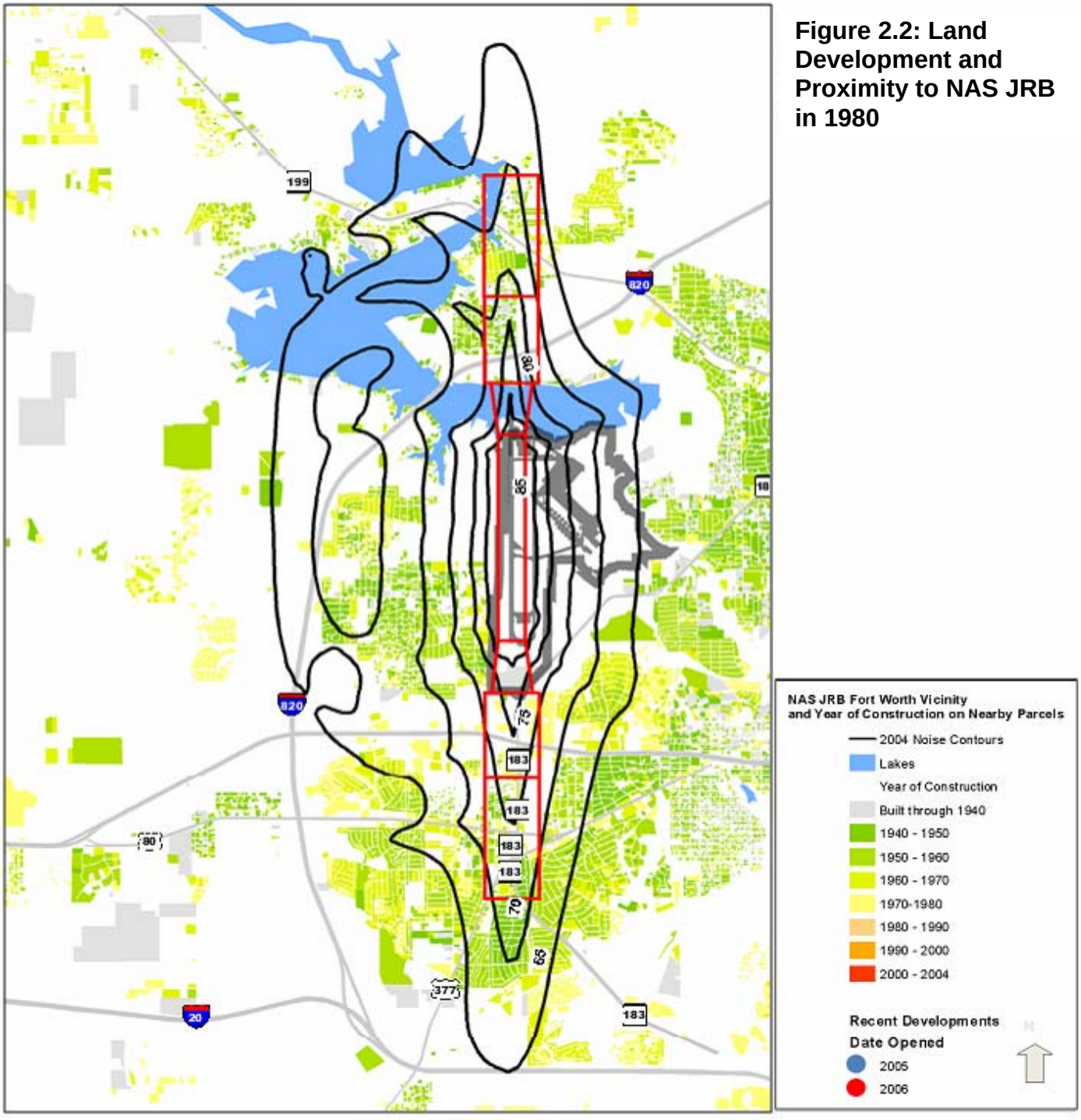
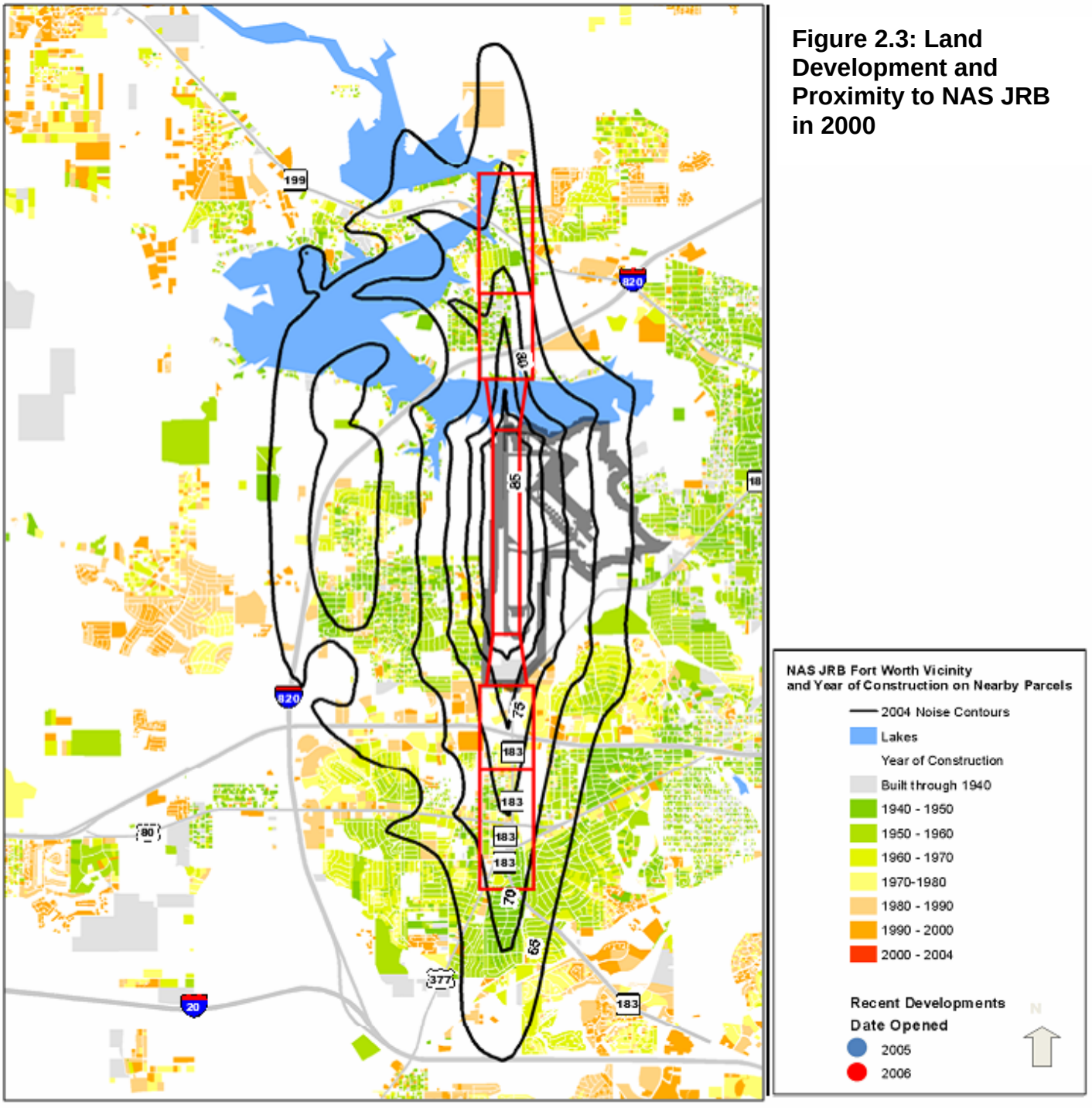


Figure 2.2: Land Development and Proximity to NAS JRB in 1980

Source: NCTCOG



Source: NCTCOG

Figure 2.3: Land Development and Proximity to NAS JRB in 2000

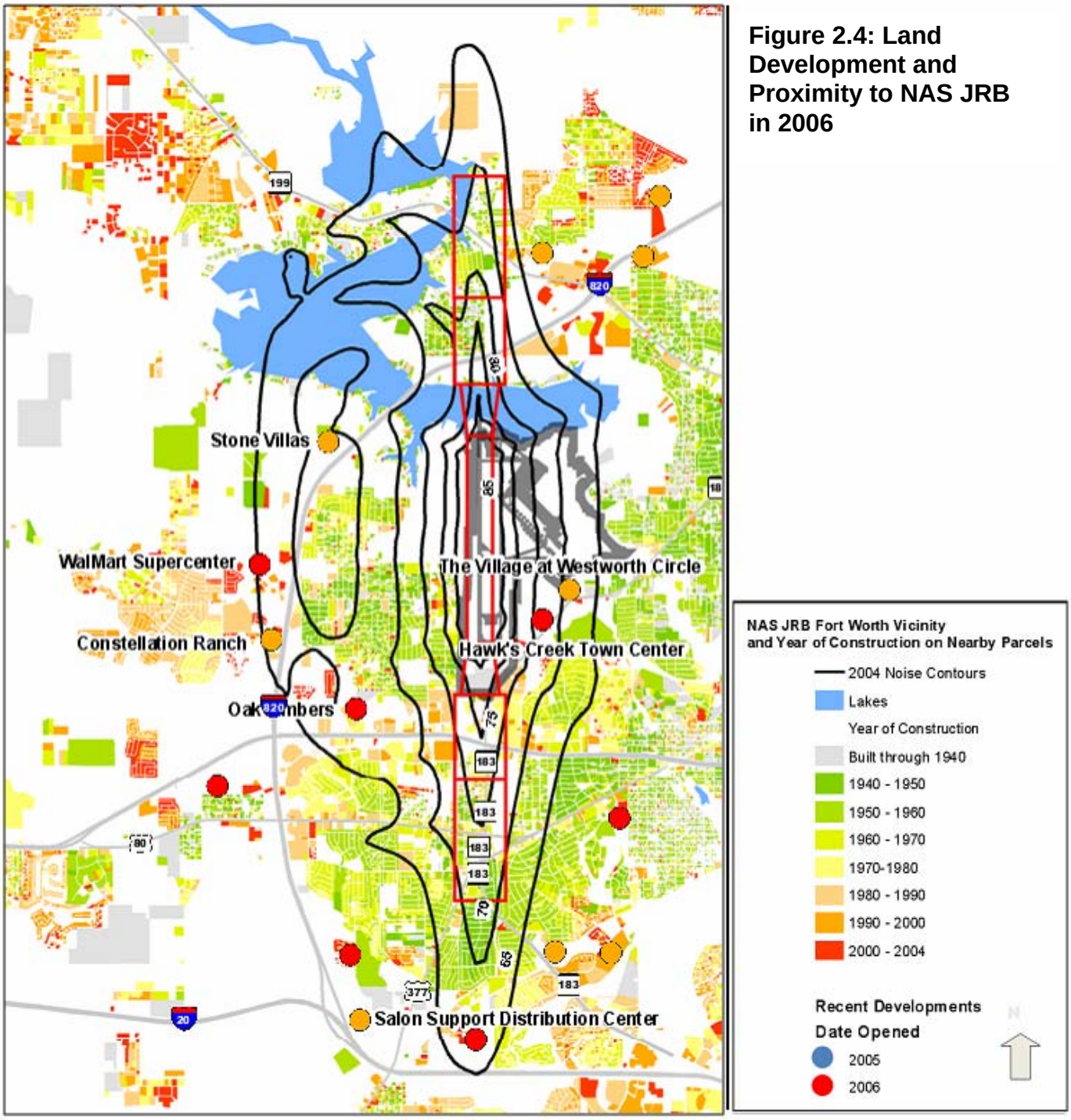


Figure 2.4: Land Development and Proximity to NAS JRB in 2006

Source: NCTCOG

The 2004 Wyle Labs Noise Study also identified the boundaries of the CZ and APZ areas at both ends of the active runway. A strategy aimed at protecting the CZ/APZ areas will also minimize potential noise conflicts associated with these contour areas.

Presently, development within the CZ/APZ areas is regulated by several different zoning districts under the local governments of Fort Worth, Lake Worth, or White Settlement. The northern APZ I and II zones are primarily controlled by the Lake Worth and Fort Worth zoning codes. As shown in Figure 2.5, Lake Worth regulates the use of properties in these areas, including some undeveloped land and two schools. Howry Junior High and Effie Morris Elementary are located within the APZ II zone on the north end of the runway. The remainder of the APZ II is primarily residential and commercial, with some industrial uses.

Figure 2.5: APZ I, II, CZ -North of NAS JRB

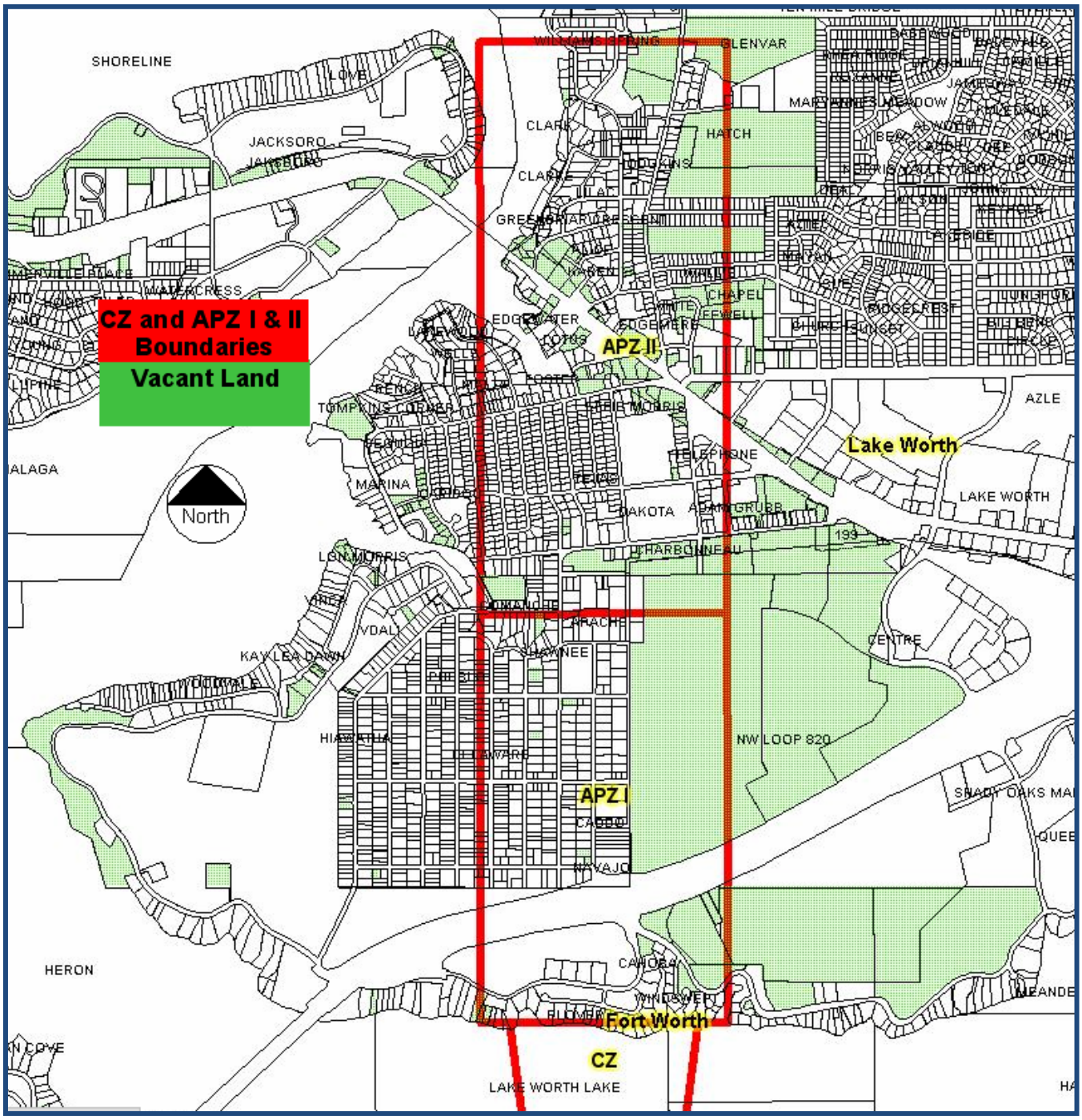
Source: Google Earth, Woolpert, Inc.

Figure 2.6 Jurisdictional Boundary of Lake Worth

Source: Google 2006 Europa Technologies

APZ I primarily consists of single-family residential, park lands and industrial properties. Figure 2.6 shows how the City of Fort Worth wraps around Lake Worth's corporate limits. The vacant land shown to the east of Lake Worth is undeveloped, industrially zoned property under the jurisdiction of the City of Fort Worth. The park lands to the west are also controlled by the City of Fort Worth.

Figure 2.7 Vacant Properties Inside North CZ, APZ I and II



Source: Michael R. Coker Company – Created from Shapefiles Obtained from NCTCOG

Within the industrial district, there are approximately 253 acres of potentially developable land, shown in Figure 2.7 (also visible in Figure 2.6). Of this total, approximately 120 acres of this privately-owned land are located in the northern APZ I zone. The remaining properties in the APZ I zone are either individually owned residential lots or residential lots/tracts owned by the City of Fort Worth. The majority of the City of Fort Worth property is located between NW Loop 820 and Cahoba Drive, with portions located within the Lake Worth Leases Addition subdivision.

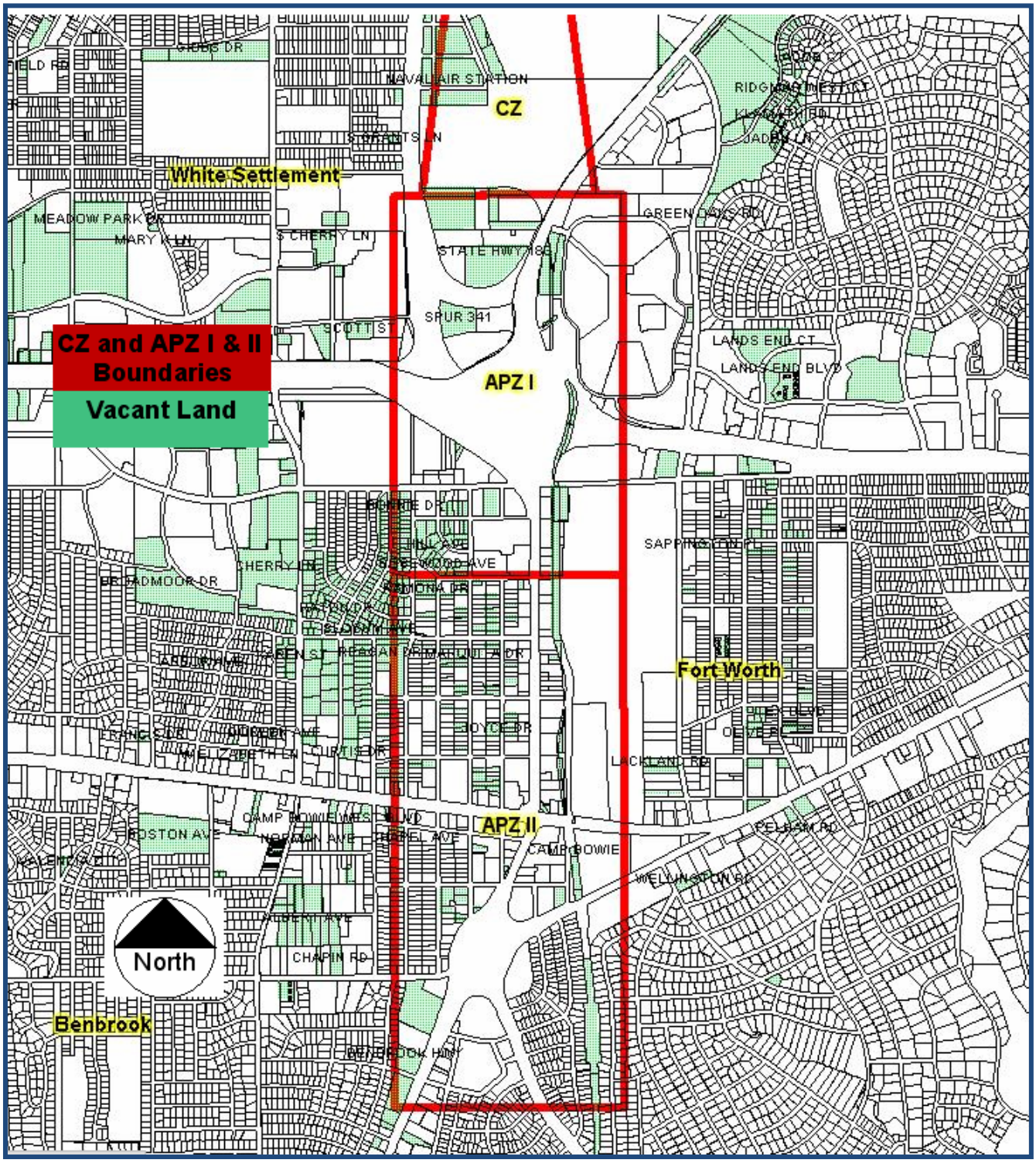
Also shown in Figure 2.7 is the northern most portion of the CZ, which contains portions of single-family residential lots in addition to Lake Worth. These lots either contain homes built prior to1950 or they are vacant lots owned by the City of Fort Worth. These lots should be acquired and converted to conservation areas or park lands.

Lake Worth, entirely within the Fort Worth city limits, serves as a recreational site for many local residents. Among the activities that take place are boating, skiing, and fishing. Standing timber is present in several areas of the lake. Numerous boat houses, fishing docks, and piers offer valuable structure and cover to the aquatic life of Lake Worth. However, Figure 2.7 illustrates that most of the CZ is also located over the lake. Not only is the CZ an area prone to aircraft mishaps, it also contains munitions storage. A portion of the Explosive Safety Quantity Distance (ESQD) arcs associated with munitions storage extends approximately 1,000 feet out over the water. These arcs are delineated by marker buoys that warn people against recreational activity within the 1,000 feet area. These warnings are enforced by NAS JRB Security Police and the City of Fort Worth Police Department. Nevertheless, these warnings do not currently apply to the entire CZ area (a 3,000 foot by 2,284 foot). Marker buoys should be placed in the lake to demarcate the CZ zone, in addition to the ESQD, in order to prohibit recreational activities in an extremely dangerous area.

Figure 2.8 shows that development within the Southern CZ/APZ areas is regulated by several different zoning districts under the jurisdictions of Fort Worth and/or White Settlement. A majority of the South CZ is contained within NAS JRB property. Of the remaining acreage, approximately 77 acres is either privately owned and currently vacant or roadway. The only exceptions are two structures located within the southeast corner of the CZ.

APZ I primarily consists of commercial and industrial properties, including portions of Ridgmar Mall and Z. Boaz Golf Course. Many dwelling units exist within the southern most portion of the APZ I and II areas, with 11 of them (between W. Elizabeth Lane and Slocum Avenue) located within the 2004 Noise Contours of 75 dB DNL or higher. Single-family residential seems to be concentrated south of Camp Bowie west (between Marquita Drive and Bonnie Drive) and south of Camp Bowie Boulevard in Noise Zones II and III.

Figure 2.8 Vacant Properties Inside South CZ, APZ I and II



Source: Michael R. Coker Company – Created from Shapefiles Obtained from NCTCOG

All of the southern APZ II zone is controlled solely by the Fort Worth zoning and land development codes. Here are two educational facilities: Luella Merrett Elementary and the Applied Learning Academy. The remainder of the APZ II consists of multi-family residential and commercial, with some industrial uses.

Action Steps

The purpose of this Joint Land Use Study is to provide guidance regarding land use decisions by the local governments in the vicinity of NAS JRB, but it is not a legal document and has no force of law to ensure its recommendations are implemented.

Planners should possess a clear understanding of the areas to consider for acquisition. Community officials should work jointly with military officials to determine these areas and reach consensus on acquisition priorities. Both local governments and the military installation should establish and maintain partnerships with federal, state, and non-profit agencies as potential sources of acquisition funding.

Similarly, military planners and officials should work with local communities to educate the community on the need for the program. Both should actively participate in the identification of appropriate areas for protection, and subsequently, acquisition, while identifying available federal grants, programs, and partnerships with non-profit organizations. The results of their joint efforts should be shared with the stakeholders.

In addition, with limited federal enforcement capabilities, it is up to local governments to see that height obstructions do not compromise the safety of air traffic, and that the safety of those on the ground is protected.

The following land use actions are recommended:

- Creation and maintenance of easy-to access source of current and accurate information for use by real estate professionals and the public. This source should provide updated information on military installations and operation areas for land owners, developers, and the public.
- Evaluation and re-evaluation by local governments of all permitted uses in the areas with noise levels in excess of 65 dB DNL and within APZ I, II and CZ districts to minimize potential safety and noise related conflicts, as recommended in the Land Use Compatibility Guidelines (LUCG) for the Navy.
- For local governments: incorporate LUCG into local comprehensive plans, zoning ordinances, subdivision regulations, building codes and any other applicable development regulations and/or plans.

Recommendations: Maximum Mission Capability

The essential part of developing a preferred land use plan that addresses the current mission of NAS JRB, but recognizes the potential for expanded mission requirements, is the lack of, or uncertainty about, the time frame in which a change in mission status could materialize. Answers to this question cannot be expressed in black and white terms.

In order to address this issue, a two-pronged approach is recommended for establishing a preferred land use plan around the base that includes both a short-term and a long-term strategy.

The short-term strategy includes actions for preserving the existing mission area as well as an interim strategy for evaluating development potential within the maximum mission area (see discussion in baseline trends and conditions). The long-term recommendations relate only to the maximum mission area and these recommendations should be considered.

Action Steps: Short-Term

Short-term recommendations for preserving the maximum mission capability include all of the actions that are intended to support the existing mission. The reason for this similarity is that recommendations related to the existing mission are primarily focused on minimizing land use conflicts within the CZ/APZ areas, which are equally important for the maximum mission operations. A key consideration in managing future land use in the maximum mission area involves the fact that even if land use compatibility guidelines are implemented over the long-term, higher densities of development that are being considered could still result in cumulative levels of growth that have negative impacts on the continuing viability of operations at NAS JRB.

The following immediate action steps are recommended:

- Establish Oversight Committee to monitor changes
- Revise and continue to implement current regulatory requirements
- Institute noise level reduction measures into building codes
- Establish real estate disclosure process
- Initiate land protection/acquisition in APZ and CZ areas
- Modify future land use plans/rezoning processes

Actions Steps: Long-Term

Long-term recommendations for minimizing land use conflicts that could affect NAS JRB maximum mission capability focus on the remaining undeveloped land within the 2004 Noise Contour Areas. These recommendations should be investigated and considered for implementation since the base's mission status is expected to be expanded as a result of the assignment of additional military activities and the resulting aircraft operations, thus affecting land and uses within the larger AICUZ area.

- **Regulate land use activities**: Modify land use and comprehensive plans to minimize recommended land uses in and around the base. Adopt Overlay District zoning regulations, either as an overlay district or other appropriate method, as outlined in Appendix D. Implementation of the existing and proposed future land use plans should remain flexible over the next two to three years in order to evaluate the potential for mission changes at NAS JRB, particularly in regards to the introduction of the F-35. (See Appendix E)

- **Purchase of AICUZ Zones (both noise sensitive and accident potential)**: an alternative to regulatory methods for preserving land within the maximum mission noise contours. Fee-simple purchase of impacted land is the most permanent form of land use

control that could be considered.

If a property acquisition program is established for NAS JRB, it should set a hierarchy of priorities for most critical areas related to base operations as follows: CZ, APZ I and APZ II; Noise Zone III, Noise Zone II, and Noise Zone I. Noise Zones are defined in the Executive Summary as well as in Table 4 of the Baseline Trends and Conditions section of this report.

- **Acquire easements for AICUZ Zones (both noise sensitive and accident potential):** In addition to fee-simple acquisition of land use avigation easements to address flight and noise related matters. Easements can be an effective and permanent form of land-use control. (See Appendix F)

- **Transfer of development rights (TDR)**: used to manage location of future development. This action takes place voluntarily. The owner of the constrained land sells the development credits established under zoning to a buyer who then can develop additional density on another property based on the number of credits purchased. The program would be inexpensive or cost-free to the military installation since the local government would administer it. The program could also stimulate growth and appropriate development of the property to which development rights were being transferred while reducing the potential of incompatible development in certain areas. (See Appendix G)

- **Implement land banking in maximum mission area:** The term “land banking” is defined as a system in which an entity, such as the local governing body, acquires a substantial amount of land available for future development within a given region for the purpose of implementing a public land use policy. Land banking differs from permanent acquisition in that it places the land in a temporary holding status to be turned over for development at a future date. Land banking may have an anti-inflationary effect on land prices, thus preventing land speculation, and may permit more rational patterns of development.

- **Utilize public/private leaseback of land to control types of development permitted**: a financial arrangement in which the land is acquired and controlled, but not necessarily occupied, by the owner. The leaseback arrangement typically involves a two-step process where the real estate is purchased by either a private firm or government entity and then leased back by the purchaser for specific uses in accordance with the approved plan for the area. Leaseback offers a way for public agencies to acquire land, yet provide for the continued use of the land by others. Public agencies can thus limit the land use, while acquiring some income from the property. The leaseback method is popular in the private sector because it provides capital from outside sources and is a flexible form of financing.

Voluntary Acquisition and Noise Mitigation

Local governments with property located within the CZ or APZs should consider providing a voluntary acquisition program for residential properties and vacant land located within the APZ I, APZ II and CZ areas. Voluntary acquisition is one of several effective measures for noise and incompatible land use mitigation. However, it can be controversial and must be handled with sensitivity. (See Appendix I)

Federal legislation supports the idea of voluntary acquisition through noise mitigation or noise compatibility programs. Under section 104(a) of the Aviation Safety and Noise Abatement Act of 1979, an airport operator, including those on military bases, who has previously submitted a noise exposure map, may submit to the FAA a noise compatibility program which sets forth the measures taken or proposed by the airport operator for the reduction of existing incompatible land uses and prevention of additional incompatible land uses within the area covered by the noise exposure maps. The Act requires such programs to be developed in consultation with interested and affected parties including local communities, government agencies, airport users, and FAA personnel.

If an acquisition will involve the displacement of individuals, families, business concerns, farm operations or nonprofit organizations, a Relocation Plan should be developed. The primary intent of a relocation plan is to identify the needs of occupants who are going to be displaced, and to relate this to the available supply of comparable replacement properties. (See Appendix J)

In addition, in 2002, federal legislation (Agreements to Limit Encroachments and Other Constraints on Military Training, Testing, and Operations) granted authority to the DOD to partner with local governments and conservation organizations to assist in acquiring land near military installations from a willing seller when the acquisition can protect both the environment and the military mission. Purchasing development rights would compensate the owner for the assessed market value of development potential lost when the land remains permanently undeveloped. It should be noted that any purchase of development rights as part of this strategy would be strictly voluntary.

Noise mitigation projects that acquire designated properties containing incompatible land uses for redevelopment into noise compatible land uses require the acquisition of all or substantially all of the property in the project area to accomplish the intended noise mitigation. Therefore, acquisitions for these projects may not be considered voluntary transactions.

There will be instances where it is prudent for an entire parcel of land to be acquired rather than a specific portion, i.e. the lots located along Cahoba Drive that front on Lake Worth in the CZ. Eligible land acquisition should normally be fee simple; however, some lesser interest may be acquired in the form of easements where appropriate.

Voluntary Acquisition Programs

Easements

This measure allows for the purchase of easements within the 65 dB DNL or greater noise contours to ensure continued land use compatibility of properties where the municipality has taken other actions to mitigate noise within the 65 dB DNL or greater noise contour. Easements may also be purchased from property owners who choose not to utilize sound attenuation measures. If the property were resold, it would be subject to avigation easements attached to the deed to ensure long-term compatibility. Properties containing the avigation easements could be redeveloped to a compatible use within the 65 dB DNL or greater noise contours.

Fee Simple Purchase of Part of Land

When only a small amount of land is being acquired from a larger tract and the remainder is not being materially affected, such as a change in the highest and best use or evidence of diminution of value, only that area being acquired should be appraised. In these instances, the highest and best use of the part to be acquired must reflect the same highest and best use of the remainder. Examples of less than full fee interest acquisitions are:

- **Part of Whole in Fee Simple:** Fee simple acquisition of only a part of an owner's property.

- **CZ Easement:** An easement that restricts all building, and growth of trees or plants from the level of the ground. The land itself is not acquired. The areas controlled by a CZ Easement must be, and must remain, cleared of any buildings, structures, objects (other than air navigation facilities), growths (vegetation, such as trees), or assemblies of persons.

  NOTE: *CZ Easements alone provide protection from obstruction and do not include right-of-flight and will not protect an airport owner from future claims from property owners due to over flights. For this reason, land acquisition in the CZ is also recommended.*

- **Avigation Easement:** An easement giving a property interest in air space over a particular portion of ground, providing for, among other things, the right of flight; the right to cause noise and dust, etc.; the right to remove all objects protruding into the airspace and the right to enter the land to enforce the rights required.

- **Life Estates:** (FAA 5100.37a, 2-27 & 3-10) A life estate is the right to reside on the property until death even though the property is sold. It is not a recommended method of land acquisition and it is unlikely that the DOD or FAA would approve reimbursement of land purchased with a life estate granted until the life estate has been fully exercised.

Examples of restrictions that may be included in an easement are:

- Right to restrict or prohibit radio or electromagnetic interference. On commercial property, this restriction may affect the highest and best use and value; however, little or no effect should occur to agricultural land.

- Right to restrict or prohibit construction of certain types of buildings or structures. This restriction may severely limit the use of land intended for certain development. On the other hand, the land use zoning ordinance may already have placed restrictions on the physical development, in which case the net effect of the easement restriction may be isolated.

- Right to restrict or prohibit lights, lighted signs, and other lighted objects which could distract or temporarily blind pilots.

- Right to restrict or prohibit hazardous or unreasonably objectionable smoke, fumes, or vapor.

- Right to control the maintenance of any structure, including temporary interference with any of the acquired surfaces.

- Right to restrict or prohibit specific agricultural uses such as growth and harvesting of timber, establishment of orchards or other plant growth that may eventually penetrate imaginary surfaces.

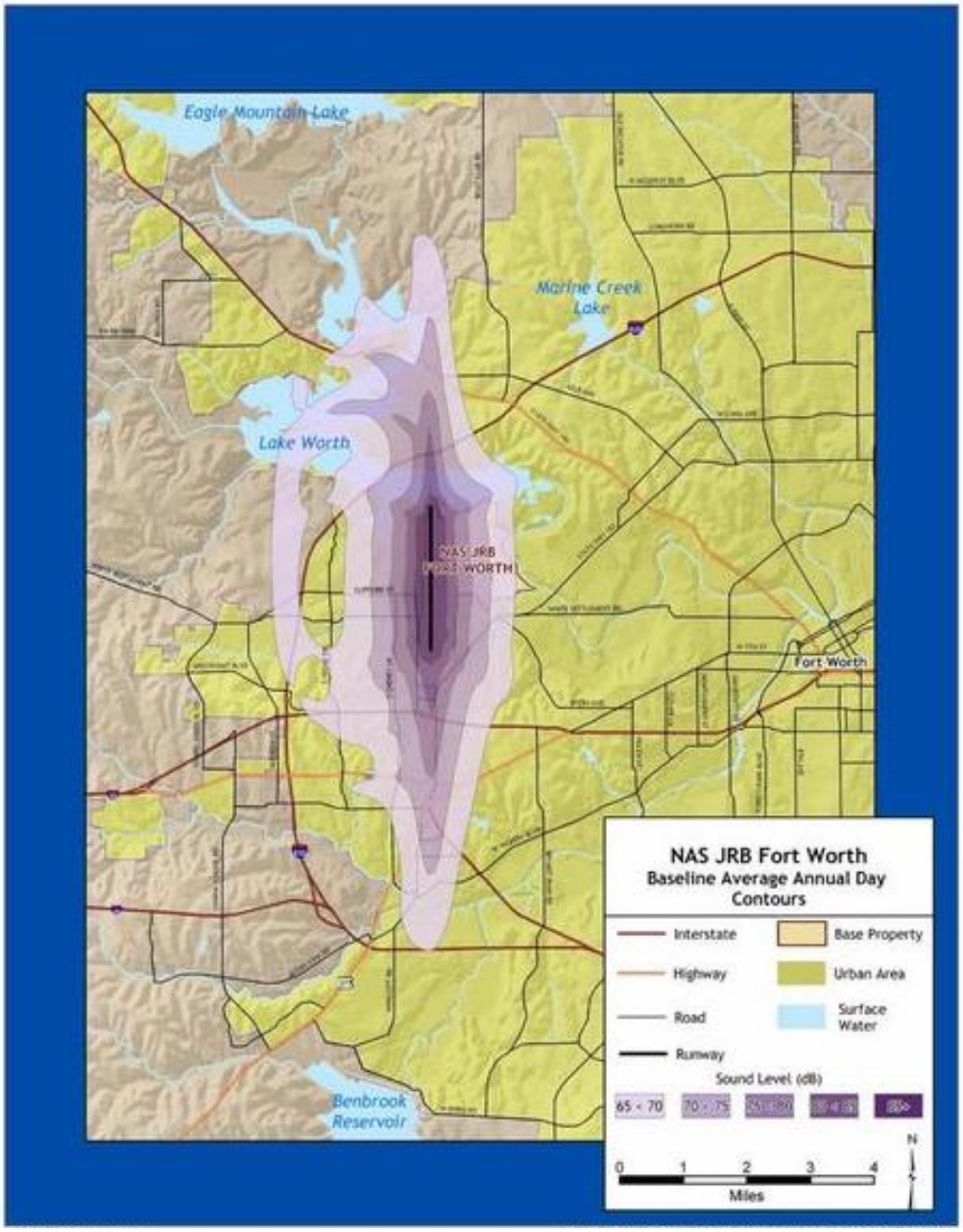
- Right to restrict or prohibit specific agricultural uses; construction of ponds, lakes or other water impoundment; sanitary landfills or other manmade improvements that may attract or result in the concentration of birds and/or waterfowl.

In cases where easement acquisition may prove cumbersome, other means of noise mitigation should be explored. For residences, a provision for sound insulation should be considered, but only where feasible and cost effective and if publicly funded or subsidized, in exchange for an avigation easement to homeowners located within the 65+ dB DNL noise contour of the 2004 Noise Exposure Map (See Figure 2.9).

Figure 2.9 Aircraft Noise Contours

August 2004
WR 04-18

Aircraft Noise Study for NAS JRB Fort Worth



Source: Wyle Laboratories

Sound insulation would only be beneficial to those residences where sound insulation can be effectively applied. It is also recommended that this method include sound reduction insulation of all schools and institutional/public uses located within the 65 dB DNL. This will reduce the noise impacts on existing non-compatible land uses.

The Fifth Amendment of the U.S. Constitution states that "private property shall not be taken without payment of just compensation" and that "no person shall be deprived of life, liberty, or property without due process of the law."

Though they appear similar, voluntary acquisition programs are NOT the same process as eminent domain in disguise. In the wake of the Supreme Court's *Kelo vs. New London* decision (June 23, 2005), state and local governments are taking action to restrict the use of eminent domain for *economic development* purposes. Acquisition of property for conservation or to protect the base from encroachment is not an economic development purpose.

Economic Development--The term "economic development" means any activity to increase tax revenue, tax base, employment, or general economic health, when that activity does not result in (1) the transfer of land to public ownership, such as for a road, hospital or military base; (2) the transfer of land to a private entity that is a common carrier, such as a railroad, utility, or tollroad; or (3) the transfer of property to a private entity when eminent domain will remove a harmful use of the land, such as the removal of public nuisances, removal of structures that are beyond repair or that are unfit for human habitation or use, or acquisition of abandoned property. Kelo et al vs. City of New London et al.

AICUZ Disclosure and Real Estate Transactions

The recommendations contained within this section are consistent with the standards required by the State of Texas. The applicable State law is partially contained in the text box below. Additionally, these recommendations support Section 11 of the resolution adopted by the Policy Committee on September 24, 2007. Section 11 of the September 24, 2007 resolution states: "Real Estate Disclosures: the NAS JRB Regional Coordination Committee shall assist the real estate community to meet applicable State law related to disclosures."

It is imperative to note, noise and APZ proximity disclosure in real estate transactions has been a common theme in all AICUZ and JLUS studies. Additionally, it is one of the recommendations identified by DOD's Office of Economic Adjustment as desirable.

Table 2.1: APZ I – Recommended Use and Acquisition Plan

Tools / Property Type	Develop with compatible use	Rezone or grant conditional use permit ("CUP") for compatible use	Voluntary acquisition	Eminent domain
NON-RESIDENTIAL				
Developed	Already developed use is"not incompatible" and can remain, or owner can redevelop with a different compatible use.	Owner can initiate application for new compatible use. City will not initiate rezoning because owner has existing use and other allowable, compatible reasonable uses.	Owner has development options for reasonable use, so City need not acquire. But if initiated by owner, City may acquire to "roll back" development in APZ1.	Owner has development options for reasonable use. City need not acquire.
Undeveloped	Owner can initiate development to a compatible use. Every nonresidential zoning category allows some compatible & reasonable use.	Owner can initiate application for compatible use. City need not initiate rezoning because owner may seek approval for some compatible & reasonable use.	Owner has development options for reasonable use. City need not acquire.	Owner has development options for reasonable use. City need not acquire.
RESIDENTIAL				
Developed	Not applicable because the property is already developed. Existing uses are "not incompatible" so no action is needed.	On case-by-case basis. Owner can initiate rezoning.	Existing use is "not incompatible," thus City need not acquire.	Existing use is "not incompatible," thus City need not acquire.
Undeveloped	There is no compatible use without rezoning/ CUP	On case-by-case basis; depends on size, location and intended use of parcel. Either owner or City can initiate rezoning.	But only if unsuitable for rezoning/CUP and only if new APZ-1 Zoning Ordinance leaves property without a reasonable use.	If voluntary acquisition is not possible and property cannot be rezoned, there is no reasonable use for the property. Eminent domain is appropriate to compensate owner for loss of all use.

Source: Tri-Services Community and Environmental Noise Primer, U.S. Operational Noise Program (as amended)

Transportation Recommendations

Transportation impacts resulting from BRAC investigations would be profound and need to be aggressively dealt with to ensure safe and efficient access to NAS JRB and to prevent further disruption of an overburdened transportation network. Although a comprehensive transportation study is beyond the scope of this report, some preliminary concerns and recommendations have been identified.

As in any community, if new development is allowed to proceed unchecked without significant transportation review and mitigation, there will be traffic flow problems throughout the community. If land use compatibility recommendations are followed, the retail and light industrial growth in previously residential areas will be the primary traffic generators in the future. These land uses generally require transportation infrastructure improvements, particularly the addition of lanes and intersection improvements for new turning movements, to maintain traffic flow.

The DOD should work with and assist Texas Department of Transportation (TXDOT) and the local governments of North Central Texas in addressing these severe transportation situations. Obviously, the first recommendation is for the local communities through NCTCOG to complete a comprehensive transportation study of the area surrounding NAS JRB, with an emphasis on recommended JLUS compatible land uses. Specific recommendations are as follows:

- NCTCOG should work with the Congressional delegation to establish priorities for federal assistance for transportation improvements required in the BRAC-affected communities of Fort Worth, Lake Worth, Westworth Village and White Settlement.

- It is recommended that Texas elected officials and agencies impress upon federal representatives the need to provide Benbrook, Fort Worth, Lake Worth, River Oaks, Westworth Village, White Settlement, and Tarrant County with the resources to attend to the transportation impacts resulting from BRAC actions.

Building Code Recommendations

A building code prescribes the basic requirements that regulate construction of structures. The building code is adopted by a local governing body to protect the health, safety, and general welfare of the occupants of these structures. Such a code establishes a set of requirements covering matters such as fire protection, building materials, lights, ventilation, exits, plumbing, and other related activities.

Although building codes are not a technique to actually prevent development, they can restrict it, especially near military installations. A code could require that walls, partitions, and floor-ceiling construction have minimum sound transmission capabilities. The code could specify a certain sound transmission class (STC) that must be obtained through specific construction techniques and materials. In addition, the code could require that certain noise level reductions are maintained after the structure is complete.

The American National Standards Institute (ANSI) has published guidelines for assessing the compatibility of various types of land uses with different levels of sound exposures. The figure below shows specific land use compatibility with yearly day-night average sound levels at a site for building as commonly constructed (i.e. without special sound barriers). Table 2.2, obtained from 14 ANSI S12.40, should be viewed as a list of recommended guidelines, as each jurisdiction will have to adopt these guidelines by ordinance to make them enforceable.

Table 2.2: Noise Levels and Land Use Compatibility

Land Use	Yearly Day-Night Average Sound Level (dB DNL)							
	<55	55-60	60-65	65-70	70-75	75-80	80-85	85+
Residential-Single Family (Extensive Outdoor Use)								
Residential-Single Family (Moderate Outdoor Use)								
Residential - Multistory (Limited Outdoor Use)								
Transient Lodging (Indoor Use)								
School Classrooms, Libraries, Religious Facilities (Indoor Use)								
Auditoriums, Concert Halls (Indoor Use)								
Music Shells (Outdoor Use)								
Sports Arenas, Outdoor Spectator Sports (Outdoor Use)								
Neighborhood Parks (Outdoor Use)								
Playgrounds, Golf Courses, Riding Stables, Water Recreational Areas, Cemeteries (Outdoor Use)								
Office Buildings, Personal Services, Business and Professional (Indoor Use)								
Commercial (Indoor Use)								
Livestock Farming, Animal Breeding (Outdoor Use)								
Agriculture (Except Livestock) (Outdoor Use)								
Extensive Natural Wildlife and Recreation Areas (Outdoor Use)								
	Source: ANSI S12.40, 1990 Appendix							
		Compatible			Compatible with Sound Attenuation			
		Marginally Compatible			Incompatible			

In general, housing is compatible with an exterior noise exposure up to 55 dB DNL. Standards indicate that with exposure between 65-75 dB DNL, additional protective measures, such as indoor noise reduction/isolation for residential and certain other types of indoor uses may be warranted. Noise exposure that exceeds 75 dB DNL is incompatible with all residential uses but many uses, such as manufacturing, retail, government facilities, and agriculture can be suitable even within a relatively high noise setting, with strict conditions.

In addition to ensuring that land uses should be compatible with noise levels, safety issues must also be considered. Certain uses are not permissible within the APZs because of safety considerations. The following figure recommends compatible land uses within the various air safety zones around NAS JRB.

It is recommended that existing building codes be modified to reflect sound attenuation measures, in addition to the adoption of height, lighting and obstruction ordinances. (See Appendix J for sample amendments). At the present time all but two of the JLUS local governments utilize the Internal Building Code (IBC) 2003 (or newer) for all new construction (including additions to existing structures). It should be noted that IBC code requirements are likely equivalent to the noise attenuation measures being recommended.

It is preferred that local governments use acoustic sound transmission class (STC) ratings rather than other single or multiple-figure ratings, since extensive STC data is readily available to architects and building code officials. The aim is to require a minimum amount of additional effort and cost for builders.

In order to make the transition smoother, a construction guide should be prepared to provide builders, developers, architects and building inspectors with information that addresses noise reduction of structures in areas exposed to aircraft noise. The guidelines, along with a noise attenuation ordinance (See Appendix J) could be used by the local governments in their review of comprehensive plan amendments or development plans and/or subdivision plats. The guide could:

- Provide a better understanding of the issues and problems encountered in complying with noise regulations
- Serve as a designing guide for exterior-to-interior noise attenuation
- Estimate required STC values within certain aircraft noise zones
- Determine whether or not the design of a single-family residence or other habitable structure (apartments, townhouses, hotels, condominiums) complies with noise reduction guidelines
- Provide STC values for a variety of building elements, including walls, roof assemblies, windows and doors

It is possible to make existing structures noise compatible by implementing structural improvements including increased insulation, better windows and airtight exterior walls. This can be accomplished by means of changes to and enforcement of the local building codes, where necessary. Additionally, both existing structures and new construction in the 65 dB DNL or higher should be required to participate in a sound attenuation program. Once a structure complies with the program, certification should be awarded to the property owner and recorded

along with all other property ownership records at the County. Certification should be considered mandatory.

Noise attenuation measures may be considered relatively inexpensive for new homebuilders and purchasers. However, for individuals or households with low or moderate incomes the costs to retrofit homes with noise attenuation measures may be prohibitive. Local governments may choose to assist in establishing subsidized programs.

Storm Water Drainage Recommendations

The basic concept described in this section is that each land development project should be designed to minimize rainwater runoff by retaining as much storm water as possible on site to allow percolation and runoff over a reasonable period of time (generally at levels comparable to pre-development). Excess storm water runoff should be directed to an off-site drainage detention area through a designed or natural drainage system utilizing features such as swales and pipes. Properties within NAS JRB must be protected from storm water damage as a result of proposed development. The two local governments with the most potential for adverse runoff impacts onto the base are Fort Worth and White Settlement. This recommendation should be applicable to any development within the boundaries of Farmers Branch Creek basin.

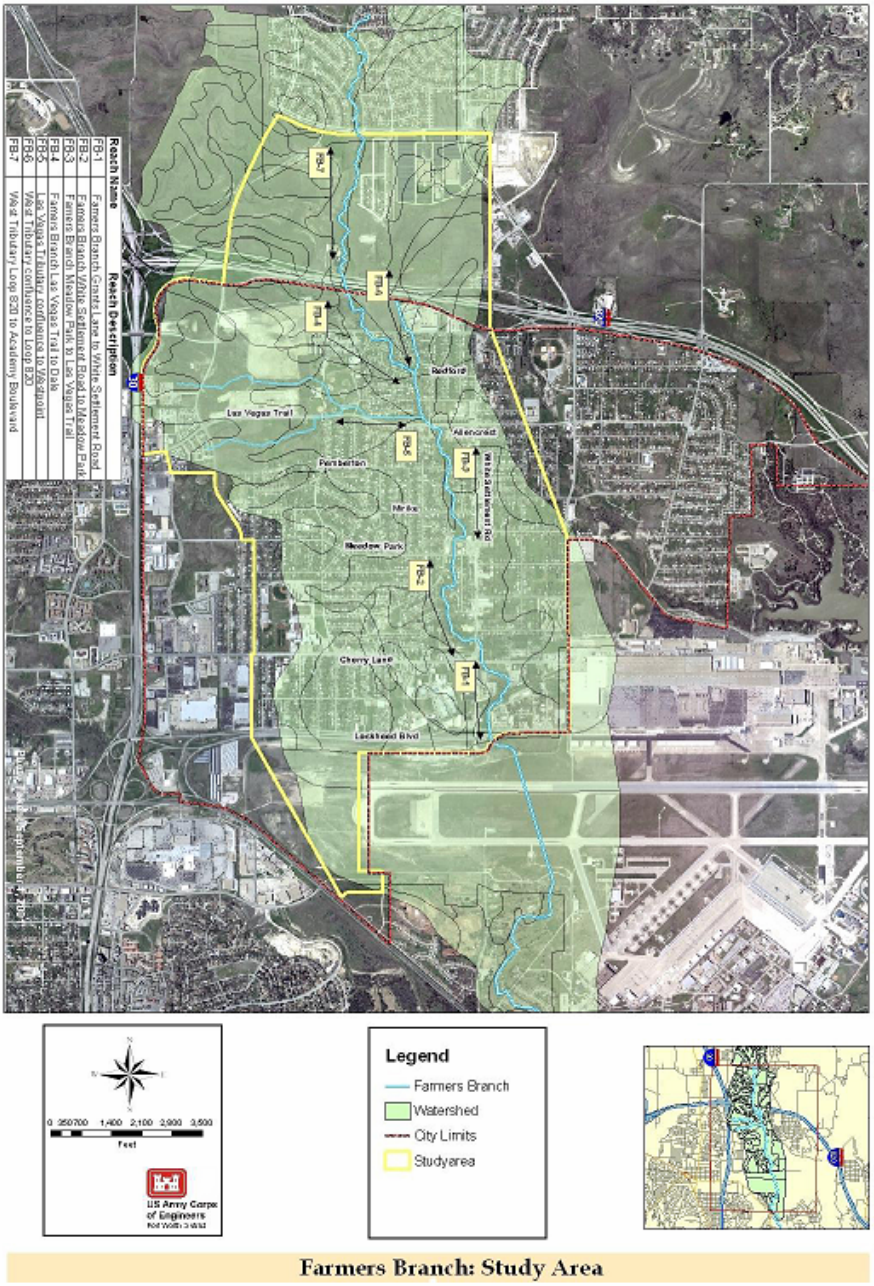
Most of the flooding that occurs on base stems from overflows of the Farmers Branch watershed. In November 2005, the United States Army Corp. of Engineers conducted a study of the Farmers Branch watershed, which bifurcates the southern end of the base's runway. It was recommended in that study that the City of White Settlement consider a National Economic Development Plan (NED). The NED plan includes channelization and bridge modifications along the main stem of Farmers Branch Creek and its tributary. The plan also shows how to implement a permanent evacuation of the water in the 5-year flood zone for residential structures immediately upstream and downstream of the channel improvement. However, White Settlement selected to construct a locally preferred plan, which was approved and adopted. This plan was to provide a greater level of protection and reduce the risks to life, health, and safety during a flood event for its citizens, with no mention of the base. The locally preferred plan involves effectively removing approximately 60 percent of the structures from the 100-year flood plain.

With regards to NAS JRB, an additional strategy, known as Low Impact Development (LID) may be required. Basic LID strategy for handling runoff is to: 1) reduce the volume of runoff, and 2) decentralize flows. This may best be accomplished by creating a series of smaller detention areas that allow localized filtration by minimizing runoff carried to remote collection areas, by retaining wider areas for drainageways, and increasing the setbacks from natural drainage areas. Many LID strategies will require commitment by the Cities of Fort Worth and White Settlement, developers, and property owners.

In some cases the cities' conventional development standards, comprehensive plans and public improvements standards must be revised to allow for LID strategies. Additionally, as development occurs in the basin area, "Best Management Practices" (BMP) and technologies that simultaneously conserve and protect natural resource systems and reduce infrastructure costs should be incorporated. The practice of such strategies will allow land to be developed in an environmentally responsible manner and help developers reduce costs associated with more

stringent design requirements for traditional storm water collection and conveyance systems. They may also help reduce the possibility of flooding in the lower portions of the drainage basin.

Figure 2.10 Farmers Branch Watershed



Farmers Branch: Study Area

Source: U.S. Army Corp of Engineers

As growth occurs to the west in the Farmers Branch basin, the roadways must be surveyed to determine which roads need to be improved to current urban design standards. Upgrades may include curbs, gutters, and storm sewer, etc. in order to serve new development without adversely affecting the base.

Potential Security Issues and Recommendations

The September 11, 2001 attacks on the World Trade Center, and other acts of global terror since, have highlighted the ever-increasing importance of the development and implementation of effective anti-terrorism policy and procedure. While Anti-Terrorism and Force Protection (AT/FP) issues are not the most central of concerns to the JLUS process, they are relevant topics when examining land use activities in close proximity to military installations. It was primarily at the federal level with the Department of Homeland Security (DHS) and agencies cooperating with or reporting to it that a set of targets and criteria focused on anti-terrorist activities has been established. In 2003, the Federal Emergency Management Agency (FEMA) created, in cooperation with branches of the armed forces and other federal agencies, a Risk Management Series of manuals, each offering guidance, and outlining explicit criteria, for designing buildings and sites to reduce or minimize the impacts of terrorist activities. Although the bulk of the information that has been developed focuses on increasing the structural integrity of buildings and nearby areas, the manuals also indicate that smart site planning on surrounding properties can help lessen the impact of terrorist acts.

Local authorities bear a majority of responsibility for implementation of directives and polices defined within anti-terrorism planning, even though the driving force encouraging such planning emanates from the federal level. An awareness emerges of a new role for local authorities, which is to start planning an array of contingencies related to prospective terrorist activity that can be effectively integrated with already present schema for crime prevention and the provision of natural disaster relief.

To effectively address this need, the American Planning Association (APA) has initiated the development of key policies that offer guidance for both state and local planners that address the following areas:

- The general need for a planned approach
- State and local policies affecting building locations, street closures, and the public realm
- Policies and standards affecting the location and design of federally owned or leased facilities
- Security planning for transportation facilities and services
- Building design for security
- Incorporation of security issues into the comprehensive planning process.

These comprehensive policies provide a framework from which the effectiveness of anti-terrorism guidelines, related to NAS JRB, can be evaluated. Instead of the case-by-case approach adopted at present in evaluating each development proposal, it is recommended that a comprehensive planning process, incorporating awareness of security issues, be adopted.

To reduce or eliminate terrorist attacks upon targeted buildings or sites, APA and FEMA guidelines describe three layers of defense using different sets of strategies for asset protection.

The first and outermost layer of defense includes buildings, installations, and other infrastructures located adjacent to the site.

Barriers (natural and man-made) and spaces around a building should be designed and/or modified to protect it; they make up the second layer of defense. This layer takes into account all aspects of the building's surroundings: parking, access point, roads, sidewalks, signs, natural barriers, and other features.

The actual building envelope is the third layer of defense.

The JLUS and the comprehensive plan are primarily concerned with the first layer of defense relating to the use of the grounds outside of the NAS JRB fence line. The incorporation of concepts which integrate the planning of land use, landscape architecture (vegetation, landforms and water) and site planning, as noted in the FEMA guidebook, should be implemented when attempting to mitigate potential threats with regard to land development and the design basis threats as pinpointed via the process of risk management assessment.

There are multiple stages of risk management assessment, including threat and vulnerability estimates, which should then be followed by decision-making about specific planning activities guided by the criteria described in the first layer of defense. FEMA recommendations are intended to aid the planners and designers in considering these factors when making anti-terrorism and security decisions.

Implementation considerations are as follows:

- The building footprint relative to total land available
- The building location or, if undeveloped, suitable building locations relative to the site perimeter and adjacent land uses, distance between the perimeter fence and improved areas off site
- Access via foot, road, rail, water, and air, suitable to support a secure perimeter
- Current and planned infrastructure and its vulnerabilities, including easements, tunnels, pipes, and rights-of-way
- Infrastructure nodes that constitute single-point vulnerabilities
- Adjacent land uses and occupancies that could facilitate attacks or that are potential targets themselves and thus present collateral damage or cascading failure hazards
- Proximity to fire and police stations, hospitals, shelters, and other critical facilities that could be of use in an attack
- Natural hazards, susceptibility to subsidence or liquefaction, and other environmental considerations
- Presence of natural physical barriers such as water features, dense vegetation, and terrain that could provide access control and/or shielding, or suitability of the site for the incorporation of such features
- Topographic and climate characteristics that could affect the performance of chemical agents and other weapons
- Observability from outside site boundaries, ability of vegetation in proximity to building or site to screen covert activity.

There are many different factors to consider when choosing a response to security threats around the base, as illustrated in the list above. The FEMA report is not intended to be an ultimate compendium of anti-terrorist measures; instead, it notes that threats may change, and thus, countermeasures may change as well. The expense and resources required to protect the facility should be analyzed in order to ensure that they do not exceed physical and monetary limits or become grossly inefficient. While it might be of interest to leave the highest percentage of land possible around the base available for agricultural uses or open space (parkland), such a solution could be impractical in the eyes of individual or communal land owners, unless adequate funding emerges to subsidize the requirements of such security levels via purchasing the land or development rights in question.

To satisfactorily address the future security issues of NAS JRB, the cooperation and coordination of effort among military and community officials and representatives (key to any systematic and well-executed planning and implementation process) will be necessary.

Topic	Proposed Tools for Consideration	Definition	Purpose/Intent	Proposed Action Steps for Consideration by Local Governments	Investigation and Possible Implementation Responsibility
Communications/Information	Improve communications through updated web sites	Provide JLUS information and any other relevant AICUZ or related land use/noise conflict information on local governments' websites. Update information on a regular basis	To ensure public education of regional agreements resulting from current and future JLUS efforts, as well as related AICUZ topics	Continue to update/expand websites of regional local governments	Local governments (in cooperation with DOD)
	Request **FAA briefing (not a study)** on application of FAR Part 150 to uses in JLUS study area	FAA Part 150 may have noise impact mitigation and other measures applicable. Request FAA to provide briefing in potential applications	Provide clear disclosure of noise and safety impacts around military airfields to potential developers	Jurisdiction planning and public affairs departments to prepare and distribute information as appropriate	FAA and Local governments
	Strengthen public education regarding safety and noise restrictions in Airport Noise Ordinances	Educate public on existing AICUZ policy which recognizes noise, safety, height, land use and other restrictions around military airfields	Ensure communication between stakeholders and encourage future land use decision-making consensus	Select subset of representatives from JLUS Policy Committee to continue working together on future issues	Local governments
Coordination/Organizational	Create JLUS Regional Coordinating Committee to include the military facilities and local governments	Multi-stakeholder committee which will continue dialogue and monitoring of JLUS recommendations and future land use impacts			Local governments, DOD
Planning and Public Policy	Seek DOD input on school siting boards/ decisions	Consult DOD on school siting decisions to review future school sitings	Allow DOD to review and provide input on future siting of schools	School Boards and DOD coordinate on acceptable guidelines to use as the "standard" in school site selection	Independent School District Boards, DOD
	Adoption of Airport Environs Ordinance that establishes an overlay district: Military Airport Zone	Serve as overlay districts, within which growth management policies and regulatory techniques shall guide land use activities and construction	To ensure the long-term viability of airports and military installation activities.	City planning to create and distribute draft of MAZ/PAZ ordinance for consideration and approval by P & Z and City Councils	Local governments, with assistance from Tarrant County, FAA and NCTCOG
	Create a Master Land Development Plan and Design Guidelines	Establish a comprehensive vision for all local governments within the Noise Zones and APZ/CZ zones that can be shared by the local, regional, state, private and public sector stakeholders	Guide development efforts in the study area, in a way compatible with NAS JRB and its current and future missions	Assess funding requirements and other available resources for creation and implementation of the plan. Engage developers and realtors for input, as well as affected stakeholders	All Local governments, NCTCOG
	Create a Noise Mitigation Plan	Developed through the leadership and efforts of all local governments in the Noise Zones and APZ/CZ zones	Guide development within the study area in a way compatible with NAS JRB's current and future missions through acquisition/demolition/relocation efforts	Assess funding requirements and other available resources for creation and implementation of the plan. This would include funding for acquisition, voluntary and through the use of eminent domain	All Local governments, NCTCOG, FAA, Department of Defense and other funding sources.
	Consideration of mechanism similar to the Meacham Field Joint Airport Zoning Board	There has been set up a joint zoning board by most of the cities in question and the City of Fort Worth to govern land development around Meacham Field	To utilize the board as a "neutral" authority for implementation of planning and public policy issues regarding land development around airfields – military and public	Expand the board to include all cities in the JLUS study area. Board should be given the jurisdiction for development around all airfields, including NAS JRB Fort Worth	Current cities represented by the board plus Benbrook and Westworth Village, and White Settlement.
Real Estate Measures	Early disclosure	Disclosure of structure's location within AICUZ noise zones and/or within APZs at the initial advertisement of property (e.g., Multiple Listing Service database). Ensure early disclosure is being followed and educate agents of proper language/timing	Provide honest disclosure of impacts to property within AICUZ which may impact buyer or renter decision	Work with TX Real Estate Commission and Real Estate representatives to develop and implement language for inclusion in disclosure notices	Local governments, TX Real Estate Commission, Realtors Associations

Topic	Proposed Tools for Consideration	Definition	Purpose/Intent	Proposed Action Steps for Consideration by Local Governments	Investigation and Possible Implementation Responsibility
Acquisition	Transfer of Development Rights	Used to manage location of future development. This action takes place voluntarily	Stimulate growth and appropriate development of property with development rights being transferred to reduce the potential of incompatible development	Identify property owners who may be interested in participating in program	Local governments
	Land Banking	A system in which an entity, such as the local governing body, acquires a substantial amount of land available for future development. Land banking differs from permanent acquisition in that it places the land in a temporary holding status to be turned over for development at a future date	Anti-inflationary affect on land prices, thus preventing land speculation, and it will permit more rational patterns of development rather than urban sprawl	Identify properties for temporary governmental acquisition	Local governments, Tarrant County
Sound Attenuation	Implement noise attenuation requirements for certain non-residential structures	Conduct research to implement recently-enacted state legislation enabling communities to require noise attenuation for certain non-residential noise-sensitive structures (churches, office buildings, hospitals, etc.)	Provide interior sound attenuation for non-residential noise-sensitive structures in high noise zones	Conduct research of other building codes; work with appropriate national and state agencies on revisions to Texas Uniform Statewide Building Code	Local governments, NCTCOG
	Strengthen building codes	Modify existing Sound Transmission Class (STC) ratings for sound attenuation to higher levels; tier application of expanded codes according to noise zones	Provide additional sound attenuation for residences & other buildings within 65 DNL noise contours and higher	Discuss action with North Central Texas Council of Governments; Create certification program for private property owners for new construction and bringing existing uses into compliance – certification should be recorded at the County	Local governments, State Representatives in Legislature, DOD, NCTCOG, Independent School Districts
	Sound Attenuation Program	A voluntary program in the 65+ DNL areas to sound insulate homes, with formal certification of compliance with the program.	Increase the tax base in the area and add value to the real estate properties	Assess funding requirements and other available sources per creation of this plan, through the possible use of DOD funds, state, county and local funding	NCTCOG, Tarrant County and/or Local governments
	Ensure building code enforcement	Ensure contracted builders are following increased standards in noise contours	Prevent structures from being built within noise contours that do not meet higher sound attenuation standards	Review & educate as needed code compliance (specifically sound attenuation measures) with building inspectors; work with building industry & developer representatives on compliance methods & technologies	Local governments & Building Associations
	Building code Research & Development	Promote research and development on new methods of sound attenuation tough construction and building materials	Use highly impacted areas as research grounds for improving overall construction standards for all impacted structures	Local governments work with Building Association, schools and other building industry representatives to develop research partnerships & initiate sound attenuation R&D programs	Local governments & Building Associations, Local Educational Institutions, Local/National Building Material Retailers

Topic	Proposed Tools for Consideration	Definition	Purpose/Intent	Proposed Action Steps for Consideration by Local Governments	Investigation and Possible Implementation Responsibility
	Strengthen building codes of schools in noise contours	Improve sound attenuation of school structures based on applications by other local governments	Provide additional sound attenuation for schools within 2004 Noise Contours	Use STC guidelines for noise attenuation	Local governments, State Representatives Legislature, NCTCOG, Independent School districts
Infrastructure	Transportation Plan	Improve surface transportation access to NAS JRB from surrounding communities and from interstate highway system.	Provide transportation outlook after full implementation of BRAC 2005 and JLUS recommendations	Consultation with the NCTCOG	Local governments, TXDOT and NCTCOG
	Storm Water Drainage Assessment (Low Impact Development Strategy - LID)	Reduce the volume of runoff to the base and decentralize flows	To create a series of smaller detention areas that allow localized filtration rather than carrying runoff to a remote collection area, by retaining wider areas for drainage ways, and increasing the setbacks from natural drainage areas	Partnership with the Farmer's Branch Creek watershed; creation of a LID plan through joint efforts of planning staffs, elected officials, developers & property owners	Cities of Fort Worth and White Settlement, Tarrant County, developers, and property owners
Memorandum of Understanding	Establish a mutually beneficial process that will ensure timely and consistent notification and cooperation between all parties on projects, policies, and activities	Promote sustainability and protect military readiness training	To limit development on vacant land and to encourage conservation	Negotiate MOU or easement with Lockheed Martin and with Tarrant County	Local governments & Lockheed Martin, NAS JRB
Security	Regional Security Guidelines	Developed to reduce or eliminate terrorist attacks upon targeted buildings or sites at NAS JRB Fort Worth	Area specific guidelines to satisfactorily address potential future security issues of NAS JRB Fort Worth	Multiple stages of risk management assessment, including threat and vulnerability estimates, which will involve cooperation and coordination of effort among military and community officials and representatives	Local governments, DOD, NCTCOG
Statutory Lighting Requirements	Review and adopt new regulations regarding the installation and use of outdoor lighting within a five mile radius of NAS JRB Fort Worth	Prohibits the use of a type of outdoor lighting that is incompatible with the effective use of the observatory (tower) or military installation	To improve visibility around airfields for incoming aircraft by reducing glare and light refraction, thereby improving the safety of property owners within a 5 mile radius	City building official to submit amendments to building codes for consideration and approval by the City Council	Became effective September 1, 2007 as per State legislation. Tarrant County

Topic	Proposed Tools for Consideration	Definition	Purpose/Intent	Proposed Action Steps for Consideration by Local Governments	Investigation and Possible Implementation Responsibility
Communications/Information	Improve communications through updated web sites	Improvement of communication methods of Navy activities to the public	Ensuring public education of Navy activities and response to community concerns	Continue to update/expand website regarding current activities and response to noise complaints	Navy (in cooperation with Local governments)
	Update educational materials explaining noise, AICUZ, and real estate disclosure	New brochures (with AICUZ maps) discussing specifics of noise contours, AICUZ, and Navy operations	Increase operational understanding	Assemble and print brochures and distribute to regional realtors/NCTCOG	Navy (in cooperation with Local governments)
	Enhanced use of Community Planning Liaison Officer	To provide information on relevant civilian programs, projects, planning and services from the DOD's perspective	Improve the relationship between the base and surrounding communities and to build constructive partnerships; provide timely and relevant information to assist communities in their land development endeavors	Create a full-time position for a military and civilian CPLO	Navy (in cooperation with DOD and Local governments)
Planning and Public Policy	Enforce development restrictions on existing easements	Enforce development restrictions on existing easements to ensure AICUZ compatible development around airfield	Better control of development restrictions on existing easements	Review all easements and work with local governments to enforce	Navy (in cooperation with Local governments)
Acquisition	Pursue funding for DOD Conservation Land purchase	Partnerships with local, state and non-profit conservation entities to acquire land around military installations to prevent further encroachment and preserve open space	Enable quick response to priority real estate acquisition opportunities and leverage Navy's encroachment prevention efforts	Research local, state, and non-profit funding sources	Navy, DOD, Local governments, partners and/or entities
Infrastructure	Storm Water Drainage Assessment (Low Impact Development (LID) Strategy)	Reduce the volume of runoff to the base and decentralize flows	To create a series of smaller detention areas that allow localized filtration rather than carrying runoff to a remote collection area, by retaining wider areas for drainage ways, and increasing the setbacks from natural drainage areas	Creation of an LID plan for on-base development/construction	Navy with assistance from applicable government agencies
Air Operations/Training	Flight Ops modifications	Implement/continue all flight operations modifications feasible to reduce air operations to minimum feasible to support missions over developed areas	To minimize noise/safety impacts on developed areas around Navy airfields. Educate public on previous changes	Commanding Officer approval – Flight Squadron implementation	Navy
Water Safety	Marker Buoys	Delineate the CZ boundary in Lake Worth Lake	To ensure public education of the dangers of being in the Clear Zone	Place buoys in Lake Worth Lake and provide CZ area maps to the public	City of Fort Worth, NAS JRB

Topic	Proposed Tools for Consideration	Definition	Purpose/Intent	Proposed Action Steps for Consideration by Local Governments	Investigation and Possible Implementation Responsibility
Communications/Information	Improve communications through updated web sites	Provide JLUS information and any other relevant AICUZ or related land use/noise conflict information on City' websites. Update information on a regular basis	To ensure public education of regional agreements resulting from current and future JLUS efforts, as well as related AICUZ topics	Continue to update/expand websites of regional City	City (in cooperation with DOD)
	Request **FAA briefing (not a study)** on application of FAR Part 150 to uses in JLUS study area	FAA Part 150 may have noise impact mitigation and other measures applicable. Request FAA to provide briefing in potential applications	Provide clear disclosure of noise and safety impacts around military airfields to potential developers	City planning and public affairs departments to prepare and distribute information as appropriate	FAA and City
	Strengthen public education regarding safety and noise restrictions in Airport Noise Ordinances	Educate public on existing AICUZ policy which recognizes noise, safety, height, land use and other restrictions around military airfields	Ensure communication between stakeholders and encourage future land use decision-making consensus	Select subset of representatives from JLUS Policy Committee to continue working together on future issues	City
Planning and Public Policy	Seek DOD input on school siting boards/ decisions	Consult DOD on school siting decisions to review future school sitings	Allow DOD to review and provide input on future siting of schools	School Boards and DOD coordinate on acceptable guidelines to use as the "standard" in school site selection	Independent School District Boards, DOD
	Adoption of Airport Environs Ordinance that establishes an overlay district: Military Airport Zone	Serve as overlay districts, within which growth management policies and regulatory techniques shall guide land use activities and construction	To ensure the long-term viability of airports and military installation activities	City planning to create and distribute draft of MAZ/PAZ ordinance for consideration and approval by P & Z and City Councils	City, with assistance from Tarrant County, FAA and NCTCOG
	Revise Future Land Use Plan/Zoning Districts and Rezoning Process	Incorporate appropriate planning concepts with regard to minimizing inappropriate land uses with regard to the continuing mission of NAS JRB Fort Worth	Better control over development; imposes restrictions based on AICUZ footprint	Planning to amend comprehensive plan and zoning text to incorporate overlay district, and land use development within the AICUZ footprint for submittal to Planning Commission and City Council	City of Benbrook
Real Estate Measures	Early disclosure	Disclosure of structure's location within AICUZ noise zones at the initial advertisement of property (e.g., Multiple Listing Service database). Ensure early disclosure is being followed and educate agents of proper language/timing	Provide honest disclosure of impacts to property within AICUZ which may impact buyer or renter decision.	Work with TX Real Estate Commission and Real Estate representatives to develop and implement language for inclusion in disclosure notices	City, TX Real Estate Commission, Realtors Associations
Acquisition	Create an Avigation Easement Program	Provide guidance for new development within the AICUZ footprint	Increase protection from inappropriate land use conflicts with military readiness training	Planning and other divisions should collaborate to create this program for consideration and approval by the P & Z and City Council	City of Benbrook and Tarrant County

Topic	Proposed Tools for Consideration	Definition	Purpose/Intent	Proposed Action Steps for Consideration by Local Governments	Investigation and Possible Implementation Responsibility
Sound Attenuation	Implement noise attenuation requirements for certain non-residential structures	Conduct research to implement recently-enacted state legislation enabling communities' ability to require noise attenuation for certain non-residential noise-sensitive structures (churches, office buildings, hospitals, etc.)	Provide interior sound attenuation for non-residential, noise-sensitive structures in high noise zones	Conduct research of other building codes; work with appropriate national and state agencies on revisions to Texas Uniform Statewide Building Code	City, NCTCOG
	Strengthen building codes	Modify existing Sound Transmission Class (STC) ratings for sound attenuation to higher levels; tier application of expanded codes according to noise zones	Provide additional sound attenuation for residences & other buildings within 65 DNL noise contours and higher	Discuss action with North Central Texas Council of Governments; Create certification program for private property owners for new construction and bringing existing uses into compliance – certification should be recorded at the County	City, State Representatives in Legislature, DOD, NCTCOG, Independent School Districts
	Sound Attenuation Program	A voluntary program in the 65+ DNL areas to sound insulate homes, with formal certification of compliance with the program	Increase the tax base in the area and add value to the real estate properties	Assess funding requirements and other available sources per creation of this plan, through the possible use of DOD funds, state, county and local funding	NCTCOG, Tarrant County and/or City
	Ensure building code enforcement	Ensure contracted builders are following increased standards in noise contours	Prevent structures from being built within noise contours that do not meet higher sound attenuation standards	Review & educate as needed code compliance (specifically sound attenuation measures) with building inspectors; work with building industry & developer representatives on compliance methods & technologies	City & Building Associations
	Strengthen building codes of schools in noise contours	Improve sound attenuation of school structures based on applications by other cities	Provide additional sound attenuation for schools within AICUZ	Use STC guidelines for noise attenuation	City, State Representatives in Legislature, NCTCOG, Independent School Districts

Topic	Proposed Tools for Consideration	Definition	Purpose/Intent	Proposed Action Steps for consideration by local governments	Investigation and Possible Implementation Responsibility
Communications/Information	Improve communications through updated web sites	Provide JLUS information and any other relevant AICUZ or related land use/noise conflict information on City' websites. Update information on a regular basis	To ensure public education of regional agreements resulting from current and future JLUS efforts, as well as related AICUZ topics	Continue to update/expand websites of regional City	City (in cooperation with DOD)
	Request **FAA briefing (not a study)** on application of FAR Part 150 to uses in JLUS study area	FAA Part 150 may have noise impact mitigation and other measures applicable. Request FAA to provide briefing in potential applications	Provide clear disclosure of noise and safety impacts around military airfields to potential developers	Local government planning and public affairs departments to prepare and distribute information as appropriate	FAA and City
	Strengthen public education regarding safety and noise restrictions in Airport Noise Ordinances	Educate public on existing AICUZ policy which recognizes noise, safety, height, land use and other restrictions around military airfields	Ensure communication between stakeholders and encourage future land use decision-making consensus	Select subset of representatives from JLUS Work/Policy groups to continue working together on future issues	City
Planning and Public Policy	Seek DOD input on school siting boards/ decisions	Consult DOD on school siting decisions to review future school sitings	Allow DOD to review and provide input on future siting of schools	School Boards and DOD coordinate on acceptable guidelines to use as the "standard" in school site selection	Independent School District Boards, DOD
	Adoption of Airport Environs Ordinance that establishes an overlay district: Military Airport Zone	Serve as overlay districts, within which growth management policies and regulatory techniques shall guide land use activities and construction	To ensure the long-term viability of airports and military installation activities	City planning to create and distribute draft of MAZ/PAZ ordinance for consideration and approval by P & Z and City Councils	City, with assistance from Tarrant County, FAA and NCTCOG
	Revise Future Land Use Plan/Zoning Districts and Rezoning Process	Incorporate appropriate planning concepts with regard to minimizing inappropriate land uses with regard to the continuing mission of NAS JRB Fort Worth	Better control over development; imposes restrictions based on AICUZ footprint	Planning to amend comprehensive plan and zoning text to incorporate overlay district, and land use development within the AICUZ footprint for submittal to Planning Commission and City Council	City of Fort Worth
	Create a Noise Mitigation Plan	Developed through the leadership and efforts of all City in the Noise Zones and APZ/CZ zones	Guide development within the study area in a way compatible with NAS JRB's current and future missions through acquisition/demolition/relocation efforts	Assess funding requirements and other available resources for creation and implementation of the plan. This would include funding for acquisition, voluntary and through the use of eminent domain	All City, NCTCOG, FAA, Department of Defense and other funding sources.
Real Estate Measures	Early disclosure	Disclosure of structure's location within AICUZ noise zones and/or within APZs at the initial advertisement of property (e.g., Multiple Listing Service database). Ensure early disclosure is being followed and educate agents of proper language/timing	Provide honest disclosure of impacts to property within AICUZ which may impact buyer or renter decision	JLUS Regional Coordinating Committee shall assist the real estate community to meet applicable State Law related to disclosures	City, TX Real Estate Commission, Realtors Associations -
Acquisition	Pursue purchase of impacted properties in the CZ, APZ I and APZ II	Reduction of inappropriate land uses through voluntary acquisition of properties, funded by the state or federal government	To reduce the number of adversely affected properties in high noise areas & to protect NAS JRB Fort Worth from inappropriate land uses while protecting the health safety and welfare of all stakeholders	Pursue funding from government and private sources	City of Fort Worth, Tarrant County

Topic	Proposed Tools for Consideration	Definition	Purpose/Intent	Proposed Action Steps for Consideration by Local Governments	Implementation Responsibility
Acquisition (Continued)	Transfer of Development Rights	Used to manage location of future development. This action takes place voluntarily	Stimulate growth and appropriate development of property with development rights being transferred to reduce the potential of incompatible development	Identify property owners who may be interested in participating in program	City
	Land Banking	A system in which an entity, such as the local governing body, acquires a substantial amount of land available for future development. Land banking differs from permanent acquisition in that it places the land in a temporary holding status to be turned over for development at a future date	Anti-inflationary affect on land prices, thus preventing land speculation, and it will permit more rational patterns of development rather than urban sprawl	Identify properties for temporary governmental acquisition	City, Tarrant County
	Create an Avigation Easement Program	Provide guidance for new development within the AICUZ footprint	Increased protection from inappropriate land use conflicts with military readiness training	Planning and other divisions should collaborate to create this program for consideration and approval by the P & Z and City Council	City of Fort Worth and Tarrant County
Sound Attenuation	Implement noise attenuation requirements for certain non-residential structures	Conduct research to implement recently-enacted state legislation enabling communities' ability to require noise attenuation for certain non-residential noise-sensitive structures (churches, office buildings, hospitals, etc.)	Provide interior sound attenuation for non-residential noise-sensitive structures in high noise zones	Conduct research of other building codes; work with appropriate national and state agencies on revisions to Texas Uniform Statewide Building Code	City, NCTCOG
	Strengthen building codes	Modify existing Sound Transmission Class (STC) ratings for sound attenuation to higher levels; tier application of expanded codes according to noise zones	Provide additional sound attenuation for residences & other buildings within 65 DNL noise contours and higher	Discuss action with North Central Texas Council of Governments; Create certification program for private property owners for new construction and bringing existing uses into compliance – certification should be recorded at the County	City, State Representatives in Legislature, DOD, NCTCOG
	Sound Attenuation Program	A voluntary program in the 65+ DNL areas to sound insulate homes, with formal certification of compliance with the program	Increase the tax base in the area and add value to the real estate properties	Assess funding requirements and other available sources per creation of this plan, through the possible use of DOD funds, state, county and local funding	NCTCOG, Tarrant County and/or City
	Ensure building code enforcement	Ensure contracted builders are following increased standards in noise contours	Prevent structures from being built within noise contours that do not meet higher sound attenuation standards	Review & educate as needed code compliance (specifically sound attenuation measures) with building inspectors; work with building industry & developer representatives on compliance methods & technologies	City & Building Associations
	Strengthen building codes of schools in noise contours	Improve sound attenuation of school structures based on applications by other City	Provide additional sound attenuation for schools within AICUZ	Use STC guidelines for noise attenuation	City, State Representatives in Legislature, NCTCOG, Independent School Districts

Topic	Proposed Tools for Consideration	Definition	Purpose/Intent	Proposed Action Steps for Consideration by Local Governments	Investigation and Possible Implementation Responsibility
Infrastructure	Transportation Plan	Evaluate the area's transportation system, and ascertain what is needed to make the transportation system work over the course of the planning horizon established by NCTCOG	Provide transportation outlook after full implementation of BRAC 2005 and JLUS recommendations	Consultation with the NCTCOG	City, TXDOT and NCTCOG
	Storm Water Drainage Assessment (Low Impact Development (LID) Strategy)	Reduce the volume of runoff to the base and decentralize flows	To create a series of smaller detention areas that allow localized filtration rather than carrying runoff to a remote collection area, by retaining wider areas for drainage ways, and increasing the setbacks from natural drainage areas	Partnership with the Farmers Branch (Creek) watershed; creation of a LID plan through joint efforts of planning staffs, elected officials, developers & property owners	Cities of Fort Worth, White Settlement and Tarrant County, developers, and property owners

Topic	Proposed Tools for Consideration	Definition	Purpose/Intent	Proposed Action Steps for Consideration by Local Governments	Investigation and Possible Implementation Responsibility
Communications/Information	Improve communications through updated web sites	Provide JLUS information and any other relevant AICUZ or related land use/noise conflict information on City' websites. Update information on a regular basis	To ensure public education of regional agreements resulting from current and future JLUS efforts, as well as related AICUZ topics	Continue to update/expand websites of regional City	City (in cooperation with DOD)
	Request **FAA briefing (not a study)** on application of FAR Part 150 to uses in JLUS study area	FAA Part 150 may have noise impact mitigation and other measures applicable. Request FAA to provide briefing in potential applications	Provide clear disclosure of noise and safety impacts around military airfields to potential developers	City planning and public affairs departments to prepare and distribute information as appropriate	FAA and City
	Strengthen public education regarding safety and noise restrictions in Airport Noise Ordinances	Educate public on existing AICUZ policy which recognizes noise, safety, height, land use and other restrictions around military airfields	Ensure communication between stakeholders and encourage future land use decision-making consensus	Select subset of representatives from JLUS Policy Committee to continue working together on future issues	City
Planning and Public Policy	Seek DOD input on school siting boards/ decisions	Consult DOD on school siting decisions to review future school sitings	Allow DOD to review and provide input on future siting of schools	School Boards and DOD coordinate on acceptable guidelines to use as the "standard" in school site selection	Independent School District Boards, DOD
	Adoption of Airport Environs Ordinance that establishes an overlay district: Military Airport Zone	Serve as overlay districts, within which growth management policies and regulatory techniques shall guide land use activities and construction	To ensure the long-term viability of airports and military installation activities	City planning to create and distribute draft of MAZ/PAZ ordinance for consideration and approval by P & Z and City Councils	City, with assistance from Tarrant County, FAA and NCTCOG
	Revise Future Land Use Plan/Zoning Districts and Rezoning Process	Incorporate appropriate planning concepts with regard to minimizing inappropriate land uses with regard to the continuing mission of NAS JRB Fort Worth	Better control over development; imposes restrictions based on AICUZ footprint	Planning to amend comprehensive plan and zoning text to incorporate overlay district, and land use development within the AICUZ footprint for submittal to Planning Commission and City Council	City of Lake Worth
	Create a Noise Mitigation Plan	Developed through the leadership and efforts of all City in the Noise Zones and APZ/CZ zones	Guide development within the study area in a way compatible with NAS JRB's current and future missions through acquisition/demolition/relocation efforts	Assess funding requirements and other available resources for creation and implementation of the plan. This would include funding for acquisition, voluntary and through the use of eminent domain	All City, NCTCOG, FAA, Department of Defense and other funding sources.
Real Estate Measures	Early disclosure	Disclosure of structure's location within AICUZ noise zones and/or within APZs at the initial advertisement of property (e.g., Multiple Listing Service database). Ensure early disclosure is being followed and educate agents of proper language/timing	Provide honest disclosure of impacts to property within AICUZ which may impact buyer or renter decision	Work with TX Real Estate Commission and Real Estate representatives to develop and implement language for inclusion in disclosure notices	City, TX Real Estate Commission, Realtors Associations
Acquisition	Pursue purchase of impacted properties in the APZ I, and APZ II zones	Reduction of inappropriate land uses through voluntary acquisition of properties, funded by the state or federal government	To reduce the number of adversely affected properties in high noise areas & to protect NAS JRB Fort Worth from inappropriate land uses while protecting the health safety and welfare of all stakeholders	Pursue funding from government and private sources	City of Lake Worth, Tarrant County

Topic	Proposed Tools for Consideration	Definition	Purpose/Intent	Proposed Action Steps for Consideration by Local Governments	Investigation and Possible Implementation Responsibility
Acquisition (Continued)	Transfer of Development Rights	Used to manage location of future development. This action takes place voluntarily	Stimulate growth and appropriate development of property with development rights being transferred to reduce the potential of incompatible development	Identify property owners who may be interested in participating in program	City
	Land Banking	A system in which an entity, such as the local governing body, acquires a substantial amount of land available for future development. Land banking differs from permanent acquisition in that it places the land in a temporary holding status to be turned over for development at a future date	Anti-inflationary affect on land prices, thus preventing land speculation, and it will permit more rational patterns of development rather than urban sprawl	Identify properties for temporary governmental acquisition	City, Tarrant County
	Create an Avigation Easement Program	Provide guidance for new development within the AICUZ footprint	Increased protection from inappropriate land use conflicts with military readiness training	Planning and other divisions should collaborate to create this program for consideration and approval by the P & Z and City Council	City of Lake Worth and Tarrant County
Sound Attenuation	Implement noise attenuation requirements for certain non-residential structures	Conduct research to implement recently-enacted state legislation enabling communities' ability to require noise attenuation for certain non-residential noise-sensitive structures (churches, office buildings, hospitals, etc.)	Provide interior sound attenuation for non-residential noise-sensitive structures in high noise zones	Conduct research of other building codes; work with appropriate national and state agencies on revisions to Texas Uniform Statewide Building Code	City, NCTCOG
	Strengthen building codes	Modify existing Sound Transmission Class (STC) ratings for sound attenuation to higher levels; tier application of expanded codes according to noise zones	Provide additional sound attenuation for residences & other buildings within 65 DNL noise contours and higher	Discuss action with North Central Texas Council of Governments; Create certification program for private property owners for new construction and bringing existing uses into compliance – certification should be recorded at the County	City, State Representatives in Legislature, DOD, NCTCOG
	Sound Attenuation Program	A voluntary program in the 65+ DNL areas to sound insulate homes, with formal certification of compliance with the program	Increase the tax base in the area and add value to the real estate properties	Assess funding requirements and other available sources per creation of this plan, through the possible use of DOD funds, state, county and local funding	NCTCOG, Tarrant County and/or City
	Ensure building code enforcement	Ensure contracted builders are following increased standards in noise contours	Prevent structures from being built within noise contours that do not meet higher sound attenuation standards	Review & educate as needed code compliance (specifically sound attenuation measures) with building inspectors; work with building industry & developer representatives on compliance methods & technologies	City & Building Associations

Topic	Proposed Tools for Consideration	Definition	Purpose/Intent	Proposed Action Steps for Consideration by Local Governments	Investigation and Possible Implementation Responsibility
	Strengthen building codes of schools in noise contours	Improve sound attenuation of school structures based on applications by other City	Provide additional sound attenuation for schools within AICUZ	Use STC guidelines for noise attenuation	City, State Representatives Legislature, NCTCOG, Independent School Districts

Exhibit 6: City of River Oaks Recommendations

Topic	Proposed Tools for Consideration	Definition	Purpose/Intent	Proposed Action Steps for Consideration by Local Governments	Investigation and Possible Implementation Responsibility
Communications/Information	Improve communications through updated web sites	Provide JLUS information and any other relevant AICUZ or related land use/noise conflict information on City' websites. Update information on a regular basis	To ensure public education of regional agreements resulting from current and future JLUS efforts, as well as related AICUZ topics	Continue to update/expand websites of regional City	City (in cooperation with DOD)
	Request **FAA briefing (not a study)** on application of FAR Part 150 to uses in JLUS study area	FAA Part 150 may have noise impact mitigation and other measures applicable. Request FAA to provide briefing in potential applications	Provide clear disclosure of noise and safety impacts around military airfields to potential developers	City planning and public affairs departments to prepare and distribute information as appropriate	FAA and City
Planning and Public Policy	Seek DOD input on school siting boards/decisions	Consult DOD on school siting decisions to review future school sitings	Allow DOD to review and provide input on future siting of schools	School Boards and DOD coordinate on acceptable guidelines to use as the "standard" in school site selection	Independent School District Boards, DOD
	Revise Future Land Use Plan/Zoning Districts and Rezoning Process	Incorporate appropriate planning concepts with regard to minimizing inappropriate land uses with regard to the continuing mission of NAS JRB Fort Worth	To provide better control over development; imposes restrictions based on AICUZ footprint	Planning to amend comprehensive plan and zoning text to incorporate overlay district, and land use development within the AICUZ footprint for submittal to Planning Commission and City Council	City of River Oaks
Real Estate Measures	Early disclosure	Disclosure of structure's location within AICUZ noise zones at the initial advertisement of property (e.g., Multiple Listing Service database). Ensure early disclosure is being followed and educate agents of proper language/timing	Provide honest disclosure of impacts to property within AICUZ which may impact buyer or renter decision	Work with TX Real Estate Commission and Real Estate representatives to develop and implement language for inclusion in disclosure notices	City, TX Real Estate Commission, Realtors Associations
Sound Attenuation	Implement noise attenuation requirements for certain non-residential structures	Conduct research to implement recently-enacted state legislation enabling communities' ability to require noise attenuation for certain non-residential noise-sensitive structures (churches, office buildings, hospitals, etc.)	Provide interior sound attenuation for non-residential, noise-sensitive structures in high noise zones	Conduct research of other building codes; work with appropriate national and state agencies on revisions to Texas Uniform Statewide Building Code	City, NCTCOG
	Strengthen building codes	Modify existing Sound Transmission Class (STC) ratings for sound attenuation to higher levels; tier application of expanded codes according to noise zones	Provide additional sound attenuation for residences & other buildings within 65 DNL noise contours and higher	Discuss action with North Central Texas Council of Governments; Create certification program for private property owners for new construction and bringing existing uses into compliance – certification should be recorded at the County	City, State Representatives in Legislature, DOD, NCTCOG
	Sound Attenuation Program	A voluntary program in the 65+ DNL areas to sound insulate homes, with formal certification of compliance with the program	Increase the tax base in the area and add value to the real estate properties	Assess funding requirements and other available sources per creation of this plan, through the possible use of DOD funds, state, county and local funding	NCTCOG, Tarrant County and/or City

Topic	Proposed Tools for Consideration	Definition	Purpose/Intent	Proposed Action Steps for Consideration by Local Governments	Investigation and Possible Implementation Responsibility
Communications/Information	Improve communications through updated web sites	Provide JLUS information and any other relevant AICUZ or related land use/noise conflict information on City' websites. Update information on a regular basis	To ensure public education of regional agreements resulting from current and future JLUS efforts, as well as related AICUZ topics	Continue to update/expand websites of regional City	City (in cooperation with DOD)
	Request **FAA briefing (not a study)** on application of FAR Part 150 to uses in JLUS study area	FAA Part 150 may have noise impact mitigation and other measures applicable. Request FAA to provide briefing in potential applications	Provide clear disclosure of noise and safety impacts around military airfields to potential developers	City planning and public affairs departments to prepare and distribute information as appropriate	FAA and City
	Strengthen public education regarding safety and noise restrictions in Airport Noise Ordinances	Educate public on existing AICUZ policy which recognizes noise, safety, height, land use and other restrictions around military airfields	Ensure communication between stakeholders and encourage future land use decision-making consensus	Select subset of representatives from JLUS Policy Committee to continue working together on future issues	City
Planning and Public Policy	Seek DOD input on school siting boards/ decisions	Consult DOD on school siting decisions to review future school sitings	Allow DOD to review and provide input on future siting of schools	School Boards and DOD coordinate on acceptable guidelines to use as the "standard" in school site selection	Independent School District Boards, DOD
	Adoption of Airport Environs Ordinance that establishes an overlay district: Military Airport Zone	Serve as overlay districts, within which growth management policies and regulatory techniques shall guide land use activities and construction	To ensure the long-term viability of airports and military installation activities	City planning to create and distribute draft of MAZ/PAZ ordinance for consideration and approval by P & Z and City Councils	City, with assistance from Tarrant County, FAA and NCTCOG
	Revise Future Land Use Plan/Zoning Districts and Rezoning Process	Incorporate appropriate planning concepts with regard to minimizing inappropriate land uses with regard to the continuing mission of NAS JRB Fort Worth	Better control over development; imposes restrictions based on AICUZ footprint	Planning to amend comprehensive plan and zoning text to incorporate overlay district, and land use development within the AICUZ footprint for submittal to Planning Commission and City Council	City of Westworth Village
	Create a Noise Mitigation Plan	Developed through the leadership and efforts of all City in the Noise Zones and APZ/CZ zones	Guide development within the study area in a way compatible with NAS JRB's current and future missions through acquisition/demolition/relocation efforts	Assess funding requirements and other available resources for creation and implementation of the plan. This would include funding for acquisition, voluntary and through the use of eminent domain	All City, NCTCOG, FAA, Department of Defense and other funding sources.
Real Estate Measures	Early disclosure	Disclosure of structure's location within AICUZ noise zones and/or within APZs at the initial advertisement of property (e.g., Multiple Listing Service database). Ensure early disclosure is being followed and educate agents of proper language/timing	Provide honest disclosure of impacts to property within AICUZ which may impact buyer or renter decision	Work with TX Real Estate Commission and Real Estate representatives to develop and implement language for inclusion in disclosure notices	City, TX Real Estate Commission, Realtors Associations -
Acquisition	Create an Avigation Easement Program	Provide guidance for new development within the AICUZ footprint	Increase protection from inappropriate land use conflicts with military readiness training	Planning and other divisions should collaborate to create this program for consideration and approval by the P & Z and City Council	City of Westworth Village and Tarrant County

Topic	Proposed Tools for Consideration	Definition	Purpose/Intent	Proposed Action Steps for Consideration by Local Governments	Investigation and Possible Implementation Responsibility
Acquisition (Continued)	Transfer of Development Rights	Used to manage location of future development. This action takes place voluntarily	Stimulate growth and appropriate development of property with development rights being transferred to reduce the potential of incompatible development	Identify property owners who may be interested in participating in program	City
	Pursue purchase of impacted properties in the 80 DNL or higher	Reduction of inappropriate land uses through voluntary acquisition of properties, funded by the state or federal government	To reduce the number of adversely affected properties in high noise areas	Pursue funding from government and private sources	City of Westworth Village, Tarrant County, Department of Defense,
	Land Banking	A system in which an entity, such as the local governing body, acquires a substantial amount of land available for future development. Land banking differs from permanent acquisition in that it places the land in a temporary holding status to be turned over for development at a future date.	Anti-inflationary affect on land prices, thus preventing land speculation, and it will permit more rational patterns of development rather than urban sprawl	Identify properties for temporary governmental acquisition	City, Tarrant County
Sound Attenuation	Implement noise attenuation requirements for certain non-residential structures	Conduct research to implement recently-enacted state legislation enabling communities' ability to require noise attenuation for certain non-residential noise-sensitive structures (churches, office buildings, hospitals, etc.)	Provide interior sound attenuation for non-residential noise-sensitive structures in high noise zones	Conduct research of other building codes; work with appropriate national and state agencies on revisions to Texas Uniform Statewide Building Code	City, NCTCOG
	Strengthen building codes	Modify existing Sound Transmission Class (STC) ratings for sound attenuation to higher levels; tier application of expanded codes according to noise zones	Provide additional sound attenuation for residences & other buildings within 65 DNL noise contours and higher	Discuss action with North Central Texas Council of Governments; Create certification program for private property owners for new construction and bringing existing uses into compliance – certification should be recorded at the County	City, State Representatives in Legislature, DOD, NCTCOG
	Sound Attenuation Program	A voluntary program in the 65+ DNL areas to sound insulate homes, with formal certification of compliance with the program	Increase the tax base in the area and add value to the real estate properties	Assess funding requirements and other available sources per creation of this plan, through the possible use of DOD funds, state, county and local funding	NCTCOG, Tarrant County and/or City
	Ensure building code enforcement	Ensure contracted builders are following increased standards in noise contours	Prevent structures from being built within noise contours that do not meet higher sound attenuation standards	Review & educate as needed code compliance (specifically sound attenuation measures) with building inspectors; work with building industry & developer representatives on compliance methods & technologies	City & Building Associations

Exhibit 7: City of Westworth Village Recommendations

Topic	Proposed Tools for Consideration	Definition	Purpose/Intent	Proposed Action Steps for Consideration by Local Governments	Investigation and Possible Implementation Responsibility
	Strengthen building codes of schools in noise contours	Improve sound attenuation of school structures based on applications by other City	Provide additional sound attenuation for schools within AICUZ	Use STC guidelines for noise attenuation	City, State Representatives Legislature, NCTCOG, Independent School Districts
Memorandum of Understanding	Establish a mutually beneficial process that will ensure timely and consistent notification and cooperation between all parties on projects, policies, and activities	Promote sustainability and protect military readiness training	To limit development on vacant land and to encourage conservation	Negotiate MOU or easement with Lockheed Martin and with Tarrant County	City of Westworth Village, Tarrant County, & Lockheed Martin, NAS JRB

Topic	Proposed Tools for Consideration	Definition	Purpose/Intent	Proposed Action Steps for Consideration by Local Governments	Investigation and Possible Implementation Responsibility
Communications/Information	Improve communications through updated web sites	Provide JLUS information and any other relevant AICUZ or related land use/noise conflict information on City' websites. Update information on a regular basis	To ensure public education of regional agreements resulting from current and future JLUS efforts, as well as related AICUZ topics	Continue to update/expand websites of regional City	City (in cooperation with DOD)
	Request **FAA briefing (not a study)** on application of FAR Part 150 to uses in JLUS study area	FAA Part 150 may have noise impact mitigation and other measures applicable. Request FAA to provide briefing in potential applications	Provide clear disclosure of noise and safety impacts around military airfields to potential developers	City planning and public affairs departments to prepare and distribute information as appropriate	FAA and City
	Strengthen public education regarding safety and noise restrictions in Airport Noise Ordinances	Educate public on existing AICUZ policy which recognizes noise, safety, height, land use and other restrictions around military airfields	Ensure communication between stakeholders and encourage future land use decision-making consensus	Select subset of representatives from JLUS Policy Committee to continue working together on future issues	City
Planning and Public Policy	Seek DOD input on school siting boards/ decisions	Consult DOD on school siting decisions to review future school sitings	Allow DOD to review and provide input on future siting of schools	School Boards and DOD coordinate on acceptable guidelines to use as the "standard" in school site selection	Independent School District Boards, DOD
	Adoption of Airport Environs Ordinance that establishes an overlay district: Military Airport Zone	Serve as overlay districts, within which growth management policies and regulatory techniques shall guide land use activities and construction	To ensure the long-term viability of airports and military installation activities	City planning to create and distribute draft of MAZ/PAZ ordinance for consideration and approval by P & Z and City Councils	City, with assistance from Tarrant County, FAA and NCTCOG
	Revise Future Land Use Plan/Zoning Districts and Rezoning Process	Incorporate appropriate planning concepts with regard to minimizing inappropriate land uses with regard to the continuing mission of NAS JRB Fort Worth	Better control over development; imposes restrictions based on AICUZ footprint	Planning to amend comprehensive plan and zoning text to incorporate overlay district, and land use development within the AICUZ footprint for submittal to Planning Commission and City Council	City of White Settlement
	Create a Noise Mitigation Plan	Developed through the leadership and efforts of all City in the Noise Zones and APZ/CZ zones	Guide development within the study area in a way compatible with NAS JRB's current and future missions through acquisition/demolition/relocation efforts	Assess funding requirements and other available resources for creation and implementation of the plan. This would include funding for acquisition, voluntary and through the use of eminent domain	All City, NCTCOG, FAA, Department of Defense and other funding sources.
Real Estate Measures	Early disclosure	Disclosure of structure's location within AICUZ noise zones and/or within APZs at the initial advertisement of property (e.g., Multiple Listing Service database). Ensure early disclosure is being followed and educate agents of proper language/timing	Provide honest disclosure of impacts to property within AICUZ which may impact buyer or renter decision	Work with TX Real Estate Commission and Real Estate representatives to develop and implement language for inclusion in disclosure notices	City, TX Real Estate Commission, Realtors Associations -
Acquisition	Create an Avigation Easement Program	Provide guidance for new development within the AICUZ footprint	Increased protection from inappropriate land use conflicts with military readiness training	Planning and other divisions should collaborate to create this program for consideration and approval by the P & Z and City Council	City of White Settlement and Tarrant County

Topic	Proposed Tools for Consideration	Definition	Purpose/Intent	Proposed Action Steps for Consideration by Local Governments	Investigation and Possible Implementation Responsibility
Acquisition (Continued)	Transfer of Development Rights	Used to manage location of future development. This action takes place voluntarily	Stimulate growth and appropriate development of property with development rights being transferred to reduce the potential of incompatible development	Identify property owners who may be interested in participating in program	City
	Land Banking	A system in which an entity, such as the local governing body, acquires a substantial amount of land available for future development. Land banking differs from permanent acquisition in that it places the land in a temporary holding status to be turned over for development at a future date	Anti-inflationary affect on land prices, thus preventing land speculation, and it will permit more rational patterns of development rather than urban sprawl	Identify properties for temporary governmental acquisition	City, Tarrant County
Sound Attenuation	Implement noise attenuation requirements for certain non-residential structures	Conduct research to implement recently-enacted state legislation enabling communities' ability to require noise attenuation for certain non-residential noise-sensitive structures (churches, office buildings, hospitals, etc.)	Provide interior sound attenuation for non-residential noise-sensitive structures in high noise zones	Conduct research of other building codes; work with appropriate national and state agencies on revisions to Texas Uniform Statewide Building Code	City, NCTCOG
	Strengthen building codes	Modify existing Sound Transmission Class (STC) ratings for sound attenuation to higher levels; tier application of expanded codes according to noise zones	Provide additional sound attenuation for residences & other buildings within 65 DNL noise contours and higher	Discuss action with North Central Texas Council of Governments; Create certification program for private property owners for new construction and bringing existing uses into compliance – certification should be recorded at the County	City, State Representatives in Legislature, DOD, NCTCOG
	Sound Attenuation Program	A voluntary program in the 65+ DNL areas to sound insulate homes, with formal certification of compliance with the program	Increase the tax base in the area and add value to the real estate properties	Assess funding requirements and other available sources per creation of this plan, through the possible use of DOD funds, state, county and local funding	NCTCOG, Tarrant County and/or City
	Ensure building code enforcement	Ensure contracted builders are following increased standards in noise contours	Prevent structures from being built within noise contours that do not meet higher sound attenuation standards	Review & educate as needed code compliance (specifically sound attenuation measures) with building inspectors; work with building industry & developer representatives on compliance methods & technologies	City & Building Associations
	Strengthen building codes of schools in noise contours	Improve sound attenuation of school structures based on applications by other City	Provide additional sound attenuation for schools within AICUZ	Use STC guidelines for noise attenuation	City, State Representatives Legislature, NCTCOG, Independent School Districts

Topic	Proposed Tools for Consideration	Definition	Purpose/Intent	Proposed Action Steps for Consideration by Local Governments	Investigation and Possible Implementation Responsibility
Memorandum of Understanding	Establish a mutually beneficial process that will ensure timely and consistent notification and cooperation between all parties on projects, policies, and activities	Promote sustainability and protect military readiness training	To limit development on vacant land and to encourage conservation and to preserve open space	Negotiate MOU or easement with Lockheed Martin and with Tarrant County	City of White Settlement, Tarrant County, & Lockheed Martin, NAS JRB
Infrastructure	Storm Water Drainage Assessment (Low Impact Development (LID) Strategy)	Reduce the volume of runoff to the base and decentralize flows	To create a series of smaller detention areas that allow localized filtration rather than carrying runoff to a remote collection area, by retaining wider areas for drainage ways, and increasing the setbacks from natural drainage areas	Partnership with the Farmer's Branch (Creek) watershed; creation of a LID plan through joint efforts of planning staffs, elected officials, developers & property owners	Cities of White Settlement and Fort Worth, Tarrant County, developers, and property owners

SECTION III

OPTIONS FOR COMPATIBLE LAND USE DEVELOPMENT

NAS JRB Fort Worth (Carswell Field)
(*Department of Defense*)

Options for Compatible Land Use Development

Recognizing that the introduction of any change in permitted uses around an air field is not a simple matter, issues such as pre-existing rights, non-conforming uses, claims for compensation, etc. should be addressed. However, these are issues that are commonly addressed when there are any proposed changes to land use planning guidelines. Ultimately, a decision, which balances competing needs and wants, has to be made by the relevant planning authorities.

“Active” aircraft noise management strategies are those directed at reducing the community noise level through imposing controls on the source of the noise (i.e. the aircraft). These approaches include controlling:

- How much noise is emitted by each aircraft through aircraft noise certification.
- Where the noise is emitted through imposing noise abatement flight paths and/or flight path corridors
- When the noise is emitted through using tools such as curfews
- Total amount of noise which is emitted through air field movement caps and other restrictions

“Passive” approaches, on the other hand, are those directed at reducing the community aircraft noise level and/or reaction by protecting the receiver from the noise. In broad terms these approaches can be broken down into restrictive measures (i.e. those which stop people from doing certain things) and approaches directed at “assistance”.

- Restrictive measures - imposing land use planning controls to keep people away from noise

Examples of assistance measures supporting strategies and actions in place are:

- “Real” aircraft noise disclosure strategies
- Assisting people to leave noise affected areas through property acquisition and relocation assistance programs
- Protecting people who are exposed to high levels of aircraft noise through acoustic insulation of residences
- Assisting future noise tolerant activities to locate near an airfield

The first two of the assistance measures are basically aimed at selectively finding a noise tolerant population that has no objection to living near flight paths.

Under the current approaches, noise sensitive land uses (i.e. a school) can be built under a busy flight path, without any acknowledgment of the presence of aircraft noise,

even if it is only just outside the 60 dB DNL. This can result in alternative sites, away from flight paths, not being examined. Strong arguments can be made that, at the very least, land use planning decisions should take into account both noise contours and the location of flight paths.

Similarly, according to data obtained from NCTCOG, there is housing directly under busy flight paths of NAS JRB, particularly in Lake Worth and White Settlement. A noise sensitive person would be greatly assisted, and be less likely to be placed in an undesirable situation, if they were advised of the location of the flight paths and had information on the activity levels on the flight paths before they make a decision about buying or renting a house. Similar arguments apply to proposals to construct new dwellings in the vicinity of flight paths.

The concept of air fields developing some form of flight path corridors or zones over unoccupied land, which is protected from noise sensitive development, should be strongly considered. This idea could be taken further by adopting an approach based on integrating land use planning with operational controls. An example is establishing agreed flight path corridors and then adopting regulations stating that noise sensitive land uses will not be built on the land under those corridors.

Developing even portions of these approaches under the auspices of a dedicated master development plan would allow a community to consider what future it envisions and would provide a mechanism for all interested parties to actively take part in the land development vision for the future. This JLUS is merely the first step in formally acknowledging and revealing to the public the seriousness of the noise/encroachment situation present around NAS JRB.

General Regional Land Use Tools

The overlay of noise contour mapping with comprehensive plan mapping, the factoring of airports as essential public facilities and the location of incompatible uses and high densities away from noise affected areas are paramount to the protection of the health, safety and welfare of all involved. The following general communication and coordination tools are appropriate for any local government participating in the JLUS.

- **Communication**: Under this communication option, participating local governments should develop appropriate mechanisms to ensure that residents, developers, businesses, and local decision-makers have adequate information about airfield operations, possible impacts on lands surrounding NAS JRB, procedures to submit comments, and any additional local measures to promote land use compatibility around the installation. Governments should use all

available media, including newsletters, brochures, and city and county websites to convey the information.

- **Coordinating Committee**: To continue the momentum created by the JLUS Policy Committee, the local governments, in collaboration with the Navy, should establish a single Regional Coordinating Committee, consisting at least, in part, select members of the Policy Committee. The Regional Coordinating Committee should serve as a forum for a collaborative exchange of information and the review of major land use proposals both within the military and civilian communities.

- **Comprehensive Plan**: Under this option, local governments should include specific language on JLUS coordination as part of any Comprehensive Plan update. The Comprehensive Plan establishes a firm legal basis for the implementation of compatibility actions such as zoning. The plan should emphasize the relationship between the community and the military, the desire to promote cooperative land use planning and complementary land use goals, such as agricultural conservation and environmental protection, and clear guidelines about appropriate future land use in areas vulnerable to encroachment.

- **Memorandum of Understanding (MOU)**: The MOU is a "good faith" document that lays out procedures for communication among affected parties and formalizes collaboration among multiple stakeholders (See Appendix K). All participating local governments should sign a general MOU with NAS JRB to be executed at the beginning stages of the implementation process. Examples of issues that should be addressed in the general MOU include, but are not limited to, the following:

    - **Employment**: Provides information and programs to facilitate the evaluation of employment for spouses of officers and enlisted members
    - **Emergency management/disaster preparedness**: Provides for mutual aid in the case of emergencies and disasters and participation in joint exercises to ensure successful coordination
    - **Mutual aid agreement**: Supplements the emergency management MOU by specifying the type and level of assistance to be provided by each participating entity in the event of a disaster (natural or man-made) that exceeds the capabilities of either entity
    - **Redevelopment**: Creates a work group to review legal, fiscal, zoning, and economic requirements and limitations applicable to the private financing and construction of new single- and multi-family housing for military families

- **Conservation**: Existing vacant lands should be preserved as vacant in the APZ or CZ zones.

- **Military Airport Zone:** Consistent development standards should be created within the ordinances, resolutions, plans and related maps of Benbrook, Fort Worth, Lake Worth, River Oaks, Westworth Village, White Settlement, and Tarrant County.

- **AICUZ:** Existing comprehensive plans, zoning ordinances, building codes and other plans and regulatory documents should be modified to ensure that future development and redevelopment is compatible with the land uses in the Air Installation Compatible Use Zone Report (AICUZ) for the NAS JRB and that appropriate height and density standards are adopted.

- **Consistency**: Modifications among the local governments to zoning and codes should be coordinated to ensure that there is a consistent approach and to prevent future land use/zoning "jurisdiction shopping" by developers and builders.

- **Provision for Legal Nonconformities**: By ensuring that existing land uses and structures can continue as "legal nonconforming uses," present owners are protected. At the same time, conversion of uses and structures to do a compatible and uniform approach should be adopted by all local governments. Consistent regulations in the "nonconforming" sections of ordinances should cover issues including but not limited to: damage to structures, change of ownership, abandonment, repairs and renovations

- **Retrofitting**: Existing property owners should be encouraged to make their structures compatible. For example, adding recommended windows and levels of insulation to single family homes is beneficial. To minimize hardship for lower income residents, tax credit and other direct and/or indirect assistance, measures should be included as part of JLUS implementation.

- **Establish Area Standing Advisory Committees**: Committees should be created made up of area residents to ensure that their concerns and suggestions are incorporated in ongoing JLUS planning and implementation. Committee members should also act as liaisons within their neighborhoods and communities and facilitate two-way communications.

- **Noise Attenuation:** Incorporating additional noise attenuation measures into the existing uniform building code for new construction should be done by local governments. This should include not only exterior wall insulation and special fenestration, but additional roof/ceiling insulation. Builders and relevant skilled

trades are familiar with noise attenuation measures, how to incorporate them in a cost-effective manner, and how to market them as beneficial.

- **Disclosure**: All organizations and individuals in the pre-planning phase of development of subdivisions and other developments in the Military Airport Zone should be referred to city staff for consultation and advisement to ensure that AICUZ-compatible land uses are incorporated into subdivisions and other large-scale new developments and redevelopments as appropriate. This requirement should be referenced in the appropriate sections of zoning and development ordinances of all local governments and also be made part of the "check lists" for developers.

- **Standardization of AICUZ Disclosure Process**: Standard AICUZ disclosure references should be applied to all real estate transactions for both sale/purchase and rental/lease. Improvements should include but not be limited to:

    - The disclosure statement should include a map showing both the 65 dB DNL boundaries and the location of the subject property. The purchaser or lessee should sign a statement that he/she/they understand not only that the specific property/home is in the AICUZ footprint but exactly where it is located within the zones.
    - The Multiple Listing Service (MLS) listing form should use an easily-recognizable icon to identify properties within AICUZ boundaries.
    - Real Estate Association websites should have a link to the JLUS website for easy access to more detailed information.
    - Notice should be required prior to the signing or the acceptance of a contract for either sale or rent/lease of real property.
    - The disclosure process should be referenced in the appropriate sections of the zoning and development ordinances.
    - Disclosure statements should be filed with the title documents for land within the 65 or greater noise contour. The property owner or the local government should be responsible for the filing.

- **Monitor Changes:** Growth and land use changes in Tarrant County and at NAS JRB should be monitored to determine whether those changes significantly impact AICUZ boundaries and JLUS policies and practices. Plans should be modified accordingly.

- **Interactive Websites:** Existing community relations and education programs should be enhanced to ensure that citizens of affected areas are kept informed through direct contact about the changes that may result from the implementation of the JLUS Plan.

Navy Land Use Tools

These tools are intended to minimize the noise, safety, and other impacts experienced by communities around NAS JRB, while protecting the viability of the military mission.

- **Communications**: This tool urges the Navy to improve communication with its neighbors through methods such as publishing planned training schedules (subject to changes day-to-day) and operational guidelines for night training on the base web site; establishing a liaison to address noise and other issues in the community; and creating a brochure on base mission and activities, operational impacts and mapped noise contours, and other compatibility issues. (See Section I for additional recommendations.)

- **Noise Mitigation**: Noise mitigation refers either to an operational change or a structural practice for reducing the noise produced by military activity. For example, muffling the noise at the source or interfering with the path that the noise travels as it goes off post (e.g. an intact forested buffer) mitigates sound. According to the 2004 Wyle Labs Noise Study prepared for NAS JRB, there are engineering limitations to the amount of reduction, particularly for low frequency sound, that can be achieved at the source of the noise or along the path that noise travels.

- **MOU**: The Navy should also sign a general MOU that documents future efforts for collaboration between local communities and the military. A specific provision of the MOU may include monitoring noise and conducting noise surveys in areas (off the installation) where incompatible development seems likely, i.e. APZ II areas.

- **Conservation**: With this strategy, the Navy should pursue conservation initiatives, such as a Compatible Use Buffer. The Navy has the authority to partner with local governments and conservation organizations to assist in acquiring land or the development rights of land near military installations from a **willing** seller when the acquisition can protect both the environment and the military mission.

Local Government Land Use Tools

All recommendations contained within this JLUS are predominately based on noise contours rather than flight paths, flight zones or buffers. Implementation should follow based on these parameters as well. However, all entities participating in the JLUS retain the prerogative of adopting those tools from among the following tools, or any additional tools, that are deemed to be the most effective for balancing land use compatibility goals with community and military interests:

- **General Land Use Guidelines**: Land use compatibility guidelines encourage or require activities (industry, retail, recreation, agriculture, very low density/rural residential) that maintain compatibility with installation operations. Compatible activities generally avoid the concentration of people and show lower sensitivity to noise/vibration, smoke and other possible operational impacts. Local governments should implement such guidelines through Comprehensive Plan policy and zoning.

- **Air Safety Land Use Guidelines**: Compatibility guidelines focused specifically on land uses near airfields should be utilized. The guidelines encourage or require land uses that maintain compatibility with safe airspace operations, including limiting concentrations of people, properly siting and marking tall structures to protect airspace zones, and meeting the approval of the FAA and DOD.

- **Coordination**: Under this approach, local governments should promote collaboration by sharing information on specific community development proposals (rezonings and subdivisions). The Navy should also share information about on-base activity within a 2,500-foot buffer inside the installation boundary. In instances where on-base activities may increase off-base noise levels or expand noise zones farther off the installation would be appropriate information.

- **Attenuation**: Attenuation refers to special design and construction practices intended to lower the amount of noise and vibration that penetrates the windows, doors, walls, and roof of a building. Local governments should require attenuation as part of building code enforcement for new residential and other noise sensitive construction in certain noise affected areas.

- **Disclosure**: The NAS JRB Regional Coordination Committee shall assist the real estate community to meet applicable State law related to disclosures**.**

- **Infrastructure**: As part of this strategy, local governments should consider the impacts of both public and private infrastructure installation/extension (e.g. water and sewer facilities) into noise and safety affected areas around NAS JRB. New infrastructure can induce or support incompatible growth patterns, such as denser residential development, especially if compatible zoning and land use guidelines are not in place.

- **Clustering or Transfer of Development Rights**: Clustering can be an effective tool in promoting land use compatibility around a military installation, particularly on larger parcels that straddle a noise or safety boundary. Under clustering (also known as conservation design), developers can separate the buildable areas of the parcel from areas that have a development constraint, such as noise or safety exposure. The district then allows more compact lots in the developable portion of the site in exchange for the permanent protection of land in the constrained area. This essentially becomes a density-neutral transfer of development rights onto another portion of the same parcel outside of areas adjacent to the base, targeted conservation areas or designated noise or air safety zones.

  Local governments could also pursue a pure transfer of development rights (TDR) program, which shifts growth from a designated “sending area” with development constraints (noise or air safety zones, areas adjacent to the base, conservation buffers) to a designated “receiving area” that does not have site limitations. This transaction takes place voluntarily in the free market. The owner of the constrained land sells the development credits established under zoning to a buyer who then can develop additional density on another property based on the number of credits purchased.

  Also as part of this strategy, local governments could require developers to use low impact site design principles, including the creation of green space/conservation buffers that can support noise and safety impact mitigation.

- **Conservation**: Conservation refers to a series of tools designed to eliminate incompatible land use through voluntary transactions in the real estate market and local development process. These strategies are particularly effective because they advance the complementary goals of shifting future growth away from the installation, while protecting the environment, maintaining agriculture, and conserving open spaces.

  As part of this strategy, local governments in the region should explore partnerships with the Navy, the State of Texas, and non-profit conservation entities, such as the Trust for Public Land and The Nature Conservancy, to secure conservation easements or to purchase development rights from **willing** sellers of land in proximity to NAS JRB.

  The initiative seeks to protect lands primarily through a conservation easement in which a landowner exchanges some or all of the development potential of a tract for tax or other incentives. Other tools for conservation could include transfer of development rights and purchase of development rights, which compensates the owner for the assessed market value of development potential lost when the land remains permanently undeveloped.

SECTION IV

ANALYSIS OF CURRENT LAND DEVELOPMENT SURROUNDING NAS JRB

Lake Worth: a community resource.
(*Texas Parks and Wildlife Department*)

Analysis of Current Land Development Surrounding NAS JRB

The following analysis assesses the compatibility of existing non-military land uses around NAS JRB. When compatible, land uses can exist next to each other without causing interference or exposing people to risk or nuisance. In the JLUS context, the following land uses are generally deemed inconsistent when near military aircraft operations as delineated in DOD Instruction 4165.57, Air Installation Compatible Use Zones:

- Uses that concentrate people in a compact area (ex. certain residential densities, schools, churches, hospitals)
- Vertical uses that encroach on airspace (communications towers)
- Uses that may draw birds/animals near airfields creating a strike hazard for aircraft (ex. retention ponds)
- Uses that may interfere with radio frequency
- Uses that emit excessive lighting and may impair a pilot's vision
- Uses that emit smoke, dust, and steam and may impair a pilot's vision

The accident potential concept describes the probable impact area if an accident were to occur, which is to be distinguished from the probability of an accident occurring. Probable impact area information is based upon historical accident data. This data is used to determine: (1) the size of the Clear Zone and Accident Potential Zones I and II, and (2) suggested land use guidelines for each zone. Application of this concept includes not only statistical but operational considerations as well.

Due to the characteristics of flight operations at Navy installations, the trapezoidal or "fan shaped" Clear Zone was used in land use calculations shown in Table 4.1. The CZ which is closest to the runway ends and which has the highest potential for accidents, is approximately 1,500' x 2,284'. Adjoining the CZs are two Accident Potential Zones, APZ I and APZ II, where the potential for accidents diminishes as the distance from the end of the runway increases (See Figure 4.1). The standard measurements for the APZ I, APZ II and the CZ Zones are as follows:

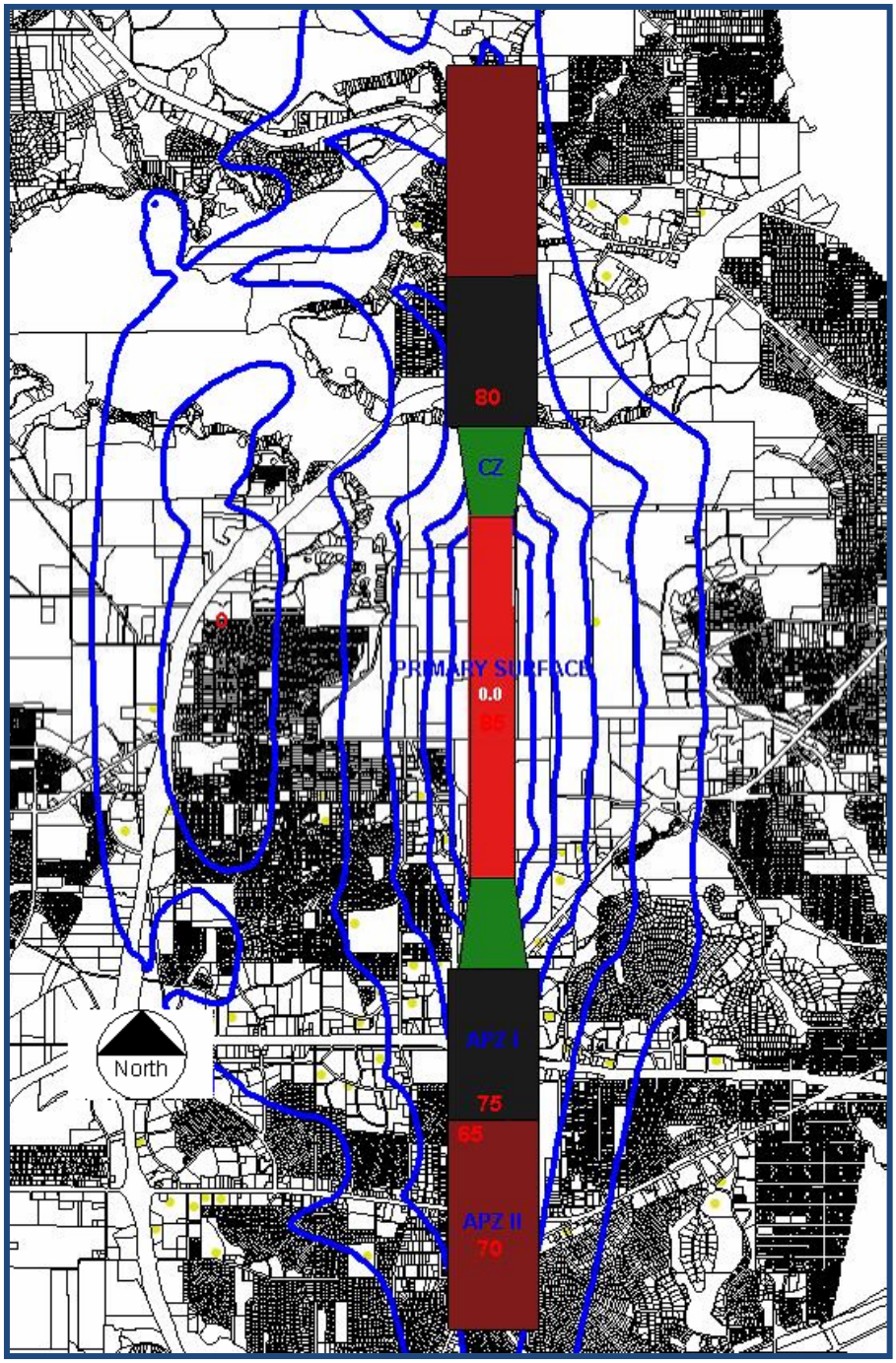
Table 4.1

Zone Acreage Comparison

Zone ID	Measurement	Total Acreage
APZ I	3000' x 5000'/43560=344*2	688
APZ II	3000' x 7000'/43560=482*2	964
CZ	1500' x 2284'/43560=78.5*2	157

Source: NCTCOG website.

Figure 4.1 Existing CZ, APZ I and APZ II with Noise Contour Overlays



Source: Michael R. Coker Company

Figure 4.1 illustrates the APZs, CZs and noise contours overlay for the JLUS study area. Approximately two-thirds of the base is occupied by the flight line and air operations facilities. Land use within the primary surface/ clear zone, APZ I, and Noise Zone III (See Table 4.1) is limited to the runways, weapons area, open space, operations/training areas and facilities. Because these uses are necessary for NAS JRB to function, they will be considered compatible for this study.

Throughout the land use analysis, as well as other sections of this report, reference is made to the Land Use Compatibility Guidelines (LUCG). These guidelines, which are the same as those used in the 2002 AICUZ study, are based on those published by the Federal Interagency Committee on Urban Noise in 1980. The LUCGs provide recommendations for which land uses are appropriate in various AICUZ locations based on the types of structures and estimated population densities, as shown in Table 4.2.

TABLE 4.2 - AIR INSTALLATIONS COMPATIBLE USE ZONES
SUGGESTED LAND USE COMPATIBILITY IN ACCIDENT POTENTIAL ZONES

Source: OPRNAV 11010.36B

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation	APZ-I Recommendation	APZ-II Recommendation	Density Recommendation
10	***Residential***				
11	Household Units				
11.11	Single units: detached	N	N	Y[2]	Maximum density of 1-2 Du/Ac
11.12	Single units: semidetached	N	N	N	
11.13	Single units: attached row	N	N	N	
11.21	Two units: side-by-side	N	N	N	
11.22	Two units: one above the other	N	N	N	
11.31	Apartments: walk-up	N	N	N	
11.32	Apartment: elevator	N	N	N	
12	Group quarters	N	N	N	
13	Residential Hotels	N	N	N	
14	Mobile home parks or courts	N	N	N	
15	Transient lodgings	N	N	N	
16	Other residential	N	N	N	
20	***Manufacturing*** [3]				
21	Food & kindred products; manufacturing	N	N	Y	Maximum FAR 0.56
22	Textile mill products; manufacturing	N	N	Y	Same as above
23	Apparel and other finished products; products made from fabrics, leather and similar materials; manufacturing	N	N	N	
24	Lumber and wood products (except furniture); manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
25	Furniture and fixtures; manufacturing	N	Y	Y	Same as above
26	Paper and allied products; manufacturing	N	Y	Y	Same as above
27	Printing, publishing, and allied industries	N	Y	Y	Same as above
28	Chemicals and allied products; manufacturing	N	N	N	
29	Petroleum refining and related industries	N	N	N	

TABLE 4.2 - AIR INSTALLATIONS COMPATIBLE USE ZONES
SUGGESTED LAND USE COMPATIBILITY IN ACCIDENT POTENTIAL ZONES
(Continued)

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation	APZ-I Recommendation	APZ II Recommendation	Density Recommendation
30	***Manufacturing*** [3] ***(continued)***				
31	Rubber and misc. plastic products; manufacturing	N	N	N	
32	Stone, clay and glass products; manufacturing	N	N	Y	Maximum FAR 0.56
33	Primary metal products; manufacturing	N	N	Y	Same as above
34	Fabricated metal products; manufacturing	N	N	Y	Same as above
35	Professional scientific, & controlling instrument; photographic and optical goods; watches & clocks	N	N	N	
39	Miscellaneous manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
40	***Transportation, communication and utilities*** [4].				See Note 3 below.
41	Railroad, rapid rail transit, and street railway transportation	N	Y[5]	Y	Same as above.
42	Motor vehicle transportation	N	Y[5]	Y	Same as above
43	Aircraft transportation	N	Y[5]	Y	Same as above
44	Marine craft transportation	N	Y[5]	Y	Same as above
45	Highway and street right-of-way	N	Y[5]	Y	Same as above
46	Auto parking	N	Y[5]	Y	Same as above
47	Communication	N	Y[5]	Y	Same as above
48	Utilities	N	Y[5]	Y	Same as above
485	Solid waste disposal (Landfills, incineration, etc.)	N	N	N	
49	Other transport, comm. and utilities	N	Y[5]	Y	See Note 3 below
50	***Trade***				
51	Wholesale trade	N	Y	Y	Maximum FAR of 0.28 in APZ I. & .56 in APZ II.
52	Retail trade - building materials, hardware and farm equipment	N	Y	Y	Maximum FAR of 0.14 in APZ I & 0.28 in APZ II

TABLE 4.2 - AIR INSTALLATIONS COMPATIBLE USE ZONES
SUGGESTED LAND USE COMPATIBILITY IN ACCIDENT POTENTIAL ZONES
(Continued)

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation	APZ-I Recommendation	APZ-II Recommendation	Density Recommendation
50	*Trade (Continued)*				
53	Retail trade - shopping centers	N	N	Y	Maximum FAR of 0.22.
54	Retail trade - food	N	N	Y	Maximum FAR of 0.24
55	Retail trade - automotive, marine craft, aircraft and accessories	N	Y	Y	Maximum FAR of 0.14 in APZ I & 0.28 in APZ II
56	Retail trade - apparel and accessories	N	N	Y	Maximum FAR 0.28
57	Retail trade - furniture, home, furnishings and equipment	N	N	Y	Same as above
58	Retail trade - eating and drinking establishments	N	N	N	
59	Other retail trade	N	N	Y	Maximum FAR of 0.22
60	*Services* [6]				
61	Finance, insurance and real estate services	N	N	Y	Maximum FAR of 0.22 for "General Office/Office park"
62	Personal services	N	N	Y	Office uses only. Maximum FAR of 0.22.
62.4	Cemeteries	N	Y[7]	Y[7]	
63	Business services (credit reporting; mail, stenographic, reproduction; advertising)	N	N	Y	Max. FAR of 0.22 in APZ II
63.7	Warehousing and storage services	N	Y	Y	Max. FAR 1.0 APZ I; 2.0 in APZ II
64	Repair Services	N	Y	Y	Max. FAR of 0.11 APZ I; 0.22 in APZ II
65	Professional services	N	N	Y	Max. FAR of 0.22
65.1	Hospitals, nursing homes	N	N	N	
65.1	Other medical facilities	N	N	N	
66	Contract construction services	N	Y	Y	Max. FAR of 0.11 APZ I; 0.22 in APZ II
67	Government Services	N	N	Y	Max FAR of 0.24
68	Educational services	N	N	N	
69	Miscellaneous	N	N	Y	Max. FAR of 0.22

TABLE 4.2 - AIR INSTALLATIONS COMPATIBLE USE ZONES
SUGGESTED LAND USE COMPATIBILITY IN ACCIDENT POTENTIAL ZONES
(Continued)

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation	APZ-I Recommendation	APZ-II Recommendation	Density Recommendation
70	*Cultural, entertainment and recreational*				
71	Cultural activities	N	N	N	
71.2	Nature exhibits	N	Y[8]	Y[8]	
72	Public assembly	N	N	N	
72.1	Auditoriums, concert halls	N	N	N	
72.11	Outdoor music shells, amphitheaters	N	N	N	
72.2	Outdoor sports arenas, spectator sports	N	N	N	
73	Amusements - fairgrounds, miniature golf, driving ranges; amusement parks, etc	N	N	Y	
74	Recreational activities (including golf courses, riding stables, water recreation)	N	Y[8]	Y[8]	Max. FAR of 0.11 APZ I; 0.22 in APZ II
75	Resorts and group camps	N	N	N	
76	Parks	N	Y[8]	Y[8]	Same as 74
79	Other cultural, entertainment and recreation	N	Y[8]	Y[8]	Same as 74
80	*Resource production and extraction*				
81	Agriculture (except live stock)	Y[4]	Y[9]	Y[9]	
81.5, 81.7	Livestock farming and breeding	N	Y[9,10]	Y[9,10]	
82	Agriculture related activities	N	Y[9]	Y[9]	Max FAR of 0.28 APZ I; 0.56 APZ II no activity which produces smoke, glare, or involves explosives
83	Forestry Activities[11]	N	Y	Y	Same as Above
84	Fishing Activities[12]	N[12]	Y	Y	Same as Above
85	Mining Activities	N	Y	Y	Same as Above
89	Other resource production or extraction	N	Y	Y	Same as Above
90	*Other*				
91 93	Undeveloped Land Water Areas	Y N[13]	Y N[13]	Y N[13]	

KEY TO TABLE 4.2
SUGGESTED LAND USE COMPATIBILITY IN ACCIDENT POTENTIAL ZONES

Y*– (Yes with restrictions) The land use and related structures are generally compatible. However, see notes indicated by the superscript.

N*– (No with exceptions) The land use and related structures are generally incompatible. However, see notes indicated by the superscript.

FAR – Floor Area Ratio A floor area ratio is the ratio between the square feet of floor area of the building and the site area. It is customarily used to measure non-residential intensities.

Du/Ac – Dwelling Units per Acre This metric is customarily used to measure residential densities.

NOTES FOR TABLE 4.2
SUGGESTED LAND USE COMPATIBILITY IN ACCIDENT POTENTIAL ZONES

1. A “Yes” or a “No” designation for compatible land use is to be used only for general comparison. Within each, uses exist where further evaluation may be needed in each category as to whether it is clearly compatible, normally compatible, or not compatible due to the variation of densities of people and structures. In order to assist installations and local governments, general suggestions as to floor/area ratios are provided as a guide to density in some categories. In general, land use restrictions which limit commercial, services, or industrial buildings or structure occupants to 25 per acre in APZ I, and 50 per acre in APZ II are the range of occupancy levels considered to be low density. Outside events should normally be limited to assemblies of not more that 25 people per acre in APZ I, and maximum assemblies of 50 people per acre in APZ II.

2. The suggested maximum density for detached single-family housing is one to two Du/Ac. In a Planned Unit Development (PUD) of single family detached units where clustered housing development results in large open areas, this density could possibly be increased provided the amount of surface area covered by structures does not exceed 20 percent of the PUD total area. PUD encourages clustered development that leaves large open areas.

3. Other factors to be considered: Labor intensity, structural coverage, explosive characteristics, air-pollution, electronic interference with aircraft, height of structures, and potential glare to pilots.

4. No structures (except airfield lighting), buildings or aboveground utility/ communications lines should normally be located in CZ areas on or off the installation.

The CZ is subject to severe restrictions. See NAVFAC P-80.3 or Tri-Service Manual AFM 32-1123(I);

TM 5-803-7, NAVFAC P-971 “Airfield and Heliport Planning & Design” dated May 1, 1999 for specific design details.

5. No passenger terminals and no major above ground transmission lines in APZ I.

6. Low intensity office uses only. Accessory uses such as meeting places, auditoriums, etc. are not recommended.

7. No chapels are allowed within APZ I or APZ II.

8. Facilities must be low intensity, and provide no tot lots, etc. Facilities such as clubhouses, meeting places, auditoriums, large classes, etc. are not recommended.

9. Includes livestock grazing, but excludes feedlots and intensive animal husbandry. Activities that attract concentrations of birds creating a hazard to aircraft operations should be excluded.

10. Includes feedlots and intensive animal husbandry.

11. Lumber and timber products removed due to establishment, expansion, or maintenance of CZ will be disposed of in accordance with appropriate DOD Natural Resources Instructions.

12. Controlled hunting and fishing may be permitted for the purpose of wildlife management.

13. Naturally occurring water features (e.g., rivers, lakes, streams, wetlands) are compatible.

Land Uses Located Within the 2004 Noise Contour Boundaries

A summary of the approximate acreage of existing land uses located within the 2004 noise contour boundaries is as follows:

2004 Wyle Noise Study	
65-dB Contour:	15,048 acres
70-dB Contour:	6,698 acres
75-dB Contour:	3,083 acres
80-dB Contour:	1,484 acres
85-dB Contour:	774 acres
Total Acreage	**27,087 Acres**
Includes base and bodies of water	

As shown, the estimated acreage figures were divided into five noise contour intervals ranging between 60 dB DNL and 85+ dB DNL in order to illustrate potential conflicts that may exist between various land uses as noise levels increase. Table 4.3 combines these intervals into three noise zone classifications, previously defined in the Executive Summary (See Appendix L). For the purpose of analysis, incompatible uses will be those that are not only incompatible with APZ and CZ areas but are also incompatible with the following criteria regarding allowable noise levels:

Table 4.3

Noise Zones I-III

Noise Zone	Time Interval	Allowable Exterior Noise Level
I	10:00 p.m. to 7:00 a.m. 7:00 a.m. to 10:00 p m.	60 dB 64 dB
II	10:00 p.m. to 7:00 a.m. 7:00 a.m. to 10:00 p m.	65 dB 74 dB
III	10:00 p.m. to 7:00 a.m. 7:00 a.m. to 10:00 p m.	75 dB and higher

It is important to remember that these noise contours/zones should be viewed as a planning tool, not as a series of discrete lines that sharply divide noise-affected land from non-noise affected areas. However, contours are a useful framework for identifying those off-base areas in which noise exposure may be high enough to generate a public nuisance.

A review of the findings contained within the 2002 AICUZ study revealed very little change with regards to the reduction of incompatible land uses contained within the hazard areas since the study was completed. These incompatible uses have been allowed to remain, while new ones have since developed. The following is a re-cap of the 2002 AICUZ study analysis with 2007 updates:

• **North of the Air Station:** Immediately adjacent to the Air Station is Lake Worth, and, farther north, the cities of Fort Worth, Lake Worth and Sansom Park (not located within the AICUZ footprint). Land use in this area is mainly parks, vacant, and single family residential, with some scattered commercial. There are single family residential dwellings within the CZ in Fort Worth's jurisdiction. A new 300,000 sq. ft. retail development, Landmark Lakes, has been announced for the northwest corner of Loop 820 and Quebec in Noise Zones I and II. There is commercial redevelopment at the intersection of Interstate 820 and Navajo Trail/Cahoba Drive and new commercial developments along Jacksboro Highway and Azle Avenue.

• **South of the Air Station:** The Cities of Benbrook and Fort Worth lie south of the Air Station. The land use in this area is primarily single family residential, with the land adjacent to major thoroughfares zoned for highway commercial. Western Hills High School on Boston Avenue is partially located in Noise Zone I.

Immediately south of the Air Station are Ridgmar Mall and Z. Boaz Golf Course, which lay partially within APZ I and/or APZ II. There are two restaurants on the mall's outparcels that are located just inside the CZ area.

New/proposed construction in Noise Zone II consists of a new, single-family residential development for seniors, Miravanti Cooperative at Ridgmar, located at the southeast corner of Ridgmar Boulevard and Green Oaks Road. Although single-family residential is permitted with conditions in Noise Zone II, precautions should be taken to safeguard senior citizens who will be living in the development.

• **East of the Air Station:** The Cities of Westworth Village, Westover Hills and River Oaks lie east of the Air Station. Both Westover Hills and River Oaks lie outside of the noise footprint. This area is primarily single family residential, with parkland to the northeast and two golf courses to the southeast (Carswell AFB and Shady Oaks Country Club). Immediately adjacent to the base is a women's correctional facility (e.g. hospital). This facility lies within Noise Zone II, which is compatible if some level of noise reduction or isolation is accomplished.

Although there have been no significant changes in River Oaks, Westworth Village has shown significant growth since 2004, with the most recent development being the expansion of the Hawks Creek Town Center. This development brings another 340,000 sq. ft. of retail; however, the development lies within Noise Zone III.

Hawks Creek development lies adjacent to NAS JRB's main gate and appears to be built out with no indications of any plans for additional housing units (at least through May 2007). This is an area to be treated with caution and sensitivity while implementing recommendations for acquisition/relocation of residents. The larger parcels located between Highway 183 and NAS JRB could be developed for residential if recommendations for compatible land use development are not followed. On Roaring Springs Road near Shady Oaks Country Club, 45 homes were built in 2006 within a gated community. Another 55 homes are planned.

As previously discussed, Westworth Village and White Settlement joined forces to redevelop Carswell AFB. In April 2005, Texas State Bill 1766 established the Westworth Village-White Settlement Redevelopment Authority (RDA) as a political subdivision of the state for the purpose of accepting title from the United States to property related to the Carswell Air Force Base, and provided that the boundaries of the authority would be synonymous with the boundaries of the City of Westworth Village and that of White Settlement. The RDA has been charged with creating diversified activity on the former USAF parcels that foster economic development and they have succeeded thus far. However, new development should adhere to the land use compatibility guidelines outlined in subsequent sections.

• **West of NAS JRB:** The City of White Settlement lies adjacent to the NAS JRB and to the southern portion of Lockheed Martin. The city mainly consists of single-family and multi-family housing, with that portion of the city immediately adjacent to the Air Station and I-30 zoned for industrial and commercial uses. However, there is an area adjacent to the fence line which contains single family and medium to high density, residential housing. Institutional uses include Brewer High School (including the new facility) and Cherry Lane Hospital, both of which are located in Noise Zone II.


Photo Credit: www.cotsjournalonline.com

Six schools are within a two-mile radius of Lockheed Martin; the closest school is Brewer High School, located 1/2 mile south of the facility. The areas south, west, and west-northwest of Lockheed Martin are mainly residential. Lake Worth, bordering Lockheed Martin to the north, provides recreational boating, fishing, and water skiing. This lake is also a part of the municipal water system of the City of Fort Worth and is a recharge source to the underlying Paluxy Aquifer. The City of White Settlement, Texas, receives municipal water supply from wells completed in the Lower Paluxy Aquifer.

Flight track data regarding flights arriving and departing NAS JRB are to the west over much of White Settlement and Fort Worth. The flight pattern was implemented to mitigate noise impacts to residential and urban areas east of the base, as well as to avoid accidents with aircraft departing from Fort Worth Meacham International Airport and Dallas Fort Worth International Airport. The areas under these flight path corridors have no protection from noise sensitive development. However, there would be no apparent legal impediment to flight path corridors defined in a planning scheme and restrictions being placed on land uses in those areas.

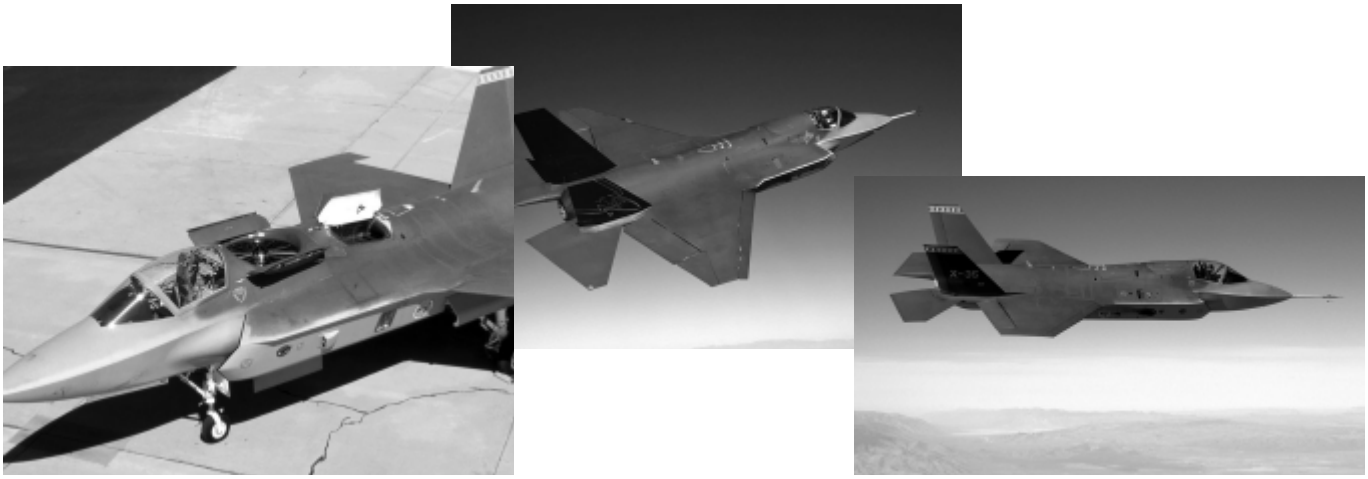
Lockheed Martin

Air Force Plant #4 occupies approximately 650 acres. Lockheed Martin operates the plant, which manufactures aircraft for the Air Force. It is a Government-Owned Contractor-Operated (GOCO) defense manufacturing facility, located seven miles northwest of the City of Fort Worth. It is bounded on the north by Lake Worth, on the east by NAS JRB, and on the south and west by the City of White Settlement.

Lockheed Martin shares access to the runway and the support facilities with the base. The plant includes eight million sq. ft. of industrial floor space (the government owns 84%). It is a self-sufficient and self-contained fabrication and assembly operation. Facilities include a high bay structure and flyaway capability. Support functions (logistics, engineering, office space) are conducted onsite and on leased offsite space.

Lockheed is home of the F-16 Fighting Falcon and Joint Strike Fighter. The facility has designed and produced the B-32 Dominator and B-36 "Peacemaker" bombers, the B-58 Hustler delta-winged jet bomber, the swing-wing F-111 Aardvark interdiction aircraft, and the F-16 Fighting Falcon multirole fighter. More than 4,000 F-16s have been built for the United States and 20 other countries.

Additionally, the company produces major components for the Mitsubishi F-2 fighter aircraft (based on the F-16) for Japan, the Korea Aircraft Industries T-50/A-50 trainer/light attack aircraft and the mid-fuselage and avionics for the U.S. Air Force's F/A-22 Raptor air dominance fighter.



All three Lockheed prototypes with the clearly visible differences from the X-35B (lift engine) and X-35C (larger wing) (Pictures from Lockheed Martin)

The single-engine F-35 will be manufactured in three versions: a conventional takeoff and landing (CTOL) variant for the U.S. Air Force, an aircraft carrier version (CV) for the U.S. Navy, and a short-takeoff/vertical landing (STOVL) version for the U.S. Marine Corps, the Royal Air Force, and the Royal Navy. The F-35C will eventually replace the Navy's F/A-18 Hornet and fly alongside the newer F/A-18E/F Super Hornet as the main combat assets of U.S. naval aviation. Plans call for the majority of the new F-35s to be employed mainly for dropping smart bombs from low altitude.The F-35A is the conventional version for the Air Force and will supplant the F-16 and A-10 attack planes beginning in 2010 while the F-35B will replace the Harrier jets flown by the U.S. Marines and the British military.

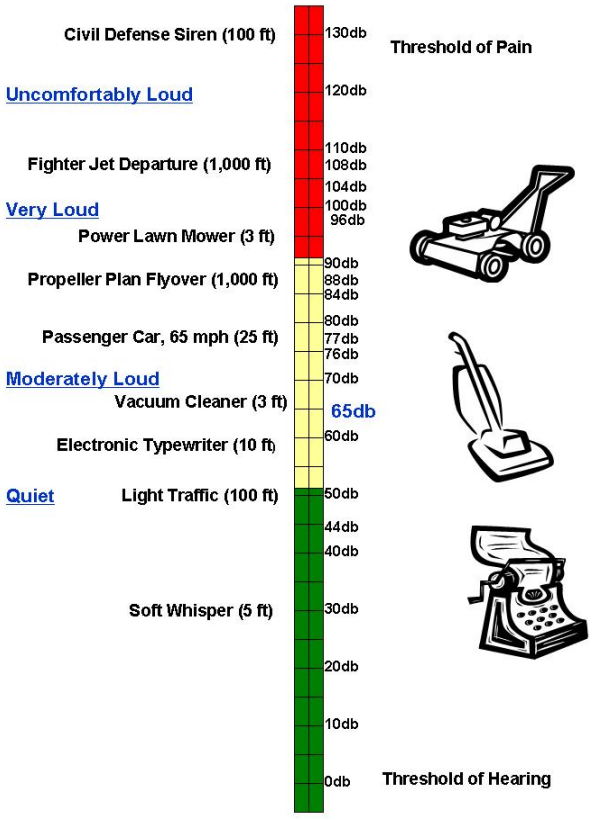
In the first two years after the F-35 JSF program was awarded to Lockheed Martin Aeronautics, the company added more than 4,000 people to its workforce. The program could run as long as 40 years, according to a study prepared for by the Fort Worth Chamber of Commerce by The Perryman Group of Waco, Texas. Personal income should rise by $1.3 billion annually, while state coffers will receive an additional $73.9 million each year. It could be assumed that if future BRAC recommendations include closure of the base, Lockheed Martin may relocate as well. In order for NAVAIR to keep production of the F-35 at NAS JRB, inappropriate land uses should be addressed. To lose an economic powerhouse such as this would have a significant adverse impact on the regional economy that could extend throughout the North Central Texas region.

Common Noise Sources:

Figure 4.2 is illustrates the noise level created by common noise sources. This comparison illustrates that a power lawn mower creates approximately 95 decibels (when heard from three feet away), while a passenger car creates approximately 77 decibels (from a distance of 25 feet). Additionally, a fighter jet departure at 1,000 feet is significantly louder (108 decibels) than a propeller plane flyover at the same distance (88 decibels).

Additionally, aircraft noise is compiled into a daily average for the purposes of this study, which allows us to review the average daily effect that noise is having at various distances from aircraft operational areas.

Figure 4.2 Common Noise Sources



The F-35 Joint Strike Fighter mission training requires late night and early morning flight operations with take-offs and landings every 90 seconds. The F-35 will be louder than the F-15 and F-16 aircraft and will require updated noise contours and AICUZ reports. The illustration shows the normal decibel level of each aircraft with the F-35 shown as JSF (Joint Strike Fighter). As indicated in Figure 4.2, the F-35 will generate 148 decibels representing a 3 db increase over the F-16 and a 4 db increase over the F-15, with 152 decibels generated during afterburn. The NAS JRB's aircraft engine ground test facility, called the "Hush House" and built in 2001 to support F-18 engine tests, will be used for F-35 engine tests. This should significantly reduce the number of noise complaints from nearby residents.

Analysis of Local Government Land Use Tools

Incompatible development includes any land use activity or civilian development activity that adversely affects the utility or training and readiness missions of a military installation. Incompatible development of land close to military installations can affect the ability of an installation to fulfill its mission. Such development also threatens public safety because accidents may occur in the areas surrounding an installation. The economic health of a community is affected if military operations and missions may be required to relocate because of urban encroachment.

Examples of development or land use activities that might be incompatible with the mission of a military installation include:

- Intensive residential development
- Building/tower height
- Lighting
- Electromagnetic spectrum interference
- Loss of endangered species habitat outside of military installations resulting in a curtailment of mission activities to prevent impacts to similar habitat areas inside the installation

Local government land use and planning documents were collected as part of the JLUS. With the exception of City of Fort Worth, review of these documents indicated that the land use tools available did not adequately address issues such as encroachment, construction or conservation they relate to aircraft noise and military airfields.

Comprehensive Plans

The comprehensive planning element of the *Standard City Planning Enabling Act* (SPEA) was adopted by the State of Texas in 1997. Section § 213.002 of Texas' Local Government Code empowers local governments with the authority to adopt a comprehensive plan through the local government's planning commission. It reads:

> "(a) A comprehensive plan may be adopted or amended by ordinance following:
>
> (1) A hearing at which the public is given the opportunity to give testimony and present written evidence; and
> (2) Review by the municipality's planning commission or department, if one exists.
>
> (b) A municipality may establish, in its charter or by ordinance, procedures for adopting and amending a comprehensive plan."

The purpose of the Comprehensive Plan is to identify goals and policies that will be achieved. Goals and policies are meaningless unless there is concurrence on and commitment to the methods to be used toward their achievement. This element serves to identify major implementation needs and to document the techniques which can be used. The methods address four broad applications: (1) regulation of development; (2) improvement programs; (3) the fiscal implications of needed improvements and services; and (4) execution of the various processes and procedures necessary for the local government's planning, development, and operational functions. All of these applications are intertwined.

A comprehensive plan has been adopted and utilized by local governments within the JLUS study area with the exception of Lake Worth, Westworth Village and Tarrant County. All three of these entities should consider adoption of a comprehensive or general plan to facilitate long-term encroachment mitigation strategies.

Comprehensive Plans and Zoning Ordinances

Zoning ordinances and Comprehensive Plans serve two different purposes. The zoning ordinance sets forth what can be done currently, while the Comprehensive Plan provides general direction for the future. Even though the zoning ordinance implements the policies of the Comprehensive Plan, the ordinance and the plan may not be identical.

The current zoning map and the comprehensive plan land use diagrams need not be identical provided that the zoning map conforms to the policies of the plan. An area shown as single-family residential on the plan may be zoned predominantly residential with a few pockets of commercial use if the general plan policies provide for small commercial enclaves within residential areas.

Conformity between the zoning ordinance and the Comprehensive Plan should be obtained over time. Any proposed amendment to the zoning ordinance should be checked against the plan. If necessary, the plan should be amended when the ordinance is amended. Conversely, if the plan is amended, the zoning ordinance should be examined for possible amendment.

Prior to the analysis of each local government's zoning requirements as they pertain to compatible development around the base, it became imperative that the land use guidelines as presented in Table 5, taken from OPRNAV 11010.36B, *Airport Noise Compatibility Planning*, be reviewed and considered.

Table 4.4: AICUZ Land Use Compatibility by Noise Zone

Land Use		Suggested Land Use Compatibility						
		Noise Zone 1 (DNL or CNEL)		Noise Zone 2 (DNL or CNEL)		Noise Zone 3 (DNL or CNEL)		
SLUCM NO	LAND USE NAME	< 55	55- 64	65 - 69	70 -74	75- 79	80 -84	85+
	Residential							
11	Household Units	Y	Y [1]	N [1]	N [1]	N	N	N
11.11	Single units: detached	Y	Y [1]	N [1]	N [1]	N	N	N
11.12	Single units: semidetached	Y	Y [1]	N [1]	N [1]	N	N	N
11.13	Single units: attached row	Y	Y [1]	N [1]	N [1]	N	N	N
11.21	Two units: side-by-side	Y	Y [1]	N [1]	N [1]	N	N	N
11.22	Two units: one above the other	Y	Y [1]	N [1]	N [1]	N	N	N
11.31	Apartments: walk-up	Y	Y [1]	N [1]	N [1]	N	N	N
11.32	Apartment: elevator	Y	Y [1]	N [1]	N [1]	N	N	N
12	Group quarters	Y	Y [1]	N [1]	N [1]	N	N	N
13	Residential Hotels	Y	Y [1]	N [1]	N [1]	N	N	N
14	Mobile home parks or courts	Y	Y [1]	N	N	N	N	N
15	Transient lodgings	Y	Y [1]	N [1]	N [1]	N [1]	N	N
16	Other residential	Y	Y [1]	N [1]	N [1]	N	N	N
20	***Manufacturing***							
21	Food & kindred products; manufacturing	Y	Y	Y	Y[2]	Y[3]	Y[4]	N
22	Textile mill products; manufacturing	Y	Y	Y	Y[2]	Y[3]	Y[4]	N
23	Apparel and other finished products; products made from fabrics, leather and similar materials; manufacturing	Y	Y	Y	Y[2]	Y[3]	Y[4]	N
24	Lumber and wood products (except furniture); manufacturing	Y	Y	Y	Y[2]	Y[3]	Y[4]	N
25	Furniture and fixtures; manufacturing	Y	Y	Y	Y[2]	Y[3]	Y[4]	N
26	Paper and allied products; manufacturing	Y	Y	Y	Y[2]	Y[3]	Y[4]	N
27	Printing, publishing, and allied industries	Y	Y	Y	Y[2]	Y[3]	Y[4]	N
28	Chemicals and allied products; manufacturing	Y	Y	Y	Y[2]	Y[3]	Y[4]	N
29	Petroleum refining and related industries	Y	Y	Y	Y[2]	Y[3]	Y[4]	N

Table 4.4: AICUZ Land Use Compatibility by Noise Zone (Continued)

Land Use		Suggested Land Use Compatibility						
		Noise Zone 1 (DNL or CNEL)		Noise Zone 2 (DNL or CNEL)		Noise Zone 3 (DNL or CNEL)		
SLUCM NO.	LAND USE NAME	< 55	55- 64	65 - 69	70 -74	75- 79	80 -84	85+
30	*Manufacturing (continued)*							
31	Rubber and misc. plastic products; manufacturing	Y	Y	Y	Y [2]	Y [3]	Y [4]	N
32	Stone, clay and glass products; manufacturing	Y	Y	Y	Y [2]	Y [3]	Y [4]	N
33	Primary metal products; manufacturing	Y	Y	Y	Y [2]	Y [3]	Y [4]	N
34	Fabricated metal products; manufacturing	Y	Y	Y	Y [2]	Y [3]	Y [4]	N
35	Professional scientific, and controlling instruments; photographic and optical goods; watches and clocks	Y	Y	Y	25	30	N	N
39	Miscellaneous manufacturing	Y	Y	Y	Y [2]	Y [3]	Y [4]	N
40	*Transportation, communication and utilities.*							
41	Railroad, rapid rail transit, and street railway transportation	Y	Y	Y	Y [2]	Y [3]	Y [4]	N
42	Motor vehicle transportation	Y	Y	Y	Y [2]	Y [3]	Y [4]	N
43	Aircraft transportation	Y	Y	Y	Y [2]	Y [3]	Y [4]	N
44	Marine craft transportation	Y	Y	Y	Y [2]	Y [3]	Y [4]	N
45	Highway and street right-of-way	Y	Y	Y	Y [2]	Y [3]	Y [4]	N
46	Automobile parking	Y	Y	Y	Y [2]	Y [3]	Y [4]	N
47	Communication	Y	Y	Y	25 [5]	30 [5]	N	N
48	Utilities	Y	Y	Y	Y [2]	Y [3]	Y [4]	N
49	Other transportation, communication and utilities	Y	Y	Y	25 [5]	30 [5]	N	N
50	*Trade*							
51	Wholesale trade	Y	Y	Y	Y [2]	Y [3]	Y [4]	N
52	Retail trade - building materials, hardware and farm equipment	Y	Y	Y	Y [2]	Y [3]	Y [4]	N
53	Retail trade - shopping centers	Y	Y	Y	25	30	N	N
54	Retail trade - food	Y	Y	Y	25	30	N	N

Table 4.4: AICUZ Land Use Compatibility by Noise Zone (Continued)

Land Use		Suggested Land Use Compatibility						
		Noise Zone 1 (DNL or CNEL)		Noise Zone 2 (DNL or CNEL)		Noise Zone 3 (DNL or CNEL)		
SLUCM NO	LAND USE NAME	< 55	55- 64	65 -69	70 -74	75-79	80 -84	85+
50	*Trade (Continued)*							
55	Retail trade - automotive, marine craft, aircraft and accessories	Y	Y	Y	25	30	N	N
56	Retail trade - apparel and accessories	Y	Y	Y	25	30	N	N
57	Retail trade - furniture, home, furnishings and equipment	Y	Y	Y	25	30	N	N
58	Retail trade - eating and drinking establishments	Y	Y	Y	25	30	N	N
59	Other retail trade	Y	Y	Y	25	30	N	N
60	*Services*							
61	Finance, insurance and real estate services	Y	Y	Y	25	30	N	N
62	Personal services	Y	Y	Y	25	30	N	N
62.4	Cemeteries	Y	Y	Y	Y [2]	Y [3]	Y [4,11]	Y [6,11]
63	Business services	Y	Y	Y	25	30	N	N
63.7	Warehousing and storage	Y	Y	Y	Y [2]	Y [3]	Y [4]	N
64	Repair Services	Y	Y	Y	Y [2]	Y [3]	Y [4]	N
65	Professional services	Y	Y	Y	25	30	N	N
65.1	Hospitals, other medical fac.	Y	Y [1]	25	30	N	N	N
65.16	Nursing Homes	Y	Y	N [1]	N [1]	N	N	N
66	Contract construction services	Y	Y	Y	25	30	N	N
67	Government Services	Y	Y [1]	Y [1]	25	30	N	N
68	Educational services	Y	Y [1]	25	30	N	N	N
69	Miscellaneous	Y	Y	Y	25	30	N	N
70	*Cultural, entertainment and recreational*							
71	Cultural activities (& churches)	Y	Y[1]	25	30	N	N	N
71.2	Nature exhibits	Y	Y[1]	Y[1]	N	N	N	N
72	Public assembly	Y	Y[1]	Y	N	N	N	N
72.1	Auditoriums, concert halls	Y	Y	25	30	N	N	N
72.11	Outdoor music shells, amphitheaters	Y	Y [1]	N	N	N	N	N
72.2	Outdoor sports arenas, spectator sports	Y	Y	Y [7]	Y [7]	N	N	N
73	Amusements	Y	Y	Y	Y	N	N	N
74	Recreational activities (include golf courses, riding stables, water rec.)	Y	Y[1]	Y[1]	25	30	N	N
75	Resorts and group camps	Y	Y [1]	Y [1]	Y [1]	N	N	N
76	Parks	Y	Y [1]	Y [1]	Y [1]	N	N	N
79	Other cultural, entertainment and recreation	Y	Y [1]	Y [1]	Y [1]	N	N	N

Table 4.4: AICUZ Land Use Compatibility by Noise Zone (Continued)

Land Use		Suggested Land Use Compatibility						
		Noise Zone 1 (DNL or CNEL)		Noise Zone 2 (DNL or CNEL)		Noise Zone 3 (DNL or CNEL)		
SLUCM NO.	LAND USE NAME	< 55	55- 64	65 -69	70 -74	75-79	80 -84	85+
80	*Resource Production and Extraction*							
81	Agriculture (except live stock)	Y	Y	Y [8]	Y [9]	Y [10]	Y [10,11]	Y [10,11]
81.5,	Livestock farming	Y	Y	Y [8]	Y [9]	N	N	N
81.7	Animal breeding	Y	Y	Y [8]	Y [9]	N	N	N
82	Agriculture related activities	Y	Y	Y [8]	Y [9]	Y [10]	Y [10,11]	Y [10,11]
83	Forestry Activities	Y	Y	Y [8]	Y [9]	Y [10]	Y [10,11]	Y [10,11]
84	Fishing Activities	Y	Y	Y	Y	Y	Y	Y
85	Mining Activities	Y	Y	Y	Y	Y	Y	Y
89	Other resource production or extraction	Y	Y	Y	Y	Y	Y	Y

Source: OPRNAV 11010.36B

KEY TO TABLE 4.4 - AICUZ Land Use Compatibility by Noise Zone

SLUCM	Standard Land Use Coding Manual, U.S. Department of Transportation
Y (Yes)	Land Use and related structures compatible without restrictions.
N (No)	Land Use and related structures are not compatible and should be prohibited.
Yx (Yes with Restrictions)	The land use and related structures are generally compatible. However, see note(s) indicated by the superscript.
Nx (No with exceptions)	The land use and related structures are generally incompatible. However, see notes indicated by the superscript.
NLR (Noise Level Reduction)	Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise

	attenuation into the design and construction of the structure.
25, 30, or 35	The numbers refer to Noise Level Reduction levels. Land Use and related structures generally compatible however, measures to achieve NLR of 25, 30 or 35 must be incorporated into design and construction of structures. However, measures to achieve an overall noise reduction do not necessarily solve noise difficulties outside the structure and additional evaluation is warranted. Also, see notes indicated by superscripts where they appear with one of these numbers.
DNL	Day-Night Average Sound Level.
CNEL	Community Noise Equivalent Level (Normally within a very small decibel difference of DNL)
Ldn	Mathematical symbol for DNL.

NOTES FOR TABLE 4.4 - AICUZ Land Use Compatibility by Noise Zone

1.

a) Although local conditions regarding the need for housing may require residential use in these Zones, residential use is discouraged in DNL 65-69 and strongly discouraged in DNL 70-74. The absence of viable alternative development options should be determined and an evaluation should be conducted locally prior to local approvals indicating that a demonstrated community need for the residential use would not be met if development were prohibited in these Zones.

b) Where the community determines that these uses must be allowed, measures to achieve and outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB in DNL 65-69 and NLR of 30 dB in DNL 70-74 should be incorporated into building codes and be in individual approvals; for transient housing a NLR of at least 35 dB should be incorporated in DNL 75-79.

c) Normal permanent 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, upgraded Sound Transmission Class (STC) ratings in windows and doors and closed windows year round. Additional consideration should be given to modifying NLR levels based on peak noise levels or vibrations.

d) 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 NLR particularly from ground level 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 project or proposed development is noise sensitive, use indicated NLR; if not, land use is compatible without NLR.

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. Land use not recommended, but if community decides use is necessary, hearing protection devices should be worn.

It is assumed that the Noise Zones I-III were utilized by the DOD as a means of consolidation of the noise contours. This practice is sensible for local governments as they begin the implementation process of restructuring land development guidelines in accordance with Exhibits 1 through 7 at the beginning of this study.

Compatibility between Existing Zoning Districts and Noise Zones

Each local government surrounding NAS JRB was analyzed to determine whether incompatible uses still existed since the 2004 Wyle Noise Study and, if so, did they exist "by right?" In other words, did (does) the zoning adjacent to the base allow the development of incompatible uses in the Noise Zones?

According to the study, the DNL contours extend over Lake Worth to the north, Benbrook to the south, and White Settlement to the west. To the east, the contours lie mainly over base property and Lake Worth.

The results showed that these incompatible uses still exist and are permitted "by right" according to zoning laws. The following Tables 4.5 through 4.9 show the zoning districts in each local government that permit incompatible uses within the 65 db DNL or higher noise contours. Such incompatible zoning is shown in yellow. (Please note that Tarrant County does not have a zoning code.)

Table 4.5

Zoning Districts within the 65-70 DNL

	Industrial	Commercial/ Office	SF Residential	MF Residential	Public/ Institutional
Benbrook	H	F , HC, F-PD, E-PD	A	C, D-PD	CF
Fort Worth	J, I	ER, F, G, FR, PD	R-1, A-5, A-10	B, C, CR, D	N/A
Lake Worth	P-I	C, P-C	SF-1	N/A	N/A
River Oaks	N/A	N/A	N/A	N/A	N/A
Tarrant County	N/A	N/A	N/A	N/A	N/A
Westworth Village	N/A	C, O	SF-A, SF-B	MF	N/A
White Settlement	N/A	C-C, C-N, PD	R-5, R-6, R-7, R-D	MF-16, MF-24	T

Although considered incompatible, uses highlighted may be permitted with conditions. These conditions include density, height, and noise attenuation as discussed in subsequent sections of this study.

Uses within the 70-75 db DNL shown in yellow are discouraged by AICUZ, as indicated in Table 4.4. Benbrook and River Oaks do not contain noise contours above the 70 DNL and both will show as N/A on Tables 4.6 through 4.9.

Table 4.6

Zoning Districts within the 70-75 DNL

	Industrial	Commercial/ Office	SF Residential	MF Residential	Public/ Institutional
Benbrook	N/A	N/A	N/A	N/A	N/A
Fort Worth	I, J	E, ER, F, G, PD, MU-1	A-5	N/A	CF
Lake Worth	P-I	C, P-C	SF-1	N/A	N/A
River Oaks	N/A	N/A	N/A	N/A	N/A
Tarrant County	N/A	N/A	N/A	N/A	N/A
Westworth Village	N/A	C	SF-A, SF-B	MF	N/A
White Settlement	N/A	C-C	M-H, R-5, R-6, R-D	MF-16, MF-24	T

Table 4.7

Zoning Districts within the 75-80 DNL

	Industrial	Commercial/ Office	SF Residential	MF Residential	Public/ Institutional
Benbrook	N/A	N/A	N/A	N/A	N/A
Fort Worth	I, J, K, IP	F, FR, PD	A-5	N/A	N/A
Lake Worth	N/A	C	SF-1	PM-F	N/A
River Oaks	N/A	N/A	N/A	N/A	N/A
Tarrant County	N/A	N/A	N/A	N/A	N/A
Westworth Village	LI	C	N/A	N/A	N/A
White Settlement	I-H, I-L	C-C	M-H, R-6, R-D, R-V	N/A	N/A

Table 4.8

Zoning Districts within the 80-85 DNL

	Industrial	Commercial/ Office	SF Residential	MF Residential	Public/ Institutional
Benbrook	N/A	N/A	N/A	N/A	N/A
Fort Worth	J	N/A	A-5	N/A	N/A
Lake Worth	N/A	C	SF-1	N/A	N/A
River Oaks	N/A	N/A	N/A	N/A	N/A
Tarrant County	N/A	N/A	N/A	N/A	N/A
Westworth Village	LI	C	N/A	N/A	N/A
White Settlement	I-H, I-L	C-C	R-D	N/A	N/A

Table 4.9

Zoning Districts within the 85-90 DNL

	Industrial	Commercial/ Office	SF Residential	MF Residential	Public/ Institutional
Benbrook	N/A	N/A	N/A	N/A	N/A
Fort Worth	N/A	N/A	A-5	N/A	N/A
Lake Worth	N/A	N/A	N/A	N/A	N/A
River Oaks	N/A	N/A	N/A	N/A	N/A
Tarrant County	N/A	N/A	N/A	N/A	N/A
Westworth Village	LI	N/A	N/A	N/A	N/A
White Settlement	N/A	C-C	N/A	N/A	N/A

All local governments with zoning districts that allow incompatible land uses within Noise Zones II and III and within the APZ/CZ zones should change the zoning to comply with appropriate land use development guidelines presented in the 2002 AICUZ study, illustrated in Table 4.4. Rezoning appears to be required in Clear Zones and Accident Potential Zones on the north and south sides of the base. All development and redevelopment proposals brought to the local governments by a developer or property owner should be scrutinized for land use and environmental compatibility and should involve DOD staff.

Effects of Incompatible Land Uses

Incompatible land uses are regarded as those uses whose cumulative impacts put pressure on military installations and the surrounding communities. The result is increasing environmental controls, increasing regulatory burdens, and competition for air, land, water, energy, radio spectrum, and other resources. The burden imposed on military bases by intense development impacts not only developers and local communities but also military readiness. The DOD requires and desires continued, unobstructed access to lands it occupies to train its soldiers, sailors, and airmen; test its weapon systems and equipment; and maintain mission readiness. Inappropriate land use limits the military's ability to fully use its training and testing facilities for their intended purposes and increases the potential for negative effects on surrounding state and local governments.

At the same time, military training and testing activities often impose effects on the local communities. DOD operations and environmental footprints often extend to lands which DOD does not own or control. State and local governments maintain responsibility for land use planning (local), environmental regulation (state) and enforcement (both). The sharing of air, land, and water resources dictates the need for partnerships between the three primary stakeholders; the military, regional/state/local regulatory agencies, and local land use governments.

Inappropriate land development pressures essentially are results of competition for scarce resources that continue to grow even more scarce. Resources such as land continue to diminish in availability and it can be assumed that financial resources of state and local governments are not always available. Regulatory environments by nature continue to become more stringent over time. Some factors include wilderness designations, cultural sites, unexploded ordnance and constituents, commercial development, population encroachment, maritime issues, air quality, water quantity and quality, noise abatement, airspace congestion and competition, and endangered species and wildlife habitat.

Depleting availability of land and the increasing urbanization, growth and development surrounding military facilities is the primary short-term focus. Regulatory land development will be a significant issue in the long-term for the military.

In instances where land use incompatibilities currently exist, a "troubleshooting" matrix has been developed. This matrix cites specific "problem" areas and identifies example actions that can be considered to address certain land use or development issues. As shown in Table 4.10, specific situations are identified that represent possible conflicts with either safety or noise-related guidelines.

Depending on whether the potential impact relates to noise or safety, different actions are available to address incompatibility. Further, strategies identified in this matrix represent both preventive and corrective actions. This exhibit also references the section of this document where more detailed information on specific strategies and/or safety and noise related planning criteria are available. Specific examples from the various Appendices can be adopted to achieve certain preventive measures or corrective actions as noted. This study provides information for each community to use to examine their compatibility with the surrounding environs. It is the responsibility of each local community to determine and identify where existing incompatible land uses have developed in the military environs, and to determine what strategies are most appropriate.

Table 4.10: Incompatible Land Use Troubleshooting Matrix

Land Use	Potential Impact	Example Actions Available	Appendix/Reference
Existing Residential Development	Noise Concern	Soundproofing	Appendix J
	Safety Concern	Fee Simple Acquisition	Appendix F
Proposed Residential Development	Noise Concern	Hold Harmless Agreement/ Fair Disclosure Statement	Section VI, Appendix G, H, & I
	Safety Concern	Comprehensive Plan	Appendix E
Landfills	Safety Concern	Overlay Zoning	Appendix D
School, Hospital, and Church Development	Noise Concern	Soundproofing	Appendix J
	Safety Concern	Overlay Zoning	Appendix D
Radio / Television Tower	Safety Concern	Avigation Easement	Appendix F
		Height Limitation Zoning	Appendix M
Factory Smoke	Safety Concern	Avigation Easement	Appendix F
		Overlay Zoning	Appendix D
Golf Courses	Safety Concern	Avigation Easement	Appendix F
		Overlay Zoning	Appendix D
Auditoriums/Outdoor Theater	Safety Concern	Overlay Zoning	Appendix D
Power Lines	Safety Concern	Avigation Easement	Appendix F
		Height Limitation Zoning	Appendix M
Agricultural	Safety Concern	Avigation Easement	Appendix F
Water Impoundments	Safety Concern	Avigation Easement	Appendix F

State/Military Land Use Legislation

State legislatures have used existing local comprehensive planning statutes authorizing or requiring counties and municipalities to adopt land use plans and regulations as the basis for new laws that address developmental concerns. Land planning policy options build upon these existing laws by:

• Requiring local governments to identify lands adjacent to military installations and to adopt strategies to ensure that incompatible development does not occur

• Expanding upon existing requirements that the military installation commander be notified and offered an opportunity to submit comments on a proposed land use change prior to a public hearing or planning/zoning change

In addition, state legislatures have set up special revolving loan and grant funds, appropriated general fund revenue, and authorized the use of bond proceeds dedicated to open space preservation to purchase title or development rights to lands to serve as buffers between military bases and expanding urban development. Other land conservation tools that build upon existing statutory strategies may be used to offer incentives to local governments and landowners to preserve open space and farmland near military installations. These tools include:

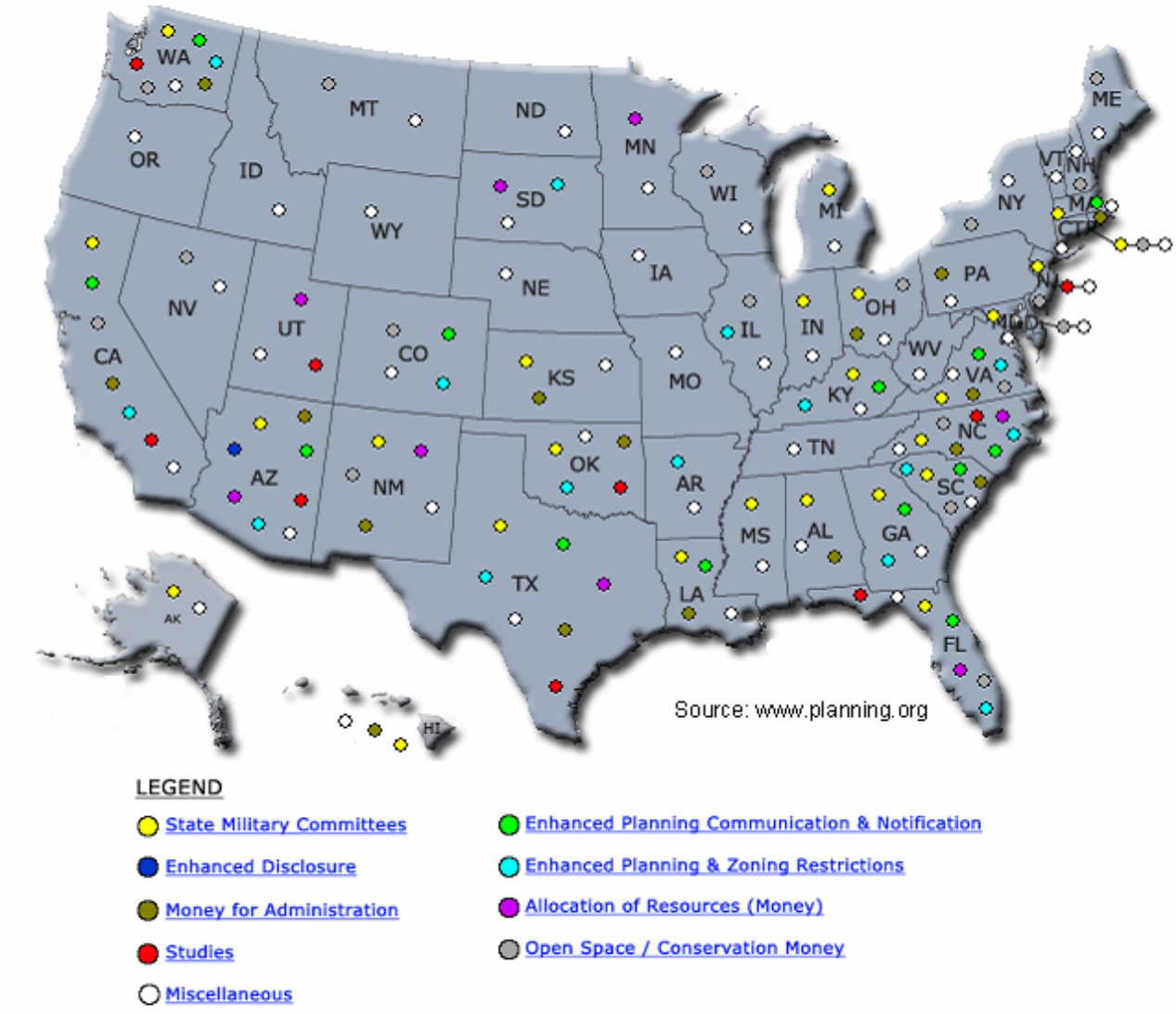
• Expansion of local government authority to purchase land for the continued operation of a military facility in addition to land conservation purposes

• Transfer of development rights from rural lands adjacent to military bases to urban areas that can accommodate increased density

• Tax credits for the donation of conservation easements on lands with open space or agricultural values

State legislatures in recent years have been active in passing laws designed to prevent inappropriate land use. As shown in Figure 4.3 below, at least 20 states have enacted land use related laws to address these types of developmental concerns.

Figure 4.3: State Land Use Plans and Regulations



Sustainability of Resources Surrounding NAS JRB Fort Worth

The primary goal of developing sustainable bases is military readiness.

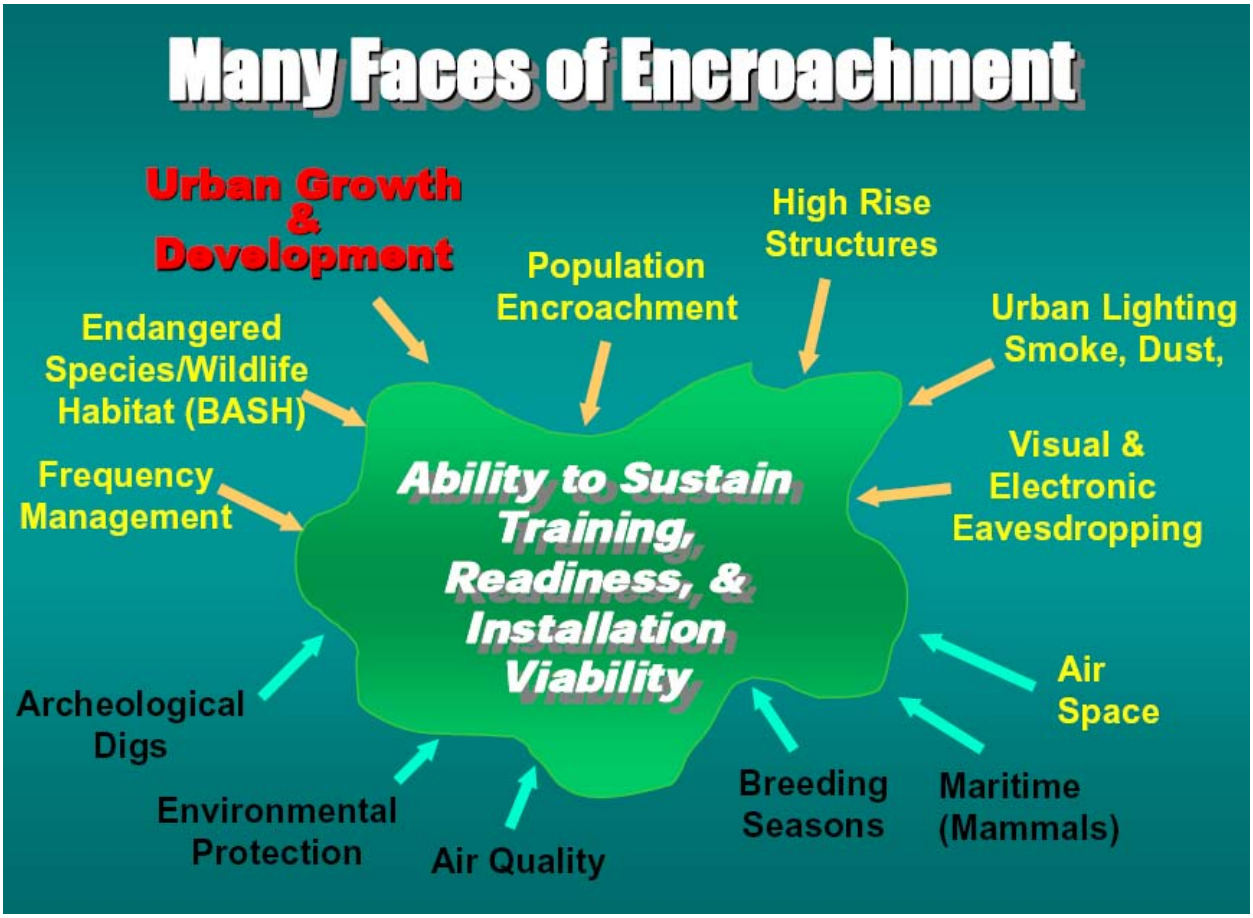


Figure 4.4 *Source: Office of the Secretary of Defense, Office of Economic Adjustment*

While there is no universal definition for sustainability, the term is largely defined through impacts on the economy, environment, and general social well-being; and measured by system effectiveness and efficiency, and the impacts of the system on the natural environment. The Sustainable Installations Regional Resource Assessment (SIRRA™) helps identify "*relative vulnerability in nine sustainability issue areas: (1) air, (2) energy, (3) urban development, (4) threatened and endangered species (TES), (5) locational specific issues, (6) water, (7) economic issues, (8) quality of life, and (9) infrastructure. Indicators are measurable aspects of a system that can be used to quantify the state or condition of that system.*"

An effective regional indicator provides information about the impact of the surrounding region on the installation's ability to train and maintain its mission. Sustainability ratings are developed in several different ways. National regulatory goals exist for some indicators. Examples include the EPA's six criteria air pollutants that comprise the air

quality indicator, the U.S. Fish and Wildlife Agency's species at risk designation, and Federal Emergency Management Agency (FEMA) designated seismic zones. Quality of life indicators may encompass a series of assessments (See Appendix M).

SIRRA™ is associated with the Fort Future™ initiative, a technology suite designed to help military installations and units plan for future requirements. Resources for the development of SIRRA™ have been provided by the Strategic Environmental Resources and Development Program (SERDP), the Army's Fort Future™ research program, the Army Environmental Policy Institute, and the Total Army Basing Study. The SIRRA™ website at http://www.erdc.usace.army.mil provides multiple configurations, thus allowing users to search and display sustainability ratings in many different ways.

For example, infrastructure sustainability can be studied in this way. SIRRA™ indicators provide a measurement of the congestion of the local road network in the region surrounding a military installation in terms of annual average daily traffic per lane. Congestion problems can place the military installation in a vulnerable state, affecting the type and intensity of training that could take place on the installation. The annual average daily trip count shown in this area is considered extremely high. A transportation plan should be considered to find ways to alleviate congestion around the base.

Threatened and Endangered Species (TES) is another area to study. The presence of TES is highly sought after as a sustainability indicator due to the possible limitations they may put on certain land use actions, military or otherwise, in time or in space. In addition, other federal requirements (e.g. Sikes Act) may require consideration and protection of state listed or other identified species identical or comparable to that required by the Endangered Species Act. Data is provided by the United States Fish and Wildlife Service, Endangered Species Program. In the case of NAS JRB, both state and regional data indicate that there is an extremely low occurrence of endangered species (less than the federally established criteria of .0005).

Water Sustainability shows a high number of people at flood risk in this area. This indicator is based on the current population living within a 500-Year Floodplain. The flood risk indicator characterizes the extent to which lives and property are at risk of flood damages. The 500-Year Floodplain was selected over the more commonly used 100-Year standard because most, if not all, zoning standards and building practices have been based on the 100-Year standard (B. Hurd et al., 1999). The risks are high in this area due to flooding from the Trinity River, Farmer's Branch Creek watershed and Lake Worth. Cities within the Farmer's Branch Creek watershed are Fort Worth and White Settlement. Both cities have zoning districts adjacent to the base which allow industrial and commercial development that, if not carefully monitored, could adversely affect sustainability through an increase in storm water runoff to the base. In the previous five years, the airfield has flooded twice.

Stream flows are critical to many riparian areas, and falling below safe threshold levels can threaten individual species or potentially endanger entire aquatic ecosystems. Impacts to the military mission could include diminished or stress-threatened and endangered species (TES) habitat and population, which, in turn, could negatively impact the ability for certain training and other missions. Diminished carrying capacity across training areas may result due to water and erosion.

Flow sensitivity measurement is mostly independent of levels and changes in surface runoff. Base flow is determined by the cubic feet per second (cfs), water flow equivalent to one cubic foot of water passing a given point for an entire second. The EPA has determined that the flow sensitivity is low for NAS JRB, meaning the base flow of water is less than 0.065 cfs per square mile. This is viewed as somewhat positive since there is an extremely low occurrence of endangered species in this area that would require these waters for habitation.

The NCTCOG has developed the Integrated Storm Water Management program to assist developers and property owners with sustainable site design. One of the fundamental goals of the program is to reduce flood impacts by a combination of on-site control, downstream protection, floodplain management, and/or other mitigation measures. The program provides credits for the protection of trees, floodplains, stream buffers, and other sensitive natural features. While this is a tremendous step towards environmental protection and preservation, modifying the program to incorporate credits for the protection of the base as a “sensitive area” should also be considered.

According to the 2008 Fiscal Year BRAC Budget Summary, “Remedial actions at affected bases (i.e. NAS JRB) will continue in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).” Sustainability must be maintained in order for the base to remain operational. Accordingly, BRAC has determined that it will spend $161,000 for an environmental assessment at NAS JRB next fiscal year. Other future BRAC activities slated to occur include: “Realign Naval Air Station Joint Reserve Base Fort Worth, TX, by consolidating Navy Reserve Readiness Command South with Naval Reserve Readiness Command Midwest at Naval Station Great Lakes, IL; dis-establishing the Aircraft Intermediate Maintenance Department; establishing a Fleet Readiness Center West site; and transferring all intermediate maintenance workload and capacity to the Fleet Readiness Center West Site.”

BRAC funding is expected to support the $4.2 million reconfiguration of Hangar 1404 for VR-46, a fleet logistics support squadron. VR squadrons are to be in a constant state of readiness. Based on the availability of information regarding future BRAC expenditures, “sustainability” must be considered carefully as land use policies and construction codes evolve.

SECTION V

POTENTIAL IMPACTS

The Emergency Operation Center on board NAS JRB was a central communication point for Hurricane Katrina relief.
(*U.S. Navy photo by Photographer's Mate 1st Class Andrew Rutigliano*)

Potential Impacts of Development on Existing Mission

This section examines the projected growth levels within Noise Zone III (75 dB DNL or higher), CZs and APZs and identifies conflicts with potential future development based on existing zoning. These areas are referred to collectively as the existing mission impact area.

Table 5.1 Land Compatibility in the CZ and APZ Zones

Land Use	CZ	APZ I	APZ II
Schools, Regional Malls			
Transient Lodging			
Hospitals, Multifamily			
Single-Family Detached			
Commercial, Retail			
Wholesale, Manufacturing			
Agriculture, Public ROW			

Source: DOD Instruction 4165.57, AICUZ

Incompatible
Compatible with Conditions
Compatible

Table 5.1 above provides a brief synopsis of land use compatibility in the CZ, APZ I and II Zones. Red indicates uses that are not compatible within these zones; yellow indicates uses that may be compatible with certain conditions; and green indicates uses that are acceptable. The only uses that are considered to be compatible are agriculture and public ROW (i.e. open spaces). The Clear Zone (CZ) is closest to the runway ends and has the highest potential for accidents. Adjoining the CZs are two Accident Potential Zones (APZ), APZ I and APZ II, where the potential for accidents diminish as the distance from the end of the runway increases.

The remaining portion of the existing mission area, Noise Zone III, is slightly more flexible regarding the allowance of uses. Tables 4.2 and 4.3 in Section IV of this report identify those uses permitted in Noise Zone III and their conditions. The remaining Noise Zones I & II will be addressed in subsequent sections regarding the maximum mission area.

Future Residential Development

This section will be divided into the northern and southern sectors for analysis and discussion purposes.

Northern Sector:

The amount of future residential development expected to occur within this portion of the existing mission impact area is relatively small. There are several reasons for this expectation. First, the CZ contains a relatively small amount of vacant land area, approximately 11 acres. Of that total, approximately seven acres of the land area is owned by the City of Fort Worth. The City should retain ownership of the property as conservation or park land property. The remaining acreage in this CZ is contained within Lake Worth and thus, represents no potential conflicts with regard to future land development. According to Tarrant County Appraisal District records, only 18 dwelling units have been constructed within the north APZ I and II areas over the last 10 years and all were constructed within Noise Zone III. Additionally, there are many older homes located in the same areas across Loop 820.

A moderate amount of undeveloped land remains in the existing mission impact area, with approximately 122 acres owned by the City of Fort Worth. This amount of vacant land, combined with the historical low rate of residential development, suggests that future residential development levels may be low as well. However, future development on these vacant parcels should comply with the AICUZ compatibility standards discussed in Section II and should follow proposed land development guidelines as discussed in Section III. Residential uses are discouraged in these areas.

Southern Sector:

More than half of the CZ is contained within NAS JRB property. The remaining acreage, approximately 77 acres, is privately owned and currently vacant. This vacant land should be considered for acquisition by the local government, a conservation group or combination thereof. Local zoning regulations should be updated to reflect CZ compatible uses in order to minimize developmental impacts should the property remain individually owned.

As discussed in Section III, many dwelling units exist within the southern APZ I and II areas. The APZ/CZ areas encompass two local governments: Fort Worth and White Settlement. Residential is among the top five incompatible uses in APZ/CZ areas and it will take a joint effort of all local governments, including Tarrant County, and the public to bring uses into compliance.

A single land development plan should be considered for adoption and consistent implementation by all affected local governments to alleviate confusion among realtors, developers, builders and the public regarding acceptable land development.

Potential noise impacts to the land uses around the base could change with an increase in the number and/or types of aircraft.

Non-Residential Development

Projected employment growth within the existing mission area is also expected to be relatively modest, given the limited amount of land area on the north side of the base. Some would argue that employment will increase significantly due to Lockheed Martin's contract to build more than 2,000 F-35 Joint Strike Fighters. Lockheed should experience an increase in workforce capacity, but these additional employees may not actually reside outside the JLUS area. Thus, it is difficult to foresee whether population density will increase in the near future.

On the south side of the base, the land adjacent to major thoroughfares is zoned highway commercial, which, if not changed, could contribute to more congestion and increased inappropriate land uses. Zoning changes should be considered to the west, as most of this area adjacent to I-30 is zoned industrial or commercial with no current restrictions in place. On the north and east, care should be given to the types of commercial and industrial development allowed to ensure they comply with the AICUZ. Due to the potential for increased non-residential development in these areas, a transportation study should be considered in addition to ordinance and building code amendments.

There are several institutional uses located within Noise Zone II and the APZs which should be relocated.

Airport-Related Development

With regard to airport-related development and the impact that growth will have on the existing aviation related uses, civil airport forecasts published by the FAA indicates moderate growth, therefore no significant impacts or conflicts are anticipated.

Military forecasts are not generally prepared as part of military airfield planning, so the most conservative approach to protecting land use would be to compare existing

aviation activity with the 2004 Wyle Labs Noise study. This scenario is referred to as maximum mission capability.

The noise impacts associated with maximum mission capability can be estimated by determining the capability of NAS JRB to accommodate more or different types of activity that would affect a larger surrounding area. This concept, with regard to potential impacts on development, is discussed in more detail in this section. Potential noise impacts to the land uses around the base could change with an increase in the number and/or types of aircraft, i.e. the F-35 Joint Strike Fighter.

Potential Development Conflicts

The potential for future development to conflict with operations of the existing mission at NAS JRB is primarily a function of the land use regulations (e.g. zoning, subdivision regulations, and building codes) that are applied to the remaining undeveloped land within the 2004 Noise Study area.

There are two primary types of potential impacts associated with adjoining land development and operations of aircraft at NAS JRB. The first is related to noise impacts of structures that are located within the impact area delineated by the 2004 Noise Contour Areas. Regular exposure to noise levels greater than 65 dB DNL is considered potentially harmful for a variety of types of land uses, which are identified in the Land Use Compatibility Guidelines (LUCG), summarized in the Appendices.

The second potential type of conflict is related to safety considerations associated with accidents during take off and landing of aircraft. In order to minimize these types of potential hazards, CZs and APZs are delineated at the ends of either runway. Once again, the LUCGs provide recommended types of land uses that are considered suitable within these safety zones.

The remaining undeveloped acreage in the 2004 Noise Study area lies within several different zoning districts situated in the Cities of Benbrook, Fort Worth, Lake Worth, Westworth Village and White Settlement. A concerted approach to land use planning should be sought by all affected local governments to alleviate future potential development impacts.

A single land development plan should be considered for adoption and implementation by all affected local governments to alleviate confusion among realtors, developers, builders and the general public regarding acceptable land development.

Potential Impacts of Development on Maximum Mission Capability

Future residential development within the 2004 Noise Study Area is anticipated to occur at a considerably slower rate than experienced over the last decade. In fact, historical residential growth within the noise contours has been decreasing over the last decade, as shown in the existing land use analysis portion of this study.

This declining growth seems to support the future rate of residential development anticipated in the traffic model projections within the 2004 Noise Study Area over the forecast period. However, one factor that could change this scenario is future residential development outside the contours. As new subdivisions are built, the construction of these subdivision roads will have the potential to increase access to previously inaccessible land within the noise contour area. If this occurs, it may contribute to the lack of roadway access and municipal utilities, which tends to result in a lower rate of growth. In other words, historical growth rates, as well as land planning policies, may not necessarily preclude residential development within the 2004 Noise Study Area if market forces and land development patterns create pressure to make this land available for residential uses.

Residential Development

The full development potential or complete build-out of the undeveloped acreage remaining in the maximum mission capability impact area (JLUS study area), could result in additional construction of incompatible land uses. According to the standards prescribed in the AICUZ, all development in this area should be strongly evaluated for compatibility.

However, if it is determined by the community that residential development is necessary in areas with noise exposure between 65 dB DNL and 74 dB DNL, then noise level reduction measures should be implemented. For areas with noise exposure greater that 75 dB DNL, AICUZ recommends no residential development under any circumstances.

Non - Residential Development

Non-residential development within this noise impact area represents the potential for fewer land use conflicts, based on AICUZ standards. This is particularly true for commercial and industrial uses although public and quasi-public uses are considered less desirable since they may include larger public gatherings. However, for commercial and industrial uses, most types of land uses can be accommodated in all but the greatest noise exposure areas (i.e. greater than 75 dB DNL) if noise level reduction measures are incorporated into construction of the buildings.

Optional Approaches for Managing Future Development

Comprehensive Growth Management Plan (GMP): The GMP is an OEA program designed to help a community plan for military growth caused by new military personnel and their dependents. The OEA offers assistance to communities to help themselves by developing a GMP developed through a partnership between the impacted communities and the local military installation. The first step in developing a GMP is to form an ad hoc organization composed of public and private community leaders to assess the likely impacts of the military growth, plan for the community's response, and implement any identified activities. The ad hoc organization is formed under the auspices of a local or state sponsor. Local participants in the organization can include elected officials, business leaders, school district representatives, community facility and service providers, affected neighborhood organizations, homebuilders, local economic development organizations, the lodging industry, appropriate state officials, and representatives of the local military installation.

The organization begins the process with an analysis of the amount, timing, and important demographic characteristics (for example, the number of school-age children) of direct population growth. It also analyzes the number of DOD civilian, support contractor, and construction jobs needed to support the growth. In addition, the organization conducts an initial assessment of the important issues that need to be addressed, such as transportation, housing availability, utilities, public services, and education. Working committees are established to address those issues.

A successful GMP planning process includes the involvement of all interests and stakeholders and decisions by consensus. The GMP process also involves the development of an implementation strategy and action plan that include identifying the sources of capital funding needed to create the capacity to accommodate future growth. Such capital funding needs might include creating additional capacity in the areas of transportation, water and sewer systems, public schools, health care, and social service systems. It can also include providing the housing and commercial developments needed to support the new population and create employment for military spouses and dependents.

Conservation Partnering Authority: As previously discussed, the DOD is authorized to enter into service partnership agreements with eligible non-federal entities that share an interest in preserving and protecting land not under military control, particularly where incompatible development and/or loss of natural habitat does or would impact military base operations and readiness. Under the agreement, DOD funds can be used to acquire real estate in the vicinity of military installations to protect military training, testing operations, and readiness. Eligible entities include state and local governmental agencies and private conservation organizations, including local land trusts. The partnership agreement must provide for the acquisition of all rights, title, and interest, or any lesser interest, in real property by the eligible entity. The agreement must also provide for the sharing of acquisition costs.

SECTION VI

CONCLUSION

F-16 Fighting Falcon
(*Lockheed Martin*)

CONCLUSION

This study has been completed with the overarching objective of providing the participating local jurisdictions with a tool box of recommendations that they may consider for implementation within their respective communities.

The implementation phase requires action by and for the individual jurisdictions. While some of the recommendations are regional in nature, individual jurisdictional adoption of policies, rules and regulations are the foundation from which effective implementation will build. Moreover, these local actions will underpin the implementation of the regional recommendations.

We believe that, for this study to produce the intended effects, the participating jurisdictions should consider individual and regional recommendations in the context of those actions that produce the most effective land use and development standards for the preservation and expansion of NAS JRB.

We urge the local governments to adopt and aggressively implement the recommendations contained herein.

DFW Advisors
Michael R. Coker Company
Pavlik and Associates

SECTION VII

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SECTION VIII

APPENDICES

APPENDIX A

RESOLUTION SUPPORTING THE EXPANSION OF THE NAVAL AIR STATION JOINT RESERVE BASE (NAS JRB) AND RELATED COMMUNITY INITIATIVES

RESOLUTION SUPPORTING THE EXPANSION OF THE NAVAL AIR STATION JOINT RESERVE BASE (NAS JRB) AND RELATED COMMUNITY INITIATIVES

WHEREAS, the Naval Air Station Joint Reserve Base Fort Worth (NAS JRB) is recognized as one of the strongest economic engines in the North Central Texas region, and the need to protect the installation from encroachment of incompatible land uses is recognized as vital to its long-term existence; and,

WHEREAS, NAS JRB is the premier Joint Reserve Base in the United States and is home to more than 2,100 active duty military personnel and more than 7,000 Reserve and Guard personnel representing the Navy, Marine Corps, Air Force, Army, and Texas Air National Guard; and,

WHEREAS, Lockheed Martin, which employs more than 14,000 local citizens at its Fort Worth facility, shares NAS JRB's runway and utilizes the base's air support operations; and,

WHEREAS, the military has defined compatible land use in noise and safety zones surrounding the installation through the Air Installation Compatible Use Zone (AICUZ) study; and,

WHEREAS, development that is incompatible with AICUZ recommendations in the noise and safety zones may result in negative training impacts, such as reduced operations, reduced number of available training days, reduced training realism, and/or complete loss of flying mission; and,

WHEREAS, the cities of Benbrook, Fort Worth, Lake Worth, River Oaks, Westworth Village and White Settlement, and Tarrant County, have joined together in a Joint Land Use Study regarding urban encroachment around the installation; and,

WHEREAS, the Joint Land Use Study Policy Committee was convened in August of 2006 to oversee the Joint Land Use Study around NAS JRB and make recommendations relating to the preservation and improvement of NAS JRB consistent with the AICUZ study and community needs.

NOW, THEREFORE, BE IT HEREBY RESOLVED THAT:

Section 1. The JLUS Policy Committee endorses and supports (and recommends local government endorsement and support) of the current NAS JRB mission:

To provide a high quality training environment for active duty and reserve components of all branches of the Armed Services; to reduce redundancy and overhead by developing joint doctrine and operating procedures that create seamless functionality among host and tenant commands in base support and community service programs.

Section 2. The mission for the community in the next round of Base Realignment and Closure (BRAC) is to ensure that NAS JRB not only remain an active

and vital military installation, but also that NAS JRB receive additional units, squadrons, equipment and related full-time active duty military, Reserve, and Guard personnel.

Section 3. The JLUS Policy Committee endorses and supports (and recommends local government endorsement and support) of the initiatives shown in Attachment 1 in support of the current and future mission of NAS JRB.

Section 4. Each cooperating local partner should develop a resolution endorsing these recommendations, including the attached initiatives, and transmit that resolution to NAS JRB and NCTCOG, and other study partners as soon as practical.

Section 5. This resolution shall be transmitted to each impacted local government, and NAS JRB, DOD Office of Economic Adjustment, immediately upon adoption.

Section 6. This resolution shall be in effect immediately upon adoption.

Chuck Silcox, Chair, Joint Land Use Study Policy Committee
Councilmember, City of Fort Worth

I hereby certify that this resolution was adopted by the Joint Land Use Study Policy Committee on September 24, 2007.

Keith Bailey, Secretary, Joint Land Use Study Policy Committee
Councilmember, City of Benbrook

Attachment 1
Recommended Initiatives in Support of the Current and Future Mission of NAS JRB

1. The Naval Air Station Joint Reserve Base Regional Coordination Committee: The cooperating local governments should form a Naval Air Station Joint Reserve Base (NAS JRB) Regional Coordination Committee. The purpose of the NAS JRB Regional Coordination Committee shall be to develop, implement and monitor policies, programs and projects which improve opportunities to expand operations at NAS JRB in the next Base Realignment and Closure (BRAC) process. The Joint Land Use Study Policy Committee shall study and adopt an institutional structure for the board's governance.

When each of the entities has appointed voting members to the NAS JRB Regional Coordination Committee, the Policy Committee will transfer all responsibilities/roles to that group and dissolve. Until such time, recommendations of this resolution related to the NAS JRB Regional Coordination Committee activities shall be carried out by the JLUS Policy Committee.

2. Host Community Strategies: The NAS JRB Regional Coordination Committee shall implement strategies that will (1) educate the community about the economic, real estate, and security benefits associated with hosting NAS JRB and Lockheed Martin, (2) exchange information about regular, sporadic, or other major noise events taking place at NAS JRB and Lockheed Martin, and (3) serve the needs of active duty and reserve personnel and their families.

3. Planning Updates: Each entity should, with support and guidance of the NAS JRB Regional Coordination Committee, initiate updates to and/or develop comprehensive plans, area and other special plans, land use maps, and transportation plans to be responsive to the Air Installation Compatible Use Zone (AICUZ) study and the 2007 JLUS planning project.

4. Zoning Changes: Each municipality should, with support and guidance of the NAS JRB Regional Coordination Committee, pursue city-initiated zoning changes compliant with recommendations found in Tables VI-1 and VI-2 of the AICUZ study and the 2007 JLUS planning project.

5. Building Regulations: Each municipality should adopt, with support and guidance of the NAS JRB Regional Coordination Committee, local development regulations/building codes to comply with the AICUZ study and the 2007 JLUS planning project. Codes should be applicable to all new buildings.

6. Height of Structures: The NAS JRB Regional Coordination Committee shall develop a model ordinance and best management practices regarding the height of structures built surrounding NAS JRB. The area of interest shall be defined by the Federal Aviation Regulation, Part 77, Imaginary Surfaces, and by Terminal Instrument Procedures

(TERPS) surfaces surrounding NAS JRB. Each entity should adopt, with support and guidance of the NAS JRB Regional Coordination Committee, a local ordinance regulating the height of structures built in proximity to NAS JRB.

7. Light Surrounding NAS JRB: The NAS JRB Regional Coordination Committee shall develop a model ordinance and best management practices regarding outdoor lighting in the Clear Zone, Accident Potential Zone 1 and Accident Potential Zone 2 to minimize night time visual interference with flight operations. Each entity should adopt, with support and guidance of the NAS JRB Regional Coordination Committee, a local ordinance regulating the emission of light in proximity to NAS JRB.

8. Public Use Facilities: The NAS JRB Regional Coordination Committee shall inventory all public use buildings, such as educational structures and other public gathering places within the noise and safety zones. The NAS JRB Regional Coordination Committee shall make building specific recommendations for renovation or relocation. The NAS JRB Regional Coordination Committee shall develop a model ordinance and best management practices regarding locating new public buildings/public uses within the noise and safety zones. Each entity should adopt, with support and guidance of the NAS JRB Regional Coordination Committee, a local policy regulating the location or relocation of their own public use buildings in proximity to NAS JRB.

9. Storm Water Drainage Assessment: The NAS JRB Regional Coordination Committee shall conduct a Storm Water Drainage Assessment surrounding NAS JRB and consider recommending a Low Impact Development Strategy to reduce the volume of runoff to the base. The NAS JRB Regional Coordination Committee will assist impacted local governments with the implementation of such recommendations.

10. Real Estate Advisory Service: The NAS JRB Regional Coordination Committee shall develop educational materials, resources and consultation programs to assist property owners who wish to meet building standards which are compliant with the AICUZ study and the 2007 JLUS planning project.

11. Real Estate Disclosures: The NAS JRB Regional Coordination Committee shall assist the real estate community to meet applicable State law related to disclosures.

12. Surface Transportation Access: The NAS JRB Regional Coordination Committee shall study and recommend improvements to surface access around NAS JRB to include roadway geometry, safety, accessibility, roadway maintenance, mobility, reliability, air quality, transit, and goods movement. The NAS JRB Regional Coordination Committee shall develop partnerships with the Texas Department of Transportation, Regional Transportation Council, Department of Defense, local entities and others to prioritize and implement individual projects.

13. NAS JRB Regional Coordination Committee Development Review: The NAS JRB Regional Coordination Committee shall develop a Memorandum of Understanding between all impacted local governments creating an NAS JRB Regional Coordination Committee Development Review process. In this process, the NAS JRB Regional

14. Coordination Committee, all impacted local governments, NAS JRB, and Lockheed Martin, would review all comprehensive plan or area plan changes, development applications, zoning requests, and building permit applications from within the noise and safety zones from all entities. These reviews will be "comment only" and provide each entity the opportunity to be familiar with and comment on development plans throughout the noise and safety zones surrounding NAS JRB.

15. Public Purchase of Land: The JLUS Policy Committee endorses pursuing public acquisition of parcels and easements in the Clear Zone, Accident Potential Zone 1 and Accident Potential Zone 2 on all lands that are not compliant with the AICUZ study and the 2007 JLUS planning project. The JLUS Policy Committee recognizes that this is a long-term goal to be accomplished by acquisition of parcels and easements by voluntary sale. Acquisition of mineral rights is not included.

Phase 1: The NAS JRB Regional Coordination Committee shall establish agreements and partnerships as necessary to assist local partners in the voluntary acquisition of residential lands and related easements in the Clear Zone, Accident Potential Zone 1 and Accident Potential Zone 2.

Phase 2: The NAS JRB Regional Coordination Committee shall study the need for additional land acquisition strategies in the noise and safety zones. The NAS JRB Regional Coordination Committee shall establish priorities, agreements, and partnerships as necessary to assist local partners in the acquisition, maintenance, and (as applicable) redevelopment to conforming land use.

16. Other Encroachment Mitigation Efforts: The NAS JRB Regional Coordination Committee shall consider and recommend to the study partners, DOD, and the community other strategies related to preserving and enhancing the mission of the base and adopt recommendations as necessary.

17. Updates to Noise and Safety Zones: The NAS JRB Regional Coordination Committee shall support all DOD recommended updates to the noise and safety zones surrounding the installation in support of current and future mission requirements.

18. Funding of Recommendations: The NAS JRB Regional Coordination Committee shall support the pursuit of funding to implement the recommendations contained herein. All such recommendations are dependent upon the identification and availability of funding.

APPENDIX B

Chapter 241. Municipal And County Zoning Authority Around Airports

CHAPTER 241. MUNICIPAL AND COUNTY ZONING AUTHORITY AROUND AIRPORTS

SUBCHAPTER A. GENERAL PROVISIONS

§ 241.001. Short Title

This chapter may be cited as the Airport Zoning Act.
Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987.

§ 241.002. Legislative Findings

The legislature finds that:
(1) An airport hazard endangers the lives and property of users of the airport and of occupants of land in the vicinity of the airport;
(2) An airport hazard that is an obstruction reduces the size of the area available for the landing, taking off, and maneuvering of aircraft, tending to destroy or impair the utility of the airport and the public investment in the airport;
(3) The creation of an airport hazard is a public nuisance and an injury to the community served by the airport affected by the hazard;
(4) It is necessary in the interest of the public health, public safety, and general welfare to prevent the creation of an airport hazard;
(5) The creation of an airport hazard should be prevented, to the extent legally possible, by the exercise of the police power without compensation; and
(6) The prevention of the creation of an airport hazard and the elimination, the removal, the alteration, the mitigation, or the marking and lighting of an airport hazard are public purposes for which a political subdivision may raise and spend public funds and acquire land or interests in land.
Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987.

§ 241.003. Definitions

In this chapter:
(1) “Airport” means an area of land or water, publicly or privately owned, designed and set aside for the landing and taking off of aircraft and used or to be used in the interest of the public for that purpose. The term includes an area with installations relating to flights, including installations, facilities, and bases of operations for tracking flights or acquiring data concerning flights.
(2) “Airport hazard” means a structure or object of natural growth that obstructs the air space required for the taking off, landing, and flight of aircraft or that interferes with visual, 52 radar, radio, or other systems for tracking, acquiring data relating to, monitoring, or controlling aircraft.
(3) “Airport hazard area” means an area of land or water on which an airport hazard could exist.

(4) “Airport zoning regulation” means an airport hazard area zoning regulation and an airport compatible land use zoning regulation adopted under this chapter.

(5) “Centerline” means a line extending through the midpoint of each end of a runway.
(6) “Compatible land use” means a use of land adjacent to an airport that does not endanger the health, safety, or welfare of the owners, occupants, or users of the land because of levels of noise or vibrations or the risk of personal injury or property damage created by the operations of the airport, including the taking off and landing of aircraft.
(7) “Controlled compatible land us e area” means an area of land located outside airport boundaries and within a rectangle bounded by lines located no farther than 1-1/2 statute miles from the centerline of an instrument or primary runway and lines located no farther than five statute miles from each end of the paved surface of an instrument or primary runway.
(8) “Instrument runway” means an existing or planned runway of at least 3,200 feet for which an instrument landing procedure published by a defense agency of the federal government or the Federal Aviation Administration exists or is planned.
(9) “Obstruction” means a structure, growth, or other object, including a mobile object that exceeds a limiting height established by federal regulations or by an airport hazard area zoning regulation.
(10) “Political subdivision” means a municipality or county.
(11) “Primary runway” means an existing or planned paved runway, as shown in the official airport layout plan (ALP) of the airport, of at least 3,200 feet on which a majority of the approaches to and departures from the airport occur.
(12) “Runway” means a defined area of an airport prepared for the landing and taking off of aircraft along its length.
(13) “Structure” means an object constructed or installed by one or more persons and includes a building, tower, smokestack, and overhead transmission line.
Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987.

§ 241.004. Airport Used in Interest of Public

For the purposes of this chapter, an airport is used in the interest of the public if:
(1) The owner of the airport, by contract, license, or otherwise, permits the airport to be used by the public to an extent that the airport fulfills an essential community purpose; or
(2) The airport is used by the state or an agency of the state or by the United States for national defense purposes or for any federal program relating to flight.
Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987.

§ 241.005. Adoption of Regulation Includes Amendment or Other Change

A reference in this chapter to the adoption of an airport zoning regulation includes the amendment, repeal, or other change of a regulation. A reference to the adoption of an airport zoning regulation also includes the amendment of an airport zoning regulation existing on the date the law codified by this chapter took effect, which was September 5, 1947.

Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987.

SUBCHAPTER B. ADOPTION OF AIRPORT ZONING REGULATIONS

§ 241.011. Airport Hazard Area Zoning Regulations

(a) To prevent the creation of an airport hazard, a political subdivision in which an airport hazard area is located may adopt, administer, and enforce, under its police power, airport hazard area zoning regulations for the airport hazard area.
(b) The airport hazard area zoning regulations may divide an airport hazard area into zones and for each zone:

(1) Specify the land uses permitted;
(2) Regulate the type of structures; and
(3) Restrict the height of structures and objects of natural growth to prevent the creation of an obstruction to flight operations or air navigation.

Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987.

§ 241.012. Airport Compatible Land Use Zoning Regulations

(a) A political subdivision may adopt, administer, and enforce, under its police power, airport compatible land use zoning regulations for the part of a controlled compatible land use area located within the political subdivision if the airport is:
(1) used in the interest of the public to the benefit of the political subdivision; or
(2) located within the political subdivision and owned or operated by a federal defense agency or by the state.
(b) The political subdivision by ordinance or resolution may implement, in connection with airport compatible land use zoning regulations, any federal law or rules controlling the use of land located adjacent to or in the immediate vicinity of the airport.
(c) The airport compatible land use zoning regulations must include a statement that the airport fulfills an essential community purpose.
Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987.

§ 241.013. Extraterritorial Zoning in Political Subdivisions with Population of More Than 45,000

(a) A political subdivision with a population of more than 45,000 in which an airport used in the interest of the public to the benefit of the political subdivision is located may adopt, administer, and enforce:
(1) Airport hazard area zoning regulations applicable to an airport hazard area relating to the airport and located outside the political subdivision; and
(2) Airport compatible land use zoning regulations applicable to a controlled compatible land use area relating to the airport and located outside the political subdivision.

(b) The political subdivision has the same power to adopt, administer, and enforce airport hazard area zoning regulations or airport compatible land use zoning regulations under this section as that given a political subdivision by Sections 241.011 and 241.012.
(c) The airport hazard area zoning regulations or airport compatible land use zoning regulations must include a statement that the airport fulfills an essential community purpose.

Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987. Amended by Acts 1991, 72nd Leg., ch. 98, §§ 1, 2, eff. Aug. 26, 1991.

§ 241.014. Joint Airport Zoning Board

(a) A political subdivision to whose benefit an airport is used in the interest of the public or in which an airport owned or operated by a defense agency of the federal government or the state is located may create a joint airport zoning board with another political subdivision in which an airport hazard area or a controlled compatible land use area relating to the airport is located. The political subdivisions must act by resolution or ordinance in creating the joint board.
(b) The joint airport zoning board has the same power to adopt, administer, and enforce airport hazard area zoning regulations or airport compatible land use zoning regulations under this section as that given a political subdivision by Sections 241.011 and 241.012.
(c) The joint airport zoning board must consist of two members appointed by each of the political subdivisions creating the board and, in addition, a chairman elected by a majority of the appointed members.
(d) If an agency of the state owns and operates an airport located within an airport hazard area or controlled compatible land use area governed by a joint airport zoning board, the agency is entitled to have two members on the board.
(e) The joint airport zoning board for an airport that is owned or operated by a defense agency of the federal government and that is closed by the federal government may provide that zoning regulations adopted by the board continue in effect until the fourth anniversary of the date the airport is closed.
Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987. Amended by Acts 1997, 75th Leg., ch. 352, § 1, eff. May 27, 1997.
Amended by Acts 1999, 76th Leg., ch. 1176, § 1, eff. June 18, 1999.

§ 241.015. Incorporation of Airport Zoning Regulation into Comprehensive Zoning Ordinance

A political subdivision ma y incorporate an airport zoning regulation in a comprehensive zoning ordinance and administer and enforce it in connection with the administration and enforcement of the comprehensive zoning ordinance if:
(1) The two zoning regulations apply, in whole or in part, to the same area; and
(2) The comprehensive zoning ordinance includes, among other matters, a regulation on the height of buildings.
Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987.

§ 241.016. Airport Zoning Commission

(a) Before an airport zoning regulation may be adopted, a political subdivision acting unilaterally under Section 241.013 must appoint an airport zoning commission. If the political subdivision has a planning commission or comprehensive zoning commission, that commission may be designated as the airport zoning commission.
(b) The commission shall recommend the boundaries of the zones to be established and the regulations for these zones.

(c) The commission shall make a preliminary report and hold public hearings on the report before submitting a final report.
(d) Before the 15th day before the date of a hearing under Subsection (c), notice of the hearing shall be published in an official newspaper or a newspaper of general circulation in each political subdivision in which the airport hazard area or controlled compatible land use area to be zoned is located.
(e) A joint airport zoning board created under Section 241.014 is not required to appoint a commission under this section.
Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987. Amended by Acts 1995, 74th Leg., ch. 697, § 1, eff. Sept. 1, 1995.

§ 241.017. Procedural Limitations Applying to Adoption of Zoning Regulations

(a) The governing body of a political subdivision may not hold a public hearing or take other action concerning an airport zoning regulation until it receives the final report of the airport zoning commission.
(b) An airport zoning regulation may not be adopted except by action of the governing body of the political subdivision or a joint airport zoning board after the political subdivision or joint airport zoning board holds a public hearing on the matter at which parties in interest and citizens have an opportunity to be heard.
(c) Before the 15th day before the date of a hearing under Subsection (b), notice of the hearing must be published in an official newspaper or a newspaper of general circulation in each political subdivision in which the area to be zoned is located.
Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987. Amended by Acts 1995, 74th Leg., ch. 697, § 2, eff. Sept. 1, 1995.

§ 241.018. Reasonableness of Airport Zoning Regulations

(a) An airport zoning regulation must be reasonable and may impose a requirement or restriction only if the requirement or restriction is reasonably necessary to achieve the purposes of this chapter.
(b) In determining which airport zoning regulations to adopt, the governing body of a political subdivision or a joint airport zoning board shall consider, among other things:
(1) The character of the flying operations expected to be conducted at the airport;
(2) The nature of the terrain within the airport hazard area;
(3) The character of the neighborhood; and

(4) The current and possible uses of the property to be zoned.

Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987.

§ 241.019. Nonconforming Uses and Structures

Except as provided by Section 241.035, airport zoning regulations may not require:
(1) Changes in nonconforming land use existing on the date of the adoption of the regulations;

(2) The removal, lowering, or other change of a structure that does not conform to the regulations on the date of their adoption, including all phases or elements of a multiphase structure, regardless of whether actual construction has commenced, that received a determination of no hazard by the Federal Aviation Administration under 14 C.F.R., Part 77, before the regulations were adopted;
(3) The removal, lowering, or other change of an object of natural growth that does not conform to the regulations on the date of their adoption; or
(4) Any other interference in the continuation of a use that does not conform to the regulations on the date of their adoption.
Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987.

§ 241.020. Permits

(a) Airport zoning regulations may require that a permit be obtained before:
(1) A new structure is constructed;
(2) An existing structure is substantially changed or repaired;
(3) A new use is established; or
(4) An existing use is substantially changed.

(b) Airport zoning regulations must provide that a permit be obtained from the administrative agency authorized to administer and enforce the regulations before:

(1) A nonconforming structure may be replaced, rebuilt, or substantially changed or repaired; or
(2) A nonconforming object of natural growth may be replaced, substantially changed, allowed to grow higher, or replanted.

(c) A permit may not allow:

(1) The establishment of an airport hazard;
(2) A nonconforming use to be made;
(3) A nonconforming structure or object of natural growth to become higher than it was at the time of the adoption of the airport zoning regulations relating to the structure or object of natural growth or at the time of the application for the permit; or

(4) A nonconforming structure, object of natural growth, or use to become a greater hazard to air navigation than it was at the time of the adoption of the airport zoning regulations relating to the structure, object of natural growth, or use or at the time of the application for the permit.

(d) Except as provided by Subsection (c), an application for a permit shall be granted.

Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987.

SUBCHAPTER C. ADMINISTRATIVE AGENCY AND BOARD OF ADJUSTMENT

§ 241.031. Administrative Agency

(a) Airport zoning regulations must provide for the administration and enforcement of the regulations by an administrative agency. The administrative agency may be:

(1) An agency created by the regulations;

(2) An existing official, board, or agency of the political subdivision adopting the regulations; or

(3) An existing official, board, or other agency of a political subdivision that participated in the creation of a joint airport zoning board adopting the regulations, if satisfactory to that political subdivision.

(b) The administrative agency may not be the board of adjustment or include any member of the board.

(c) The administrative agency shall hear and decide all applications for permits under Section 241.020.

(d) The agency may not exercise any of the powers delegated to the board of adjustment.

Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987.

§ 241.032. Board of Adjustment

(a) Airport zoning regulations must provide for a board of adjustment.

(b) If a zoning board of appeals or adjustment exists, it may be designated as the board of adjustment under this chapter.

(c) If a zoning board of appeals or adjustment does not exist or is not designated as the board of adjustment under this chapter, a board of adjustment must be appointed. The board must consist of five members to be appointed for terms of two years. The appointing authority may remove a board member for cause on a written charge after a public hearing. A vacancy on the board shall be filled for the unexpired term.

(d) The concurring vote of four members of the board is necessary to:

(1) Reverse an order, requirement, decision, or determination of the administrative agency;

(2) Decide in favor of an applicant on a matter on which the board is required to pass under an airport zoning regulation; or

(3) Make a variation in an airport zoning regulation.

(e) The board shall adopt rules in accordance with the ordinance or resolution that created it.

(f) Meetings of the board are held at the call of the chairman and at other times as determined by the board. The chairman or acting chairman may administer oaths and compel the attendance of witnesses. All hearings of the board shall be open to the public.

(g) The board shall keep minutes of its proceedings that indicate the vote of each member on each question or the fact that a member is absent or fails to vote. The board shall keep records of its examinations and other official actions. The minutes and records shall be filed immediately in the board's office and are public records.

Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987.

§ 241.033. Authority of Board

The board of adjustment shall:
(1) hear and decide an appeal, as provided by Section 241.036, from an order, requirement, decision, or determination made by the administrative agency in the enforcement of an airport zoning regulation;
(2) hear and decide special exceptions to the terms of an airport zoning regulation when the regulation requires the board to do so; and (3) hear and decide specific variances under Section 241.034.
Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987.

§ 241. 034. Variances

(a) A person who desires to erect or increase the height of a structure, permit the growth of an object of natural growth, or otherwise use property in violation of an airport zoning regulation, may apply to the board of adjustment for a variance from the regulation.
(b) The board shall allow a variance from an airport zoning regulation if:
(1) A literal application or enforcement of the regulation would result in practical difficulty or unnecessary hardship; and
(2) The granting of the relief would:
(A) Result in substantial justice being done;
(B) Not be contrary to the public interest; and
(C) Be in accordance with the spirit of the regulation and this chapter.
(c) The board may impose any reasonable conditions on the variance that it considers necessary to accomplish the purposes of this chapter.
Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987.

§ 241.035. Hazard Marking and Lighting

If the administrative agency or board of adjustment considers it reasonable in the circumstances and advisable to accomplish the purposes of this chapter, the agency or board may require in a permit or a variance granted under this chapter that the owner of a structure or object of natural growth allow the political subdivision, at its own expense, to install, operate, and maintain on the structure or object of natural growth any markers and lights necessary to indicate to flyers the presence of an airport hazard.
Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987.

§ 241.036. Appeal to Board

(a) A decision of the administrative agency made in its administration of an airport zoning regulation may be appealed to the board of adjustment by:

(1) A person who is aggrieved by the decision;

(2) A taxpayer who is affected by the decision; or

(3) The governing body of a political subdivision or a joint airport zoning board that believes the decision is an improper application of the airport zoning regulation.

(b) The appellant must file with the board and the administrative agency a notice of appeal specifying the grounds for the appeal. The appeal must be filed within a reasonable time as determined by the rules of the board. On receiving the notice, the administrative agency shall immediately transmit to the board all the papers constituting the record of the action that is appealed.
(c) An appeal stays all proceedings in furtherance of the action that is appealed unless the administrative agency certifies in writing to the board facts supporting the agency's opinion that a stay would cause imminent peril to life or property. In that case, the proceedings may be stayed only by an order of the board, after notice to the administrative agency, if due cause is shown.
(d) The board shall set a reasonable time for the appeal hearing and shall give public notice of the hearing and due notice to the parties in interest. A party may appear at the appeal hearing in person or by agent or attorney. The board shall decide the appeal within a reasonable time.
(e) The board may reverse or affirm, in whole or in part, or modify the administrative agency's order, requirement, decision, or determination from which an appeal is taken and make the correct order, requirement, decision, or determination, and for that purpose the board has the same authority as the administrative agency.
Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987.

SUBCHAPTER D. JUDICIAL REVIEW AND OTHER REMEDIES

§ 241.041. Judicial Review of Board Decision

(a) A person who is aggrieved or a taxpayer who is affected by a decision of a board of adjustment, or the governing body of a political subdivision or a joint airport zoning board that believes a decision of a board of adjustment is illegal, may present to a court of record a verified petition stating that the decision of the board of adjustment is illegal in whole or in part and specifying the grounds of the illegality. The petition must be presented within 10 days after the date the decision is filed in the board's office.
(b) On the presentation of the petition, the court may grant a writ of certiorari directed to the board of adjustment to review the board's decision. Granting of the writ does not stay the proceedings on the decision under appeal, but on application and after notice to the board the court may grant a restraining order if due cause is shown.
(c) The board's return must be verified and must concisely state any pertinent and material facts that show the grounds of the decision that is appealed. The board is not required to return the original documents on which the board acted but may return certified or sworn copies of the documents or parts of the documents as provided by the writ.
Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987.

§ 241.042. Trial by Court

(a) The court, in an appeal from a decision of a board of adjustment as provided by Section 241.041, shall try and determine the case de novo on the basis of the facts adduced in the trial of the case in the court. The court shall independently rule on the facts and the law as in an ordinary civil suit.
(b) The court has exclusive jurisdiction to reverse or affirm, in whole or in part, or modify the decision that is appealed and, if necessary, may order further proceedings by the board.
(c) Costs may not be assessed against the board unless the court determines that the board acted with gross negligence, in bad faith, or with malice in making its decision.
Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987.

§ 241.043. Effect of Holding of the Court

If the court holds that an airport zoning regulation, although generally reasonable, interferes with the use or enjoyment of a particular structure or parcel of land to such an extent that, or is so onerous in its application to a particular structure or parcel of land that, the application of the regulation constitutes a taking or deprivation of property in violation of the state or federal constitution, the holding does not affect the application of the regulation to any other structure or parcel of land. Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987.

§ 241.044. Additional Remedies

(a) A political subdivision or joint airport zoning board adopting airport zoning regulations may bring an action in a court of competent jurisdiction to prevent, restrain, correct, or abate a violation of:

(1) This chapter;

(2) An airport zoning regulation adopted by the political subdivision or board; or

(3) An order or ruling made in connection with the administration or enforcement of an airport zoning regulation adopted by the political subdivision or board.

(b) The court shall grant any relief, including an injunction which may be mandatory, as may be proper under all the facts and circumstances of the case to accomplish the purposes of this chapter and the regulations adopted and orders and rulings made under it.

Acts 1987, 70th Leg., ch. 149, § 1, eff. Sept. 1, 1987.

SUBCHAPTER Z. MISCELLANEOUS PROVISIONS

§ 241.901. Conflict of an Airport Hazard Area Zoning Regulation with Another Regulation

(a) If an airport hazard area zoning regulation conflicts with any other regulation applicable to the same area, the more stringent limitation or requirement controls.

(b) Subsection (a) applies to any conflict with respect to the height of a structure or object of natural growth or any other matter.

(c) Subsection (a) applies to any regulation that conflicts with an airport hazard area zoning regulation whether the regulation was adopted by the political subdivision that adopted the airport zoning regulation or by another political subdivision.

APPENDIX C

Chapter 397. Strategic Planning Relating To Military Installations

LOCAL GOVERNMENT CODE

CHAPTER 397. STRATEGIC PLANNING RELATING TO MILITARY INSTALLATIONS

Sec. 397.001. DEFINITIONS. In this chapter:

(1) "Defense base" means a federally owned or operated military installation or facility that is presently functioning or was closed as a result of the United States Department of Defense base realignment process.

(2) "Defense community" means a political subdivision, including a municipality, county, or special district, that is adjacent to, is near, or encompasses any part of a defense base.

Added by Acts 2003, 78th Leg., ch. 149, Sec. 9, eff. May 27, 2003. Amended by Acts 2005, 79th Leg., ch. 396, Sec. 4, eff. June 17, 2005; Acts 2005, 79th Leg., ch. 1160, Sec. 7, eff. Sept. 1, 2005.

Sec. 397.002. DEFENSE BASE MILITARY VALUE ENHANCEMENT STATEMENT. (a) A defense community that applies for financial assistance from the Texas military value revolving loan account under Section 436.153, Government Code, shall prepare, in consultation with the authorities from each defense base associated with the community, a defense base military value enhancement statement that illustrates specific ways the funds will enhance the military value of the installations and must include the following information for each project:

(1) the purpose for which financial assistance is requested, including a description of the project;

(2) the source of other funds for the project;

(3) a statement on how the project will enhance the military value of the installation;

(4) whether the defense community has coordinated the project with authorities of the military installation and whether any approval has been obtained from those authorities;

(5) whether any portion of the project is to occur on the military installation;

(6) whether the project will have any negative impact on the natural or cultural environment;

(7) a description of any known negative factors arising from the project that will affect the community or the military installation; and

(8) a description of how the project will address future base realignment or closure.

(b) The Texas Military Preparedness Commission may require a defense community to provide any additional information the commission requires to evaluate the community's request for financial assistance under this section.

(c) Two or more defense communities near the same defense base that apply for financial assistance from the Texas military value revolving loan account may prepare a joint statement.

(d) A copy of the defense base military value enhancement statement shall be distributed to the authorities of each defense base included in the statement and the Texas Military Preparedness Commission.

(e) This section does not prohibit a defense community that is not applying for financial assistance from preparing a defense base military value enhancement statement under this section.

Added by Acts 2003, 78th Leg., ch. 149, Sec. 9, eff. May 27, 2003. Amended by Acts 2005, 79th Leg., ch. 396, Sec. 5, eff. June 17, 2005; Acts 2005, 79th Leg., ch. 1160, Sec. 8, eff. Sept. 1, 2005.

Sec. 397.0021. DEFENSE COMMUNITY ECONOMIC REDEVELOPMENT VALUE STATEMENT. (a) A defense community that is adjacent to a closed military installation and applies for financial assistance from the Texas military value revolving loan account shall prepare an economic redevelopment value statement that illustrates specific ways the funds will be used to promote economic development in the community and include the following information for each project:

(1) the purpose for which financial assistance is requested, including a description of the project;

(2) the source of other funds for the project;

(3) a statement on how the project will promote economic development in the community;

(4) whether any portion of the project is to occur on a closed military installation;

(5) whether any approval has been obtained from those authorities retaining or receiving title to that portion of the closed installation to be affected by the project;

(6) whether the project will have any negative impact on the natural or cultural environment; and

(7) a description of any known negative factors arising from the project that will affect the defense community.

(b) The Texas Military Preparedness Commission may require a defense community to provide any additional information the commission requires to evaluate the community's request for financial assistance under this section.

(c) Two or more defense communities near the same defense base that apply for financial assistance from the Texas military value revolving loan account may prepare a joint statement.

(d) A copy of the economic redevelopment value statement shall be distributed to the Texas Military Preparedness Commission and any defense community which may be affected by the resulting project.

(e) This section does not prohibit a defense community that is not applying for financial assistance from preparing an economic redevelopment value statement under this section.

Added by Acts 2005, 79th Leg., ch. 396, Sec. 6, eff. June 17, 2005; Acts 2005, 79th Leg., ch. 1160, Sec. 9, eff. Sept. 1, 2005.

Sec. 397.003. COMPREHENSIVE DEFENSE INSTALLATION AND COMMUNITY STRATEGIC IMPACT PLAN. (a) A defense community may request financial assistance from the Texas military value revolving loan account to prepare a comprehensive defense

installation and community strategic impact plan that states the defense community's long-range goals and development proposals relating to the following purposes:

(1) controlling negative effects of future growth of the defense community on the defense base and minimizing encroachment on military exercises or training activities connected to the base;

(2) enhancing the military value of the defense base while reducing operating costs; and

(3) identifying which, if any, property and services in a region can be shared by the defense base and the defense community.

(b) The comprehensive defense installation and community strategic impact plan should include, if appropriate, maps, diagrams, and text to support its proposals and must include the following elements as they relate to each defense base included in the plan:

(1) a land use element that identifies:

(A) proposed distribution, location, and extent of land uses such as housing, business, industry, agriculture, recreation, public buildings and grounds, and other categories of public and private land uses as those uses may impact the defense base; and

(B) existing and proposed regulations of land uses, including zoning, annexation, or planning regulations as those regulations may impact the defense base;

(2) a transportation element that identifies the location and extent of existing and proposed freeways, streets, and roads and other modes of transportation;

(3) a population growth element that identifies past and anticipated population trends;

(4) a water resources element that:

(A) addresses currently available surface water and groundwater supplies; and

(B) addresses future growth projections and ways in which the water supply needs of the defense community and the defense base can be adequately served by the existing resources, or if such a need is anticipated, plans for securing additional water supplies;

(5) a conservation element that describes methods for conservation, development, and use of natural resources, including land, forests, soils, rivers and other waters, wildlife, and other natural resources;

(6) an open-space area element that includes:

(A) a list of existing open-space land areas;

(B) an analysis of the defense base's forecasted needs for open-space areas to conduct its military training activities; and

(C) suggested strategies under which land on which some level of development has occurred can make a transition to an open-space area, if needed;

(7) a restricted airspace element that creates buffer zones, if needed, between the defense base and the defense community; and

(8) a military training route element that identifies existing routes and proposes plans for additional routes, if needed.

(c) Two or more defense communities near the same defense base may prepare a joint plan.

Added by Acts 2003, 78th Leg., ch. 149, Sec. 9, eff. May 27, 2003.

Sec. 397.004. PLANNING MANUAL. A defense community that has prepared a comprehensive defense installation and community strategic impact plan described by Section 397.003 is encouraged to develop, in coordination with the authorities of each defense base associated with the community, a planning manual based on the proposals contained in the plan. The manual should adopt guidelines for community planning and development to further the purposes described under Section 397.002. The defense community should, from time to time, consult with defense base authorities regarding any changes needed in the planning manual guidelines adopted under this section.

Added by Acts 2003, 78th Leg., ch. 149, Sec. 9, eff. May 27, 2003.

Sec. 397.005. CONSULTATION WITH DEFENSE BASE AUTHORITIES. If a defense community determines that an ordinance, rule, or plan proposed by the community may impact a defense base or the military exercise or training activities connected to the base, the defense community shall seek comments and analysis from the defense base authorities concerning the compatibility of the proposed ordinance, rule, or plan with base operations. The defense community shall consider and analyze the comments and

analysis before making a final determination relating to the proposed ordinance, rule, or plan.

Added by Acts 2003, 78th Leg., ch. 149, Sec. 9, eff. May 27, 2003.

APPENDIX D

Sample Airport Environs Ordinance

ARTICLE XXXXXX
AIRPORT ENVIRONS

XX.00.00 FINDINGS: The Board of County Commissioners of Tarrant County has considered, among other things, the character of the operations conducted and proposed to be conducted at the various airports in the applicable areas of Tarrant County, the nature of the terrain and the character of the area within the airport hazard area; the current uses of property and the uses for which it is applicable, and the Board finds as follows:

A. There exist airports within Tarrant County and in proximity to Tarrant County whose operations are potentially inimical to the health, safety and general welfare of the citizens of Tarrant County;
B. Airport hazards endanger the lives and property of users and of airports and occupants and owners of property in their vicinity;
C. Airports produce noise which is not compatible with residential uses and certain commercial and industrial uses;
D. Obstructions reduce the size of the area available for the landing, taking off and maneuvering of aircraft, thus tending to destroy or impair the utility of the airport and the public investment therein;
E. The creation or establishment of an airport hazard injures the community served by the airport in question; and
F. In the interest of the public health, safety and general welfare, the creation or establishment of airport hazards must be prevented.

XX.01.00 APPLICABILITY: The regulations on land use set forth herein are applicable to all lands within the delineated zones and surfaces set forth in this article. The delineated zones shall be an overlay district established and delineated on the adopted zoning maps.

XX.02.00 CONFLICTING REGULATIONS: In the event of conflict between any regulations in this article and any other regulations applicable to the same property, the more stringent limitation or regulation shall govern and prevail.

XX.03.00 MILITARY AIRPORT ZONES AND SURFACES: The following definitions describe special zones or surfaces within, adjacent to or near a military airport. These special zones or surfaces are used to protect specific airspace areas or specific ground areas within the airport environ. All imaginary surfaces shall be consistent with the most recent applicable definitions set forth in Federal Air Regulations (FAR) Part 77 (Obstructions to Navigable Airspace).

A. **Primary Surface:** means an area longitudinally centered on a runway, extending 200 feet beyond each paved end.

B. **Runway Protection Zone (RPZ):** The RPZ extends from each end of the primary surface to enhance the protection of people and property on the ground. The Runway Protection Zone is trapezoidal in shape and centered about the extended runway

centerline. The RPZ dimension for a particular runway end is a function of the type of aircraft and the approach visibility minimum associated for that runway end.

C. **Approach Surface (AS):** A surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the primary surface. An approach surface is applied to each end of each runway based upon the type of approach available or planned for that runway end.

D. **Approach Surface Floor (ASF):** The ground or water surface beneath the approach surface. For purposes of this ordinance, the approach surface floor shall extend 5,000 feet from the ends of the primary surface established as of July 1, 2007. Any portion of the approach surface floor extending beyond the outer end of the approach surface will have the same width as the greatest width of the approach surface.

E. **Horizontal Surface:** The horizontal surface is a horizontal plane located 150 feet above the established airport elevation, covering an area from the transitional surface to the conical surface. The perimeter is constructed by swinging arcs from the center of each end of the primary surface and connecting the adjacent arcs by lines tangent to those areas.

F. **Conical Surface:** A surface extending outward and upward from the periphery of the horizontal surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

G. **Conical Surface Floor (CSF):** The ground or water surface beneath the conical surface.

H. **Transitional Surface:** Transitional surfaces extend outward and upward at right angles to the runway centerline and are extended at a slope of seven (7) feet horizontally for each foot vertically (7:1) from the sides of the primary and approach surfaces. The transitional surfaces extend to where they intercept the horizontal surface at a height of 150 feet above the runway elevation.

I. **Military Airport Zone (MAZ):** The Military Airport Zone is an overlay district that addresses land use compatibility with airport operations and structure height within the immediate airport vicinity most affected by take-off and landing patterns and airport ground activities. It covers an area extending one-half mile from the runway. The Military Airport Zone includes any portion of imaginary surfaces defined by Federal Aviation Regulations (FAR, Part 77) that lie within its half-mile perimeter. Serving principally to protect the airport from the encroachment of incompatible development, the Military Airport Zone also serves to protect health, safety, and quality of life for people living, working, or visiting the area most affected by airport activities.

J. **Public Airport Influence Area (PAIA):** The Public Airport Influence Area (PAIA) extends a distance of two miles from the runway centerline and contains those areas defined by Federal Aviation Regulations (FAR, Part 77) as imaginary surfaces. It serves

principally to addresses land uses and structure heights that may create potential threat to flight safety and operation for aircraft approaching or departing an airport.

K. **Public Airport Notification Zone:** Public Airport Notification Zones are those areas within which notification of airfield proximity is required when property is sold or leased.

XX.03.01 HEIGHT LIMITATIONS WITHIN PUBLIC AIRPORT ENVIRONS: A building, structure, use or tree that penetrates any of the Federal Aviation Administration's designated imaginary surfaces or zones constitutes an obstruction, as defined by Federal Air Regulations (FAR), Part 77. Height of buildings, structures, or trees within environs surrounding a public airport shall not create an unreasonable threat to aircraft operations and safety.

A. Any property or area located in more than one of the zones or surfaces described in this section shall be considered to be only in the zone or surface with the more restrictive height limitation.

B. Except as otherwise provided, no structure shall be constructed or maintained, or tree permitted to grow within any zone or surface created herein in excess of the height limitations established herein. In addition, no structure or obstruction will be permitted within Tarrant County that could potentially change minimum obstruction clearance altitude, minimum descent altitude or a decision height.

C. A structure or tree will not exceed 35 feet in height; or, if greater than 35 feet in height, will not penetrate the approach, transitional, horizontal, or conical surface zones of the airport for any existing or planned approaches as defined by FAR, Part 77. The height of structures and trees within a Public Airport Environ shall comply with restrictions set forth in Table XX-1.

Table XX-1
Height Restrictions Public/Private Airport Environ

Structure Type	Runway Protection Zone (RPZ)	Approach Surface Floor	PAZ	Conical Surface Floor	PAIA
Single Family Residential Structure	Structure Not Allowed	[1]	[1]	[1]	[1]
Multiple Family Residential Structure	Structure Not Allowed	[1]	Structure Not allowed	[1]	[1]
Non-Residential (Habitable Space)	Structure Not Allowed	[1]	[1]	[1]	[1]
Non-Residential Façade (Non-Habitable Space), Steeples, Chimneys, Smoke Stacks	Structure Not Allowed	50'	50'	1	1
Communication Towers/Radio or TV Transmission Towers	Structure Not Allowed	Structure Not allowed	Structure Not allowed	150'	150'
Water Tower	Structure Not Allowed	Structure Not allowed	50'	150'	150'
Above Ground Local Utility or Electric Service Lines	Structure Not Allowed	[1]	[1]	[1]	[1]
Regional Electric Transmission Lines	Structure Not Allowed	150'	Structure Not Allowed	150'	150'

[1] Height restricted by applicable zoning category unless otherwise restricted by this ordinance.

XX.03.02 NEW PUBLIC OR PRIVATE AIRPORTS: Development or expansion of any public or private airport, airfield, or landing strip, developed or expanded after the effective date of this Article, requires the establishment of a public airport overlay zone (PAZ) through an ordinance adopted by the County Commission. Airports or runways shall only be located on property assigned an Industrial zoning category on the official zoning map. Airports owned or controlled by a military branch are not public airports for the purposes of this Article. All new public or private airports, heliports, or landing fields shall be designed so that the incidence of aircraft passing near preexisting dwellings or places of public assembly is minimized. New public or private airports shall be located in areas where air traffic will not expose residential uses to more than 55 decibel (day/night average) noise levels.

XX.03.03 USE RESTRICTIONS: Notwithstanding any provision of Article ____ of this ordinance, the permitted land use for any property within a Public Airport Zone or Public Airport Influence Area shall be modified as set forth in Table XX-2.

A. Any property or area located in more than one of the zones or surfaces described in Section XX.03.00 shall be considered only in the zone or surface with the more restrictive or limited use.

B. Incompatible Uses or Activities: Uses or activities determined to be incompatible with airport operations, or contribute to a potential threat to flight safety, are prohibited

within the designated zone or surface. An "N" appearing under a zone or surface category in Table XX-2 means that the use or activity is incompatible and not allowed.

C. Compatible Uses or Activities: Article ____ provides generalized description of permitted uses and activities for each zoning category. Table XX-2 provides a more detail description of uses and activities that are determined to be compatible with airport operations and aircraft flight safety for public airports. A land use is a permissible use within an airport zone or imaginary surface category if such use is allowed within the underlying zoning category, as defined in Article ____, and if denoted as a compatible use within Table XX-2. A land use is compatible in an airport zone or imaginary surface if denoted by a Y" in Table XX-2.

D. Conditional Uses or Activities: Certain land uses are incompatible with and prohibited within a airport environ zone or surface except when a development complies with conditions or specific development standards that create compatibility. Land uses denoted with a C" in Table XX-2 are not allowed unless determined to be compliant with conditional use criteria set forth in Section XX.03.04.

Table XX-2
Use Restrictions within Public/Private Airport Environs Zones and Surfaces

Land Use	RPZ	ASF	PAZ	PAIA
Residential				
Single Family Dwelling	N	Y	Y	Y
Multifamily Dwellings, Including Duplexes	N	N	N	Y
Transient Lodging Including Hotels And Group Quarters	N	N	Y	Y
Industrial/Manufacturing				
Food And Kindred Products; Textile Mill Products; Paper Mills; Any Use Industrial Activity Generating Smoke Or Steam Reaching 150 Feet Above Ground Level	N	N	N	N
Apparel; Chemicals & Allied Products Activities; Petroleum Refining & Related Rubber & Misc. Plastic Products	N	N	N	C
Lumber & Wood Products; Furniture & Fixtures; Paper And Allied Products; Printing & Publishing; Stone, Clay & Glass Products; Primary Metal Industries; Fabricated Metal Products; Product Assembly; Motor Freight	N	N	Y	Y
Professional, Scientific & Control Instruments	N	N	Y	Y
Any Manufacturing Sensitive To Ground or Air Vibration	N	N	N	C
Printing And Publishing	N	Y	Y	Y
Aerospace Product, Parts Manufacturing, Or Related Activities	N	N	Y	Y
Business and Professional Services				
Finance; Real Estate; Insurance; Personal Services; Business Services; Professional Services; Indoor Recreation Services	N	N	Y	Y
Telemarketing Bureaus	N	N	N	Y
Hospitals, Medical Offices	N	N	C	Y
Communications And Utilities				

APPENDIX E

Sample Comprehensive Plan Amendments

Option 1.

PROPOSED COMPREHENSIVE PLAN OBJECTIVES & POLICIES

Objectives:

1. Develop regulations that minimize incompatible uses in Accident Potential Zone I as follows:

a. Prohibit any new residential development.

b. Prohibit any new use which involves release of airborne substances, such as steam, dust, and smoke which interfere with aircraft operations.

c. Prohibit any new use which emits light, direct or indirect (reflections), which interfere with pilot's vision.

d. Facilities which emit electrical currents should be installed in a manner that does not interfere with communication systems or navigational equipment.

e. Prohibit any new use which attracts birds or waterfowl (i.e., sanitary landfills, feeding stations, and the growth of certain vegetation).

2. Coordinate land use regulations developed to minimize land use incompatibilities in Accident Potential Zone II (APZ II) as follows:

a. Prohibit any new use which involves release of airborne substances, such as steam, dust, and smoke which interfere with aircraft operations.

b. Prohibit any new use which emits light, direct or indirect (reflections), which interfere with pilot’s vision.

c. Facilities which emit electrical currents should be installed in a manner that does not interfere with communication systems or navigational equipment.

d. Prohibit any new use which attracts birds or waterfowl (i.e., sanitary landfills, feeding stations, and the growth of certain vegetation).

f. Prohibit any new development or redevelopment which results in an increase in density or intensity of current development.

3. New churches, schools, libraries, and similar buildings that concentrate people should not be located in Accident Potential Zones I or II.

4. Adopt Aircraft Accident Potential Areas as identified in the NAS JRB Fort Worth Installation Compatible Use Zone Study (AICUZ).

5. Upon adoption of accident potential zones, landlords, housing referral agencies, real estate agents, sellers, and lenders should include disclosure statements in rental agreements and purchase agreements.

6. Adopt the area within the 65 Ldn noise contour shown in the NAS JRB Fort Worth Air Installation Compatible Use Zone Study (AICUZ) as "aircraft noise sensitive" areas in local Environmental Regulations. Aircraft noise sensitive areas should be updated when new noise contours are identified in amendments to AICUZ.

7. Coordinate land use regulations developed for the Aircraft Noise Sensitive Areas.

8. Adopt regulations in the 75-80 Ldn noise contour as follows:

a. Permit no new residential development.

b. Permit no day care facilities, schools or other facilities which incorporate outside activities.

c. Permit low intensity uses such as golf courses.

d. Permit manufacturing; cultural facilities such as auditoriums, public meeting facilities, theaters; and medical facilities when the building envelope reduces aircraft noise transmissions to the Department of Housing and Urban Development (HUD) standards.

9. Provide information to the public on how to achieve aircraft noise reduction when remodeling buildings.

10. Consider the military installations as an affected agency for land use planning decisions.

11. Invite the military to participate as members on growth management committees.

12. Provide opportunities for the military to participate in local and regional planning issues and programs.

13. Establish periodic meetings of elected local, state and federal officials and military commanders on growth management issues of mutual concern.

14. Environmental policies adopted by the military should continue to reinforce the environmental policies of surrounding jurisdictions.

15. Comprehensive Plan policies pertaining to environmental issues should agree with and not degrade the environmental policies of the military installations.

Sample Comprehensive Plan Policy Statements

• The ____ requires disclosure at the time of property transfers and the issuance of building permits through the provisions of the _____ Overlay District.

• _____ will amend the zoning ordinance to identify these areas and additional requirements beyond existing zoning. These requirements may limit uses in the Compatible Use Zones (CUZ).

• The ____ will not rezone areas within the CUZ to a zoning district that allows higher residential densities than the current district.

• The _____ will encourage property owners and developers within the _____ Overlay District to consider compatible land uses and appropriate construction techniques when developing or redeveloping their property.

• ____ will provide property owners with informational brochures and access to maps that can assist them in evaluating the impact of potential accidents or noise on their property. The _____ has available a *sound attenuation construction manual* to offer voluntary measures to reduce the impacts of sound within structures within the CUZ.

Option 2

PROPOSED COMPREHENSIVE PLAN POLICIES

Goal X.1: To protect the current and long-term viability of military and public airfields for purposes of promoting a diverse local economy that supports rewarding jobs and quality of life for County residents, and support effective and safe training environments for the Nation's military forces while protecting the health and safety of the County's citizens.

Objective X.1.A: The County will ensure that future development within adopted Military Airport Zones (MAZs) and Public Airport Zones (PAZs) will not negatively impact current and long-term viable use of the airfield, will promote health and welfare by limiting incompatible land uses, and allow compatible land uses within such areas.

Policy X.X.A.1: The County hereby establishes military airport zones (MAZ) and public airport zones (PAZ) that will serve as overlay districts, within which growth management policies and regulatory techniques shall guide land use activities and

construction in a manner compatible with the long-term viability of airports and military installations and the protection of public health and safety.
For Naval Air Station Fort Worth, the MAZ boundaries extend approximately one half mile from the perimeter of each airfield and encompass all Air Installation Compatible Use Zones

(AICUZ) and noise zones. From public airports, the PAZ boundaries extend one half mile from the runway.

MAZ and PAZ boundaries appear on Map ### of the Future Land Use Map Series and are consistent with the study area boundaries of the NAS JRB Fort Worth Joint Land Use Study (October 2007).

Policy X.X.A.2: Future Land Use Map amendments and rezoning within the MAZs that would allow for increased gross residential densities are prohibited.

Policy X.X.A.3: Conservation and agriculture uses adjacent to military airfields provide a buffer between the airfield and incompatible development; therefore, the County will, whenever feasible, support efforts to purchase conservation lands, conservation easements or agriculture easements, and will encourage the establishment of conservation or agriculture easements as part of development plans.

Policy X.X.A.4: The County shall encourage the location of compatible commercial and industrial uses adjacent to or within MAZ and PAZ boundaries at locations where roads, water, and sewer are available and such uses will not adversely impact existing established residential neighborhoods.

Policy X.X.A.5: The County shall review Comprehensive Plan amendments for compatibility with the Air Installation Compatible Use Zone program. The Tarrant County Board of County Commissioners may deny a petition for a Comprehensive Plan amendment if determined that such amendment is incompatible with the AICUZ program.

Objective X.X.B: Continue to foster meaningful intergovernmental coordination between the County, the military, and the Federal Aviation Administration to ensure that land use decisions are not in conflict with military operations or federal aviation standards, and that such decisions promote the health and safety of the County's public.

Policy X.X.B.1: The County shall further protect the current and long-term viability of military installations and airports through effective coordination and communication with NAS Fort Worth and the U.S. Department of Defense.

Policy X.X.B.2: The Local Planning Board will include, as ex-officio members, appropriate local Department of Defense representatives to advise on land use issues with the potential to impact military facilities or operations.

Policy X.X.B.3: All applications for site plan or subdivision review, variances, conditional uses and special exceptions located within an MAZ shall be referred to the appropriate local Department of Defense officials for review and comment.

Policy X.X.B.4: The location of a telecommunications tower will require written evidence that the tower meets the approval of the appropriate local Department of Defense officials.

Policy X.X.B.5: The County shall require applicants of development within the PAZ or other areas of the County to obtain necessary approvals from the Federal Aviation Administration (FAA) for development encroaching jurisdictional airspace controlled by the FAA.

Policy X.X.B.6: The County will continue to coordinate with NAS Fort Worth's Field representatives regarding the County's economic development program. Such coordination will occur primarily through the North Central Texas Council of Governments and may include such things as ex-officio membership on the Aviation Board and joint use of military facilities for commercial, industrial, or community activities when appropriate.

Objective X.X.C: Inform prospective residents and property owners within a MAZ or PAZ of the impacts inherent to military installations and airports, including but not limited to noise and other similar nuisances and accident potential risks.

Policy X.X.C.1: Within MAZs and PAZs, the proximity of property to an airfield must be disclosed by the seller at the earliest possible stage of any land sales activity.

Policy X.X.C.2: The County will facilitate the provision of information to the public regarding the location of military and public airfields and impacts typically associated with these facilities through such means as posting maps on the County's website, installing signage near airfields where appropriate, and requiring MAZ and PAZ, accident potential zone, and noise zone information on site plans and subdivision plats.

APPENDIX F

Sample Avigation Easement

STATE OF _____
COUNTY OF _____
CITY OF _____

THIS INDENTURE, dated this _____ day of _____, 19_____, by and between _____, hereinafter called GRANTOR, and [County/City] a [political subdivision or municipality] of the State of Texas, hereinafter called the GRANTEE.

WHEREAS, the GRANTOR is the owner of certain premises situate, lying and being in the [County/City] of _____, Texas, as hereinafter described; and

WHEREAS, the GRANTEE, is the owner and operator of the _____ Airport Located in [County/City] of _____, Texas.

NOW, THEREFORE, in consideration of [Ten Dollars ($10.00)] and other good and valuable consideration paid by the GRANTEE to the GRANTOR, the receipt of which is hereby acknowledged, the right-of-way for the over-flight of aircraft in and through the airspace above the following described property located within _____ [County/City], to wit: [Property Description]

The GRANTOR hereby gives and grants to the GRANTEE, its successors and assigns, and to all persons lawfully using said airport, the right and easement to use the airspace above the GRANTORÕS property and to create noise normally associated with the routine operation of aircraft and for avigation purposes and without liability for any necessary, convenient or operational incident, the effects thereof whether as the same presently or in the future exist, but said right or easement hereby granted is to be executed only in a manner reasonably or substantially consistent with the safe and proper flying procedures promulgated by an agency of the government of the United States or Texas.

The rights and easements hereby granted and conveyed, and the covenants hereby entered into, shall not be construed to deprive the GRANTOR of any claims for injury or damages against any person for negligence whereby injury or damage is caused by actual or direct physical contact, without intervening media, but shall operate and constitute a full, complete and total release, quit claim and discharge of the GRANTEE, its successors and assigns, its agents and employees, and all persons lawfully using said airport and the owners and operations of aircraft lawfully using the airspace hereby conveyed, from all claims and demands whatever, not solely and proximately resulting from negligent actual or direct physical contact, if being the intent of the GRANTOR herein to waive its right to suit for nuisance and noise incident to the operation of the [Name] airport by the GRANTEE herein.

All rights, easements, releases, benefits and estates granted hereunder shall be covenants running with the land as is hereinabove described.

In the event the GRANTEE abandons the operation of said airport, all rights herein granted shall cease and revert to the GRANTOR, his successors or assigns.

IN WITNESS WHEREOF, said GRANTOR in pursuance to his due and legal action, has executed these presents, as of the date first above written.

_____
GRANTOR

WITNESSETH: WITNESSETH:

_____

STATE OF _____
COUNTY OF _____

THE FOREGOING instrument was acknowledged before me this _____ day of

_____, 20_____, by_____, GRANTOR,

who is personally known to me or who has produced

_____ [type of identification] as identification and

who did [or did not] take an oath.

_____
Signature of Notary

_____
Typed/Printed Name of Notary

_____
Title

My Commission Expires: _____

The following Avigation Easement is an example provided by the Federal Aviation Administration, Central Region Airports Division.

WHEREAS, (full name of property owner(s)), hereinafter called the Grantors, are the owners in fee of that certain parcel of land situated in the City of _____, County of _____, State of Texas, more particularly described as follows:

(Insert legal description of property to be covered by easement)

hereinafter called Grantor property, and outlined on the attached map (Exhibit 1);

NOW, THEREFORE, in consideration of the sum of dollars _____($) and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Grantors, for they, their heirs, administrators, executors, successors and assigns, do hereby grant, bargain, sell, and convey unto (owner and operator of airport; i.e., City of), hereinafter called the Grantee, its successors and assigns, for the use and benefit of the public, an easement and right of way, appurtenant to (full name of airport) for the unobstructed use and passage of all types of aircraft (as hereinafter defined), in and through the airspace above Grantors property above an imaginary plane rising and extending in a generally (i.e., Southerly) direction over Grantors property, said imaginary plane running from approximately (i.e., 874) feet Mean Sea level above (Point L13) on Exhibit 1 at the rate of one foot vertically for each (i.e. 50) feet horizontally to approximately (i.e. 878) feet Mean Sea level above (Point L11) on Exhibit 1, to an infinite height above said imaginary plane.

Said easement shall be appurtenant to and for the benefit of the real property now known as (name of airport) including any additions thereto wherever located, hereafter made by (name of airport owner) or its successors and assigns, guests, and invitees, including any and all persons, firms, or corporations operating aircraft to or from the airport.
Said easement and burden, together with all things which may be alleged to be incident to or resulting from the use and enjoyment of said easement, including, but not limited to the right to cause in all airspace above or in the vicinity of the surface of Grantors property such noise, vibrations, fumes, deposits of dust or other particulate matter, fuel particles (which are incidental to the normal operation of said aircraft), fear, interference with sleep and communication and any and all other effects that may be alleged to be incident to or caused by the operation of aircraft over or in the vicinity of Grantor property or in landing at or taking off from, or operating at or on said (full name of airport) is hereby granted; and Grantors do hereby fully waive, remise, and release any right or cause of action which they may now have or which they may have in the future against Grantee, its successor and assigns, due to such noise, vibrations, fumes, dust, fuel particles and all other effects that may be caused or may have been caused by the operation of aircraft landing at, or taking off from, or operating at or on said (full name of airport).

As used herein, the term aircraft shall mean any and all types of aircraft, whether now in existence or hereafter manufactured and developed, to include, but not limited to, jet aircraft, propeller driven aircraft, civil aircraft, military aircraft, commercial aircraft, helicopters and all types of aircraft or vehicles now in existence or hereafter developed, regardless of existing or future noise levels, for the purpose of transporting persons or property through the air, by whoever owned or operated.

The easement and right-of-way hereby grants to the Grantee the continuing right to prevent the erection or growth upon Grantor property of any building, structure, tree, or other object, extending into the airspace above the aforesaid imaginary plane, and to remove from said air space, or at the sole option of the Grantee, as an alternative, to mark and light as obstructions to air navigation, any such building, structure, tree or other objects now upon, or which in the future may be upon Grantor property, together with the right of ingress to, egress from, and passage over Grantor property for the above purpose.

(THE FOLLOWING PROVISION MUST BE INCLUDED IN AN AVIGATION EASEMENT)

The Grantors, for themselves, their heirs, administrators, executors, successors, and assigns, do hereby agree that for and during the life of said avigation easement, they will not hereafter erect, permit the erection or growth of, or permit or suffer to remain upon Grantor property any structure in the Runway Protection Zone that is an airport hazard or which might create glare or misleading lights or lead to the construction of residences, fuel handling and storage facilities, or smoke generating activities; and the grantors, for themselves, their heirs, administrators, executors, successors, and assigns, further agree they will not permit places of public assembly upon Grantor property, such as, churches, schools, office buildings, shopping centers, restaurants, child care facilities, and stadiums.

AND for the consideration hereinabove set forth, the Grantors, for themselves, their heirs, administrators, executors, successors, and assigns, do hereby agree that for and during the life of said easement and right of way, they will not hereafter erect, permit the erection or growth of, or permit or suffer to remain upon Grantor property any building, structure, tree or other object extending into the airspace above the aforesaid imaginary plane, and that they shall not hereafter use or permit or suffer the use of Grantor property in such a manner as to create electrical interference with radio communication between any installation upon said airport and aircraft, or as to make it difficult for flyers to distinguish between airport lights and others, or to permit any use of the Grantor land that causes a discharge of fumes, dust or smoke so as to impair visibility in the vicinity of the airport or as otherwise to endanger the landing, taking off or maneuvering of aircraft. Grantors furthermore waive all damages and claims for damages caused or alleged to be caused by or incidental to such activities.

TO HAVE AND TO HOLD said easement and right of way, and all rights appertaining thereto unto the Grantee, its successors, and assigns, until said (full name of airport) shall be abandoned and shall cease to be used for public airport purposes.

It being understood and agreed that the aforesaid covenants and agreements shall run with the land and shall be binding upon the heirs, administrators, executors, successors and assigns of the Grantors until said (full name of airport) shall be abandoned and cease to be used for public airport purposes.

IN WITNESS WHEREOF, the Grantors (see Footnote) have hereunto set their hands and seals this _____ day of _____, 20_____.

_____
_____ (SEAL)
Grantor(s)

ACKNOWLEDGEMENT

STATE OF (_____),
COUNTY OF (_____)

BE IT REMEMBERED, that on this _____ day of _____, 2007, before me, the undersigned, a Notary Public in and for the County and State aforesaid, came _____, who are personally known to me to be the same persons who executed the within instrument of writing and such persons duly acknowledged the execution of the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal; the day and year last above written.

_____

Notary Public

My commission expires_____

Footnotes:
Local recordation and subordination practices must also be met. If subordination is necessary, in which case the mortgagee must join in the agreement, the following language is suggested: In consideration of the premises and to assure Grantee of the continued benefits accorded it under this easement, (name of mortgagee), owner and holder of a mortgage dated _____ and recorded _____ covering the premises above described, does hereby covenant and agree that said mortgage shall be subject to and subordinate to this Easement and the recording of this Easement shall have preference and precedence and shall be superior and prior in lien to said mortgage irrespective of the date of the making or recording of said mortgage instrument.

APPENDIX G

Sample Development Agreement

Taken verbatim from the office of Economic Adjustment's "Practical Guide to Compatible Civilian Development Near Military Installations."

DEVELOPMENT AGREEMENT

THIS AGREEMENT made and entered into this _____ day of _____, 20__, by and between _____, hereinafter referred to "DEVELOPER," and the CITY OF _____, a municipal corporation of the Counties _____, State of _____, hereinafter referred to as "CITY."

RECITALS

1. DEVELOPER is the owner of the property described in Exhibit "A," attached hereto (the "Property") and has filed a petition to annex said property to the CITY; and

2. The parties mutually agree pursuant to City Code Section 146-301 that the annexation of the Property to the CITY shall not create any additional cost or impose additional burden on the existing residents of the CITY to provide public facilities and services to the Property after annexation. If the proposed development will result in new burdens on the city's existing public facilities and services, the development shall be responsible for mitigating such impacts through compliance with standards adopted by the city council. The standards will include fees calculated and imposed to provide adequate public facilities and services based on objective criteria. A. Developer desires to develop the Property as a master planned residential golf club community zoned and entitled for 1,500 single family residential units, together with open space, recreational amenities and other related uses, and consisting of two distinctive lifestyle communities as generally described below (the "Project"): (1) A golf-oriented residential community organized around an exclusive, private golf club, and consisting of a PGA/TPC (Professional Golf Association/Tournament Players Club) or equivalent championship caliber golf course designed by a "signature" golf course architect, together with a clubhouse and related amenities commensurate with PGA/TPC standards; and a lake-oriented residential community organized around an approximately 35-acre lake and associated swim, tennis and similar recreational facilities.

In consideration of the foregoing premises and the covenants, promises, and agreements of each of the parties hereto, to be kept and performed by each of them IT IS AGREED:

1. DEFINITIONS

1.1 "Developer" shall mean and refer to the DEVELOPER, and his heirs, successors, assigns, and designees.

1.2 "Crossings" shall mean and refer to all bridges, culverts, or other types of facilities or structures used to cross roadways, drainage ways, or storm drainage areas.

1.3 "Drainage Basin Development Fee" shall mean the CITY's fee of $1,052 per gross acre, or as such amount may be subsequently adjusted by City Council, payable at the time of subdivision platting, which is levied and assessed upon each vacant and undeveloped lot and parcel of land within the CITY for the purpose of funding the

construction and installation of major facilities in accordance with the Drainage Master Plan.

1.4 "Off-Site Traffic Impact Fee" shall mean the CITY's fee of $500 per gross acre, or as such amount may be subsequently adjusted by City Council, payable at the time of subdivision platting, which the CITY normally charges to offset the costs to the CITY of improvements to streets beyond the limits of the property, which are required to address the impacts to such streets from development on the property.

1.5 "Park Development Fee" shall mean the CITY's fee established by City Council, or as such amount may subsequently be adjusted by City Council, payable at the time building permit issuance, which the CITY charges to offset the costs to the CITY of improvements to public park lands that are required to address the impacts to such parks from development on the property.

1.6 "Sewer Interceptor Fee" shall mean the CITY's fee of $500 per gross acre, or as such amount may be subsequently adjusted by the City Council, payable at the time of subdivision platting, which the CITY charges for extension by the CITY of sewer interceptor lines and other improvements necessary to provide sanitary sewer service to development on the property.

1.7 "Sewer Interceptor Lines" shall mean and refer to sewer lines larger than twelve inches (12") in diameter.

1.8 "Siren Fee" shall mean the CITY's fee of $78 per gross acre, or as such amount may be subsequently adjusted by the City Council, payable at the time of subdivision platting, which the CITY charges for providing public safety warning sirens to serve the property.

1.9 "Streets" shall mean and refer to residential, commercial, collector, minor, and principal arterial streets, highways, expressways, and roadways.

1.10 "Urban Services Extension Fee" shall mean the CITY fee of $131.64 per dwelling unit per year, $.15 per year per square foot for gross floor area for office, commercial, and retail, and $.11 for industrial buildings, or as such amounts may be subsequently adjusted by City Council, payable on a monthly basis by the property owner after issuance of certificate of occupancy, which the CITY charges for the provision of municipal services other than water transmission and sewer interceptor service for lands that are located beyond the urban service area as established by the City Council.

1.11 "Water Transmission Development Fee" shall mean the CITY's fee of $1,100 per acre, or as such amount may be subsequently adjusted by City Council, payable at the time of subdivision platting, which the CITY charges for extension by the CITY of water transmission lines to supply water to the property.

1.12 "Water Transmission Lines" shall mean and refer to water lines larger than twelve inches (12") in diameter.

2. STREETS

2.1 DEVELOPER shall dedicate free and clear of all liens and encumbrances of any kind, all rights-of-way for public streets for the full width thereof, as required by the CITY. DEVELOPER shall design and fully improve to CITY standards all public streets within the Property, and one-half of all streets lying on or abutting the exterior boundaries of the Property, without cost to CITY. Such dedication of streets shall occur at the time of CITY approval of each subdivision plat within the Property; however, DEVELOPER agrees to dedicate such rights-of-way at an earlier time when determined by CITY to be required for commencement of construction of such streets or for extension of utilities. An earlier dedication shall not relieve DEVELOPER of his obligation to improve streets as provided herein.

2.2 DEVELOPER agrees to convey to CITY an easement in gross adjoining arterials, highways, and expressways to provide necessary cut and fill to establish the grade on a one foot incline for every three feet (3') of distance. Said easement shall be released to DEVELOPER at such time as the adjacent property is filled and maintained at grade.

2.3 DEVELOPER shall pay a per acre off-site traffic impact fee as established by ordinance for the acreage within the Property for the improvement of off-site transportation facilities . Such fee shall be due and payable pro rata based upon the acreage of each plat at the time of CITY approval of each subdivision plat within the Property. DEVELOPER agrees to include the Property in districts or other mechanisms established by CITY for improvement of roadways.

2.4 DEVELOPER will advance the funds required for signalization of perimeter streets when needs meet the required warrants as reasonably determined by CITY, subject to reimbursement on an equitable pro rata basis by other landowners contributing to the warranting of such signals, such reimbursement to be administered by CITY by separate agreement between DEVELOPER and CITY pursuant to the city code.

3. WATER AND SEWER

3.1 The CITY agrees to install water transmission lines and sewer interceptor lines to the Property at a point nearest CITY'S existing facilities, in accordance with its master plan. DEVELOPER agrees to dedicate all necessary unobstructed right-of-way for utility easements needed for water and sewer lines to serve the area described herein, or for transmission through the area described herein, not less than sixteen feet (16') in width for a sanitary sewer or water line, and not less than twenty-six feet (26') in width when a parallel water and sewer line must be installed. The DEVELOPER shall grant additional temporary construction easements for installation of water and sewer mains where required by the CITY. DEVELOPER agrees to develop and provide to the CITY for

review and approval prior to platting of the Property a master utilities plan for the annexed area. The master utilities plan shall describe transmission facilities and distribution facilities.

3.2 Subject to Section 3.3 herein, the CITY shall provide water and sewer service to the Property within a reasonable period of time after notification of need by the DEVELOPER as required for development of the Property. DEVELOPER agrees to pay to CITY a per acre water transmission development fee and a per acre sewer interceptor fee as established by ordinance for the gross acreage within the Property. The water transmission development fee and sewer interceptor fee shall be due and payable pro rata based upon the acreage of each plat at the time of CITY approval of each subdivision plat within the Property. The fee amount shall be that in effect at the time of payment. DEVELOPER further agrees to make additional payments on the balance of the water transmission development fee and sewer interceptor fee as may be required form time to time to extend water transmission and sewer interceptor lines to serve the Property as needed for development. In the event, however, that the total amount of such fees is insufficient to fund extension of the line, DEVELOPER shall advance the necessary funds to pay for the total cost to design and construct extension of water transmission and sewer interceptor line extensions. DEVELOPER may proceed under a separate agreement with CITY for payback of costs in excess of fees from pursuant to Section 8.1.

3.3 There shall be no duty or obligation upon the CITY to furnish water or sanitary sewer facilities to the area sought to be annexed until such time as, in the sole discretion of CITY, sufficient acreage has been annexed and fees paid to pay for extension of water and sewer facilities and to provide services to a sufficient number of inhabitants within the areas so as to make the construction and establishment of such services feasible. The City's obligation to provide water is subject to any water restrictions and rate modifications that the City Council enacts under its general police power.

3.4 Notwithstanding the fees provided in this Article III, if provisions of water and sewer services requires payment of fees or charges to regional or metropolitan service agencies or other third party authorities, DEVELOPER shall provide such funds as and when required by such service agency.

3.5 DEVELOPER will pay tap fees as are required by the CITY at the time said taps are needed. The DEVELOPER agrees that all promises of water and sanitary sewer service made by this agreement are subject to any water and sewer tap allocation program of the CITY, and are uniformly applied subject to any other general restrictions of the CITY, or regional service agencies, relating to the provision of water and sanitary sewer service.

3.6 Prior to final approval of the annexation ordinance, DEVELOPER shall deliver to CITY a special warranty deed for the non-tributary and not non-tributary water within the _____ aquifers that lie beneath the DEVELOPER'S Property. In addition to standard warranties of a deed of this type, the special warranty deed shall specifically warrant that the grantor has not divested himself of the subject non-tributary and not non-tributary groundwater prior to its conveyance to the CITY.

3.7 The DEVELOPER grants in perpetuity to the CITY the sole and exclusive right to withdraw, appropriate, and use any and all water within the _____ aquifers underlying the Property. The DEVELOPER irrevocably consents in perpetuity, on behalf of itself and any and all successors in title, pursuant to Section 37-90-137(4) of the Revised Statutes, as now existing or later amended, to the withdrawal, appropriation, and use by the CITY of all such water, and agrees to execute any additional or supplemental consents thereto that may be required for the CITY to withdraw, appropriate, or use said water.

3.8 The drilling of water wells upon the Property shall not be commenced or undertaken without the prior approval of the CITY COUNCIL. To the extent that the CITY wishes to drill wells on the Property, the location of such wells shall not affect materially the development plan. The DEVELOPER agrees to convey necessary easements to CITY for wells.

4. STORM DRAINAGE

4.1 DEVELOPER shall pay the per-acre drainage fee established by City Code for basin-wide drainage facilities as required by CITY'S master drainage plan and ordinances. The fee shall be payable at the time of CITY approval of each subdivision plat within the Property. The amount payable shall be pro rata based upon the acreage of each plat

4.2 In the event the DEVELOPER desires to complete the development of any portion of the annexed lands prior to completion of the regional storm drainage improvements to major drainage ways by the CITY, the DEVELOPER may make those improvements at its expense. At its option, and subject to a separate agreement, the CITY may agree to reimburse the DEVELOPER at a future date for DEVELOPER'S cost for construction of said improvements.

4.3 DEVELOPER shall be responsible for design and construction of drainage improvements, other than basin-wide improvements described in Section 4.1, as required by CITY to permit development of the property

4.4 DEVELOPER shall dedicate all land within the 100-year floodplain and a maintenance trail corridor at the time of platting of any property located adjacent to the floodplain.

4.5 DEVELOPER shall petition for annexation to Urban Drainage Flood Control District when platting occurs on any part of the Property.

5. CROSSINGS

5.1 The parties mutually agree that whenever it is found and determined by CITY that a crossing of drainage way, existing or proposed roadway, railroad, or any impediment to a roadway is required within the Property, CITY shall specify design criteria, and DEVELOPER shall construct the crossing, including transition improvements, in conjunction with the development of the Property. The crossings required for the described property shall be constructed in conformance with CITY standards.

5.2 If a crossing is required on the exterior boundary of the Property, DEVELOPER shall be responsible for his proportionate share of the construction cost as determined by CITY.

6. PUBLIC LAND DEDICATION

6.1 DEVELOPER agrees to dedicate land to CITY to be used for public purposes, or pay cash in lieu of land if required by CITY. Dedication of land or payment of cash shall occur at the time of approval of the first subdivision plat for development within the Property. Land dedication for parks shall comply with the requirements of the City Code. Land dedicated for public uses other than parks shall equal one percent (1%) of residentially zoned property. In addition, Developer shall also dedicate land for public uses equal to two percent (2%) of the Property zoned nonresidential. All dedicated lands shall be platted by DEVELOPER at the time of dedication in accordance with the CITY's subdivision regulations. The external boundaries of the dedicated land shall be monumented on the ground as required by the City Code.

6.2 In the event CITY requires cash in lieu of land dedication, DEVELOPER shall pay money to the CITY in an amount equal to the fair market value at the time of payment of improved land as described in Section 6.3 herein and shall meet all the standards for acceptance by the CITY as enumerated herein. The full in-lieu payment shall be due, if not sooner paid, prior to the expiration date of this agreement. All such dedicated or conveyed real property shall be dedicated for the perpetual use and benefit of the public by the dedication language of the relevant subdivision plat or shall be conveyed to the CITY by general warranty deed free and clear of mortgages, deeds of trust, and other liens of whatever sort, and be free and clear of other restrictions, reservations, exceptions, covenants, easements, rights-of-way, and other encumbrances (except easements of record), and other encumbrances or natural conditions, except for those to which CITY had no reasonable objection in light of the intended use of the site, at no monetary cost to the CITY. Said land shall have zoning to permit the intended use.

6.3 Promptly upon applying for any subdivision plat, the approval of which will trigger any in-lieu payment, DEVELOPER shall notify CITY and commence negotiations to agree upon the amount of said in-lieu payment. If the parties cannot agree upon the amount of any in-lieu payment required by this agreement, each party shall appoint an appraiser of its choosing, whose fees shall be paid by the appointing party. If the two appraisers thus appointed cannot agree on the amount, they shall jointly appoint a third appraiser whose fees shall be paid half by DEVELOPER and half by the CITY. The amount shall be the average of the two appraisal amounts (out of three appraisals) which are closest to one another in value. Until the amount is established as provided in this Section, CITY shall not approve the plat that triggers the payment at issue to proceed to final approval. CITY agrees to respond with reasonable promptness in all matters regarding determination under this Section so as to minimize the platting delay, if any, to DEVELOPER.

6.4 DEVELOPER agrees that if between the time of annexation and subdividing, any of the described Property is rezoned from a nonresidential to a residential classification, or a residentially zoned area is rezoned to a higher density, the CITY may require additional land dedications at the time of subdivision platting.

6.5 To the extent the described Property is to be zoned residential, DEVELOPER shall dedicate land for public schools as required by the city code. All land or cash in lieu shall be due at the time of the platting of the first residential subdivision. Land dedicated for schools shall comply with the requirements of City Code Section 147-48.

6.6 The DEVELOPER agrees that lands to be donated for public purposes shall include all site and public improvements including, but not limited to water, sewer, curb, gutter, streets, and sidewalks. DEVELOPER shall install such improvements when determined by the CITY to be necessary. (Or, if determined by the CITY at the time of conveyance that the improvements are not needed at that time, then DEVELOPER shall enter into a separate agreement specifying when and how the improvements will be made). No lands to be dedicated for public purposes shall be disturbed by DEVELOPER in any manner to disrupt the natural landscape, unless first approved by the CITY. DEVELOPER agrees that all lands donated to the CITY shall not be used as a borrow or fill area. Any sites dedicated for public purposes, but disturbed due to grading of adjacent sites, or lands within the flood plain disturbed due to storm drainage improvements, must be successfully planted or seeded by DEVELOPER with native grasses acceptable to CITY to prevent erosion.

6.7 DEVELOPER hereby grants to CITY a lien on the Property to secure payment of the amounts or dedications of the lands and water rights. This lien may be foreclosed like a mortgage, but only after written demand for payment or dedication to the owner(s) of the land to be foreclosed upon followed by sixty (60) days without payment or dedication of all amounts or lands identified in said demand.

6.8 DEVELOPER agrees to pay to CITY a park development fee as required by the City Code, as such amount may be subsequently adjusted by the City Council

7. URBAN SERVICES

7.1 If the proposed development will result in new burdens on the city's existing public facilities and services, the development shall be responsible for mitigating such impacts through compliance with standards adopted by the city council. The standards will include fees calculated and imposed to provide adequate public facilities and services based on objective criteria 7.2 DEVELOPER acknowledges that the Property is located beyond the area of existing CITY services. The CITY will extend services to the Property in an orderly manner as provided by CITY'S urban service extension ordinance. In the event the Property develops prior to the date of extension, DEVELOPER agrees to pay the urban services extension fee as established by ordinance upon the granting of certificate of occupancy for structures or the Property. DEVELOPER shall continue to pay said fee until the CITY'S urban service area is extended to include the Property, at which time the obligation to pay the fee shall terminate.

7.2 It is expressly understood that the CITY may be unable to provide fire protection to any of the annexed land prior to the installation of required fire hydrants. DEVELOPER shall petition for exclusion from the fire protection district upon completion of the annexation and approval of zoning. In any event, the exclusion shall be completed before the first residential building permit is issued. CITY shall provide fire protection upon exclusion of the Property from the district.

7.3 If the area of the herein described annexation lies wholly or partially within a legally constituted water, sanitation, or water and sanitation district, there shall be no obligation on the part of the CITY to provide such utilities services to the areas within any such district, unless it be done by mutual agreement between the CITY and such district. However, if requested by the CITY, the DEVELOPER shall petition for exclusion from the district. In the event of exclusion, the CITY shall assume responsibility for service to the annexed area, and the DEVELOPER shall comply with all applicable utilities service provisions contained herein.

7.4 DEVELOPER shall pay a fee of $78.00 per acre, as such amount may be subsequently adjusted by the City Council, at the time of subdivision plat approval to be used by the City to fund emergency warning siren in the area. If requested by CITY, DEVELOPER shall provide a minimum of ten (10) foot by ten (10) foot easement to locate the siren and tower.

8. PUBLIC FACILITY EXTENSION

8.1 Extension of water and sewer line, streets, storm drainage, street lighting, traffic control devices, and other public improvements from the developed areas of the CITY to

the Property may be pursuant to reimbursement as provided in the City Code to reimburse DEVELOPER from lands abutting such facilities for DEVELOPER'S costs to extend public facilities which benefit such intervening lands.

9. Development; Permitted Uses/Design Standards.

9.1 The development parcel sizes and locations, roadway locations and other aspects of the Project will be finally determined during the City's review and approval of subdivision plats, Framework Development Plan(s), and Contextual Site Plan(s) in accordance with the procedures established in the _____ Regulations. However, the uses and number of dwelling units (1,500) within the Project are intended to be vested property rights. During the Term, the City shall not accept for processing any application for rezoning of any portion of the Property unless such application includes a certificate executed by Developer consenting to the action requested.

9.2 The permitted uses of the Property, the density and intensity of use (including, without limitation, 1,500 dwelling units, together with golf course, club house and other uses), the design standards, provisions for reservation or dedication of land for public purposes, the general location of roads and trails, and other terms and conditions of development applicable to the Property and the Project shall be as set forth in this Agreement. The design, improvement, construction, and development of the Property shall be in substantial conformance with the _____ Zone District Regulations. In order to reasonably assure that development of the Project will result in a high-end residential community with home prices in a target range of 130% to 500% of the average price for single family detached homes in the CITY metropolitan market, Developer expects to impose and enforce through private covenants, conditions and restrictions design standards which are more stringent than and supplemental to those set forth in the _____ Zone District Regulations. Such privately imposed design standards will be intended to impose among other standards, the following requirements: (i) lot sizes ranging between 6,000 and more than 49,000 square feet; (ii) premium quality semi-custom homes ranging between 2,000 and more than 6,000 square feet of floor area; and (iii) a premium amenity package.

9.3 Additional Standards.

10. GENERAL PROVISIONS

10.1 This agreement shall be recorded with the Clerk and Recorder in _____ County, _____, shall run with the land, and shall be binding upon and inure to the benefit of the heirs, successors, and assigns of the parties hereto. DEVELOPER shall notify CITY of assignments and the names of assignees. Every part of the Property shall at all times remain subject to all the obligations of this agreement with respect to each and every part of the Property.

10.2 In order to facilitate construction of improvements and subject to CITY'S rights of review and approval under the laws of the State of _____, and the City Code, CITY will consider the creation of one or more districts including, but not limited to special districts, general improvement districts, and metropolitan districts authorized pursuant to (insert state statute reference)., to provide financing of public improvements. DEVELOPER agrees that any special districts established within the Property shall not levy, charge, or collect a sales tax, nor shall such districts apply for or request STATE Conservation Trust Funds as supplemented by the state lottery.

10.3 Nothing contained in this agreement shall constitute or be interpreted as a repeal of existing codes or ordinances or as a waiver or abnegation of CITY'S legislative, governmental, or police powers to promote and protect the health, safety, or general welfare of the municipality or its inhabitants; nor shall this agreement prohibit the enactment by CITY of any fee which is of uniform or general application.

10.4 No right or remedy of disconnection of the described Property from the CITY shall accrue from this agreement, other than that provided by City Code Section _____. DEVELOPER covenants that the urban service extension fee shall not constitute grounds for disconnection. In the event the Property or any portion thereof is disconnected at DEVELOPER'S request, CITY shall have no obligation to serve the disconnected Property and this agreement shall be void and of no further force and effect as to such Property.

10.5 If the annexation of the Property or any portion thereof is challenged by a referendum, all provisions of this agreement, together with the duties and obligations of each party, shall be suspended pending the outcome of the referendum election. If the referendum challenge to the annexation results in disconnection of the Property from the CITY then this annexation agreement and all provisions contained herein shall be null and void and of no further effect. If the referendum challenge fails, then DEVELOPER and CITY shall continue to be bound by all the terms and provisions of this annexation agreement.

10.6 In the event that the annexation of the Property or any portion thereof is voided by final action of any court, CITY and DEVELOPER shall cooperate to cure the legal defect which resulted in disconnection of the property, and upon such cure this annexation agreement shall be deemed to be an agreement to annex the Property to CITY pursuant to Section _____ of the _____ Revised Statutes, 1973, and City Code ____ and ____. DEVELOPER shall reapply for annexation as when the Property becomes eligible for annexation as determined by CITY.

10.7 It is understood and agreed by the parties hereto that if any part, term, or provision of this agreement is by the courts held to be illegal or in conflict with any law of the State of _____, the validity of the remaining portions or provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the agreement did not contain the particular part, term, or provision held to be invalid.

10.8 All fees recited in this agreement shall be subject to amendment by City Council. Any amendment to fees shall be incorporated into this agreement as if originally set forth herein. Nothing in this agreement shall prevent, prohibit, diminish, or impair the city's home rule governmental authority to adopt fees or regulations to address the impacts of development.

10.9 DEVELOPER agrees to include the Property in public improvement districts as may be organized by the CITY pursuant to the provisions of Title 31, Article 25, Part 6, of the STATE Revised Statutes.

10.10 This instrument embodies the whole agreement of the parties. There are no promises, terms, conditions, or obligations other than those contained herein; and this agreement shall supersede all previous communications, representations, or agreements, either verbal or written, between the parties hereto. Except as provided in Section 9.8, there shall be no modification of this agreement except in writing, executed with the same formalities as this instrument. Subject to the conditions precedent herein, this agreement may be enforced in any court of competent jurisdiction.

10.11 This agreement shall terminate and expire upon the completion of the development of the property and satisfaction of all the obligations herein. Thereafter, so long as the Property is located within the municipal boundaries of CITY, it shall continue to be subject to the charter, ordinances, and rules and regulations of the CITY.

10.12 It is expressly understood and agreed that enforcement of the terms and conditions this Agreement, and all rights of action relating to such enforcement, shall be strictly reserved to the Parties hereto, their successors and assigns, and nothing contained in this Agreement shall give or allow any claim or right of action by any other or third person under this Agreement. It is the express intention of the Parties that any person other than the Parties receiving services or benefits under this Agreement shall be deemed to be an incidental beneficiary only.

10.13 Any and all obligations of the CITY for water, sewer, and drainage improvements shall be the sole obligation of the CITY'S Utility Enterprise and as such, shall not constitute a multiple fiscal year direct or indirect debt or other financial obligation of the CITY within the meaning of any constitutional, statutory, or charter limitation. Any and all obligations of the CITY for public improvements other than water, sewer, and storm drainage improvements shall be subject to annual appropriation by the City Council.

10.14 In the event of breach or default by the city, the sole remedies hereunder shall be the equitable remedies of specific performance or injunction. Developer, it successors and assigns, hereby waive any rights to money damages for any such breach or default. IN WITNESS WHEREOF, the parties hereto have executed this agreement the day and year first above written.

By _____
DEVELOPER

State of _____

County of _____

Subscribed before me this _____ day of _____, 200_, by _____.

My commission expires:
_____ Notary Public

CITY OF _____

By_____

_____, Mayor
ATTEST:
_____
City Clerk

APPROVED AS TO FORM:
_____
City Attorney's Office
Development agreement draft

Appendix H

Sample Noise Abatement Ordinance

Noise Abatement Ordinance:

The following is a sample noise abatement ordinance that describes ways both new construction and existing structures can be brought into compliance. It is recommended that jurisdictions consider adopting a similar set of regulations as an amendment to their existing building codes, either individually or through a collective entity.

Sample Noise Abatement Ordinance

Definitions:

STC – Sound Transmission Class - used as a measure of a material's ability to reduce sound," and effectively mitigate any adverse noise levels that could impede a person's use of a residential or commercial structure. The higher the STC value, the greater the sound attenuation and presumably the quieter the structure's interior.

SLR – Sound Level Reduction – also interpreted as sound decibel reduction. (A sound level of 0 decibels is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 decibels. Therefore, all things being equal, if normal speech ceases, the Sound Level would be Reduced by 60.)

(A) Recommended Construction Methods and Materials to Achieve a minimum 25

SLR, Exterior to Interior

(1) Compliance

Compliance with the following standards shall be deemed to meet the requirements of the compatible use noise zones in which an SLR 25 is specified.

(2) General

a. Brick veneer, masonry blocks, or stucco exterior walls shall be grouted or caulked airtight.

b. At the penetration of exterior walls by pipes, ducts, or conduits, the space between the wall and pipes, ducts, or conduits shall be caulked or filled with mortar.

c. Window and/or through-the-wall ventilation units shall not be used.

d. Through-the-wall door mailboxes shall not be used.

(3) Exterior Walls

a. Exterior walls other than as described in this section shall have a laboratory sound transmission class rating of at least STC-39.

b. Masonry walls having a surface weight of at least 25 pounds per square foot do not require a furred (stud) interior wall. At least one surface of concrete block walls shall be plastered or painted with heavy bridging" paint.

c. Stud walls shall be at least 4" in nominal depth and shall be finished on the outside with siding-on-sheathing, stucco, or brick veneer.

1. Interior surface of the exterior walls shall be of gypsum board or plaster at least thick, installed on the studs.

2. Continuous composition board, plywood, or gypsum board sheathing at least thick shall cover the exterior side of the wall studs behind wood or metal siding. Asphalt or wood shake shingles are acceptable in lieu of siding.

3. Sheathing panels shall be butted tightly and covered on the exterior with overlapping building paper. The top and bottom edges of the sheathing shall be sealed.

4. Insulation material at least 2" thick shall be installed continuously throughout the cavity space behind the exterior sheathing and between wall studs. Insulation shall be glass fiber or mineral wool.

(4) Windows

a. Windows other than as described in this section shall have a laboratory sound transmission class rating of at least STC-28.

b. Glass shall be at least 3/16" thick.

c. All operable windows shall be weather stripped and airtight when closed so as to conform to an air infiltration test not to exceed 0.5 cubic foot per minute per foot of crack length in accordance with ASTM E-283-65-T.

d. Glass of fixed-sash windows shall be sealed in an airtight manner with a non-hardening sealant, or a soft elastomer gasket or glazing tape.

e. The perimeter of window frames shall be sealed airtight to the exterior wall construction with a sealant conforming to one of the following Federal Specifications: TT-S-00227, TT-S-00230, or TT-S-00153.

f. The total area of glass in both windows and doors in sleeping spaces shall not exceed 20% of the floor area.

(5) Doors

a. Doors, other than as described in this section shall have a laboratory sound transmission class rating of at least STC-28.

b. All exterior side-hinged doors shall be solid-core wood or insulated hollow metal at least 1¾ thick and shall be fully weather stripped.

c. Exterior sliding doors shall be weather stripped with an efficient airtight gasket system with performance as specified in Section 1-4C. The glass in the sliding doors shall be at least 3/16" thick.

d. Glass in doors shall be sealed in an airtight non-hardening sealant or in soft elastomer gasket or glazing tape.

e. The perimeter of door frames shall be sealed airtight to the exterior wall construction as described in Paragraph 1-4E above.

(6) Roofs

a. Combined roof and ceiling construction other than described in this Section and Section 1-7 shall have a laboratory sound transmission class rating of at least STC-39.

b. With an attic or rafter space at least 6” deep, and with a ceiling below, the roof shall consist of closely butted composition board, plywood, or gypsum board sheathing topped by roofing as required.

c. If the underside of the roof is exposed, or if the attic or rafter spacing is less than 6”, the roof construction shall have a surface weight of at least 25 pounds per square foot. Rafters, joists, or other framing may not be included in the surface weight calculation.

d. Window or dome skylights shall have a laboratory sound transmission class rating of at least STC-28.

(7) Ceilings

a. Gypsum board or plaster ceilings at least thick shall be provided where required by paragraph 1-6b above. Ceilings shall be substantially airtight, with a minimum number of penetrations.

b. Glass fibers or mineral wool insulation at least 2’ thick shall be provided above the ceiling between joists.

(8) Floors

Openings to any crawl spaces below the floor of the lowest occupied rooms shall not exceed 2% of the floor space area of the occupied rooms.

(9) Ventilation

a. A mechanical ventilation system shall be installed that will provide the minimum air circulation and fresh air supply requirements for various uses in occupied rooms without the need to open any windows, doors, or other openings to the exterior.

b. Gravity vent openings in attic shall not exceed code minimum in number and size.

c. If a fan is used for forced ventilation, the attic inlet and discharge openings shall be fitted with sheet metal transfer ducts of at least 20 gauge steel, which shall be lined with 1" thick coated glass fiber, and shall be at least 5 feet long with one 90 bend.

d. All vent ducts connecting the interior space to the outdoors, excepting domestic range exhaust ducts, shall contain at least a 5 ft. length of internal sound absorbing duct lining. Each duct shall be provided with a bend in the duct such that there is no direct line of sight through the duct from the venting cross section to the room-opening cross section.

e. Duct lining shall be coasted glass fiber duct liner at least 1" thick.

f. Domestic range exhaust ducts connecting the interior space to the outdoors shall contain a baffle plate across the exterior termination which allows proper ventilation. The dimensions of the baffle plate should extend at least one diameter beyond the line of sight into the vent duct. The baffle plate shall be of the same material and thickness as the bent duct material.

g. Fireplaces shall be provided with well-fitted dampers.

(B) Recommended Construction Methods and Materials to Achieve a Minimum 30 SLR, Exterior to Interior

(1) Compliance

Compliance with the following standards shall be deemed to meet the requirements of the compatible use noise zones in which an SLR 30 is specified.

(2) General

a. Brick veneer, masonry blocks, or stucco exterior walls shall be constructed airtight. All joints shall be grouted or caulked airtight.

b. At the penetration of exterior walls by pipes, ducts, or conduits, the space between the wall and pipes, ducts, or conduits shall be caulked or filled with mortar.

c. Window and/or through-the-wall ventilation units shall not be used.

d. Operational vented fireplaces shall not be used.

e. All sleeping spaces shall be provided with either a sound-absorbing ceiling or a carpeted floor.

f. Through-the-wall/door mailboxes shall not be used.

(3) Exterior Walls

a. Exterior walls other than as described below shall have a laboratory sound transmission class rating of at least STC-44.

b. Masonry walls having a surface weight of at least 40 pounds per square foot do not require a furred (stud) interior wall. At least one surface of concrete block walls shall be plastered or painted with heavy bridging" paint.

c. Stud walls shall be at least 4" in nominal depth and shall be finished on the outside with siding-on-sheathing, stucco, or brick veneer.

1. Interior surface of the exterior walls shall be of gypsum board or plaster at least thick, installed on the studs. The gypsum board or plaster may be fastened rigidly to the studs if the exterior is brick veneer or stucco. If the exterior is siding-on-sheathing, the interior gypsum board or plaster must be fastened resiliently to the studs.

2. Continuous composition board, plywood, or gypsum board sheathing shall cover the exterior side of the wall studs behind wood or metal siding. The sheathing and facing shall weigh at least 4 pounds per square foot.

3. Sheathing panels shall be butted tightly and covered on the exterior with overlapping building paper. The top and bottom edges of the sheathing shall be sealed.

4. Insulation material at least 2" thick shall be installed continuously throughout the cavity space behind the exterior sheathing and between wall studs. Insulation shall be glass fiber or mineral wool.

(4) Windows

a. Windows other than as described in this section shall have a laboratory sound transmission class rating of at least STC-33.

b. Glass of double-glazed windows shall be at least 1/8" thick. Panes of glass shall be separated by a minimum 3" air space.

c. Double-glazed windows shall employ fixed sash or efficiently weather stripped operable sash. The sash shall be rigid and weather stripped with material that is compressed airtight when the window is closed so as to conform to an infiltration test not to exceed 0.5 cubic foot per minute per foot of crack length in accordance with ASTM-E-283-65-T.

d. Glass of fixed-sash windows shall be sealed in an airtight manner with a non-hardening sealant, or a soft elastomer gasket or glazing tape.

e. The perimeter of window frames shall be sealed airtight to the exterior wall construction with a sealant conforming to one of the following Federal Specifications: TT-S-0027, TT-S-00230, or TT-S-00133.

f. The total area of glass of both windows and exterior doors in sleeping spaces shall not exceed 20% of the floor areas.

(5) Doors

a. Doors, other than as described in this section shall have a laboratory sound transmission class rating of at least STC-33.

b. Double door construction is required for all door openings to the exterior. Openings filled with side-hinged doors shall have one solid-core

wood or insulated hollow metal core door at least 1¾ thick separated by an airspace of at least 4" from another door, which can be a storm door. Both doors shall be tightly fitted and weather stripped.

c. The glass of double-glazed sliding doors shall be separated by a minimum 4" airspace. Each sliding frame shall be provided with an efficiently airtight weather stripping material as specified in Paragraph 2-4c above.

d. Glass of all doors shall be at least 3/16" thick. Glass of double sliding doors shall not be equal in thickness.

e. The perimeter of door frames shall be sealed airtight to the exterior wall construction as indicated in Section 8-4E.

f. Glass of doors shall be set and sealed in an airtight non-hardening sealant, or a soft elastomer gasket or glazing tape.

(6) Roofs

a. Combined roof and ceiling construction other than described in this section and Section 2-7 shall have a laboratory sound transmission class rating of at least STC-44.

b. With an attic or rafter space at least 6" deep, and with a ceiling below, the roof shall consist of closely butted composition board, plywood, or gypsum board sheathing topped by roofing as required.

c. If the underside of the roof is exposed, or if the attic or rafter spacing is less than 6', the roof construction shall have a surface weight of at least 40 pounds per square foot. Rafters, joists, or other framing may not be included in the surface weight calculation.

d. Window or dome skylights shall have a laboratory sound transmission class rating of at least STC-33.

(7) Ceilings

a. Gypsum board or plaster ceilings at least 1/2 " thick shall be provided where required by Paragraph 2-6b above. Ceilings shall be substantially airtight with a minimum number of penetrations.

b. Glass fiber or mineral wool insulation at least 2" thick shall be provided above the ceiling between joists.

(8) Floors

The floor of the lowest occupied rooms shall be slab on fill, below grade or over a fully enclosed basement. All door and window openings in the fully enclosed basement shall be tightly fitted.

(9) Ventilation

a. A mechanical ventilation system shall be installed that will provide the minimum air circulation and fresh air supply requirements for various uses in occupied rooms without the need to open any windows, doors, or other openings to the exterior.

b. Gravity vent openings in attic shall not exceed code minimum in number and size. The openings shall be fitted with transfer ducts at least 3 ft. in length containing internal sound absorbing duct lining. Each duct shall have a lined 90 bend in the duct such that there is no direct line of sight from the exterior through the duct into the attic.

c. If a fan is used for forced ventilation, the attic inlet and discharge openings shall be fitted with sheet metal transfer ducts of at least 20 gauge steel which shall be lined with 1" thick coated glass fiber, and shall be at least 5 ft. long with one 90 bend.

d. All vent ducts connecting the interior space to the outdoors excepting domestic range exhaust ducts, shall contain at least a 10 ft. length of internal sound absorbing duct lining. Each duct shall be provided with a

lined 90 bend in the duct such that there is not direct line of sight through the duct from the venting cross section to the room opening cross section.

e. Duct lining shall be coated glass fiber duct line at least 1" thick.

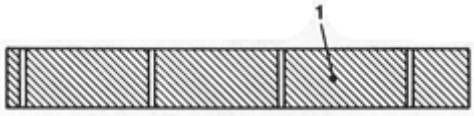
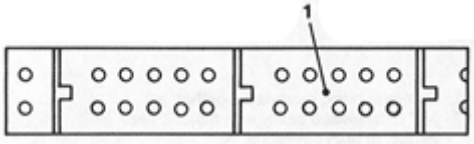
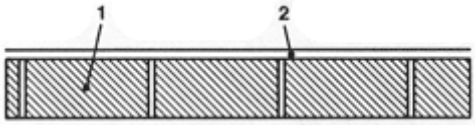
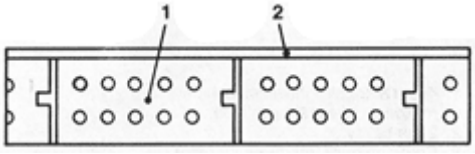
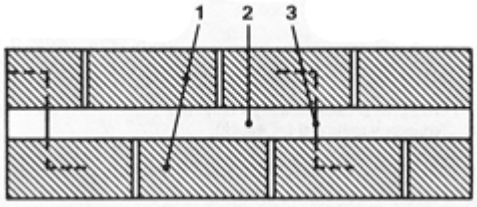
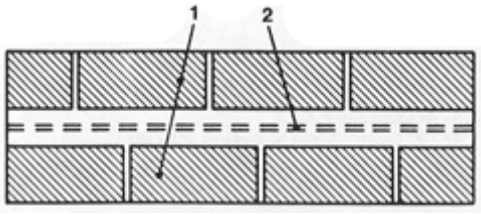
f. Domestic range exhaust ducts connecting the interior space to the outdoors shall contain a baffle plate across the exterior termination which allows proper ventilation. The dimensions of the baffle plate should extend at least one diameter beyond the line of sight into the vent duct. The baffle plate shall be of the same material and thickness as the vent duct material.

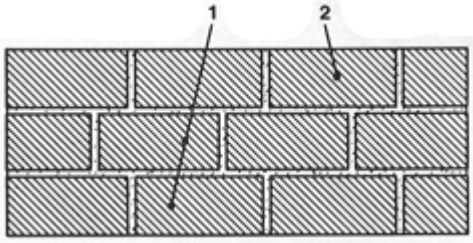
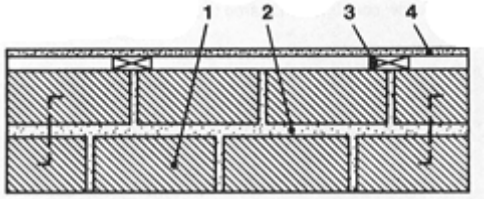
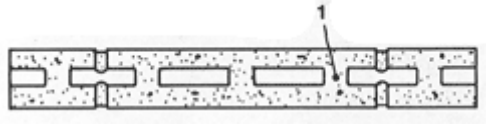
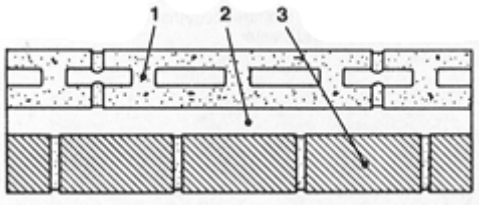
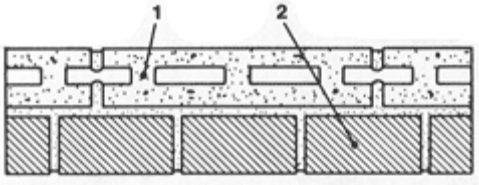
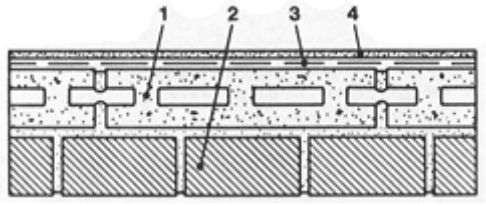
g. Building heating units with flues or combustion air vents shall be located in a closet or room closed off from the occupied space by doors.

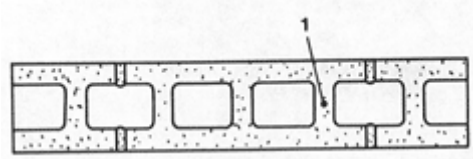
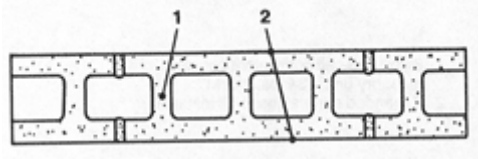
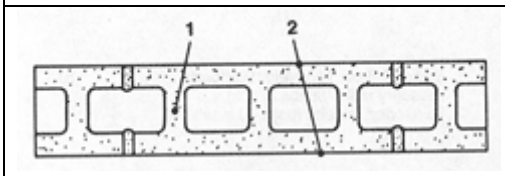
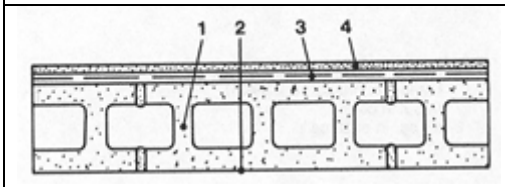
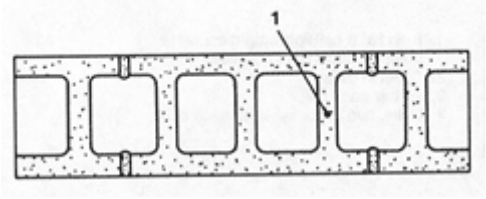
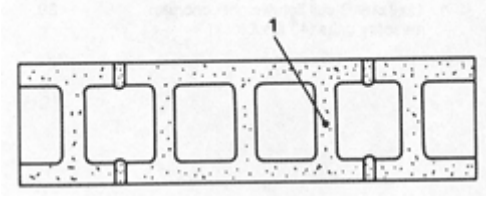
h. Doors between occupied space and mechanical equipment areas shall be solid core wood or 20 gauge steel hollow metal at least 1¾ thick and shall be fully weather stripped.

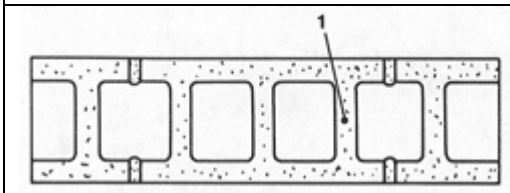
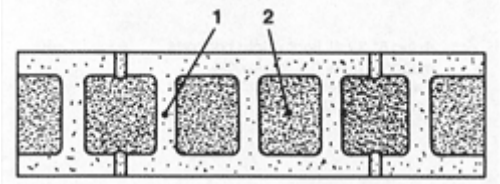
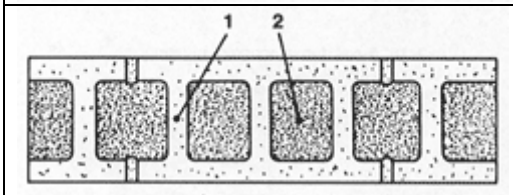
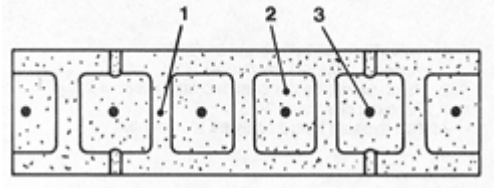
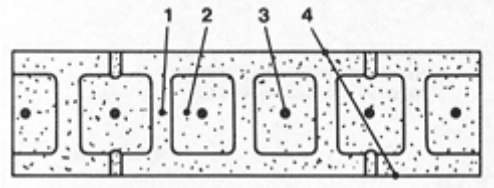
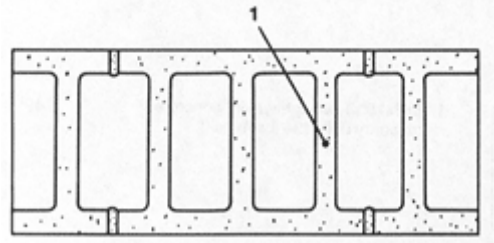
Walls: Exterior

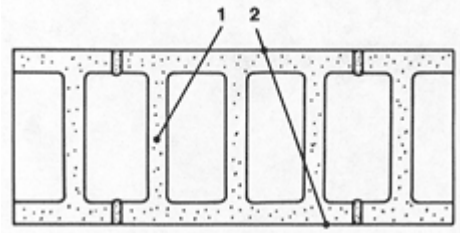
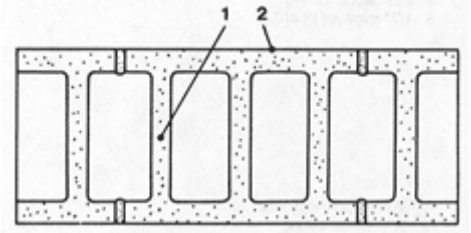
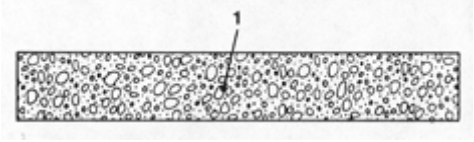
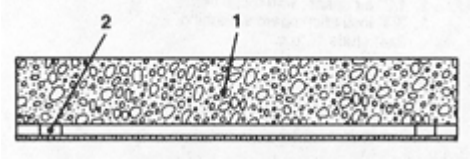
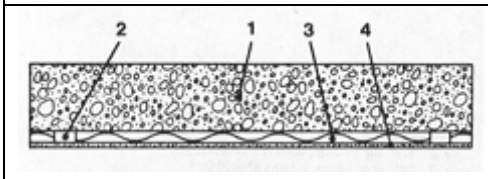
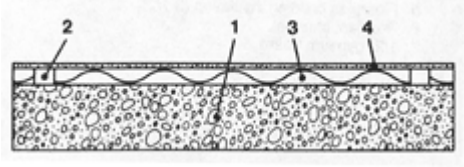
STC Ratings

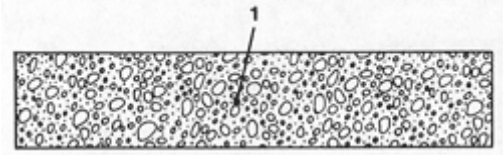
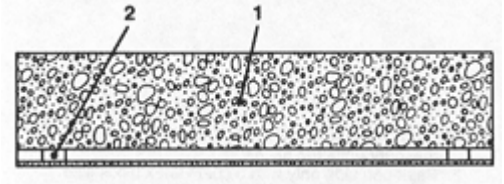
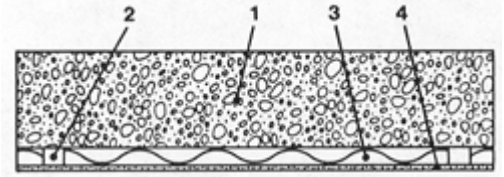
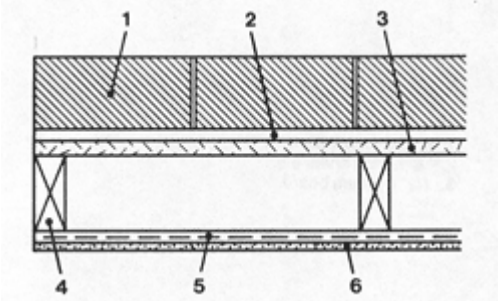
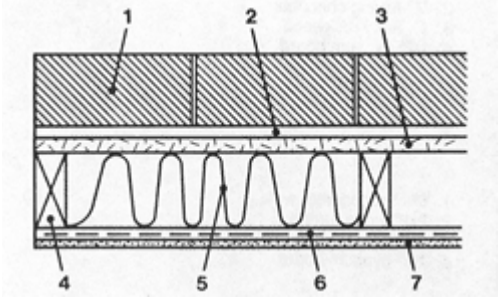
Sketch	Brief Description	STC
	1. 4” face brick, mortared together.	45
	1. Hollow core brick, mortared together.	51
	1. Common brick, mortared together. 2. ½” gypsum/sand plaster.	50
	1. Hollow core brick, mortared together. 2. ½” gypsum/sand plaster.	53
	1. Face brick, mortared together. 2. 2” air space. 3. Metal ties.	50
	1. Brick, mortared together. 2. 2 ¼” cavity filled with concrete grout and #6 bars vertically 48”o.c. and #5 bars horizontally 30”o.c.	59

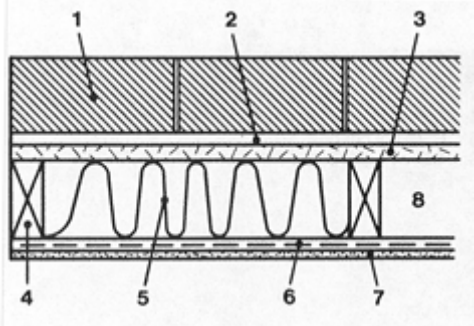
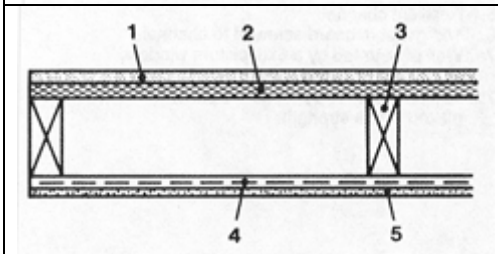
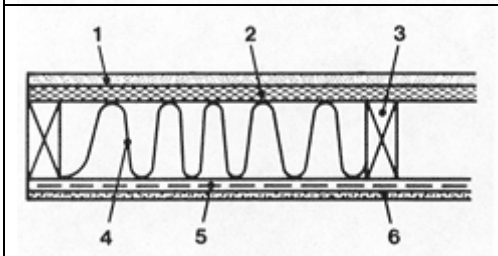
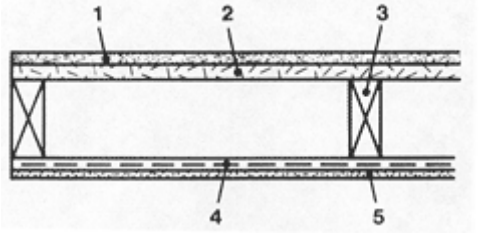
Sketch	Brief Description	STC
	1. Common brick, mortared together. 2. Face brick, mortared together.	59
	1. Common brick, mortared together. 2. ¾" mortar-filled cavity with metal Z ties 24"o.c. in both directions. 3. 1x3" furring strips 16"o.c. and nailed vertically into mortar joints 12"o.c. 4. ½" gypsum board nailed 8"o.c. along edges and 12"o.c. in field.	53
	1. 4x8x16" 3-cell lightweight concrete masonry units (17 lbs./block).	40
	1. 4x8x18" 3-cell lightweight concrete masonry units (19 lbs./block). 2. 2" air cavity. 3. Common brick, mortared together.	54
	1. 4x8x18" 3-cell lightweight concrete masonry units (19 lbs./block). 2. Common brick, mortared together. (brick headers after every second course of block to tie the withes together).	51
	1. 4x8x18" 3-cell lightweight concrete masonry units (19 lbs./block). 2. Common brick, mortared together. 3. Resilient channels. 4. ½" gypsum board screwed to channels.	56

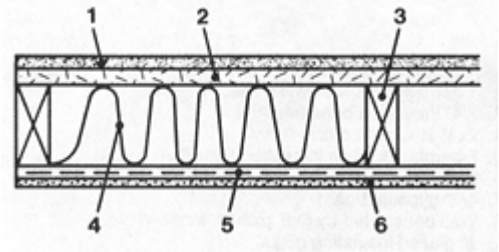
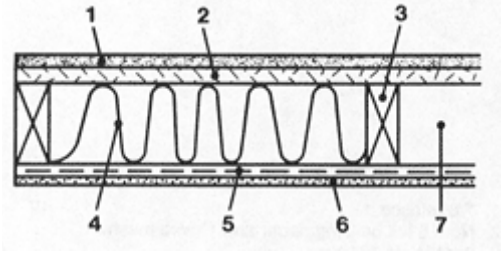
Sketch	Brief Description	STC
	1. 6x8x16” 3-cell lightweight concrete masonry units (21 lbs./block).	44
	1. 6x8x16” 3-cell lightweight concrete masonry units (21 lbs./block). 2. Paint both sides with primer-sealer coat and finish coat of latex.	46
	1. 6x8x18” 3-cell dense concrete masonry units (36 lbs./block). 2. Paint both sides with primer-sealer coat and finish coat of latex.	48
	1. 6x8x16” 3-cell lightweight concrete masonry units (21 lbs./block). 2. Paint, primer-sealer coat and finish coat of latex. 3. Resilient channels, 24”o.c. 4. ½” gypsum board screwed to channels.	53
	1. 8x8x16” 3-cell lightweight concrete masonry units (28 lbs./block).	45
	1. 8x8x18” 3-cell lightweight concrete masonry units (34 lbs./block).	49

Sketch	Brief Description	STC
	1. 8x8x18″ 3-cell lightweight concrete masonry units (38 lbs./block).	49
	1. 8x8x18″ 3-cell lightweight concrete masonry units (34 lbs./block). 2. Expanded mineral loose-fill insulation.	51
	1. 8x8x18″ 3-cell lightweight concrete masonry units (38 lbs./block). 2. Expanded mineral loose-fill insulation.	51
	1. 8x8x18″ 3-cell lightweight concrete masonry units (33 lbs./block). 2. Grout in cells. 3. #5 bar in each cell.	48
	1. 8x8x18″ 3-cell lightweight concrete masonry units (33 lbs./block). 2. Grout in cells. 3. #5 bar each cell. 4. Paint two coats flat latex each side.	55
	1. 12x8x16″ 3-cell lightweight concrete masonry units (43 lbs./block).	39

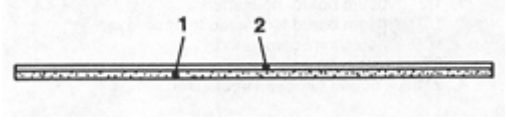
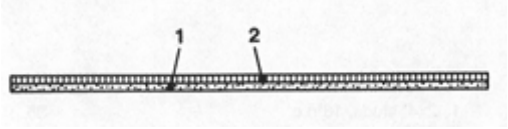
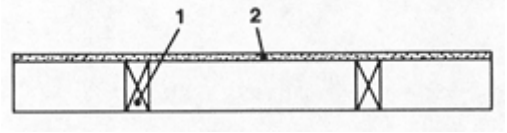
Sketch	Brief Description	STC
	1. 12x8x16. 3-cell lightweight concrete masonry units (43 lbs./block). 2. Paint both sides with 3 coats of latex block filler.	50
	1. 12x8x16” 3-cell lightweight concrete masonry units (43 lbs./block). 2. Paint one side only with 3 coats latex block filler.	51
	1. 6” cast concrete wall (71 psf).	57
	1. 6” cast concrete wall. 2. “Z” furring channels. 3. ½” gypsum board.	59
	1. 6” cast concrete wall. 2. “Z” furring channels. 3. 1”, 8-pcf rockwool. 4. ½” gypsum board.	62
	1. 6” cast concrete wall. 2. 2x2” wood furring. 3. 1 ½” 4-pcf rockwool. 4. ½” gypsum board.	63

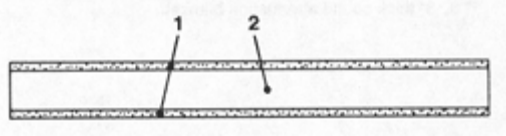
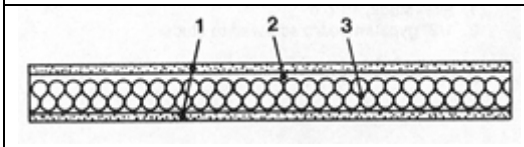
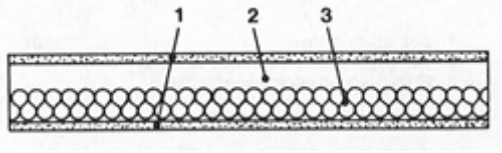
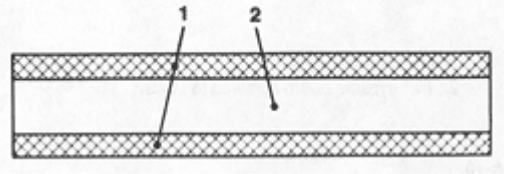
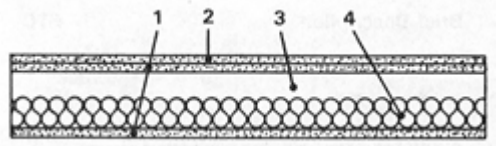
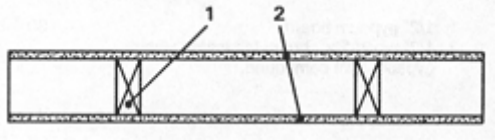
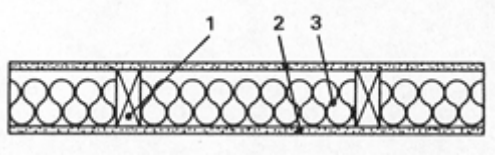
Sketch	Brief Description	STC
	1. 8” cast concrete wall (96.6 psf).	58
	1. 8” cast concrete wall. 2. 2x2” wood furring. 3. ½” gypsum board.	59
	1. 8” cast concrete wall. 2. 2x2” wood furring. 3. 1 ½”, 4 psf rockwall. 4. ½” gypsum board.	63
	1. Face brick. 2. ½” air space, with metal ties. 3. ¾” insulation board sheathing. 4. 2x4” studs 16”o.c. 5. Resilient channel. 6. ½” gypsum board.	54
	1. Face brick. 2. ½” air space, with metal ties. 3. ¾” insulation board sheathing. 4. 2x4” studs 16”o.c. 5. Fiberglas building insulation (3 ½”). 6. Resilient channel. 7. ½” gypsum board.	56

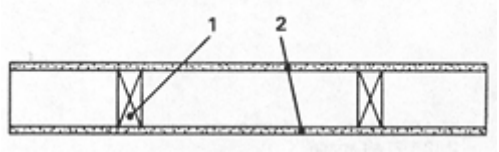
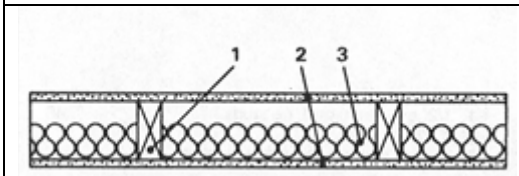
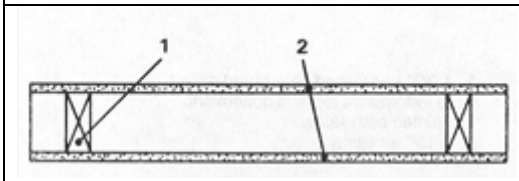
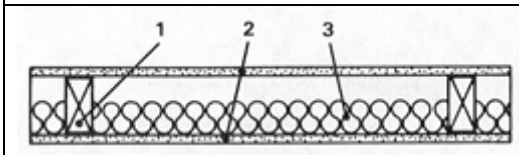
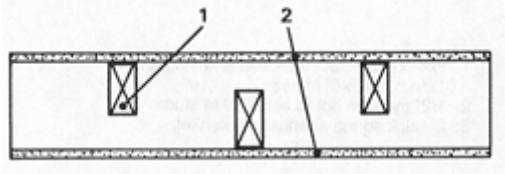
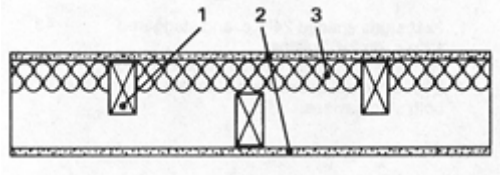
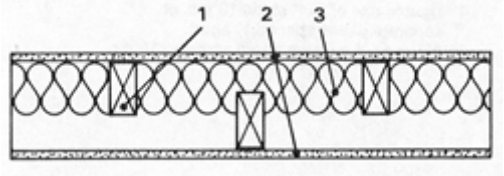
Sketch	Brief Description	STC
	1. Face brick (9x14' wall). 2. ½" air space, with metal ties. 3. ¾" insulation board sheathing. 4. 2x4" studs 16"o.c. 5. Fiberglas building insulation (3 ½"). 6. Resilient channel. 7. ½" gypsum board. 8. Wall penetrated by 6x5' picture window 1" glazed insulating glass.	39
	1. 7/8" stucco. 2. No.15 felt building paper and 1" wire mesh. 3. 2x4" studs 16"o.c. 4. Resilient channel. 5. ½" gypsum board screwed to channel.	49
	1. 7/8" stucco. 2. No.15 felt building paper and 1" wire mesh. 3. 2x4" studs 16"o.c. 4. Fiberglas building insulation (3 ½"). 5. Resilient channel. 6. ½" gypsum board screwed to channel.	57
	1. 5/8 x 10" redwood siding. 2. ½" insulation board sheathing. 3. 2x4" wood studs 16"o.c. 4. Resilient channel. 5. ½" gypsum board screwed to channel.	43

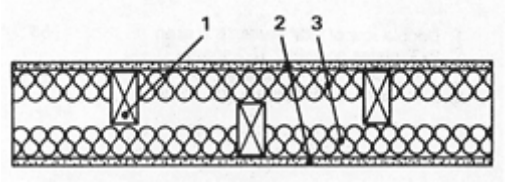
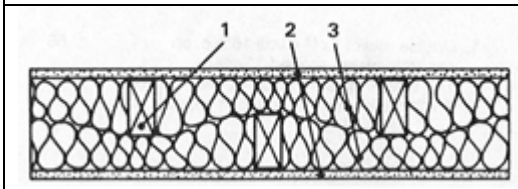
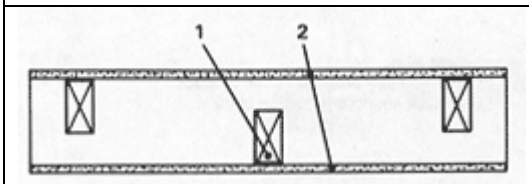
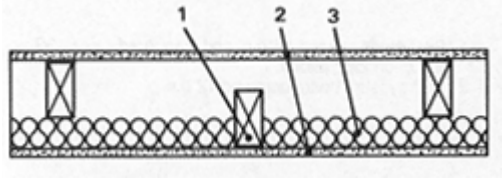
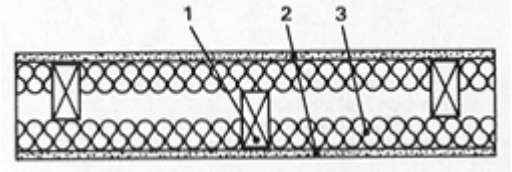
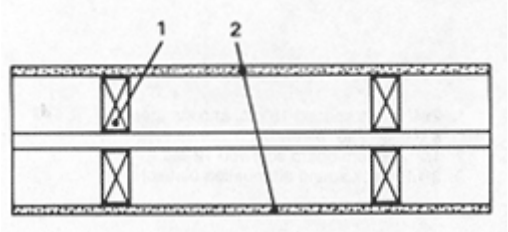
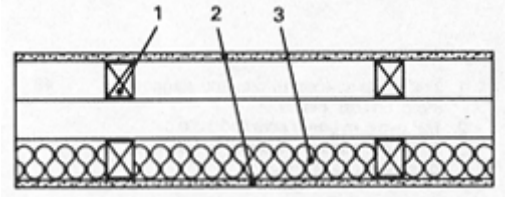
Sketch	Brief Description	STC
	1. 5/8x10” redwood siding. 2. ½” insulation board sheathing. 3. 2x4” wood studs 16”o.c. 4. Fiberglas building insulation (3 ½”). 5. Resilient channel. 6. ½” gypsum board screwed to channel.	47
	1. 5/8x10” redwood siding (9x14' wall). 2. ½” insulation board sheathing. 3. 2x4” wood studs 16.o.c. 4. Fiberglas building insulation (3 ½”). 5. Resilient channel. 6. ½” gypsum board screwed to channel. 7. a. Wall penetrated by a 6x5' picture window, 1” glazed insulating glass. b. Wall penetrated by a 6x5' 16 panel window, glazed single strength.	(a.38) (b.35)

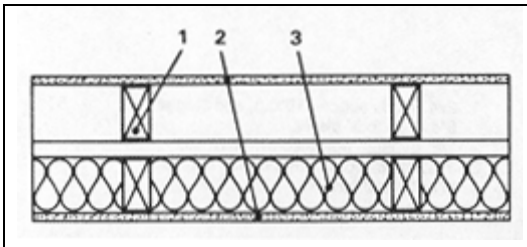
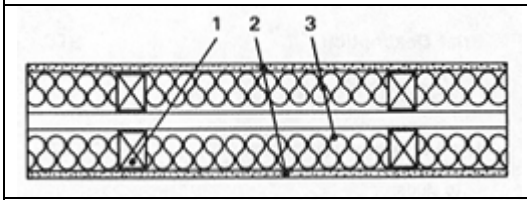
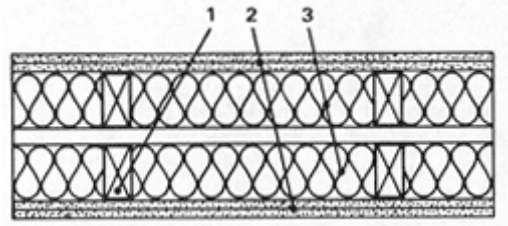
WALLS: Interior: Wooden Studs

Sketch	Brief Description	STC
	1. ½” gypsum board. 2. 3/16” plywood laminated with contact cement.	28
	1. ½” gypsum board. 2. ½” wood-fiber board laminated with gypsum joint compound.	30
	1. 2x4” studs, 16”o.c. 2. 5/8” gypsum board screwed to studs.	28

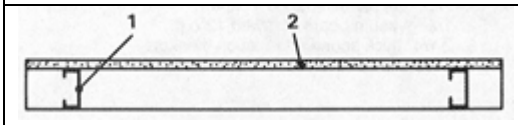
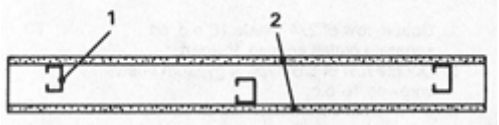
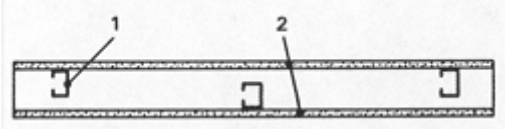
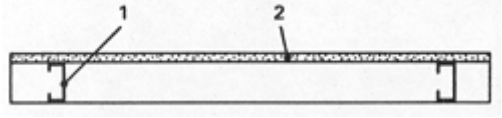
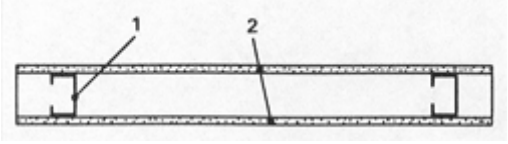
	1. ½" gypsum board, no studs. 2. 2 ½" air space.	30
	1. ½" gypsum board, no studs. 2. 2 ½" air space. 3. 2" thick sound attenuation blanket.	44
	1. ½" gypsum board, no studs. 2. 3 5/8" air space. 3. 2" thick sound attenuation blanket.	45
	1. 1 3/8" thick wood-fiber board nailed to 2x4" plates top and bottom and painted both sides. 2. 3 ½" air cavity.	44
	1. ½" gypsum board, no studs. 2. ½" gypsum board laminated to base layer with gypsum joint compound. 3. 3 5/8" air cavity. 4. 2" thick sound attenuation blanket.	48
	1. 2x4" studs, 16"o.c. 2. 3/8" gypsum board nailed to studs.	35
	1. 2x4" studs, 16"o.c. 2. 3/8" gypsum board nailed to studs. 3. 3" thick sound attenuation blanket.	41

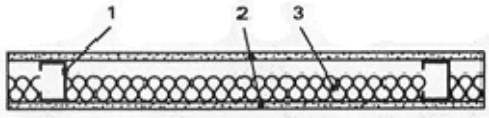
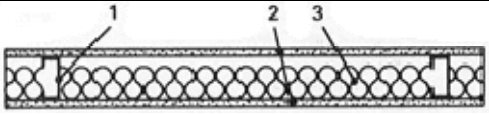
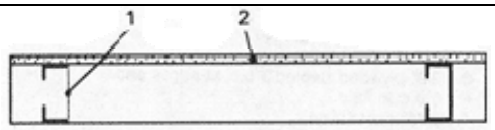
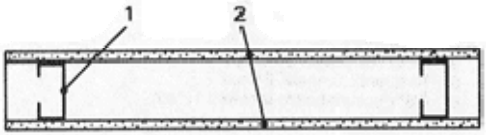
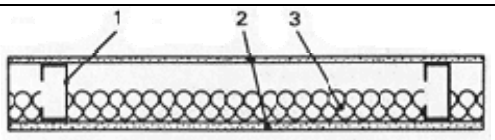
	1. 2x4” studs, 16”o.c. 2. ½” gypsum board screwed to studs.	34
	1. 2x4” studs, 16”o.c. 2. ½” gypsum board screwed to studs. 3. 2” thick sound attenuation blanket.	37
	1. 2x4” studs, 24”o.c. 2. ½” gypsum board screwed to studs.	36
	1. 2x4”studs, 24”o.c. 2. ½” gypsum board screwed to studs. 3. 2” thick sound attenuation blanket.	40
	1. 2x4” studs spaced 16”o.c. and staggered 8”o.c. on 2x6” plates. 2. ½” gypsum board screwed 12”o.c.	39
	1. 2x4” studs spaced 16”o.c. and staggered 8”o.c. on 2x6” plates. 2. ½” gypsum board screwed 12”o.c. 3. 2 ¼” thick sound attenuation blanket.	48
	1. 2x4” studs spaced 16”o.c. and staggered 8”o.c. on 2x6” plates. 2. ½” gypsum board screwed 12”o.c. 3. 3 ½” thick sound attenuation blanket.	49

	1. 2x4" studs spaced 16"o.c. and staggered 8"o.c. on 2x6" plates. 2. ½" gypsum board screwed 12"o.c. 3. 2 ¼" thick sound attenuation blankets in both stud cavities.	49
	1. 2x4" studs spaced 16"o.c. and staggered 8"o.c. on 2x6" plates. 2. ½" gypsum board screwed 12"o.c. 3. 3 ½" thick sound attenuation blankets in both stud cavities.	51
	1. 2x4" studs spaced 24"o.c. and staggered 12"o.c. on 2x6" plates. 2. ½" type X gypsum board screwed 12"o.c.	42
	1. 2x4" studs spaced 24"o.c. and staggered 12"o.c. on 2x6" plates. 2. ½" gypsum board screwed to studs. 3. 2" thick sound attenuation blanket.	46
	1. 2x4" studs spaced 24"o.c. and staggered 12"o.c. on 2x6" plates. 2. ½" type X gypsum board screwed 12"o.c. 3. 2" thick sound attenuation blankets in both stud cavities.	48
	1. Double row of 2x4" studs 16"o.c. on separate plates spaced 1" apart. 2. ½" type X gypsum board screwed 12"o.c.	47
	1. Double row of 2x3" studs 16"o.c. on 2x3" plates spaced 2 ½" apart. 2. ½" gypsum board screwed 16"o.c. 3. 2 ¼" thick sound attenuation blanket.	55

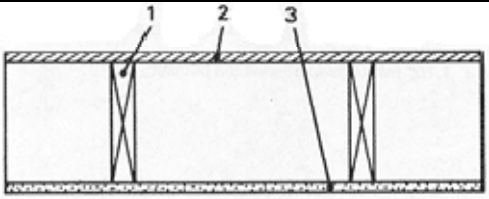
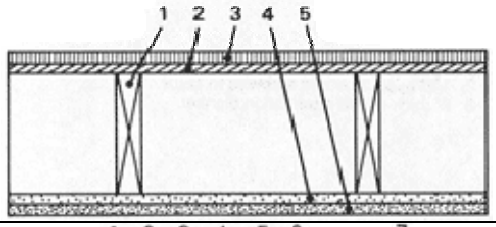
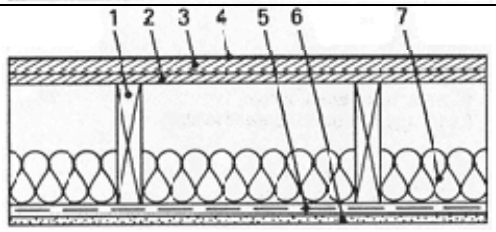
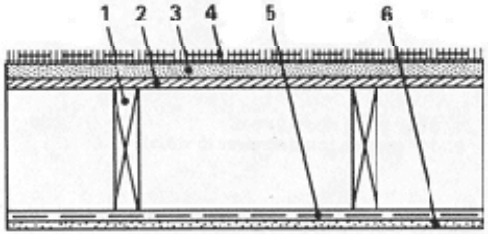
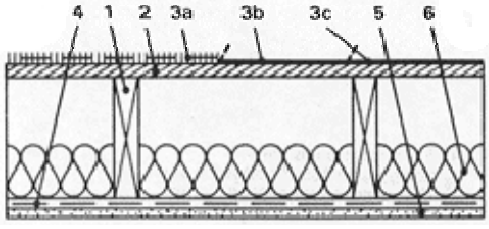
	1. Double row of 2x4” studs 16”o.c. on separate plates spaced 1” apart. 2. ½” type X gypsum board screwed 12”o.c. 3. 3 ½” thick sound attenuation blanket.	56
	1. Double row of 2x4” studs 16”o.c. on separate plates spaced 1” apart. 2. ½” gypsum board screwed 12”o.c. 3. 2 ¼” thick sound attenuation blankets in both stud cavities.	56
	1. Double row of 2x4” studs 16.o.c. on separate plates spaced 1” apart. 2. Double row of 5/8” type X gypsum board screwed 16.o.c. 3. 3 ½” thick sound attenuation blankets in both stud cavities.	63

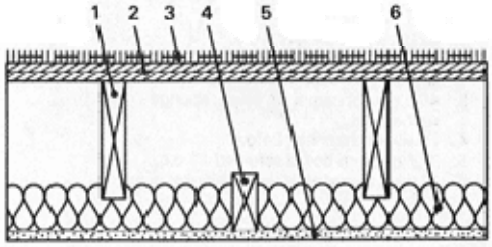
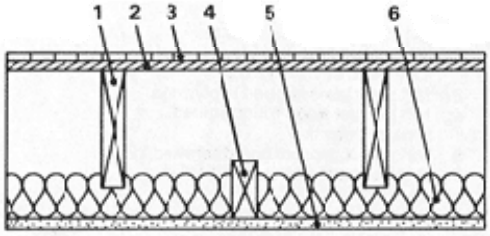
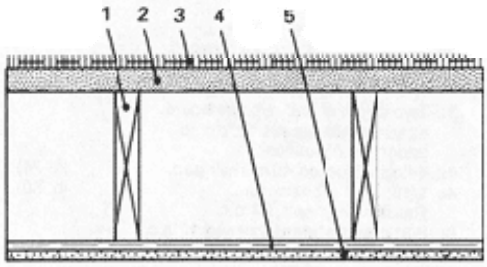
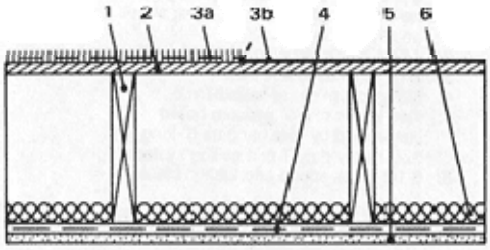
WALLS: Interior: Metal Studs

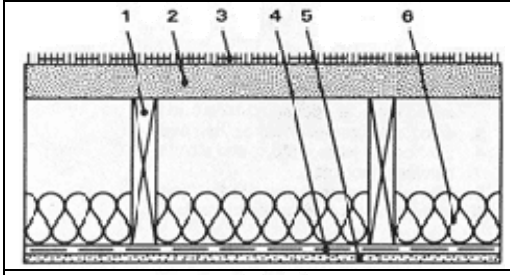
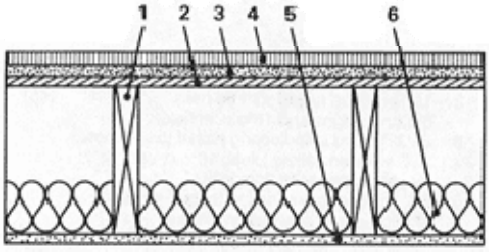
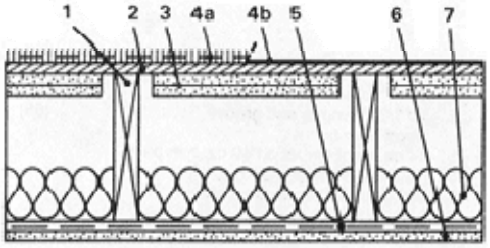
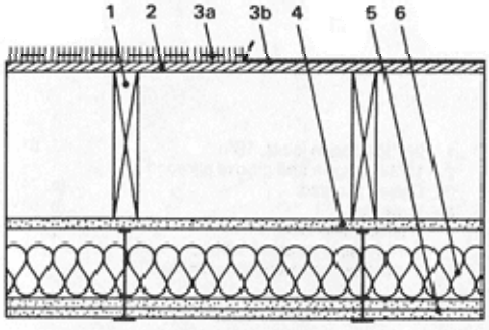
Sketch	Brief Description	STC
	1. 1 5/8" metal studs, 24"o.c. 2. 1/2. vinyl-faced gypsum board screwed to studs.	27
	1. 1 5/8" metal studs spaced 24"o.c. and staggered 12"o.c. on 2 ½" metal tracks. 2. 1/2" gypsum board screwed to studs.	34
	1. 1 5/8" metal studs, 24"o.c. 2. 5/8" gypsum board screwed 12"o.c. at edges and 24"o.c. in field.	37
	1. 1 5/8" metal studs spaced 24"o.c. and staggered 12"o.c. on 21/2" metal channels. 2. 5/8" gypsum board screwed to studs.	38
	1. 2 ½" metal studs, 24"o.c. 2. 1/2" vinyl-faced gypsum board screwed to studs.	27
	1. 2 1/2" metal studs, 24"o.c. 2. 5/8" gypsum board screwed to studs.	37

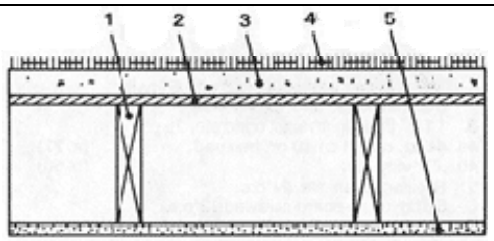
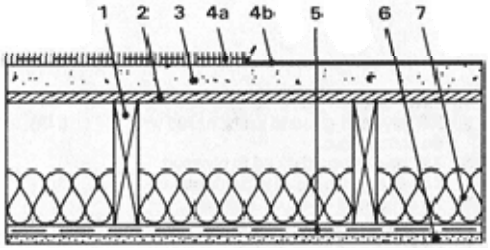
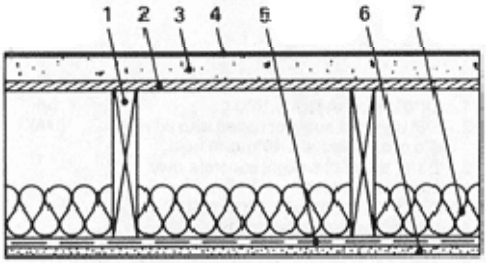
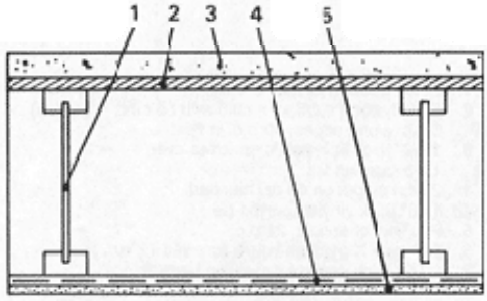
Sketch	Brief Description	STC
	1. 2 ½" metal studs, 24"o.c. 2. 5/8" gypsum board screwed 12"o.c. at edges and 24"o.c. in field. 3. 1 ½" thick sound attenuation blanket.	42
	1. 2 ½" metal studs, 24"o.c. 2. ½" gypsum board screwed to studs. 3. 2" thick sound attenuation blanket.	44
	1. 3 5/8" metal studs, 24"o.c. 2. 1/2. gypsum board screwed to studs.	27
	1. 3 5/8" metal studs, 24"o.c. 2. ½" gypsum board screwed to studs.	36
	1. 3 5/8" metal studs, 24"o.c. 2. ½" gypsum board screwed to studs. 3. 2" thick sound attenuation blanket.	44

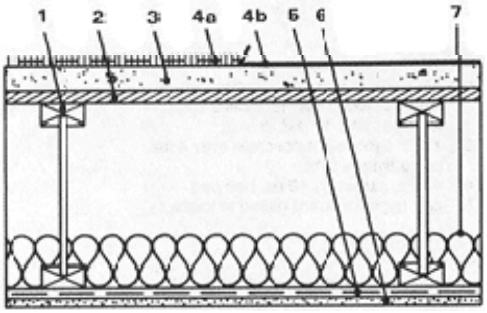
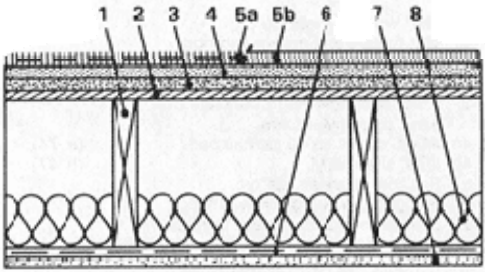
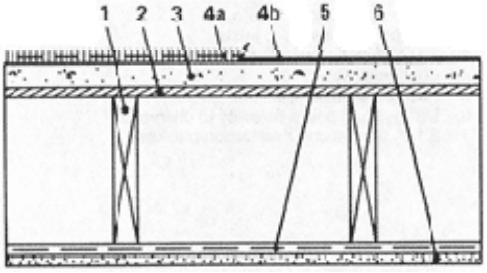
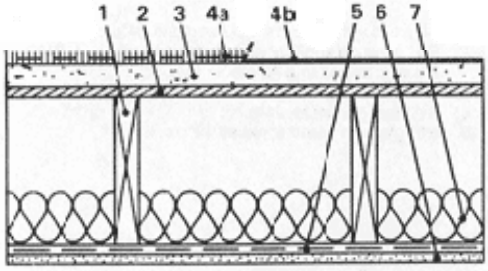
Floors: Wood

Sketch	Brief Description	STC (IIC)
	1. 2x8” wooden joists, 16”o.c. 2. 7/8” tongue and groove nailed to joints. 3. 3/8” gypsum nailed to joints.	NA (32)
	1. 2x8” wooden joists, 16”o.c. 2. ½” plywood nailed. 3. 25/32” hardwood flooring. 4. 1/2” gypsum nailed to joists. 5. Ceiling tire.	NA (37)
	1. 2x8” wooden joists, 16”o.c. 2. 5/8” tongue and groove plywood nailed with 8d nails 6”o.c. 3. 3/8” plywood stapled 3”o.c. at edges and 6”o.c. in field. 4. .075” sheet vinyl. 5. Resilient channels, 24”o.c. 6. 5/8” gypsum board screwed 12”o.c. 7. 3” thick sound attenuation blanket.	46 (44)
	1. 2x8” wooden joists, 16”o.c. 2. 5/8” plywood nailed with 8d nails. 3. ½” nominal wood-fiber board glued to plywood. 4. 44 oz. carpet on 50 oz. pad. 5. Resilient channels, 24”o.c. 6. 5/8” gypsum board screwed 12”o.c.	48 (65)
	1. 2x8” wooden joists, 16”o.c. 2. 19/32” tongue and groove plywood nailed with 8d nails 6”o.c. at edges and 10”o.c. in field. 3. a. 44 oz. carpet on 40 oz. hair pad. b. .075” sheet vinyl. c. 1/16” sheet vinyl. 4. Resilient channels, 24”o.c. 5. 5/8” gypsum board screwed 12”o.c. 6. 3” thick sound attenuation blanket.	48 (a. 69) (b. 45) (c.43)

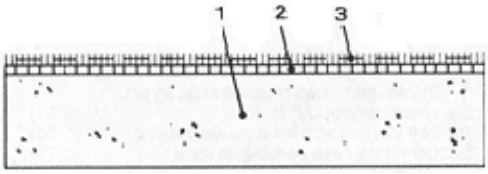
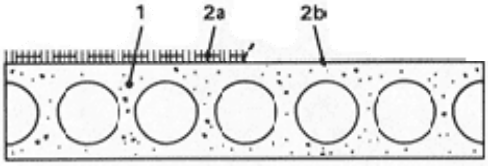
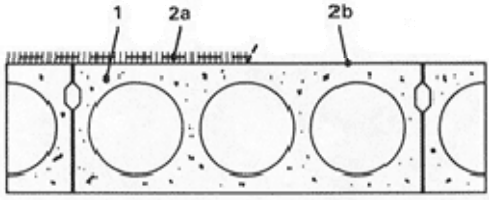
Sketch	Brief Description	STC (IIC)
	1. 2x8” wooden joists, 16”o.c. 2. 1 1/8” tongue and groove plywood nailed 6”o.c. at edges and 16”o.c. in field. 3. 44 oz. wool carpet on 40 oz. hair pad. 4. 2x4” ceiling joists, 16”o.c. and staggered between floor joists. 5. 5/8” gypsum board nailed to 2x4” joists. 6. 3” thick sound attenuation blanket.	53 (80)
	1. 2x8” wooden joists, 16”o.c. 2. 1/2” plywood nailed with 8d nails 6”o.c. at edges and 16”o.c. in field. 3. 25/32” wood strip flooring nailed to sub floor. 4. 2x4” wooden ceiling joists, 16”o.c. and staggered between floor joists. 5. 5/8” gypsum board nailed to 2x4” joists. 6. 3” thick sound attenuation blanket.	54 (45)
	1. 2x10” wooden joists, 16”o.c. 2. 1 11/32” tongue and groove wood-fiber board. 3. 44 oz. wool carpet on 40 oz. hair pad. 4. Resilient channels, 24”o.c. 5. 5/8” gypsum screwed 12”o.c.	49 (68)
	1. 2x10” wooden joists, 16”o.c. 2. 19/32” tongue and groove plywood. 3. a. Carpet and pad. b. Vinyl tile. 4. Resilient channels, 24”o.c. 5. 5/8” gypsum screwed 12”o.c. 6. 1” thick sound attenuation blanket.	51 (a. 74) (b.51)

Sketch	Brief Description	STC (IIC)
	1. 2x10” wooden joists, 16”o.c. 2. 1 11/32” tongue and groove wood-fiber board. 3. 40 oz. wool carpet on 80 oz. sponge rubber pad. 4. Resilient channels, 24”o.c. 5. 1/2” gypsum board screwed 12”o.c. 6. 3” thick sound attenuation blanket.	50 (72)
	1. 2x10” wooden joists, 16”o.c. 2. 5/8” plywood sub floor glued to joists, nailed with 8d nails 12”o.c. 3. ¼” particleboard glued to plywood. 4. ½” parquet wood flooring glued to particleboard. 5. ½” type-X gypsum board screwed 12”o.c. 6. 3” thick sound attenuation blanket.	43 (NA)
	1. 2x10” wooden joists, 16”o.c. 2. 5/8” tongue and groove plywood nailed with 8d nails 6”o.c. along edges and 10”o.c. in field. 3. Two layers of 5/8” gypsum board attached with screws 12”o.c. to underside of sub floor. 4. a. 44 oz. carpet on 40 oz. hair pad. b. 1/16” vinyl asbestos tile. 5. Resilient channels, 24”o.c. 6. 5/8” gypsum board screwed 12”o.c. 7. 3 ½” thick sound attenuation blanket.	56 (a. 74) (b.50)
	1. 2x10” wooden joists, 16”o.c. 2. 5/8” tongue and groove plywood nailed with 8d nails 6”o.c. along edges and 10”o.c. in field. 3. a. 44 oz. carpet on 40 oz. hair pad. b. 1/16” vinyl asbestos tile. 4. 5/8” gypsum board nailed 7”o.c. 5. Two layers of 5/8” gypsum board suspended by wire hangers 5” long in a 2x4' heavy-duty T grid ceiling system. 6. 3 ½” thick sound attenuation blanket.	49 (a. 68) (b.47)

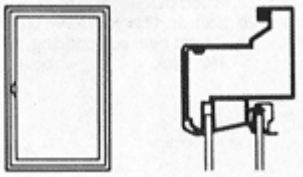
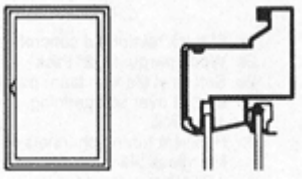
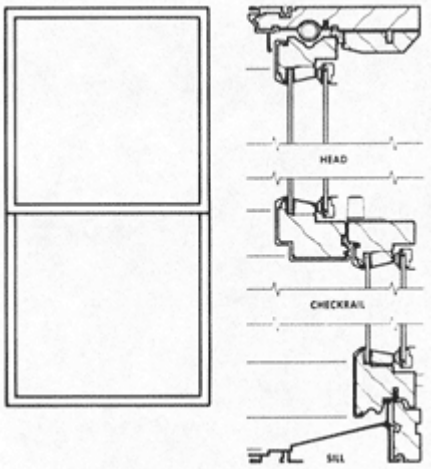
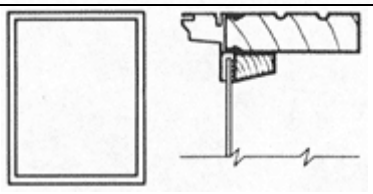
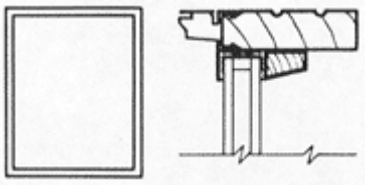
Sketch	Brief Description	STC (IIC)
	1. 2x8” wooden joists, 16”o.c. 2. 5/8” tongue and groove plywood nailed to joists with 8d nails 6”o.c. at edges and 10”o.c. in field. 3. 1 5/8” lightweight concrete over 4 mil. polyethylene film. 4. 44 oz. carpet on 40 oz. hair pad. 5. 5/8” gypsum board nailed to joists.	47 (66)
	1. 2x8” wooden joists, 16”o.c. 2. 5/8” tongue and groove plywood nailed to joists with 8d nails 6”o.c. at edges and 10”o.c. in field. 3. 1 5/8” thick lightweight concrete over 4 mil. polyethylene film. 4. a. 44 oz. carpet on 40 oz. hair pad. b. .075” sheet vinyl. 5. Resilient channels, 24”o.c. 6. 5/8” gypsum board screwed 12”o.c. 7. 3” thick sound attenuation blanket.	53 (a. 74) (b. 47)
	1. 2x10” wooden joists. 16”o.c. 2. 5/8” plywood nailed to joists. 3. 3. 1 ½” thick lightweight concrete, 13 psf. 4. Cushioned vinyl. 5. Resilient channels, 24”o.c. 6. 5/8” gypsum board screwed to channels. 7. 3 ½” thick sound attenuation blanket.	NA (51)
	1. Plywood web I-beams 12” deep and 24”o.c. 2. 3/4” plywood sub floor nailed with 6d nails 6”o.c. at edges and 10”o.c. in field. 3. 1 ½” thick lightweight concrete, 15 psf. 4. Resilient channels, 24”o.c. 5. 5/8” gypsum board screwed 12”o.c.	57 (NA)

Sketch	Brief Description	STC (IIC)
	1. Plywood web I-beams 12” deep and 24”o.c. 2. 3/4” plywood sub floor nailed with 6d nails 6”o.c. at edges and 10”o.c. in field. 3. 1 1/2” thick lightweight concrete, 15 psf. 4. a. 44 oz. carpet on 40 oz. hair pad. b. .07” vinyl tile. 5. Resilient channels, 24.o.c. 6. 5/8” gypsum board screwed 12”o.c. 7. 3” thick sound attenuation blanket.	58 (a. 77) (b. 50)
	1. 2x10” wooden joists, 16”o.c. 2. 5/8” plywood glued to joists, nailed with 8d nails 12”o.c. 3. ¼” particleboard glued to plywood. 4. ½” fiberboard glued to particleboard. 5. a. 76 oz. carpet on 50 oz. hair pad. b. 1/2” parquet wood flooring. 6. Resilient channels, 24”o.c. 7. ½” type-X gypsum board screwed 12”o.c. 8. 3” thick sound attenuation blanket.	51 (NA)
	1. 2x10” wooden joists, 16”o.c. 2. 5/8” plywood sub floor nailed with 8d nails 6”o.c. along edges, 10”o.c. in field. 3. 1 1/2” thick lightweight concrete over 15 lb. asphalt felt. 4. a. 20 oz. carpet on 40 oz. hair pad. b. 1/16” thick vinyl-asbestos tile. 5. Resilient channels, 24”o.c. 6. ½” type-X gypsum board screwed 12”o.c.	56 (NA)
	1. 2x10” wooden joists, 16”o.c. 2. 5/8” plywood sub floor nailed with 8d nails 6”o.c. along edges, 10”o.c. in field. 3. 1 ½” thick lightweight concrete over 15 lb. asphalt felt. 4. a. 20 oz. carpet on 40 oz. hair pad. b. 1/16” thick vinyl-asbestos tile. 5. Resilient channels, 24”o.c. 6. 5/8” type-X gypsum board screwed 12”o.c. 7. 3 ½” thick sound attenuation blanket.	61 (NA)

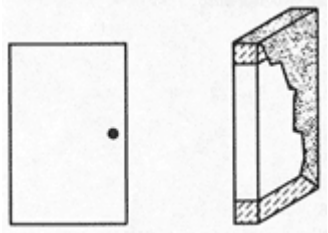
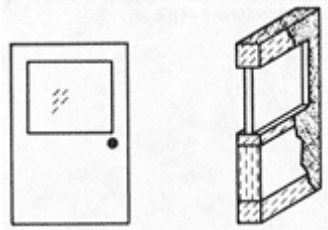
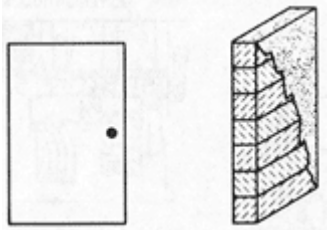
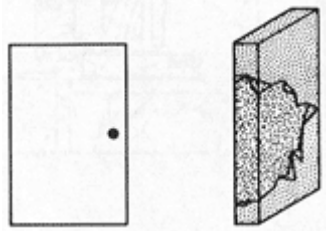
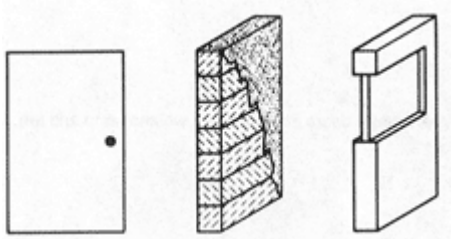
FLOORS: Concrete

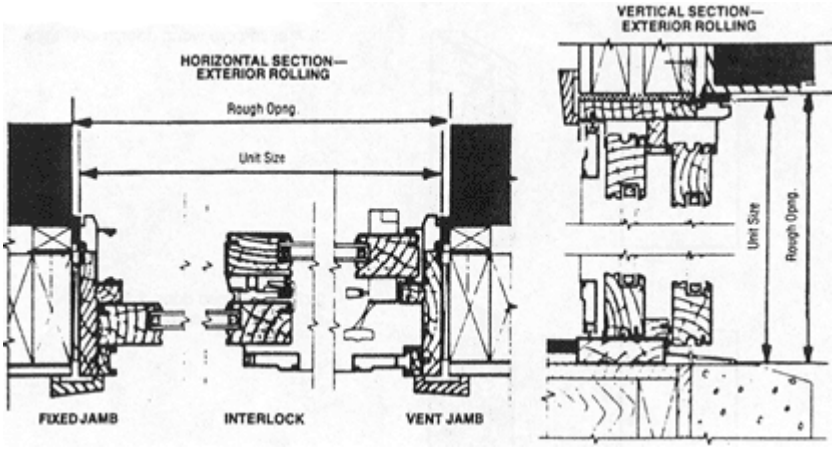
Sketch	Brief Description	STC (IIC)
	1. 4" thick concrete slab, 54 psf.	44 (25)
	1. 6" thick concrete slab, 75 psf.	55 (34)
	1. 6" thick concrete slab. 2. ½" wood-fiber board glued to concrete. 3. 44 oz. carpet on 40 oz. hair pad.	NA (81)
	1. 6" thick hollow-core concrete panel, 45 psf. 2. a. Carpet and pad. b. No floor covering.	48 (a. 69) (b. 23)
	1. 8" thick hollow-core concrete panel, 57 psf. 2. a. 66 oz. carpet on 50 oz. hair pad. b. No floor covering.	50 (a. 74) (b. 28)

WINDOWS

Sketch Front / Cross Section	Brief Description	STC
	30x48” aluminum clad casement, two 1/8” panels of glass, 13/16” apart in a wood frame.	29
	30x48” aluminum clad casement, one 3/32” panel and one 1/8” panel, 13/16” apart in a wood frame.	31
	32x24x24” aluminum double-hung windows (32” wide with 24” high upper sash and a 24” high lower sash), each sash has one 3/32” panel and one 1/8” panel, 13/16” apart in a wood frame.	29
	6x5' picture window glazed double strength, single panel.	29
	6x5' picture window plus storm sash, glazed double strength single panel, 3 ¾” separation between panels.	38

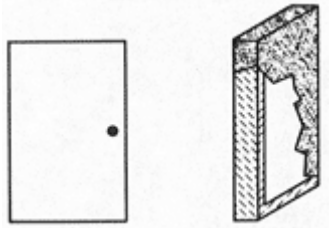
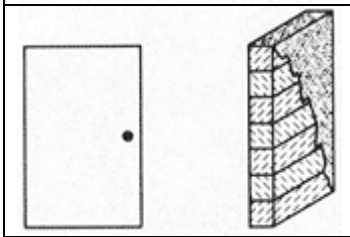
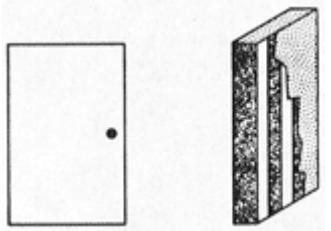
DOORS: Exterior

Sketch Front / Cross Section	Brief Description	STC
	3x7' hollow-core wood door, 1 ¾" thick.	20
	3x7' hollow-core door, 1 3/4" thick, 30% of area glazed with 1/8" glass.	19
	3x7' solid-core wood door, 1 ¾" thick.	27
	3x7' steel-faced door, 1 ¾" thick, rigid polyurethane core.	26
	3x7' solid-core wood door, 1 ¾" thick plus an aluminum storm door, glazed single strength.	34



*All exterior doors are sealed with a weathering strip around the frame. Interior doors do not have a weather strip and are not flush to the floor to permit the installation of a carpet.

DOORS: Interior

Sketch Front / Cross Section	Brief Description	STC
	3x7' solid-core wood door, 1 ¾" thick, weight 1.5 lb/ft².	17
	3x7' solid-core wood door, 1 ¾" thick, weight 4.0 lb/ft².	20
	3x7' hollow-core steel door, 1 ¾" thick, weight 5.0 lb/ft².	17

General References

Books:

Acoustical and Thermal Performance of Exterior Residential Walls. Doors and Windows; NBS Building Science Series 77, U.S. Department of Commerce/National Bureau of Standards, 1975.
Acoustics Noise and Buildings; Parkin, Humphreys and Cowell; Faber and Faber; London; 1979.

Airborne Sound Transmission Loss, Characteristics of Wood Frame Construction; Fred F. Rudder, Jr.; USDA, Forest Service; General Technical Report FPL-43.
Handbook of Architectural Acoustics and Noise Control; Michael Retting; Tab Book; Blue Ridge Summit, Pa.; 1979.
Quieting: A Practical Guide to Noise Controls; U.S. Department of Commerce/National Bureau of Standards; NBS Handbook 119; 1976.

Institutions and Organizations:
Amerada Architectural Glass.
DeSco Windows.
Georgia-Pacific.
Industrial Acoustics Company.
National Concrete Masonry Association.
Office of Noise Control; California Department of Health Services.
Overly Manufacturing Company.
Paella Products.
Portland Cement Association.
U.S. Gypsum Company.

Testing Laboratories:
Cedar Knolls Acoustical Laboratories.
Geiger and Hamme.
Kaiser Gypsum.
Kodaras Acoustical.
National Institute of Standards and Technology.
National Research Council of Canada.
Riberbank Acoustical Laboratories.

APPENDIX I

Sample Land Acquisition Checklist

ACQUISITION/RELOCATION RECORDS CHECKLIST

Displacee Name _____ Parcel# _____ Project# _____

Original Address _____

New Address
_____

Phone No. Area Code ( ) _____

Name of official providing relocation assistance _____

Owner (complete Part A) _____ Tenant _____	Type of use (check one) Business.__, Farm ___, Nonprofit Org. __ (complete Parts B & D) Residence _____ (complete Parts B & C)

Place X for each item, if document is in file. Use N/A for non applicant items.

PART A. ACQUISITION (owner occupied property only)

1. Appraisal report date, amount, certification? __
2. Owner given opportunity to accompany appraiser? __
3. Appraisal review date, amount & justification? __
4. Written offer & Summary statement with the date & amount offered? __
5. Administrative settlement date, amount, and justification? __
6. Condemnation award date, amount & documentation? __
7. Date & amount owner paid or money made available by court & date of physical possession? __
8. Date and amount owner paid for expenses incidental to transfer or title? __
9. Offer to buy uneconomic remainder made to owner? __
10. Record of each negotiation contact? __

PART B. RELOCATION-GENERAL

1. Displacee given relocation brochure? __
2. Displacee offered and accepted/refused relocation advisory services? __

3. Notice of intent to acquire? ___
4. Displacee provided written notice to eligibility requirements & amount of payment & services? ___
5. 90 day notice to vacate date required to move? ___
6. Diary of personal contacts with displacee? ___
7. Displacee notified of right to appeal, appeal process & outcome? ___
8. Date on which actual relocation occurred? ___
9. Relocation accomplished with/without the airport owner? ___

PART C. RELOCATION-RESIDENTIAL

1. Type of property-single detached, multifamily, room no.? ___
2. Data on displacee-address before & after relocation, number in family, age, race.. etc.? ___
3. Personal property storage, location, duration, bills? ___
4. If actual cost move, justification for scheduled payment? ___
5. Calculation of R.H.P. & certification of individual responsible for making same? ___
6. Offer of assistance for R.H.P. accepted/declined ___
7. Date & result of D.S.S. inspection? ___
8. Fair market value of dwelling or monthly rent? ___
9. Closing costs and/or increased mortgage interest differential? ___
10. Date and amount of each payment claimed? ___
11. Date and amount of each payment allowed? ___

___

PART D. RELOCATION-BUSINESS, FARM, OR NONPROFIT ORGANIZATION

1. Actual cost commercial move-receipted bills? ___
2. Self move-bids, cost of obtaining bids, inventory, moving expenses finding? ___
3. Actual direct losses of tangible personal propoerty-advertising & sale costs, bills of sale, auction records, ..etc.? ___
4. Searching expenses-bills, certified statement of time spent & wage rate? ___
5. Fixed business in lieu of moving expenses-basis, justification, calculation of payment, tax records .. etc.? ___
6. Business re-establishment expenses? ___
7. Date and amount of each payment claimed? ___
8. Date and amount of each payment allowed? ___

APPENDIX J

FAA Claim for Relocation Form

U.S. Department of Transportation
Federal Aviation Administration

Claim for Relocation Payments - Nonresidential

(Uniform Relocation Assistance and Real Property Acquisition Policies Act - 42 U.S.C 4601 et seq.))

This form is for use in applying for eligible payment of the actual, reasonable, and necessary moving and reestablishment expenses incurred due to displacement for an airport project. A representative will explain the differences between types of payments and, if you wish, will help you complete the forms. No payments will be made unless the forms are properly executed and received (42 U.S.C 4622). If your claim is disapproved and/or adjusted from amounts claimed, you will be provided a written explanation for the reason and steps that you may take to have your claim reviewed, in accordance with regulations and procedures.

Note: receipts, vouchers, closing statements or other documentation must support Actual expenses, or similar evidence remitted with the appropriate forms.

Privacy Act Statement:

42 U.S.C. 4601 et seq. Authorizes collection of this information. The primary use of the information is to determine whether the claimant is eligible for and entitled to relocation benefits. Furnishing the information is required in order to process your claim. Failure to do so may result in nonpayment. The information may also be provided to appropriate Federal, state, local, or foreign agencies responsible for investigation or prosecuting a violation of law; to the Department of Justice when relevant to litigation or anticipated litigation.

Penalty for False or Fraudulent Statement:

U.S.C. Title 18, 1001, provides: "Whoever, in any matter within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies… or makes any false, fictitious or fraudulent statements of representations, or makes or uses any false writing or document knowing the same to contain any false, fictitious or fraudulent, statement or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both."

You Must be Lawfully Present in the United States

In accordance with the provisions of PL 105-117 amending the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 U.S.C. 4601 et seq.), any person who is an alien not lawfully present in the United States is ineligible for relocation advisory services and relocation payments, unless such ineligibility would result in exceptional and extremely unusual hardship to qualifying spouse, parent, or child, as defined in 49 CFR 24.208(I).

Displacee:	**Property Street Address:**

11. Certification:

I CERTIFY under the penalties and provisions of U.S.C Title 18 and/or any other applicable law, that this claim and information submitted herewith has been examined and is true, correct, and complete. I have not submitted any other claim for, or received reimbursement or compensation from any other source for any item of this claim; and that any receipts submitted herewith accurately reflect costs actually incurred. I certify that the choice of payment was made on the basis of a full explanation by the displacing agency representative of the differences between the types of payment available.

As required by law (PL 105-117), in making this claim and receiving payment I further CERTIFY:

IF UNINCORPORATED BUSINESS, FARM, OR NON-PROFIT ORGANIZATION

✓ ☐ I am either a citizen or national of the United States, or an alien who is lawfully present in the United States; and as applicable

✓ ☐ On behalf of all owners or persons with an ownership interest in the displaced business, farm or non-profit organization, that each owner is either a citizen or national of the United States, or an alien who is lawfully in the United States.

IF INCORPORATED BUSINESS, FARM, OR NON-PROFIT ORGANIZATION

✓ ☐ That the corporation is authorized to conduct business within the United States.

Signature: _____ Signature: _____

Date: _____ Date: _____

Section II - To Be Completed by Agency

	Claim Amount	**Signature**	**Title**	**Date**
Recommended				
Approved				

Remarks:

☐ END OF FORM

APPENDIX K

Sample Memorandum of Understanding

SAMPLE MEMORANDUM OF UNDERSTANDING

Between NAS JRB Fort Worth
_____ Counties and
The Cities of _____

This Memorandum of Understanding between NAS JRB Fort Worth, the Counties of _____, and the Cities of _____, is enacted to establish a mutually beneficial process that will ensure timely and consistent notification and cooperation between the parties on projects, policies, and activities. These parties have a mutual interest in the cooperative evaluation, review, and coordination of local plans, programs, and projects in the Counties of _____, the Cities of _____, and on NAS JRB Fort Worth.

The Cities of _____ and the Counties of _____agree to:

1. Submit information to NAS JRB RCC on plans, programs, actions, and projects that may affect NAS JRB Fort Worth. This may include, but not be limited to the following:
   - Development proposals
   - Transportation improvements and plans
   - Sanitary waste facilities
   - Open space and recreation
   - Public works projects
   - Land use plans and ordinances
   - Rezonings and variance

2. Submit to NAS JRB RCC for review and comment, project notification, policies, plans, reports, studies and similar information on development, infrastructure and environmental activities within proximity of NAS JRB Fort Worth as defined by _____.

3. Consider NAS JRB RCC comments into local responses or reports. Include NAS JRB Fort Worth in the distribution of meeting agendas for, but not limited to:
   - City Council or County Commission Meetings
   - Planning Commission Meetings
   - Zoning Boards of Adjustment
   - Review Board
   - Transportation Studies

NAS JRB Fort Worth agrees to:

1. Submit information to City and County representatives on plans, programs, actions, and projects which may affect the city or county. These may include, but not be limited to, the following:

- Installation Master Plan
- Updated Air Installation Compatible Use Zone Study
- Noise Management Studies
- Changes in existing installation use that may change off-post impacts, such as noise
- Appropriate data on troop strength and activities for local plans, programs and projects

2. Submit to City and County representatives for review and comment, project notification, policies, plans, reports, studies and similar information on development, infrastructure and environmental activities at NAS JRB Fort Worth.

This agreement will remain in effect until terminated by any of the parties. Amendments to this memorandum may be made by mutual agreement of all the parties. Review process details and appropriate forms may be developed to facilitate uniform and efficient exchanges of comments.

This understanding will not be construed to obligate the U.S. Navy, the Cities of _____, the Counties of _____ to violate existing or future laws or regulations.

This agreement is approved by:

County _____
Authorized Representative

City _____
Authorized Representative

NAS JRB Fort Worth _____
Authorized Representative

APPENDIX L

Definitions

Definitions

Air Installation Compatible Use Zone (AICUZ) – AICUZ is a land use planning program used by the Air Force to protect the integrity of military operations at airfields, and to protect the safety, health and welfare of the affected public through source and operational controls and the use of land use compatibility measures.

Accident Potential Zone (APZ) – Areas located beyond the clear zone at the end of a runway, as shown on the air installation compatible use zone map. APZ I and APZ II are 3,000 feet by 5,000 feet and 3,000 feet by 7,000 feet, respectively.

Accident Potential Zone I – At airfields, an area located just beyond the Clear Zones at each end of the runway. Less critical than the Clear Zone it still possesses significant potential for accidents. Land use compatibility guidelines allow a wide variety of industrial, manufacturing, transportation, communication, utilities, wholesale trade, open space, recreation and agricultural uses. Uses that concentrate people in small areas are not acceptable.

Accident Potential Zone II – At airfields, an area beyond accident potential zone I. This area is less critical than zone I but still possesses potential for accidents. Acceptable land uses include those in zone I, as well as low density, single family residences. Also acceptable are personal and business services and commercial retail trade uses of low intensity or scale of operation. High density functions such as multi-story buildings, places of assembly (e.g., theaters, schools, churches, and restaurants) and high density office uses are not considered appropriate.

Ambient Noise - The total of all noise in the environment, other than the noise from the source of interest. This term is used interchangeably with background noise.

Annoyance - A feeling of displeasure associated with any agent or condition known or believed by an individual or a group to be adversely affecting them.

Attenuation - The reduction of sound intensity by various means (e.g., air, humidity, porous materials).

Clear Zone (CZ) – A 3,000 foot by 2,284 foot area at the end of each runway wherein certain activities are prohibited due to the risk of aircraft mishap.

Day-Night Average Sound Level (Ldn or Dnl) - The 24-hour average sound level, for a period from midnight to midnight, obtained after multiplying by a factor of ten the average A-weighted sound pressures occurring in the nighttime hours 0000 to 0700 hours and 2200 to 2400 hours. Also known as DNL.

Decibel (dB) – The decibel is a logarithmic unit of measure of sound pressure. One tenth of the bel ***(B)***.

Glare – direct light shining from a fixture (luminaire) that makes it difficult to see or causes discomfort—it is especially a problem for motorists.

Jet Noise - Noise produced by the exhaust of a jet into its surrounding atmosphere. It is generally associated with the turbulence generated along the interface between the jet stream and the atmosphere.

Joint Land Use Study (JLUS) - The Joint Land Use Study (JLUS) is a continuation and implementation of the ONMP (Operational Noise Management Plan). It is a collaborative land use planning effort involving the military installation and adjacent local governments. The study evaluates the planning rationale necessary to support and encourage compatible land use development surrounding the installation. Its purpose is to provide support to sustain and provide flexibility to military missions on the installation while guiding the long-term land use needs of the neighboring counties and communities.

LDN - LDN means the day-night average level, or the 24-hour equivalent continuous sound time (time-averaged A-weighted sound level) from midnight to midnight, obtained after the addition of 10 dBA to sound levels measured from 10 p.m. to 7 a.m.

Light Pollution – Upward and outward distribution of light, either directly from fixtures or from reflection off the ground or other surfaces.

Light Trespass – The shining of light onto neighboring properties when that light is intrusive or objectionable.

Military Airport Zone (MAZ) – A designated airspace below 18,000 feet MSL that is established to separate military activities from instrument flight rule traffic and to identify where these activities are conducted for the benefit of pilots using visual flight rules.

Military Training Route (MTR) – An MTR is a designated corridor of airspace with defined vertical and lateral dimensions established for conducting military flight training at airspeeds in excess of 250 nautical miles per hour.

Noise - Any disagreeable or undesired sound or other disturbance.

Noise Contours - Continuous lines of equal noise level usually drawn around a noise source. The lines are generally drawn in 5-decibel increments so that they resemble elevation contours found in topographic maps except that they represent contours of equal noise level. Noise contours are generally used in depicting the noise exposure around airports, highways, and industrial plants.

Noise Map - A noise map is a set of contours of equal noise exposure (such as equal Leq) based upon measurements or predictions of noise in the region of interest.

Noise Sensitive Land Uses – Those land areas such as residential, churches, schools, hospitals etc.

Noise Survey- A noise survey is a set of measurements of the sound levels or sound exposures in an environment of interest. In some surveys octave band (or even narrower band) analysis may be included.

Noise Zones - A noise zone is an area where the noise level, usually day-night level, is between an upper and lower specified level.

Noise Zone I - Noise zone I includes all areas around a noise source in which day-night sound level is less than 65 decibels, A-weighted or 62 decibels, C-weighted. This area is usually suitable for all types of land use activities.

Noise Zone II - Noise zone II consists of a area where the day-night sound level is between 65 and 75 decibels, A-weighted or 62 and 70 decibels, C-weighted. Exposure to noise within this area is normally incompatible with noise sensitive land uses and use of the land within the zone should normally be limited to activities such as industrial, manufacturing, transportation and resource production.

Noise Zone III - Noise zone III consists of an area around the source of noise in which the day-night sound level is greater than 75 decibels, A-weighted or 70 decibels, C-weighted. The noise level within this zone is considered incompatible with noise sensitive land uses.

Runway Clear Zone – a runway clear zone as defined in 14 C.F.R. part 151.9(b).

Sky Glow – The composite illumination coming from towns, cities, and other developed areas—it is the yellowish glow you see in the sky when you look from a relatively dark area toward a nearby town or city.

SOUND - Sound means energy that is transmitted by pressure waves in the air or in other materials and is the objective cause of the sensation of hearing. It is commonly called noise if it is unwanted.

SOUND ATTENUATION - Sound attenuation means the reduction in sound level which occurs between the source and receiver.

SOUND LEAK - Sound leak means an opening in a structure through which sound can pass. Sound leaks are often extremely small holes or cracks. In general, an air leak is a sound leak.

SOUND LEVEL - Sound level means the level of sound pressure measured with a sound level meter and one of its weighting (frequency) networks. When A-weighting is used, the sound level is expressed as dBA.

SOUND TRANSMISSION CLASS (STC) - Sound transmission class means a single number rating for describing the degree of sound transmission loss specified for a wall, window, partition or other building element. The higher the STC, the more attenuation the building element will afford.

APPENDIX M

Installation Environmental Profile For NAS JRB

INSTALLATION ENVIRONMENTAL PROFILE

NAS JRB

1. Air Quality (DOD Question #210-225):

a. The Clean Air Act (CAA) establishes health-based standards for air quality and all areas of the country are monitored to determine if they meet the standards. A major limiting factor is whether the installation is in an area designated nonattainment or maintenance (air quality is not meeting the standard) and is therefore subject to more stringent requirements, including the CAA General Conformity Rule. Conformity requires that any new emissions from military sources brought into the area must be offset by credits or accounted for in the State Implementation Plan (SIP) emissions budget. The criteria pollutants of concern include: CO, O3 (1 hour & 8 Hour), and PM (PM10, and PM2.5). Installations in attainment areas are not restricted, while activities for installations in non-attainment areas may be restricted. Non-attainment areas are classified as to the degree of non-attainment: Marginal, Moderate, Serious, and in the case of O3, Severe and Extreme. SIP Growth Allowances and Emission Reduction Credits are tools that can be used to accommodate increased emissions in a manner that conforms to a state s SIP. All areas of the country require operating permits if emissions from stationary sources exceed certain threshold amounts. Major sources already exceed the amount and are subject to permit requirements. Synthetic minor means the base has accepted legal limits to its emissions to stay under the major source threshold. Natural or true minor means the actual and potential emissions are below the threshold.

b. Joint Reserve Base Ft. Worth, TX is not in Attainment for all Criteria Pollutants. It is in Serious Nonattainment for Ozone (1 hr). It is in Moderate Nonattainment for Ozone (8 hour). It did not report holding an CAA Operating Permit. No emission credit program available. No SIP growth allowance has been allocated for this installation. Joint Reserve Base Ft. Worth, TX is in an area projected or proposed to be designated nonattainment for the 8-hour Ozone or the PM2.5 NAAQS.

2. Cultural/Archeological/Tribal Resources (DOD Question #229-237):

a. Many installations have historical, archeological, cultural and Tribal sites of interest. These sites and access to them often must be maintained, or consultation is typically required before changes can be made. The sites and any buffers surrounding them may reduce the quantity or quality of land or airspace available for training and maneuvers or even construction of new facilities. The presence of such sites needs to be recognized, but the fact that restrictions actually occur is the overriding factor the data call is trying to identify. A programmatic agreement with the State Historic Preservation Office (SHPO) facilitates management of these sites.

b. Historic property has been identified on Joint Reserve Base Ft. Worth, TX. There is a programmatic agreement for historic property in place with the SHPO. It does not have sites with high archeological potential identified.

3. Dredging (DOD Question # 226-228):

a. Dredging allows for free navigation of vessels through ports, channels, and rivers. Identification of sites with remaining capacity for the proper disposal of dredge spoil is the primary focus of the profile. However, the presence of unexploded ordnance or any other impediment that restricts the ability to dredge is also a consideration.

b. Joint Reserve Base Ft. Worth, TX has no dredging requirement.

4. Land Use Constraints/Sensitive Resource Areas (DOD Question #198-201, 238, 240-247, 254-56, 273):

a. Land use can be encroached from both internal and external pressures. This resource area combines several different types of possible constraints. It captures the variety of constraints not otherwise covered by other areas that could restrict operations or development. The areas include electromagnetic radiation or emissions, environmental restoration sites (on and off installation), military munitions response areas,

explosive safety quantity distance arcs, treaties, underground storage tanks, sensitive resource areas, as well as policies, rules, regulations, and activities of other federal, state, tribal and local agencies. This area also captures other constraining factors from animals and wildlife that are not endangered but cause operational restrictions. This resource area specifically includes information on known environmental restoration costs through FY03 and the projected cost-to-complete the restoration.

b. Joint Reserve Base Ft. Worth, TX reports that 1077 unconstrained acres are available for development out of 1717 total acres. Joint Reserve Base Ft. Worth, TX has spent $19.8M thru FY03 for environmental restoration, and has estimated the remaining the Cost to Complete at $5.5M. Joint Reserve Base Ft. Worth, TX has Explosive Safety Quantity Distance Arcs, none of which require safety waivers, and none with the potential for expansion.

5. Marine Mammal/Marine Resources/Marine Sanctuaries (DOD Question #248-250, 252-253):

a. This area captures the extent of any restrictions on near shore or open water testing, training or operations as a result of laws protecting Marine Mammals, Essential Fish Habitat, and other related marine resources.

b. Joint Reserve Base Ft. Worth, TX is not impacted by laws and regulations pertaining to Marine Mammal Protection Act, Essential Fish Habitats & Fisheries and Marine Sanctuaries, which may adversely restrict navigation and operations.

6. Noise (DOD Question # 202-209, 239):

a. Military operations, particularly aircraft operations and weapons firing, may generate noise that can impact property outside of the installation. Installations with significant noise will typically generate maps that predict noise levels. These maps are then used to identify whether the noise levels are compatible with land uses in these noise-impacted areas. Installations will often publish noise abatement procedures to mitigate these noise impacts.

b. Joint Reserve Base Ft. Worth, TX has noise contours that extend off the installation's property. Of the 7429 acres that extend to off-base property, 68 acres have incompatible land uses. It has published noise abatement procedures for the main installation.

7. Threatened and Endangered Species/Critical Habitat (DOD Question #259-264):

a. The presence of threatened and endangered species (TES) can result in restrictions on training, testing and operations. They serve to reduce buildable acres and maneuver space. The data in this section reflects listed TES as well as candidate species, designated critical habitat as well as proposed habitat, and restrictions from Biological Opinions. The legally binding conditions in

Biological Opinions are designed to protect TES, and critical habitat. The data call seeks to identify the presence of the resource, TES, candidate or critical habitat, even if they don't result in restrictions, as well places where restrictions do exist.

b. Joint Reserve Base Ft. Worth, TX reported that federally-listed TES are not present, candidate species are not present, critical habitat is not present, and that Joint Reserve Base Ft. Worth, TX does not have a Biological Opinion.

8. Waste Management (DOD Question # 265-272):

a. This resource area identifies whether the installation has existing waste treatment and/or disposal capabilities, whether there is additional capacity, and in some case whether the waste facility can accept off-site waste. This area includes Resource Conservation and Recovery Act (RCRA) Treatment, Storage and Disposal facilities, solid waste disposal facilities, RCRA Subpart X (open/burning/open detonation) and operations.

b. Joint Reserve Base Ft. Worth, TX does not have a permitted RCRA Treatment Storage and Disposal Facility (TSDF). Joint Reserve Base Ft. Worth, TX does not have an interim or final RCRA Part X facility. Joint Reserve Base Ft. Worth, TX does not have an on-base solid waste disposal facility.

9. Water Resources (DOD Question # 258, 274-299):

a. This resource area asks about the condition of ground and surface water, and the legal status of water rights. Water is essential for installation operations and plays a vital role in the proper functioning of the surrounding ecosystems. Contamination of ground or surface waters can result in restrictions on training and operations and require funding to study and remediate. Federal clean water laws require states to identify impaired waters and to restrict the discharge of certain pollutants into those waters. Federal safe drinking water laws can require alternative sources of water and restrict activities above groundwater supplies particularly sole source aquifers. Water resources are also affected by the McCarran Amendment (1952), where Congress returned substantial power to the states with respect to the management of water. The amendment requires that the Federal government waive its sovereign immunity in cases involving the general adjudication of water rights. On the other hand existence of Federal Reserve Water Rights can provide more ability to the government to use water on federal lands.

b. Joint Reserve Base Ft. Worth, TX does not discharge to an impaired waterway. Groundwater contamination is reported. Surface water contamination is not reported. Exceedances of drinking water standards are reported, during at least one of the last three reporting periods.

10. Wetlands (DOD Question # 251, 257):

a. The existence of jurisdictional wetlands poses restraints on the use of land for training, testing or operations. In the data call the installations were asked to report the presence of jurisdictional wetlands and compare the percent of restricted acres to the total acres. The presence of jurisdictional wetlands may reduce the ability of an installation to assume new or different missions, even if they do not presently pose restrictions, by limiting the availability of land.

b. Joint Reserve Base Ft. Worth, TX has no wetland restricted acres on the military installation.

APPENDIX N

Federal and State Regulations

FEDERAL REGULATIONS RELATING TO COMPATIBLE LAND USE PLANNING

The U.S. Constitution gives individual States the authority over land use, though such authority is often delegated to local governments. Some airfields are operated by the state or municipal governments that have the power to achieve appropriate land use controls through zoning and other authorities. But even when governmental bodies are themselves airport operators, the noise effects often occur in areas outside their local government.

Airports and their related businesses are crucial to a community's ability to grow. Unfortunately, in today's environment it doesn't seem to matter if the airport (or military installation) existed long before the incompatible uses surrounding it. The economic development pressures on local governments to expand and provide new housing are limitless. Comprehensive planning of land uses that tend to be more compatible to the airport operations and safety requirements minimize problems within communities and help to foster cooperation with many different interests as the community grows. The simple solution to mitigating existing compatibility issues and planning compatible uses in the future will most likely be found in cooperative efforts by airport owners, military installation personnel, local governments and developers.

In an attempt to help communities help themselves, DoD's Office of Economic Adjustment has sponsored (funded) and completed more than 80 JLUS studies from 1985 through 2007, with additional studies currently underway. JLUS recommendations rest on the precept of federal legislation dating back more than 40 years. Some of these recommendations may include military operational changes, changes to the community's comprehensive land use plan, rezonings, modifications to building code regulations, and establishment of community oversight committees, which together provides the process needed to successfully integrate the installations' operational needs with local governments' comprehensive plans for development. Regardless of the combination of recommendations that local governments implement, all will be based upon the concepts described in the following federal legislative acts.

Aviation Safety and Noise Abatement Act of 1979

Comprises subchapter I "Noise Abatement", chapter 475, in title 49, Transportation; subtitle VII, Aviation Programs; part B, Airport Development and Noise). Grants authority to the Federal Aviation Administration to issue regulations on "air noise compatibility planning". These regulations are published in 14 Code of Federal Regulations Part 150.

Federal Aviation Regulation Part 150 Noise Compatibility Program

Implements provisions of the Aviation Safety and Noise Abatement Act of 1979 that authorize federal funds to airports for expansion and development. Part 150 allows airports to apply for federal funding to implement noise mitigation measures including residential soundproofing and acquisition of noise-sensitive land around airports. A Part 150 plan can also include recommendations for development near airports. The rules prescribe the procedures, standards, and methodology for the development, submission, and review of airport noise exposure maps and airport noise compatibility programs required when airports apply for federal funds. For guidance on Part 150 studies as well as the status of FAA programs funded under 14 CFR Part 150

Airport and Airway Improvement Act of 1982

Comprises subchapter I, chapter 471, in title 49, Transportation; subtitle VII, Aviation Programs; part B, Airport Development and Noise. Assures compliance with pertinent statutes, Executive orders and such rules that no person shall, on the grounds of race, creed, color, national origin,

sex, age, or handicap be excluded from participating in any activity conducted with or benefiting from Federal assistance.

Airport Noise and Capacity Act of 1990 (National Noise Policy)
Comprises subchapter II "National Aviation Noise Policy", chapter 475, in title 49, Transportation; subtitle VII, Aviation Programs; part B, Airport Development and Noise). ANCA mandates that the U.S. air fleet convert to "stage 3" aircraft by Jan. 1, 2000. It permits citizen suits against the FAA "where there is alleged a failure of [the FAA] to perform any act or duty under section 1431 of Title 49 which is not discretionary...." For an example of such a suit see Alvarado v. Memphis-Shelby County Airport Authority. The FAA issued rules implementing ANCA in Part 161 of its regulations.

National Environmental Policy Act (NEPA) of 1969
The first comprehensive federal legislation on environmental policy and programs; created the Environmental Protection Agency. It has been amended repeatedly since 1969 to refine policy and create new programs.

Noise Control Act (1972)
This Act was passed after receiving a report from the newly created Office of Noise Abatement and Control in the Environmental Protection Agency (see Noise Pollution and Abatement Act of 1970). The NCA amended the Federal Aviation Act to specifically involve the EPA in the regulation of airport noise. It states in part:

"Each Federal agency shall consult with the Administrator in prescribing standards or regulations respecting noise. If at any time the Administrator has reason to believe that a standard or regulation, or any proposed standard or regulation, of any Federal agency respecting noise does not protect the public health and welfare to the extent he believes to be required and feasible, he may request such agency to review and report to him on the advisability of revising such standard or regulation to provide such protection."

Sikes Act Improvement Act of 1997
The Act (16 U.S.C. §670c) provides: “[t]he Secretary of a military department may enter into cooperative agreements with States, local governments, nongovernmental organizations, and individuals to provide for the maintenance and improvement of natural resources on, or to benefit natural and historic research of Department of Defense installations.” U.S. Code (31 U.S.C. §6305) further states that:
“[a]n executive agency shall use a cooperative agreement as the legal instrument reflecting a relationship between the United States Government and a State, a local government, or other recipient when the principal purpose of the relationship is to transfer a thing of value to the State, local government, or other recipient to carry out a public purpose of support or stimulation authorized by a law of the United States instead of acquiring (by purchase, lease, or barter) property or services for the direct benefit or use of the United States Government; and substantial involvement is expected between the executive agency and the State, local government, or other recipient when carrying out the activity contemplated in the agreement.”
These two sections of the U.S. Code lay out the bounds of the current use of cooperative agreements. The important concept to note is that these agreements are not limited to acquisition of conservation encumbrances, but can be creatively applied to other agreements that enhance installation natural resource posture or mission viability.

National Defense Authorization Act FY 2008

Authorizes military department Secretaries, until the end of FY2008, to exchange excess DoD real property in return for the construction of new facilities. Authorizes such Secretaries to exchange property in order to support agreements to limit encroachments upon military training, testing, and operations. Requires advance congressional notification of the latter authority. Requires annual reports on exchanges to include information concerning excess DoD real property used for such exchanges.

SEC. 2811. CONTINUED CONSOLIDATION OF REAL PROPERTY PROVISIONS WITHOUT SUBSTANTIVE CHANGE.

(a) Consolidation- Section 2663 of title 10, United States Code, is amended by adding at the end the following new subsection:
` (h) Land Acquisition Options in Advance of Military Construction Projects-
(1) The Secretary of a military department may acquire an option on a parcel of real property before or after its acquisition is authorized by law, if the Secretary considers it suitable and likely to be needed for a military project of the military department under the jurisdiction of the Secretary.
` (2) As consideration for an option acquired under paragraph (1), the Secretary may pay, from funds available to the military department under the jurisdiction of the Secretary for real property activities, an amount that is not more than 12 percent of the appraised fair market value of the property.'

Defense Economic Readjustment Zones
(As of January 1, 2005)

Chase Defense Economic Readjustment Zone
Community: Beeville, Texas
Expires: September 1, 2006
Contact: Mr. Jim Berry
(512.358.2023)

Kelly Defense Economic Readjustment Zone
Community: San Antonio, Texas
Expires: September 1, 2007
Contact: Mr. Ramiro Cavazos
(210.207.8040)

McGregor Defense Economic Readjustment Zone
Community: McGregor, Texas
Expires: September 1, 2006
Contact: Mr. Bill Dake
(254.740.2806)

San Antonio Defense Economic Readjustment Zone
Community: San Antonio, Texas
Expires: September 1, 2006
Contact: Mr. Ramiro Cavazos
(210.207.8040)

http://www.governor.state.tx.us/divisions/ecodev/ed_bank/derz

TEXAS REGULATIONS RELATING TO COMPATIBLE LAND USE PLANNING

Texas Strategic Military Planning Commission (TSMPC)
The 75th Texas Legislature directed the establishment of the Office of Defense Affairs (ODA) And the Texas Strategic Military Planning Commission (TSMPC) as an advisory group to the ODA. The TSMPC is composed of nine Commissioners appointed by the Governor. Their charter is to develop strategies to prevent further erosion of defense investment in Texas; provide information to defense dependent communities regarding intentions and actions affecting military installations and missions; support and promote the military in connection with base realignment and closure (BRAC); and assist defense dependent communities to prepare for BRAC initiatives. The TSMPC actively educates and energizes the defense industry and community leaders and serve as the primary conduit for promoting legislation that supports Texas' military installations. The Senate Committee on Veteran Affairs and Military Installations considers the TSMPC's functions to be vital to Texas' defense community.

Defense Economic Readjustment Zone Program

The Defense Economic Readjustment Zone Program (DERZ) was established as a tool for business recruitment and job creation in adversely impacted defense dependent communities. It is designed to provide assistance to Texas communities, businesses and workers impacted by, **or vulnerable to**, the closure or realignment of military installations and the reduction of federal defense contracting expenditures.
Benefits to participation:
Designated readjustment projects are eligible to apply for franchise tax credit and state sales and use tax refund on qualified expenditures. The level and amount of the credit/refund is related to the sales and use tax on qualifying expenditures and the number of jobs created/retained at the site.

- The number of jobs eligible for a refund will not exceed 500 or a number equal to 110% of the anticipated new permanent/retained jobs.
- The maximum refund per allocated job is $2,500.
- Local communities may also offer benefits to participants under the defense economic readjustment zone program as well. These may include tax abatement, tax increment financing, one-stop permitting and others.

Participation Requirements

- A community must nominate and receive designation as a Defense Economic Readjustment Zone and provide specific information as required by statute.
- A company must receive nomination from their local community.
- Applications for readjustment zone or project designation may be filed with the department on any day.
- DERZ's are designated for a period of seven (7) years with no limitation on the number of zones.
- A DERZ may have no more than two defense readjustment projects.
- DERZ projects may be designated for up to a five (5) year period, in addition to a 90 day window prior to the designation date. Employment and community commitments must be met within this time-frame.
- At least 25% of the qualified business new employees in the DERZ must be residents of the governing jurisdiction; economically disadvantage; or dislocated defense workers.

If a joint application is being submitted by a municipality and county, or a combination of municipalities and/or counties, the information must be provided for each entity. The information concerning the applicant must include:

(A) a statement signed by the applicant certifying that the contents of the application are true and correct to the best information and belief of the applicant and that the applicant has read the Act and this chapter and is familiar with the provisions of the defense readjustment zone program;

(B) a certified copy of the ordinance or order, as appropriate, of the governing body of the applicant nominating the area within its jurisdiction as a readjustment zone under the Act, containing the information set forth in the Act, §2303.104, and identifying by job title the liaison, liaisons, representative or representatives in accordance with paragraph (1) of this subsection. The ordinance or order must specify any incentives to be provided by the municipality or county to business enterprises in the readjustment zone. At least three incentives must be offered in the readjustment zones which are not offered elsewhere throughout the jurisdiction. At least one incentive must be financial in nature; and

(C) If a joint application, a description and certified copy of the agreements between joint applicants providing for the joint administration of the readjustment zone.

Chapter 240 Subchapter B. Outdoor Lighting near Observatories and Military Installations
Passed by the Senate on May 8, 2007 and passed by the House on May 14, 2007. This Act takes effect on September 1, 2007.

SECTION 3. Section 240.032, Local Government Code, is amended by adding Subsection (b-1) and amending Subsections (c) and (d) to read as follows:

(b-1) On the request of a United States military installation, base, or camp commanding officer, the commissioners court of a county, any part of which is located immediately adjacent to the installation, base, or camp, may adopt orders regulating the installation and use of outdoor lighting within five miles of the installation, base, or camp in any unincorporated territory of the county.

(c) The orders must be designed to protect against the use of outdoor lighting in a way that interferes with scientific astronomical research of the observatory or military and training activities of the military installation, base, or camp. In the orders, the commissioner's court may:

(1) Require that a permit be obtained from the county before the installation and use of certain types of outdoor lighting in a regulated area;

(2) establish a fee in an amount to cover the costs of administrating the order for the issuance of the permit;

(3) prohibit the use of a type of outdoor lighting that is incompatible with the effective use of the observatory or military installation, base, or camp;

(4) Establish requirements for the shielding of outdoor lighting; and

(5) Regulate the times during which certain types of outdoor lighting may be used.

(d) The commissioners' court may apply more stringent standards for areas in which the use of outdoor lighting has a greater impact on observatory or military installation, base, or camp activities.

SECTION 4. Subchapter B, Chapter 240, Local Government Code, is amended by adding Section 240.0325 to read as follows:

Sec. 240.0325. EXCEPTION FOR CERTAIN OUTDOOR LIGHTING.
The commissioners court may not adopt an order under Section 240.032 regulating the installation and use of outdoor lighting that is located within five miles of a military installation, base, or camp located in the unincorporated area of a county and:

(1) Was installed or used before the effective date of the order and is necessary for the operations of:

(A) An electric utility, power generation company, or transmission and distribution utility, as those terms are defined by Section 31.002, Utilities Code;

(B) An electric cooperative or a municipally owned utility, as those terms are defined by Section 11.003, Utilities Code;

(C) A gas utility, as defined by Section 101.003 or 121.001, Utilities Code;

(D) Surface coal mining and reclamation operations, as defined by Section 134.004, Natural Resources Code;

(E) A telecommunications provider, as defined by Section 51.002, Utilities Code, or its affiliates; or

(F) A manufacturing facility required by Texas Commission on Environmental Quality rule to hold a permit; or

(2) Is owned or maintained for the purpose of illuminating:

(A) A tract of land that is maintained as a single family residence and that is located outside the boundaries of a platted subdivision;

(B) A tract of land maintained for agricultural use;

(C) An activity that takes place on a tract of land maintained for agricultural use;

(D) Structures or related improvements located on a tract of land maintained for agricultural use; or

(E) A correctional facility operated by or under a contract with the Texas Department of Criminal Justice.

Chapter 397. Strategic Planning Relating To Military Installations
397.005. CONSULTATION WITH DEFENSE BASE AUTHORITIES.
If a defense community determines that an ordinance, rule, or plan proposed by the community may impact a defense base or the military exercise or training activities connected to the base, the defense community shall seek comments and analysis from the defense base authorities concerning the compatibility of the proposed ordinance, rule, or plan with base operations. The defense community shall consider and analyze the comments and analysis before making a final determination relating to the proposed ordinance, rule, or plan.
Effective May 2003.

Summary
As population statistics show exponential growth near many installations, particularly in the South and West, it is apparent that regional solutions must be found for land use planning. DoD is initiating additional outreach efforts aimed at information exchange, partnering, and leveraging complementary efforts of outside organizations. For example, the DOD has met with local government organizations, organizations that represent local developers, academic and research centers that study conservation issues, and state organizations such as the National Council of State Legislators (NCSL) and The Council of State Governments. (See Appendix L)

Land Use and the Texas Environmental Acts

Except for a select few locations—growth and land use issues in Texas are managed almost exclusively at the local level. In terms of planning for future urban land uses, all Texas cities and counties should be required to adopt general or comprehensive plans, designating which particular land uses are designated for which locations. Local zoning designations, which are the basis for permitting, must match local general plan designations and any subsequent zoning change should be accompanied by a plan amendment.

Except in rare cases, there is no such thing as “as-of-right” development in Texas. Every proposed project, even those which are consistent with local plans, must go through some type of discretionary review process.

Two types of reviews predominate: (i) subdivision reviews, such as occurs when a property is subdivided; and (ii) environmental reviews, as required under the various Texas environmental acts. Except for projects which are categorically exempt, all public and private development projects are required to undergo one or more levels of environmental review. If the first level of the environmental review, known as an Initial Study, finds that a proposed project might generate significant negative environmental impacts, the project sponsor may be required to undertake a more detailed assessment, known as an EIR, or Environmental Impact Report. The issues and impacts to be addressed in an EIR are determined as part of a process known as “scoping.”

Current environmental guidelines do not include encroachment upon military bases as an issue of concern. Thus, it is entirely possible that the individual or cumulative impacts of proposed development projects upon nearby military facilities might never be considered as part of the local permitting process. On the other hand, Texas’ environmental acts do not prevent local governments from considering encroachment issues. As in the case of general plan-making, consideration of encroachment issues is entirely a local option.

Alternative State Policy Approaches

Multi-jurisdictional planning problems like encroachment are not all that uncommon in Texas and the United States. On the one hand, our political heritage has led us to vest land-use decisions at the lowest level of government, so-called "home rule.” On the other hand, many planning problems are of a greater-than-local nature and require the balancing of local and extra-local interests.

There are many examples of land-use planning and regulatory structures that have been crafted over the years to attempt to solve similar problems. As discussed below and summarized in Exhibit 11, these range from simply requiring that local planning agencies consider encroachment issues when developing plans or issuing permits, all the way up to creating entirely new regional planning and permitting institutions.

As identified by John Landis and Michael Reilly of the Institute of Regional Development, there are nine possible approaches and one that can be used in combination with any of the other nine:

1. Revisions to state general or comprehensive plan law requiring consideration of military base encroachment issues. As noted previously, state law should require every Texas City and county to adopt a general plan setting forth anticipated and desired development patterns. State general plan statutes (and guidelines) could be amended to require local governments encompassing or abutting military bases to consider and address encroachment issues, including urban development, noise and/or other environmental issues. This change would leave planning decisions where they are now—entirely in the hands of local government. As such, it would insure that encroachment issues are considered in local planning efforts, but not necessarily that they be resolved in favor of the military.

The advantages of this approach lie in its limited and incremental nature. This alternative, of all the ones presented, would involve the fewest agencies and represent the least change from the status quo. The legislature would be required to amend the state code, and the Governor’s Office would need to issue updated guidelines. On the downside, because it leaves all planning and permitting responsibilities in the hands of local government, the willingness and ability of local officials to deal constructively with encroachment issues would continue to vary widely. Because

comprehensive plans are revised infrequently, this approach would be limited in its ability to respond to changing development circumstances and/or base needs. Lastly, the potential effectiveness of this approach would be open to question when dealing with bases surrounded by multiple units of government, such as NAS JRB.

2. Revisions to the Texas Environmental Acts to require that potential encroachment impacts be considered in the conduct of initial studies and environmental impact reports be undertaken for land development projects located within a specific distance of a military base. As with the previous approach, this change would leave local planning and permitting decision in the hands of local government. So while it would insure that potential encroachment impacts are actively considered as part of the local permitting process, and would require some level of impact mitigation, it would not guarantee that every potential encroachment impact would be resolved in favor of the military.

As with the previous approach, this one would involve only minor and targeted approaches to existing state law—perhaps enhancing its political acceptability. The advantages of this approach lie in its flexibility, "action-forcing" nature, and emphasis on mitigation. In terms of flexibility, encroachment issues would be dealt with on a case-by-case basis, with every local government and military base free to fine-tune" the result to local circumstances. Because environmental review is often tied to permitting, all resulting decisions would be binding. An emphasis on impact mitigation would require that positive steps be taken to deal with specific encroachment issues.

On the downside, environmental-based decisions could be fairly ad hoc. Impact standards and thresholds are rarely applied consistently or comprehensively. Assessment procedures and required mitigations can and do vary widely. And because lead agencies, upon making finding of over-riding consideration," can allow projects which generate unmitigated impacts to go forth, there is no guarantee that potential encroachment issues would be consistently resolved in a manner favorable to the military. Still, if the goal of encroachment planning is for the military and local stakeholders to actively engage in a discussion of all the relevant issues, it's going to be difficult to beat an environmental-based approach.

3. State review of local plans. This approach would require state-level review of local general (comprehensive) plans for cities and counties encompassing or abutting military bases. A designated state agency would first identify and map geographic areas or zones around each military base where encroachment would potentially threaten base operations. Next, the state would issue encroachment area planning guidelines listing appropriate and inappropriate land uses, conditions of approval, and required mitigations. Local governments would be required to abide by such guidelines when developing or updating their general plans.

Finally, the state would actively review draft general plans for their adequacy in incorporating state policy issues and guidelines. General plans found to be inadequate would be declared invalid, making it impossible for local governments to grant permit approvals in the designated zones. Alternately, for local governments with inadequate plans, permitting jurisdiction could revert back to the state. Once a local encroachment plan was certified by the state, all subsequent permitting would be undertaken at the local level. This approach would require substantial changes to state law. It also would require the establishment of a new plan review function in an appropriate state agency.

The attraction of this approach is that it maintains local control while providing limited state oversight. It provides local governments the freedom to deal with specific encroachment issues in the context of an overall framework, thereby insuring a certain level of statewide policy

consistency. In terms of dealing systematically with multiple encroachment issues—noise, urban development, and environmental protection—this approach has much to recommend it. On the downside, it would occasionally pit local governments on one side against the state and the military on the other. For this type of approach to work it must enjoy the support of most impacted local governments.

4. State appeal of local permitting decisions. This approach would graft state-level review guidelines onto the existing framework of strong local planning and permitting control. Development permitting under this framework would have four components, similar to the previous approach. The state would first designate geographic areas or zones around each military base where encroachment would potentially threaten base operations. Second, the state would issue permitting guidelines for use in local reviews of projects falling within the designated zones. These guidelines could list appropriate and inappropriate land uses, conditions of approval, and required mitigations. Third, local governments would be required to consider guideline provisions when issuing development permits.

Last, the military would retain the right to appeal locally-approved projects to a state agency on the grounds that state guidelines were not adequately followed. This approach keeps most permitting authority in local hands, yet requires that local reviews be undertaken consistent with state goals and guidelines. And to help keep local governments in line, it offers the possibility of state-level appeal. Like the previous approach, this one would require substantial changes to state law. To the extent that such changes would affect relatively few local governments and have little impact on local budgets, they might very well be acceptable to the legislature.

This is a good middle-ground approach. On the one hand, it would promote a much greater degree of inter-jurisdictional planning and review consistency than alternatives (1) and (2). On the other hand, because the state would actively intervene only in the case of appeals, it would be less heavy-handed than alternative (3).

5. State review of local permitting. Procedurally, this approach would be similar to the previous two except that the state would be required to review every locally-granted zoning and/or subdivision permit issued within a designated encroachment zone.

Because it would involve the state in every potential encroachment permitting decision, this approach would be both heavy-handed and expensive. On the positive side, it would insure that military base encroachment issues were dealt with comprehensively and systematically across the state. On the downside, it would forever pit the state and the military interests against those of local government, even when they don't conflict.

6. Add-on state permitting. Under this approach, developments and subdivisions in designated encroachment zones would require a permit first from local government, but then also, from a special state agency or commission charged with protecting potential encroachment areas from inappropriate development. Its principal advantage is that it doesn't burden the local permitting process with trying to balance local land use issues against statewide policy needs. Instead, that balancing is undertaken at the state level. Thus, at least in theory, it provides for a high level of

planning and permitting consistency across different areas and circumstances. The downside of this approach is that it is likely to be expensive, and in some circumstances duplicative. Unhappy local officials are also likely to try to use political means to influence state permitting decisions.

7. Pre-emptive state permitting. Under this approach, planning and/or permitting authority within designated encroachment zones would be transferred from local government to an appropriate state agency or commission charged with protecting such areas from inappropriate development.
On the positive side, this approach would insure that encroachment conflicts are treated in a consistent manner throughout the state and would facilitate, although not guarantee, taking a comprehensive approach to encroachment mitigation. It would also make it easier to deal with multi-jurisdictional issues such as noise and habitat conservation. Additionally, it would insure that the perspectives of the military might be more consistently represented.
On the downside, there is little in the way of precedent for this approach, and it would almost assuredly promote conflict over even the smallest of issues between representatives of local government and state regulators—with state legislators standing in the middle. There are also no state models currently available to use as a "template." Texas would be the first.

8. Mandatory multi-jurisdictional planning and permitting responsibility. Under this approach, local governments adjacent to NAS JRB would be mandated to form an encroachment zone authority (EZA) for the purpose of coordinated planning and land preservation/acquisition. EZA would be required to develop its own specific planning guidelines and documents, which, for the areas covered, would supercede local general plans. Local permitting would continue to be undertaken by individual local governments, but would be required to be consistent with EZA guidelines and/or plans.
This approach has both advantages and disadvantages. On the advantage side, the EZA would provide a workable framework for addressing multi-jurisdictional planning and financing issues. As members, existing governments would maintain a significant amount of discretion and control. Lastly, once an EZA plan is developed, the resources required to administer it would be relatively small. On the disadvantage side, some local governments may be reluctant to give up planning authority. Others might find it difficult to administer a plan they didn't directly develop.

9. Intergovernmental planning and permitting responsibility. Under this alternative, a single statewide commission would be established to undertake all planning and permitting responsibilities within all designated encroachment areas. This approach would incorporate local, state, and federal representatives in a single agency and vests them with comprehensive land use and environmental planning and permitting authority for a designated area.
The advantage of this approach lies in its ability to comprehensively combine long-term planning considerations with shorter-term permitting issues, and to do it in such a way that involves multiple stakeholders. As powerful as this model is for confronting a common problem (the impacts of over-development in an environmentally fragile region) in a confined area, its potential for dealing with a more diffuse set of issues in a variety of locations is unclear. Nor is it clear how one might structure a single agency or commission incorporating so many stakeholders from different areas. Finally, and from a purely political perspective, it is not clear that the encroachment issues are sufficiently acute to justify such a significant departure from Texas home-rule tradition.

10. Multi-jurisdictional land conservancies: Under this more limited version of the previous option, federal, state, and local government agencies would combine to charter and fund

encroachment zone land conservancies (EZLC) around military installations. EZLCs would have two responsibilities: (i) to acquire private lands and/or the development rights to private lands within encroachment zones; and (ii) to actively manage those lands as needed.

Funds for land acquisition could be provided through government revenues and/or through private (tax exempt) donations. Note that this approach is not an exclusive one. It could be used in conjunction with any of the other aforementioned approaches. Its advantages lie in the fact that it would work entirely through the private land market, and would not require the heavy hand of government regulation. Moreover, to the extent that many encroachment zones include sensitive habitats and landscapes, this approach would insure their continued management. The disadvantages of this approach lie in its potential costliness. Buying land and/or development rights is expensive, especially in fast-growing metropolitan areas. The greater the amount of land a particular EZLC was able to acquire or control, the greater the incentive for the remaining landowners to increase their asking prices.

Summary:
Urban growth threatens NAS JRB and the function of state policy should be to encourage and require local planners to actively consult with appropriate military personnel regarding the permanent establishment of development-free buffer zones adjacent to facility boundaries. Whether such activities occur on a single- or multi-jurisdictional basis should reflect the circumstances at the base and not state's preferences. Additionally, since military operations impose noise or other impacts on surrounding urban populations, the function of state policy should also be to mitigate and resolve the resulting conflicts in ways amenable to all parties.

The Navy's Encroachment Partnering (EP) Program

The Navy is particularly susceptible to a broad range of encroachment issues since many of its installations are located in ecologically important and high-growth urban areas. The objective of the Navy's Encroachment Partnering Program is to acquire real property interests, such as conservation easements, development rights, or water rights, which will address current or potential encroachment threats to the Navy's mission.
In order to ensure that the Encroachment Partnering (EP) program is effective, an installation or range must be aware of all of its encroachment threats. The Navy developed an Encroachment Action Plan (EAP) that captures the results of identification, quantification, and mitigation of the potential encroachment threats to an installation or range. An EAP delineates a short- , mid- , and long-term strategy to address encroachment threats, including potential Encroachment Prevention partnerships. In addition, the Navy is using its Theater Assessment Program (TAP) to capture all encroachment threats at its training ranges through the development of Range Complex Management Plans (RCMP). Results of the RCMP will be used to develop potential EP projects.

Exhibit 11: Alternate Policy Approaches for Dealing with Military Facility Encroachment Planning & Permitting Issues

Approach		Details	Examples	Geographic Scope	Changes to state law or new agencies required?	Principal Advantages	Principal Disadvantages
Revisions to Existing Local Planning & Permiting	1. Revisions to state general plan law (comprehensive plan)	Local comp plan & zoning designations limit development.		Within municipal boundaries and/or spheres-of-influence.	Changes to state law required.	Politically feasible; locally flexible.	Potential inconsistencies between jurisdictions. Efficacy unknown.
	2. Revisions to TEQA	Projects within affected areas subject to expanded environmental review.		Within municipal boundaries and/or spheres-of-influence.	Changes to state law required.	Politically feasible; locally flexible.	Efficacy unknown.
Increased State Planning and Permitting Responsibility	3. State Review of Local Plans	State agency reviews local plans for consistency with state goals		Within designated encroachment zone.	Changes to state law required.	Politically feasible? Review consistency.	Potential for ongoing political conflict.
	4. State Appeal of Local Permitting Decisions	Military could appeal local land use permitting decisions to state agency.	Texas Surface Mining and Reclamation Act	Within designated encroachment zone.	Changes to state law required.	Middle-ground approach.	Some controversy inevitable.
	5. State Review of Local Permitting	State agency reviews local permitting decisions for consistency with state goals.		Within designated encroachment zone.	Additional agency(s) required.	Review consistency.	Expensive to organize and implement.
	6. Add-on State Permitting	State permitting in addition to local permitting.	Conservation and Development Commission	Within designated encroachment zone.	Additional agency(s) required.	Review consistency, adherence to state principles.	Politically difficult and potentially expensive to implement.
	7. Pre-emptory State Planning and/or Permitting	State permitting instead of local permitting.		Within designated encroachment zone.	Additional agency(s) required.	Review consistency, adherence to state principles.	Politically difficult and potentially expensive to implement.
Multi-jurisdictional Planning & Permitting	8. Multi-jurisdictional Planning & Permitting	Joint powers authorities established for planning and permitting.	Joint Powers Authorities	Within designated encroachment zone.	Additional agency(s) required, albeit with limited roles.	Builds on existing political and administrative institutions.	Consistency unclear, potential downstream implementation difficulties.
	9. Inter-governmental Planning & Permitting	Intergovernmental state commission established for planning and permitting.	NCTCOG	Within designated encroachment zone.	Additional division(s) required.	Comprehensiveness and long-term capacity-building.	Dubious practicality.
	10. Intergovernmental Land Conservancies	Intergovernmental land conservancies chartered to acquire/manage land and development rights in encroachment zones.		Within designated encroachment zone.	Additional agency(s) required, albeit with limited roles.	Flexible and poltically unthreatening	Efficacy unclear, potentially expensive.

NAVFAC
Naval Facilities Engineering Command

Encroachment Management Program

The mission of the Naval Facilities Engineering Command (NAVFAC) Base Development (BD) Directorate is to provide comprehensive land, facilities, and public works services to U.S. Navy's installations, ranges, and operating areas worldwide.

NAVFAC provides planning, environmental, legal, real estate support, and program management oversight for the Commander, Navy Installations Command (CNIC) Encroachment Management program. One of CNIC's missions, as outlined in the OPNAVINST 11010.40, is to ensure operational sustainment for all Navy installations, test and training ranges, air and water operating areas (OPAREAs), special use airspace, and military training routes (MTRs). The BD business line at NAVFAC is responsible for land use planning, program management, and project development for encroachment. Encroachment is primarily any non-Navy action planned or executed which inhibits, curtails, or possesses the potential to impede the performance of Navy activities.

An Encroachment Action Plan (EAP) is the primary tool and process that BD develops which results in the identification, quantification, mitigation, and prevention of the potential encroachment challenges to an installation or a range. Successful EAPs will require a planner to work with Installations to identify training and test requirements, and may require the involvement of other multiple Navy entities to develop a comprehensive analysis to implement preventative or corrective actions. The NAVFAC planner, coordinating with the NAVFAC Real Estate office, will submit plans and budget requirements for all land acquisition proposals addressing encroachment including Encroachment Partnering projects, to CNIC for evaluation and coordination.

In addition to the EAPs, a NAVFAC planner will integrate encroachment analysis into various plans such as: Regional functional area plans; installation master plans; installation appearance plans; GIS development, and planning documentation development for major repair & construction projects.

Innovation, Leadership, Performance

The Naval Facilities Engineering Command (NAVFAC) manages the planning, design, construction, contingency engineering, real estate, environmental, and public works support for U. S. Navy shore facilities around the world. We provide the Navy's forces with the operating, expeditionary, support and training bases they need. NAVFAC is a global organization with an annual volume of business in excess of $11 billion. As a major Navy Systems Command and an integral member of the Navy and Marine Corps team, NAVFAC delivers timely and effective facilities engineering solutions worldwide.