

Defending Oklahoma's Future: Tinker AFB



Joint Land Use Study

Prepared for

Midwest City, Del City, Oklahoma City, Spencer, Choctaw,
Nicoma Park, Oklahoma County, Cleveland County, Oklahoma
Strategic Military Planning Commission, Tinker AFB



Association of Central Oklahoma Governments

Submitted by

DFW Advisors Ltd.

with Michael R. Coker Company and Pavlik and Associates

September 2008

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Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

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Midwest City, Del City, Oklahoma City, Spencer, Choctaw, Nicoma Park,
Oklahoma County, Cleveland County, Oklahoma Strategic Military Planning
Commission, Tinker Air Force Base

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September 2008

This study was prepared under contract with the Association of Central Oklahoma Governments, with financial support from the Office of Economic Adjustment, U.S. Department of Defense. The content does not reflect the views of the Office of Economic Adjustment.

Abstract

TITLE: Tinker Air Force Base Joint Land Use Study

POINT OF CONTACT: Holly Massie, Special Programs Officer, ACOG

DATE: September 2008

SUBJECT: The Joint Land Use Study was an initiative of Del City, Midwest City, Oklahoma City, Spencer, Nicoma Park, Choctaw, Oklahoma County, Cleveland County, the Oklahoma Strategic Military Planning Commission and Tinker Air Force Base (AFB). The U.S. Department of Defense, Office of Economic Adjustment provided project oversight and the Association of Central Oklahoma Governments served as the study sponsor. The purpose of this Joint Land Use Study was to evaluate the current status of the implementation of recommendations issued in the 2006 Air Installation Compatible Use Zone Study for Tinker AFB and to make recommendations for additional actions by local governments designed to improve land use decisions that may affect the missions of Tinker AFB.

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Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

Table of Contents

PREAMBLE	vii-xi
EXECUTIVE SUMMARY	1
SECTION I — Protection of the Base and its Neighbors	I-1
1.1 Acronyms and Abbreviations.....	I-2
1.2 Statement of the Issues.....	I-3
1.3 Tinker Air Force Base — Oklahoma City, Oklahoma.....	I-4
1.4 Role of the Department of Defense.....	I-7
1.5 Financial Support Corrects Conflicts.....	I-8
1.6 Specific Actions by Del City.....	I-9
1.7 Specific Actions by Midwest City	I-10
1.7.a Midwest City Comprehensive Plan	I-11
1.7.b Midwest City Zoning.....	I-13
1.8 Specific Actions by Oklahoma City.....	I-14
SECTION II — Communications Strategies	II-1
2.1 Acronyms and Abbreviations.....	II-2
2.2 Communications Strategies	II-3
2.3 Public Involvement Plan.....	II-3
Table 2.1 Tinker AFB JLUS Public Involvement Timeline.....	II-5
2.4 Community Communication and Support.....	II-6
2.5 Tinker’s Communications with Communities.....	II-9
2.6 Recommendations for the Community in Support of Tinker AFB.....	II-12
2.7 Recommendations for Tinker’s Involvement in the Community	II-13
2.8 Recommendations for Increased Cooperation.....	II-14

Defending Oklahoma's Future: Tinker AFB Joint Land Use Study



SECTION III — Components of the Plan	III-1
3.1 Acronyms and Abbreviations.....	III-2
3.2 Basic Conflicts.....	III-3
3.3 Air Installation Compatible Use Zone Program	III-4
3.4 Joint Land Use Study	III-6
3.4.1 Goals of the JLUS.....	III-6
Figure 3.1 Joint Land Use Study Area.....	III-7
3.5 Military Readiness and Encroachment.....	III-8
Figure 3.2 Environmental Factors	III-10
3.5.1 Impact of Urbanization	III-10
3.5.2 Development Regulations and Encroachment.....	III-11
3.6 Anti-Terrorism and Force Protection.....	III-12
3.7 DoD: Conservation Partnering Authority	III-13
 SECTION IV — Technical Information and Analyses	 IV-1
4.1 Acronyms and Abbreviations.....	IV-2
4.2 Technical Information	IV-3
4.2.1 Runway Airspace “Imaginary” Surfaces.....	IV-4
4.2.1.a Class A Runway (NOT at Tinker AFB).....	IV-4
4.2.1.b Class B Runway	IV-5
4.2.1.c Primary Surface.....	IV-5
4.2.1.d Clear Zone Surface	IV-5
4.2.1.e Accident Potential Zone Surfaces	IV-6
4.2.1.f Approach-Departure Clearance Surface	IV-6
Figure 4.1 Accident Potential Zones and Clear Zones Surrounding Tinker AFB...IV-7	
4.3 Air Installation Compatible Use Zone Studies.....	IV-8
4.4 2006 AICUZ Study for Tinker AFB.....	IV-9
Figure 4.2 Comparison of Total Acreage in AICUZ Noise Contours.....	IV-10
4.4.1 Air Installation Compatible Use Zones.....	IV-11
Table 4.1 Accident Potential Location Analysis	IV-11
4.4.1.a Clear Zones.....	IV-12
4.4.1.b Accident Potential Zone I.....	IV-12
4.4.1.c Accident Potential Zone II.....	IV-12
4.5 2006 AICUZ Land Use Analyses	IV-13
4.5.1 Objectives for an AICUZ Study	IV-14
4.5.2 Land Use and AICUZ.....	IV-14



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

4.5.2.a	Existing Land Uses within the AICUZ Planning Zones.....	IV-15
	Table 4.2 Incompatible Land Use for Runways 17/35 and 12/30	IV-16
	Figure 4.3 Incompatible Land Use	IV-17
4.5.2.b	Existing Zoning within the AICUZ Planning Zones.....	IV-18
	Figure 4.4 Land Use Within the AICUZ Accident Potential Zones.....	IV-19
4.5.2.c	Land Use Classification Systems.....	IV-20
	Table 4.3 Land Use Compatibility Guidelines.....	IV-21
4.5.2.d	Existing Land Uses within DNL 65dB Noise Contour.....	IV-26
	Figure 4.5 Land Use Categories (In Acres) Within 65+ dB Noise Contour	IV-26
4.5.2.e	Existing Zoning within DNL 65 dB Noise Contour	IV-27
	Figure 4.6 Zoning Classification Percentages Within 65+ dB Noise Contour	IV-27
4.5.2.f	Summary of 2006 AICUZ Study and Existing Land Uses	IV-28
4.5.2.g	Summary of 2006 AICUZ Study and Future Land Uses.....	IV-28
4.6	General Effects of Incompatible Land Uses.....	IV-29
4.6.1	Incompatible Land Uses	IV-30
4.7	2006 AICUZ Recommendations.....	IV-31
SECTION V — Compatibility Factors.....		V-1
5.1	Acronyms and Abbreviations.....	V-2
5.2	History of Land Use Compatibility Planning	V-5
	Figure 5.1 Community Support — Land Acquisition within CZ and APZ I.....	V-6
5.2.1	Tinker AFB General Plan	V-7
5.2.2	Management Action Plan and Community Relations Plan.....	V-7
	Figure 5.2 Tinker AFB Restoration Sites	V-8
5.3	Aerospace Eastern Oklahoma County	V-9
	Figure 5.3 Oklahoma MROTC Master Plan — Full Development.....	V-10
5.4	General Compatibility and Comprehensive Plans.....	V-11
5.5	General Compatibility and Zoning.....	V-11
5.6	Del City Comprehensive Plan Evaluation.....	V-12
5.6.1	Del City Zoning Ordinance Evaluation	V-12
5.6.2	Del City and Runway 12/30 APZ II	V-13
5.7	Midwest City Comprehensive Plan Evaluation.....	V-14
5.7.1	Midwest City Zoning Code Evaluation	V-15
5.7.2	Midwest City APZ I Boundary for Runway 17/35	V-16
5.7.3	Tinker Business and Industrial Park	V-18
5.8	Oklahoma City Comprehensive Plan Evaluation.....	V-19
5.8.1	Oklahoma City Southeast Sector Plan Evaluation.....	V-19

Defending Oklahoma's Future: Tinker AFB Joint Land Use Study



5.8.2	Oklahoma City Zoning Code Evaluation	V-22
5.8.3	Oklahoma City Area Regional Transportation Study.....	V-24
	Figure 5.4 2030 OCARTS Plan Street and Highway Network	V-26
5.9	2007 Oklahoma County Master Plan	V-29
5.9.1	Oklahoma County Zoning Regulations Evaluation	V-29
5.10	City of Spencer Zoning Regulations Evaluation	V-29
5.11	Local Government Land Use Strategies	V-30
5.11.1	Conservation.....	V-30
5.11.2	General Land Use Guidelines.....	V-31
5.11.3	Attenuation.....	V-31
5.11.4	Disclosure	V-32
5.11.5	Infrastructure.....	V-32
5.11.6	Coordination.....	V-32
5.11.7	AICUZ Land Use Guidelines	V-32
5.11.8	Clustering and Transfer of Development Rights	V-33
SECTION VI — Noise Definitions and Attenuation		VI-1
6.1	Acronyms and Abbreviations.....	VI-2
6.2	Noise Levels and Events.....	VI-3
	Figure 6.1 Common Noise Sources	VI-5
6.2.1	Day-Night Average Sound Level.....	VI-6
6.3	Land Use Analysis of Noise Contours	VI-7
	Figure 6.2.a 1998 AICUZ Noise Contours.....	VI-8
	Figure 6.2.b 2006 AICUZ Noise Contours.....	VI-9
6.3.1	Incompatible Land Uses by Community	VI-10
6.3.1.a	Midwest City	VI-11
6.3.1.b	Oklahoma City	VI-11
6.3.1.c	City of Spencer	VI-11
	Figure 6.3.a Properties in Midwest City Located in the 65+ dB DNL	VI-12
	Figure 6.3.b Properties in Midwest City Located in the 65+ dB DNL	VI-13
	Figure 6.4.a Properties in Oklahoma City Located in the 65+ dB DNL	VI-14
	Figure 6.4.b Properties in Oklahoma City Located in the 65+ dB DNL	VI-15
	Figure 6.4.c Properties in Oklahoma City Located in the 65+ dB DNL	VI-16
	Figure 6.5 Properties in the City of Spencer Located in the 65+ dB DNL	VI-17



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

6.4	Concept of Sound Transmission Class	VI-18
6.4.1	Overall Noise Level Reduction.....	VI-18
	Table 6.1 Structure Performance Standards	VI-19
	Table 6.2 Sample STC Ratings	VI-19
6.4.2	Building Codes and Noise.....	VI-20
6.5	Noise Attenuation	VI-20
6.5.1	Research, Development and Abatement	VI-21
 SECTION VII — Recommendations: Short and Long Term		VII-1
7.1	Acronyms and Abbreviations.....	VII-2
7.2	Background	VII-3
7.3	Consideration of Tinker AFB Flight Tracks	VII-5
	Figure 7.1 Tinker AFB Departure Flight Tracks	VII-7
	Figure 7.1.a Tinker AFB Arrival Flight Tracks	VII-8
	Figure 7.1.b Tinker AFB Closed Pattern Flight Tracks	VII-9
7.4	Regulatory Land Use Modifications.....	VII-10
7.5	Short Term Recommendations.....	VII-11
7.6	Recommended Low Density Standards for APZ I and APZ II	VII-12
	Figure 7.2 AICUZ APZ/CZ Areas — Del City and Midwest City	VII-16
	Figure 7.3 AICUZ APZ/CZ Areas — Midwest City.....	VII-17
	Figure 7.4 AICUZ APZ/CZ Areas — Oklahoma City.....	VII-18
7.7	Long Term Recommendations	VII-19
7.7.1	Purchase of Land in AICUZ Accident Potential and Noise Zones	VII-19
7.7.2	Acquire Easements for AICUZ Accident Potential and Noise Zones	VII-19
	7.7.2.a Voluntary Acquisition and Noise Mitigation.....	VII-20
	7.7.2.b Voluntary Avigation Easement Program.....	VII-22
	7.7.2.c Fee Simple Purchase of Part of Land.....	VII-22
	Figure 7.5 2006 Average Busy-Day Noise Contours.....	VII-25
7.7.3	Transfer of Development Rights	VII-26
7.7.4	Land Banking.....	VII-26
7.8	AICUZ Disclosure and Real Estate Transactions.....	VII-27
7.8.1	Real Estate Disclosure Process.....	VII-27
7.9	Bird Management.....	VII-28
	Figure 7.6 Landfills Within 2 Miles of Tinker AFB	VII-29

Defending Oklahoma's Future: Tinker AFB Joint Land Use Study



7.10 Building Code Recommendations	VII-30
7.10.1 American National Standards Institute Guidelines.....	VII-31
Table 7.1 Noise Levels and Land Use Compatibility	VII-33
7.10.2 Development of Construction Guide.....	VII-34
7.10.3 Architectural Design for Noise Reduction.....	VII-34
7.10.4 Acoustic Site Design.....	VII-36
7.11 Closure of a Portion of Douglas Boulevard	VII-36
7.12 Tinker AFB Recommendations.....	VII-37
JLUS Summary of Recommendations	VII-38

Section VIII — References and Appendices

VIII-1

8.1 References	VIII-3
8.2 Appendices: Table of Contents.....	VIII-7
Appendix A Oklahoma Municipal Code Section 43.101.1	VIII-9
Appendix B Sample Noise Abatement Ordinance	VIII-13
Appendix C Sample Memorandum of Understanding.....	VIII-23
Appendix D Del City's Interim Regulations	VIII-27
Appendix E Tinker AFB – 2005 BRAC Decisions.....	VIII-43
Appendix F Tinker Business and Industrial Park	VIII-47
Appendix G Engrossed House Bill No. 2472	VIII-55
Appendix H Public Involvement Activities	VIII-59



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

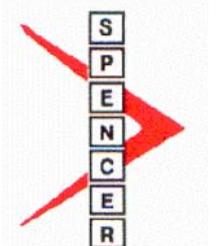
PREAMBLE

The mission of the United States Air Force is to deliver sovereign options for the defense of the United States of America and its global interests—to fly and fight in Air, Space, and Cyberspace. To achieve that mission, the Air Force has a vision of Global Vigilance, Reach and Power. That vision orbits around three core competencies: Developing Airmen, Technology-to-Warfighting and Integrating Operations. (Tinker AFB Website)

This Joint Land Use Study (JLUS) was an initiative of Midwest City, Del City, Oklahoma City, Spencer, Choctaw, Nicoma Park, Oklahoma County, Cleveland County, the Oklahoma Strategic Military Planning Commission and Tinker Air Force Base (AFB). The Association of Central Oklahoma Governments served as the study sponsor. The purpose of the JLUS was to evaluate the current status of the implementation of recommendations issued in the 2006 Air Installation Compatible Use Zone Study for Tinker AFB and to make recommendations for additional actions by local governments designed to improve land use decisions that may affect the missions of the Base. The objective of the consulting team hired to prepare this assessment is to recommend actions that will improve the compatibility of land uses around Tinker AFB now and in the future.



DFW Advisors
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What is ACOG?

The Association of Central Oklahoma Governments (ACOG) is a voluntary association of city, town and county governments within the Central Oklahoma area. The current membership includes 32 local governments and Tinker Air Force Base as an associate member. The ACOG region includes Oklahoma, Cleveland, Canadian and Logan Counties, which surround the state capital, Oklahoma City.

ACOG's purpose is to aid local governments in planning for common needs, cooperating for mutual benefit and coordinating for sound regional development. ACOG helps its member entities work in partnership to address issues common to many jurisdictions. This serves to strengthen both the individual and collective capabilities of local governments.

ACOG was originally established in June 1966. It is governed by a Board of Directors, which makes all policy decisions for the organization. Each member government appoints to the ACOG Board a representative and up to two alternates from its elected officials. Member entities exercise a weighted vote, which is based on their most recent population estimates.

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SECTION IV

Technical Information and Analyses



Midwest City

Recent development serves the area's growing population.

Source: City of Midwest City.



4.1 Acronyms and Abbreviations

ACOG	Association of Central Oklahoma Governments
AFB	Air Force Base
AICUZ	Air Installation Compatible Use Zone
APZ	Accident Potential Zone
BRAC	Base Realignment and Closure
CZ	Clear Zone
dB	decibel
dBA	A-weighted sound level measured in decibels
DNL	Day-Night Average Sound Level
DoD	U.S. Department of Defense
FAA	U.S. Federal Aviation Administration
FAR	Federal Aviation Regulations
JLUS	Joint Land Use Study
UFC	Unified Facility Criteria
USAF	United States Air Force
USN	United States Navy



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

4.2 Technical Information

The purpose of the U.S. Department of Defense's (DoD) long-standing Air Installation Compatible Use Zone (AICUZ) program is to promote compatible land development in areas subject to increased noise exposure and accident potential due to aircraft operations. The AICUZ program has as the additional goal of protecting military airfields and navigable airspace around them from encroachment by incompatible land uses and structures.

Tinker AFB is one of the DoD's premier joint service facilities. The Air Logistics Center's mission is dedicated to providing worldwide technical logistic support to Air Force and Navy weapon systems. The center's personnel manages over 2,000 aircraft, including the B-1, B-2, B-52, C/KC-135, E-6 and E-3 as well as an inventory of approximately 23,000 jet engines. Its major product line of aircraft, propulsion and commodities manages, maintains and procures resources to support first-line overhaul and maintenance of B-1, B-2 and B-52 bombers, the multipurpose C/KC-135 aircraft, and several missile systems. The center's facilities house some of the most sophisticated technical repair and manufacturing processes in the world, acquiring and maintaining superior aviation systems.



A grand affair

The Team Tinker booth at the Oklahoma State Fair and Centennial Expo allows volunteers like Petty Officer 2nd Class Todd Bigart to tell fairgoers about the mission of the Base. Civilian, Air Force and Navy personnel. (Air Force photo by Amy Schiess)



4.2.1 Runway Airspace “Imaginary” Surfaces

The safety zones around a runway are dictated by the agency or department that owns and manages the runway. The shape and size of the runway safety zones can vary based on different aircraft types, runway lengths, and runway designations. In the case of DoD ownership, the U.S. Air Force, Navy, and Army have established slightly different systems of zones and imaginary surfaces. Because of the current Air Force ownership of the runway and the likely missions, this study limits its analysis to the Air Force criteria, and does not address the Navy and Army criteria.

In the Air Force, the criteria are determined by the classification of the runway, which depends on the type of mission being supported. In general, there are two runway types, Class A and Class B. The regulations also define another type of runway, called a Contingency Landing Zone, which is limited to short dirt or paved runways used in-theatre or for training purposes. Because of the relative rareness of Contingency Landing Zones in the Air Force, this study does not address these criteria; it outlines the Class A and Class B options to represent the minimum and maximum runway footprints.

4.2.1.a Class A Runway (NOT at Tinker AFB)

Class A runways are primarily intended for small light aircraft. Ordinarily, these runways are less than 8,000 feet long, and have less than ten percent of their operations involving aircraft in the Class B category. This type of runway is not intended to support high performance and large heavy aircraft. In general, Class A runways are limited to auxiliary fields or secondary runways at larger Air Force bases. There are few, if any, Air Force flying missions that are based on Class A runways.



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4.2.1.b Class B Runway

Class B runways are designed to support high-performance and heavy aircraft. This includes all fighter, bomber, and heavy lift missions. Most Air Force bases have at least one Class B runway to support their primary mission. The DoD safety zones that are relevant to this study are the Clear Zone (CZ) including the graded portion of the CZ, Accident Potential Zone (APZ) I and APZ II. These zones are located at both ends of each runway.

Tinker AFB has two major or Class B runways. Runway 17/35 is 11,100 feet long and Runway 12/30 is 10,000 feet long. Runway 17/35 is the primary runway and accommodates the majority of air traffic at the Base. Air Force obstruction criteria are based on Unified Facility Criteria (UFC) 3-260-01. Definitions of the runway airspace “imaginary” surfaces are as follows.

4.2.1.c Primary Surface

The primary surface is an imaginary surface symmetrically centered on the runway, extending 200 feet beyond each runway end that defines the limits of the obstruction clearance requirements in the vicinity of the landing area. The width of the primary surface is 2,000 feet, or 1,000 feet on each side of the runway centerline.

4.2.1.d Clear Zone Surface

The CZ surface is an obstruction-free surface (except for features essential for aircraft operations) on the ground symmetrically centered on the extended runway centerline beginning at the end of the runway and extending outward 3,000 feet. The CZ width is 3,000 feet or 1,500 feet on each side of the runway centerline.



Steady hand

John Trip, Computer Sciences Corporation T-38 mechanic and crash recovery team member, helps steady a T-38 being removed from the runway at Tinker Air Force Base, Okla. (Photo by Brian Rochester)



4.2.1.e Accident Potential Zone Surfaces

The APZ I surface begins at the outer end of the CZ and is 5,000 feet long and 3,000 feet wide. APZ II begins at the outer end of APZ I and is 7,000 feet long and 3,000 feet wide. Figure 4.1 illustrates the APZ and CZ zones surrounding Tinker AFB. The APZ II zones on the Crosswind runway were added under the 2006 AICUZ Study for Tinker AFB.

4.2.1.f Approach-Departure Clearance Surface

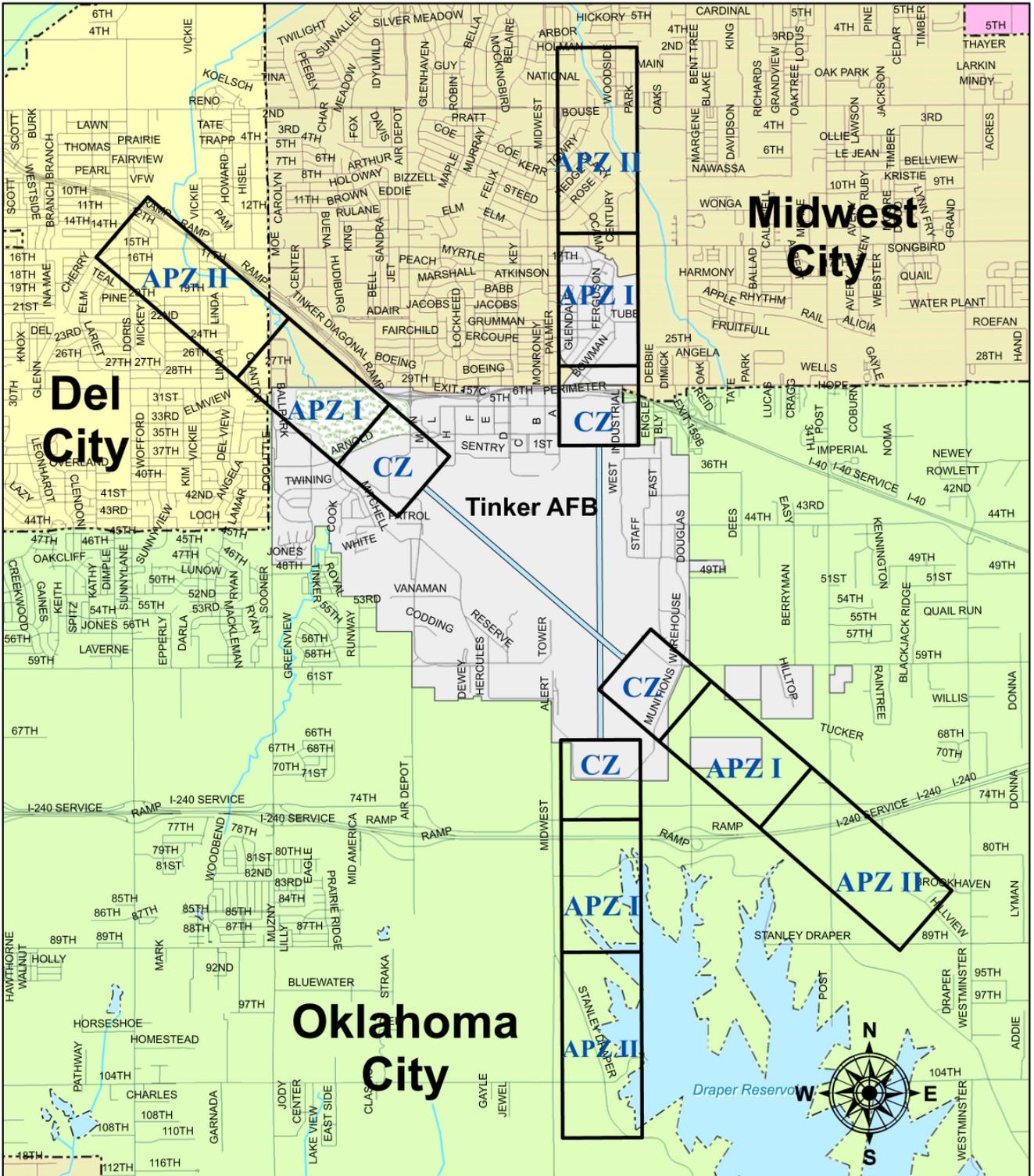
The approach-departure clearance imaginary surface is symmetrically centered on the extended runway centerline, beginning as an inclined plane (glide angle) 200 feet beyond each end of the primary surface, and extending for 50,000 feet. The slope of the approach-departure clearance surface is 50:1 until it reaches an elevation of 500 feet above the established airfield elevation. It then continues horizontally at this elevation to a point 50,000 feet from the starting point. The width of this surface at the runway end is 2,000 feet, flaring uniformly to a width of 16,000 feet at the end point.

Runway orientation is key to a safe, efficient, and usable aviation facility. Orientation is based on an analysis of wind data, terrain, local development, operational procedures, and other pertinent data. Where wind coverage of the primary runway is less than 95% or where the wind is from a direction other than the direction of primary runways, crosswind runways are required.



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

Figure 4.1 Accident Potential Zones I and II and Clear Zones Surrounding Tinker AFB



Source: Created from Data Received from ACOG and Tinker AFB



4.3 Air Installation Compatible Use Zone Studies

The Air Installation Compatible Use Zone (AICUZ) program was established by the DoD to promote compatible land use around military airfields. The military services maintain an AICUZ program in an effort to protect the operational integrity of their flying mission. DoD Instruction 4165.57 establishes the AICUZ program which is similar to the Federal Aviation Administration's Federal Aviation Regulation Part 150 program for civil airports. The AICUZ program is a land use planning program, not a land acquisition or land management program, and usually precedes the Joint Land Use Study.

The purpose of an AICUZ is twofold: 1) to promote public health and safety through the local adoption of compatible land use controls and 2) to protect the operational capability of the air installation. It was created in response to increased urban development around military airfields. Many Air Force installations were built in the late 1940s and early 1950s in locations 10 to 15 miles away from urban population centers. Since then, urban growth has gradually moved closer towards the boundaries of many installations. Incompatible land usage often results in complaints over the effects of aircraft operations (e.g. noise, low over-flights, etc). Frequent complaints can cause operational changes, which in many cases, adversely affect the flying mission. Conversely, land uses including those that attract birds, produce electrical, light or smoke/dust emissions that could obscure the pilots' vision, or interfere with the operation of electronic equipment on board the aircraft are problematic.

An AICUZ Study is written from the military perspective and contains land use compatibility guidelines based on noise exposure zones, APZs, and obstructions to air navigation. The JLUS report that normally follows is written for the communities, reiterating the AICUZ's compatibility guidelines, and expanding land use policy and regulatory recommendations for the adjacent communities. The primary difference between the two is the JLUS focuses on the framework to support **adoption and implementation** of compatible development standards designed to prevent urban encroachment; safeguard the military mission; and protect the public health, safety, and welfare.



Joint Land Use Study

Tinker environmental spokesman Brion Ockenfels discusses an Air Installation Compatible Use Zone map with area residents attending the Joint Land Use Study town meeting Oct. 18, 2007 in Midwest City. (Air Force photo by Ralph Monson)



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

In order to provide land use compatibility guidelines, the 2006 AICUZ Study identifies three basic constraints that affect flight operations: height limitations, noise levels generated by aircraft operations and statistical analysis of past aircraft accidents.

4.4 2006 AICUZ Study for Tinker AFB

The 2006 Tinker AFB AICUZ Study updated the 1998 AICUZ Study. The update documents changes for the period of 1998 to 2006, including actions taken as a result of the recommendations of the Base Realignment and Closure Commission (BRAC) in 2005.

The AICUZ Study, prepared in 2006, documented current flight operations and revised noise contours. Changes that occurred since the 1998 Tinker AFB AICUZ Study include:

- An increase in the number of operations by based aircraft
- The addition of four based KC-135 aircraft
- An increase in the number of transient aircraft operations
- Addition, elimination, and modification of aircraft flight tracks to correspond to flying operations changes
- Technical improvements to the NOISEMAP computer modeling program
- Addition of APZ II for the crosswind runway

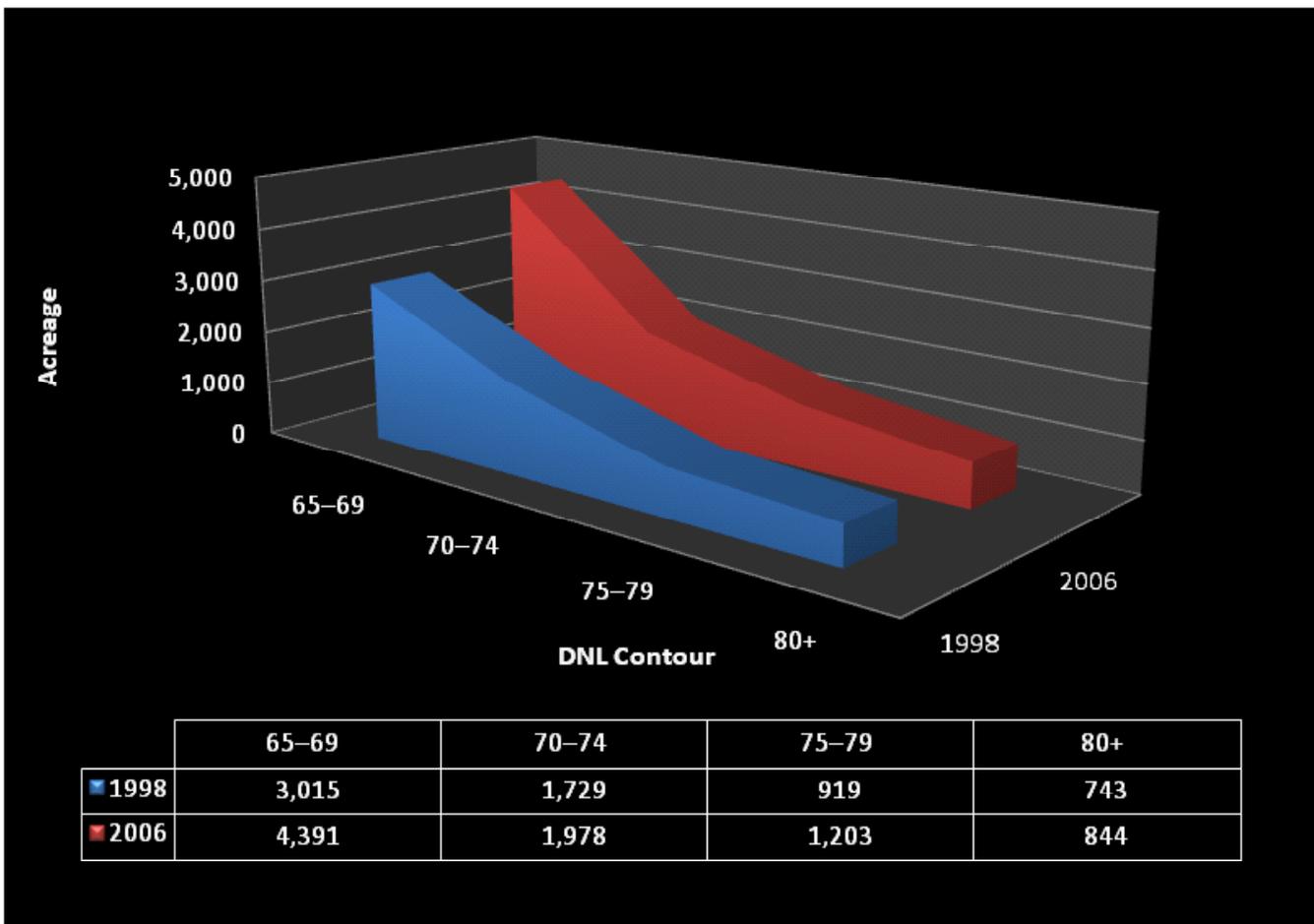
Due to the alteration of flight tracts for new mission purposes, the 2006 Study analyzed aircraft noise and accident potential to determine land use compatibility and provided compatible land use guidelines for the area surrounding the Base to assist local communities in future planning and zoning activities.

Defending Oklahoma's Future: Tinker AFB Joint Land Use Study



As illustrated in Figure 4.2, the increase in flight activity at the Base resulted in the predictable increase in affected acreage contained within each of the established noise zones. The AICUZ Study also provided an analysis of various land uses surrounding the Base including the acreages of land use categories and zoning districts within specific AICUZ accident and noise zones.

Figure 4.2 Comparison of Total Acreage in AICUZ Noise Contours



Source: 2006 AICUZ Study for Tinker AFB



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

4.4.1 Air Installation Compatible Use Zones

Communities around Tinker AFB are exposed to the possibility of aircraft accidents even with well maintained aircraft and highly trained aircrews. This fact is confirmed by USAF analysis of over 800 major accidents at many bases from 1968 through 1995 which occurred within 10 miles of a military installation. As a result, critical planning zones have been established.

While the possibilities of an aircraft mishap are remote, the Military recommends that land uses within these Accident Potential Zones be minimal or low density to ensure maximum protection of public health and property. This gives local planners a tool to promote development compatible with airfield operations.

Table 4.1 shows the cumulative percentage of accidents from data collected by the Air Force between 1950 and 1996 in the United States. According to the table, accident potential appears to increase proportionally with the aircraft's distance from the runway centerline.

Table 4.1 Accident Potential Location Analysis

Table 2.1: Accident Potential Location Analysis			
<i>Length from Both Ends of Runway</i>	<i>Width of Runway Extension</i>		
	<i>2,000 feet</i>	<i>3,000 feet</i>	<i>4,000 feet</i>
	Percent of Accidents		
On or adjacent to runway (1,000 feet to each side of runway centerline)	23	23	23
0 to 3,000 feet	35	39	39
3,000 to 8,000 feet	8	8	8
8,000 to 15,000 feet	5	5	7
	Cumulative Percent of Accidents		
On or adjacent to runway (1,000 feet to each side of runway centerline)	23	23	23
0 to 3,000 feet	58	62	62
3,000 to 8,000 feet	66	70	70
8,000 to 15,000 feet	71	75	77

Source: 32 CFR PART 256—AIR INSTALLATIONS COMPATIBLE USE ZONES



4.4.1.a Clear Zones

The Clear Zone (CZ) has the highest potential for accidents to occur. Twenty-seven percent of the accidents studied occur in the CZ. Land acquisition through purchase or easements can be utilized to eliminate any development activity, and thus decrease exposure to damages resulting from accidents that might occur.

4.4.1.b Accident Potential Zone I

The APZ I is 3,000 feet wide and extends from the CZ 5,000 feet and includes an area of reduced accident potential. Ten percent of the accidents studied occurred in this area.

Controlling land use near military airfields is important to minimize the damage from potential aircraft accidents and to reduce hazards to air navigation. Thus, the DoD has delineated APZs in the vicinity of airfield runways where, if a problem develops, an aircraft mishap would likely occur. Studies show that most mishaps occur on or near the runway or along the extended centerline of the runway.

Various industrial, manufacturing, and agricultural land uses are acceptable within APZ I. However, uses that concentrate people in small areas, such as higher density housing, pose a conflict with the safety risks of this zone.

4.4.1.c Accident Potential Zone II

The APZ II is 3,000 feet wide and extends from the outer end of the APZ I an additional 7,000 feet. This is an area of further reduced accident potential. Five percent of the accidents studied occurred in this area. The accident potential in APZ II is low enough that low-density housing and commercial uses are considered to be compatible with flight operations. Military guidance suggests low density residential uses of one to two dwelling units per acre in APZ II. High density functions such as multi-story buildings and places of assembly (e.g., theaters, schools, churches and hospitals), however, raise compatibility issues.



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

Designation of safety zones around the airfield and restriction of incompatible land uses can reduce the public's exposure to safety hazards. Air Force accident studies have found that aircraft accidents near Air Force installations occurred in the following patterns:

- 61% were related to landing operations
- 39% were related to takeoff operations
- 70% occurred in daylight
- 80% were related to fighter and training aircraft operations
- 25% occurred on the runway or within an area extending 1,000 feet out from each side of the runway
- 27% occurred in an area extending from the end of the runway to 3,000 feet long the extended centerline and 3,000 feet wide, centered on the extended centerline
- 15% occurred in an area between 3,000 and 15,000 feet along the extended runway centerline and 3,000 feet wide, centered on the extended centerline

Air Force statistics reveal that 75% of aircraft accidents resulted in definable impact areas. The size of the impact areas were:

- 5.1 acres overall average
- 2.7 acres for fighters and trainers
- 8.7 acres for heavy bombers and tankers

4.5 2006 AICUZ Land Use Analyses

The noise contours and APZs presented in the 2006 AICUZ Study were based on data collected at Tinker AFB in April 2005. The Air Force reviewed and validated the data through a communicative process that was finalized in January 2007.



4.5.1 Objectives for an AICUZ Study

The Tinker AFB AICUZ Study fulfilled two key functions. By assessing current operations, it delineated noise contours and accident potential zones to provide a geographic basis for the JLUS. At the same time, based on research done by military and civilian organizations, it recommended a strategy for community land uses that would be compatible with:

- Airfield operations
- Noise levels
- APZs
- Flight clearance requirements

Land within the Base environs predominantly falls within the cities of Midwest City, Del City and Oklahoma City. The majority of the developed land surrounding the Base can be characterized as moderate density (four to seven units per acre) urban development, with areas of undeveloped land south of the installation.

4.5.2 Land Use and AICUZ

Based on the noise and safety considerations discussed in this document, the 2006 AICUZ Study contains land use recommendations that are divided into those related to noise contours and those related to APZs. They apply to the entire area contained within defined boundaries. The land uses are categorized as follows:

- **Compatible Development:** These areas represent developed or protected parcels that are compatible with applicable land use recommendations in their current state.
- **Incompatible Development:** These areas represent developed parcels that are incompatible in their current state.
- **Potentially Incompatible Development:** These undeveloped areas may be susceptible to incompatible development in the future because of their current zoning status.



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

The goal is to encourage land uses that are compatible with the operations of Tinker AFB. In relation to the Base, incompatible uses are those which: (1) are noise sensitive; (2) involve a high concentration of people (if they are in any of the APZs); and (3) interfere with safe air operations.

The DoD has prepared a detailed and comprehensive list of suggested compatible land uses for both noise zones and APZs, by classification, as shown in Table 4.3 beginning on page IV-21.

4.5.2.a Existing Land Uses within the AICUZ Planning Zones

Tinker AFB has four 3,000 foot by 3,000 foot Clear Zones, four 3,000 foot by 5,000 foot APZ I zones, and four 3,000 foot by 7,000 foot APZ II zones. In order to provide land use compatibility guidelines, the AICUZ Study describes three basic constraints that affect flight operations: height limitations, noise levels generated by aircraft operations and statistical analysis of past aircraft accidents.

Using the above information, as well as Land Use Compatibility guidelines, an "Incompatibility Land Use Table" was included in the AICUZ Study. Each land use met compatibility criteria for its category for both noise and accident potential in order to be considered compatible. The study determined that certain uses are incompatible in the APZs and CZs. Details of these incompatible uses are summarized as follows and in Table 4.2:

- **Clear Zone:** No incompatible land uses were identified within the four defined clear zones, due to the majority of property located within the CZs being located on Tinker AFB property.
- **APZ I:** Within the four APZ I zones, four acres contained residential uses, four acres contained public/quasi public uses, and 41 acres contained commercial uses.
- **APZ II:** Within the four APZ II zones, 409 acres contained residential uses, and 121 acres contained public/quasi public uses.

Defending Oklahoma's Future: Tinker AFB Joint Land Use Study



Table 4.2 and Figure 4.3 reflect the incompatible land uses within both the APZs and noise contours that were identified in the 2006 AICUZ Study for Tinker AFB.

Table 4.2 Incompatible Land Use for Runways 17/35 and 12/30 at Tinker AFB

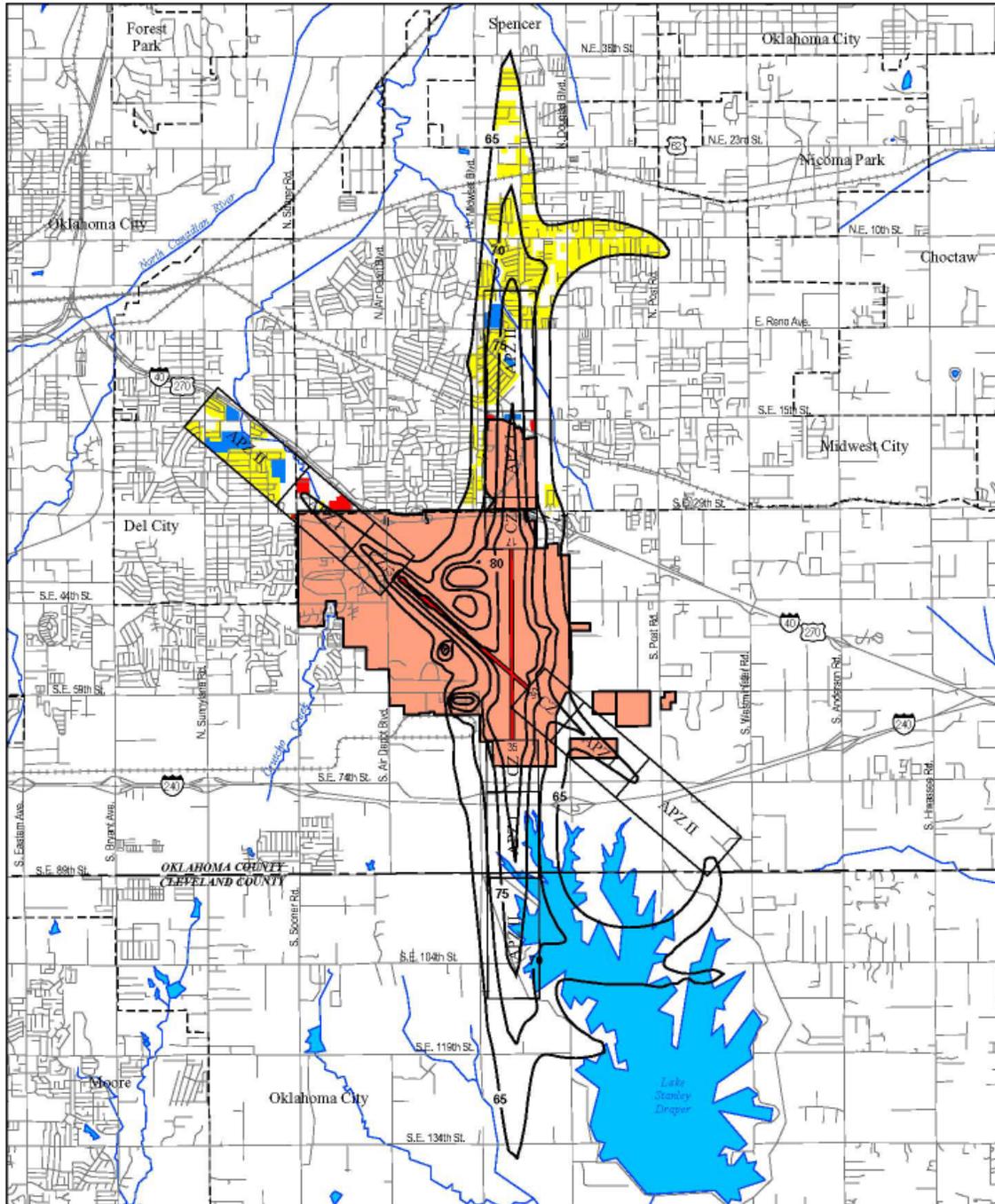
Category	Acreage Within CZs and APZs			Acreage Within Noise Zones, Not Included in CZs and APZs				Total
	CLEAR ZONE	APZ I	APZ II	65-69	70-74	75-79	80+	
Residential	•	4	409	676	164	8	•	1,261
Commercial	•	41	•	1	•	•	•	42
Industrial	•	•	•	•	•	•	•	0
Public/Quasi-public	•	4	121	5	•	•	•	130
Recreation/Open/ Agricultural/Low Density	•	•	•	•	•	•	•	0
Total	0	49	530	682	164	8	0	1,433
• Represents compatible land use								

Source: 2006 AICUZ Study for Tinker AFB



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

Figure 4.3 Incompatible Land Use



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Tinker Air Force Base 2006 AICUZ

LEGEND

Tinker AFB	DNL dB Contours
Residential	Runway
Commercial	Roadway
Public/Quasi-Public	City Limits

0 8,000 Feet

Source: 2006 AICUZ Study for Tinker AFB



4.5.2.b Existing Zoning within the AICUZ Planning Zones

Due to the number of jurisdictions within the AICUZ study area and the various zoning district names, land use zoning was grouped and generalized as follows:

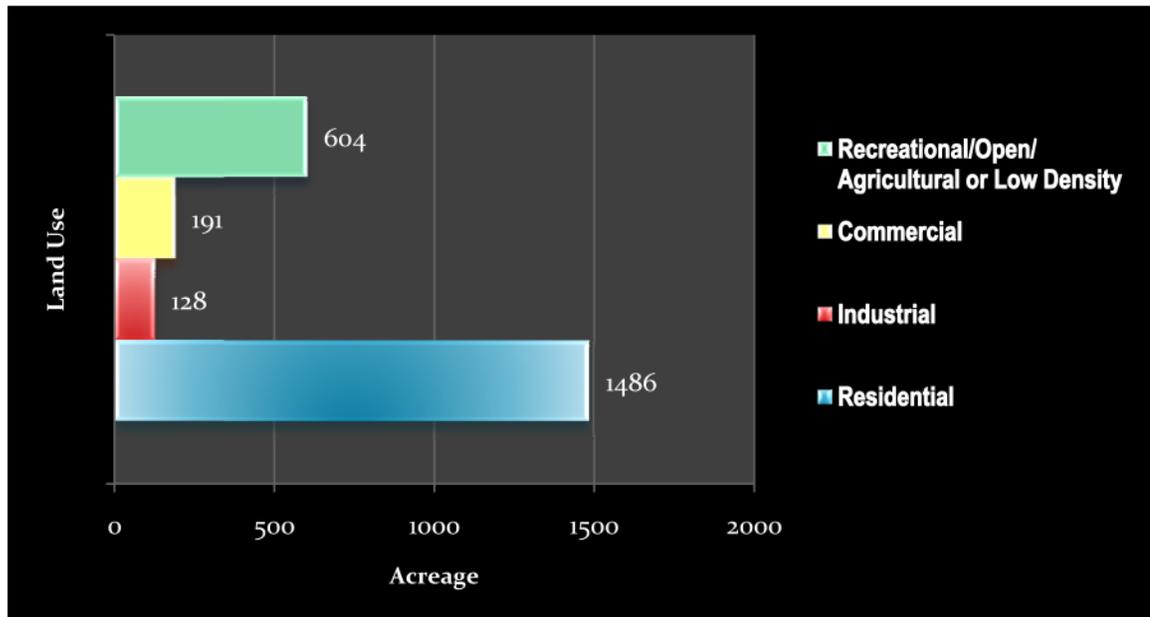
- **Residential:** includes all types of residential activity, such as single and multi-family residences and mobile homes, at a density greater than one dwelling unit per acre.
- **Commercial:** includes offices, retail, restaurants and other types of commercial establishments.
- **Industrial:** includes manufacturing, warehousing, and other similar uses.
- **Public/Quasi-Public:** includes publicly owned lands and/or land to which the public has access, including military reservations and training grounds, public buildings, schools, churches, cemeteries, and hospitals.
- **Recreational:** includes land areas designated for recreational activity including parks, wilderness areas and reservations, conservation areas, and areas designated for trails, hikes, camping, etc.
- **Open/Agricultural/Low Density:** includes undeveloped land areas, agricultural areas, grazing lands and areas with residential activity at densities less than or equal to one dwelling unit per acre.



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

Figure 4.4 illustrates the amount of acreage within each of the generalized land use zoning districts surrounding Tinker AFB.

**Figure 4.4 Land Use Within the AICUZ Accident Potential Zones
(CZ/APZ I and II)**



Source: 2006 AICUZ Study for Tinker AFB

Inclusion of the CZs and APZs in the evaluation revealed that 1,486 acres of the 2,409 total acres were classified as residential within the Tinker AFB AICUZ Planning Zones.



4.5.2.c Land Use Classification Systems

It is noteworthy that all three municipalities surrounding Tinker Air Force Base utilize the Standard Industrial Classification (SIC) system for determining land use classifications within their respective jurisdictions. The SIC code was introduced in the 1930s and has been periodically revised to reflect the economy's changing industrial composition and organization. The Standard Land Use Coding Manual (SLUCM) was introduced in 1965 and last updated in 1987. It is the standard land use classification system used by the military. There is not a clear conversion system from the SLUCM system to the SIC system. This results in potential confusion between appropriate land use classifications and definitions in the application of the Air Force's recommendations of compatible land use.



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

Table 4.3 Land Use Compatibility Guidelines

Land Use		Accident Potential Zones			Noise Zones in DNL dB			
SLUCM No.	Name	Clear Zone	APZ I	APZ II	65-69	70-74	75-79	80+
10	Residential							
11	Household units							
11.11	Single units; detached	N	N	Y ¹	A ¹¹	B ¹¹	N	N
11.12	Single units; semidetached	N	N	N	A ¹¹	B ¹¹	N	N
11.13	Single units; attached row	N	N	N	A ¹¹	B ¹¹	N	N
11.21	Two units; side-by-side	N	N	N	A ¹¹	B ¹¹	N	N
11.22	Two units; one above the other	N	N	N	A ¹¹	B ¹¹	N	N
11.31	Apartments; walk up	N	N	N	A ¹¹	B ¹¹	N	N
11.32	Apartments; elevator	N	N	N	A ¹¹	B ¹¹	N	N
12	Group quarters	N	N	N	A ¹¹	B ¹¹	N	N
13	Residential hotels	N	N	N	A ¹¹	B ¹¹	N	N
14	Mobile home parks or courts	N	N	N	N	N	N	N
15	Transient lodgings	N	N	N	A ¹¹	B ¹¹	C ¹¹	N
16	Other residential	N	N	N ¹	A ¹¹	B ¹¹	N	N
20	Manufacturing							
21	Food & kindred products; manufacturing	N	N ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
22	Textile mill products; manufacturing	N	N ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
23	Apparel and other finished products made from fabrics, leather, and similar materials; manufacturing	N	N	N ²	Y	Y ¹²	Y ¹³	Y ¹⁴
24	Lumber and wood products (except furniture); manufacturing	N	Y ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
25	Furniture and fixtures; manufacturing	N	Y ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
26	Paper & allied products; manufacturing	N	Y ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
27	Printing, publishing, and allied industries	N	Y ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
28	Chemicals and allied products; manufacturing	N	N	N ²	Y	Y ¹²	Y ¹³	Y ¹⁴
29	Petroleum refining and related industries	N	N	Y	Y	Y ¹²	Y ¹³	Y ¹⁴

Source: 2006 AICUZ Study for Tinker Air Force Base



Table 4.3 Land Use Compatibility Guidelines (cont.)

Land Use		Accident Potential Zones			Noise Zones			
SLUCM No.	Name	Clear Zone	APZ I	APZ II	65-69	70-74	75-79	80+
30	Manufacturing							
31	Rubber and misc. plastic products, manufacturing	N	N ²	N ²	Y	Y ¹²	Y ¹³	Y ¹⁴
32	Stone, clay and glass products manufacturing	N	N ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
33	Primary metal industries	N	N ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
34	Fabricated metal products; manufacturing	N	N ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
35	Professional, scientific, and controlling instruments; photographic and optical goods; watches and clocks manufacturing	N	N	N ²	Y	A	B	N
39	Miscellaneous manufacturing	N	Y ²	Y ²	Y	Y ¹²	Y ¹³	Y ¹⁴
40	Transportation, Communications and Utilities							
41	Railroad, rapid rail transit and street railroad transportation	N ³	Y ⁴	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
42	Motor vehicle transportation	N ³	Y	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
43	Aircraft transportation	N ³	Y ⁴	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
44	Marine craft transportation	N ³	Y ⁴	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
45	Highway & street right-of-way	N ³	Y	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
46	Automobile parking	N ³	Y ⁴	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
47	Communications	N ³	Y ⁴	Y	Y	A ¹⁵	B ¹⁵	N
48	Utilities	N ³	Y ⁴	Y	Y	Y	Y ¹²	Y ¹³
49	Other transportation communications and utilities	N ³	Y ⁴	Y	Y	A ¹⁵	B ¹⁵	N

Source: 2006 AICUZ Study for Tinker Air Force Base



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

Table 4.3 Land Use Compatibility Guidelines (cont.)

Land Use		Accident Potential Zones			Noise Zones			
SLUCM No.	Name	Clear Zone	APZ I	APZ II	65-69	70-74	75-79	80+
50	Trade							
51	Wholesale trade	N	Y ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
52	Retail trade-building materials, hardware and farm equipment	N	Y ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
53	Retail trade-general merchandise	N	N ²	Y ²	Y	A	B	N
54	Retail trade-food	N	N ²	Y ²	Y	A	B	N
55	Retail trade-automotive, marine craft, aircraft and accessories	N	Y ²	Y ²	Y	A	B	N
56	Retail trade-apparel and accessories	N	N ²	Y ²	Y	A	B	N
57	Retail trade-furniture, home furnishings and equipment	N	N ²	Y ²	Y	A	B	N
58	Retail trade-eating and drinking establishments	N	N	N ²	Y	A	B	N
59	Other retail trade	N	N ²	Y ²	Y	A	B	N
60	Services							
61	Finance, insurance and real estate services	N	N	Y ⁶	Y	A	B	N
62	Personal services	N	N	Y ⁶	Y	A	B	N
62.4	Cemeteries	N	Y ⁷	Y ⁷	Y	Y ¹²	Y ¹³	Y ^{14,21}
63	Business services	N	Y ⁸	Y ⁸	Y	A	B	N
64	Repair services	N	Y ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
65	Professional services	N	N	Y ⁶	Y	A	B	N
65.1	Hospitals, nursing homes	N	N	N	A*	B*	N	N
65.1	Other medical facilities	N	N	N	Y	A	B	N
66	Contract construction services	N	Y ⁶	Y	Y	A	B	N
67	Governmental services	N	N	Y ⁶	Y*	A*	B*	N
68	Educational services	N	N	N	A*	B*	N	N
69	Miscellaneous services	N	N ²	Y ²	Y	A	B	N

Source: 2006 AICUZ Study for Tinker Air Force Base



Table 4.3 Land Use Compatibility Guidelines (cont.)

Land Use		Accident Potential Zones			Noise Zones			
SLUCM No.	Name	Clear Zone	APZ I	APZ II	65-69	70-74	75-79	80+
70	Cultural, Entertainment and Recreational							
71	Cultural activities (including churches)	N	N	N ²	A*	B*	N	N
71.2	Nature exhibits	N	Y ²	Y	Y*	N	N	N
72	Public assembly	N	N	N	Y	N	N	N
72.1	Auditoriums, concert halls	N	N	N	A	B	N	N
72.11	Outdoor music shell, amphitheaters	N	N	N	N	N	N	N
72.2	Outdoor sports arenas, spectator sports	N	N	N	Y ¹⁷	Y ¹⁷	N	N
73	Amusements	N	N	Y ⁸	Y	Y	N	N
74	Recreational activities (including golf courses, riding stables, water recreation)	N	Y ^{8,9,10}	Y	Y*	A*	B*	N
75	Resorts and group camps	N	N	N	Y*	Y*	N	N
76	Parks	N	Y ⁸	Y ⁸	Y*	Y*	N	N
79	Other cultural, entertainment and recreation	N	Y ⁹	Y ⁹	Y*	Y*	N	N
80	Resources Production and Extraction							
81	Agriculture (except livestock)	Y ¹⁶	Y	Y	Y ¹⁸	Y ¹⁹	Y ²⁰	Y ^{20,21}
81.5 to 81.7	Livestock farming and animal breeding	N	Y	Y	Y ¹⁸	Y ¹⁹	Y ²⁰	Y ^{20,21}
82	Agricultural related activities	N	Y ⁵	Y	Y ¹⁸	Y ¹⁹	N	N
83	Forestry activities and related services	N ⁵	Y	Y	Y ¹⁸	Y ¹⁹	Y ²⁰	Y ^{20,21}
84	Fishing activities and related services	N ⁵	Y ⁵	Y	Y	Y	Y	Y
85	Mining activities and related services	N	Y ⁵	Y	Y	Y	Y	Y
89	Other resources production and extraction	N	Y ⁵	Y	Y	Y	Y	Y

Source: 2006 AICUZ Study for Tinker Air Force Base



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

Table 4.3 Land Use Compatibility Guidelines Legend

LEGEND

SLUCM - Standard Land Use Coding Manual, U.S. Department of Transportation.

Y - (Yes) - Land use and related structures are compatible without restriction.

N - (No) - Land use and related structures are not compatible and should be prohibited.

Y^x - (yes with restrictions) - Land use and related structures generally compatible; see notes 1-21.

N^x - (no with exceptions) - See notes 1-21.

NLR - (Noise Level Reduction) - NLR (outdoor to indoor) to be achieved through incorporation of noise attenuation measures into the design and construction of the structures.

A, B, or C - Land use and related structures generally compatible; measures to achieve NLR of A (DNL 25 dB), B (DNL 30 dB), or C (DNL 35 dB) need to be incorporated into the design and construction of structures.

A*, B*, and C* - Land use generally compatible with NLR. However, measures to achieve an overall noise level reduction do not necessarily solve noise difficulties and additional evaluation is warranted. See appropriate footnotes.

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

NOTES

1. Suggested maximum density of 1-2 dwelling units per acre possibly increased under a Planned Unit Development where maximum lot coverage is less than 20 percent.
2. Within each land use category, uses exist where further definition may be needed due to the variation of densities in people and structures. Shopping malls and shopping centers are considered incompatible in any accident potential zone (CZ, APZ I, or APZ II).
3. The placing of structures, buildings, or aboveground utility lines in the clear zone is subject to severe restrictions. In a majority of the clear zones, these items are prohibited. See AFI 32-7063 and UFC 3-260-01 for specific guidance.
4. No passenger terminals and no major aboveground transmission lines in APZ I.
5. Factors to be considered: labor intensity, structural coverage, explosive characteristics, and air pollution.
6. Low-intensity office uses only. Meeting places, auditoriums, etc., are not recommended.
7. Excludes chapels.
8. Facilities must be low intensity.
9. Clubhouse not recommended.
10. Areas for gatherings of people are not recommended.
- 11A. Although local conditions may require residential use, it is discouraged in DNL 65-69 dB and strongly discouraged in DNL 70-74 dB. An evaluation should be conducted prior to approvals, indicating a demonstrated community need for residential use would not be met if development were prohibited in these zones, and there are no viable alternative locations.
- 11B. Where the community determines the residential uses must be allowed, measures to achieve outdoor to indoor NLR for DNL 65-69 dB and DNL 70-74 dB should be incorporated into building codes and considered in individual approvals.
- 11C. NLR criteria will not eliminate outdoor noise problems. However, building location and site planning, and design and use of berms and barriers can help mitigate outdoor exposure, particularly from near ground level sources. Measures that reduce outdoor noise should be used whenever practical in preference to measures which only protect interior spaces.
12. Measures to achieve the same NLR as required for facilities in the DNL 65-69 dB range 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.
13. Measures to achieve the same NLR as required for facilities in the DNL 70-74 dB range 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.
14. Measures to achieve the same NLR as required for facilities in the DNL 75-79 dB range 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.
15. If noise sensitive, use indicated NLR; if not, the use is compatible.
16. No buildings.
17. Land use is compatible provided special sound reinforcement systems are installed.
18. Residential buildings require the same NLR required for facilities in the DNL 65-69 dB range.
19. Residential buildings require the same NLR required for facilities in the DNL 70-74 dB range.
20. Residential buildings are not permitted.
21. Land use is not recommended. If the community decides the use is necessary, personnel should wear hearing protection devices.

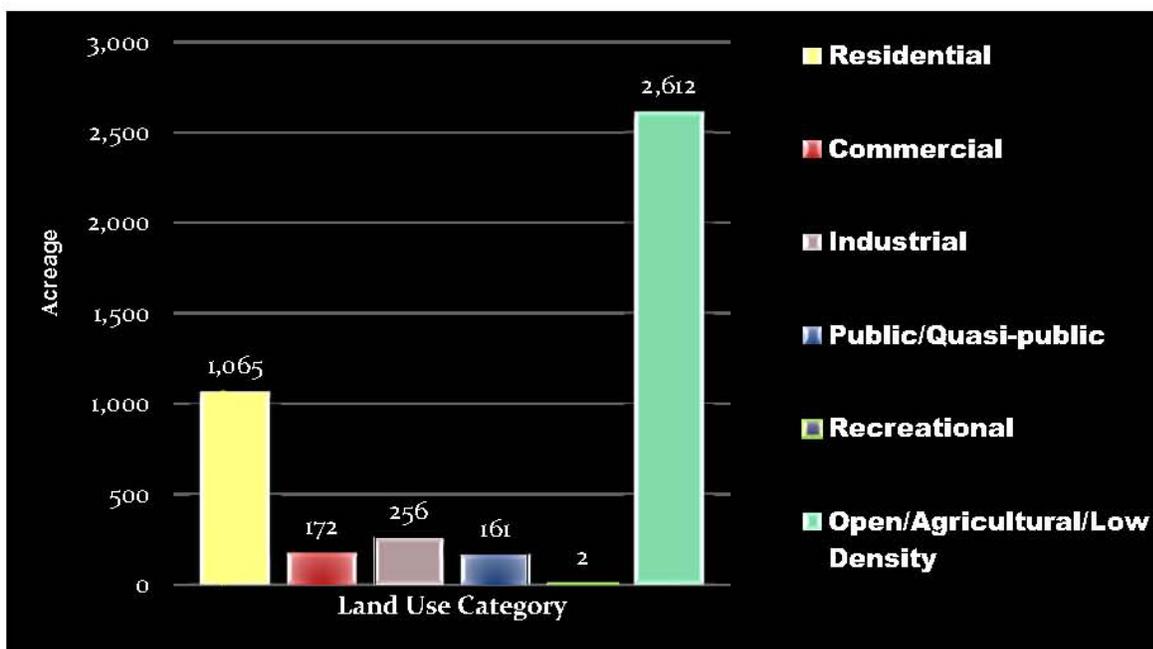
Source: 2006 AICUZ Study for Tinker Air Force Base



4.5.2.d Existing Land Uses within DNL 65dB Noise Contour

Of the 3,710 acres within the DNL 65 -70 dB Noise Contour outside the Base, 1,065 acres or 29% were residential. A summary of acreage in all land use categories is shown in Figure 4.5.

Figure 4.5 Land Use Categories (In Acres) Within 65+ dB Noise Contour



Source: 2006 AICUZ Study for Tinker AFB

The 2006 AICUZ Study also determined that certain existing uses not included in the APZs and CZs are incompatible within the 65+ dB DNL noise contour. Details of these potentially incompatible uses (existing structures) contained within the noise contours were summarized as follows:

- In the **65 dB – 69 dB DNL**: Approximately 676 acres were residential, one acre was commercial and five acres were public/quasi-public.



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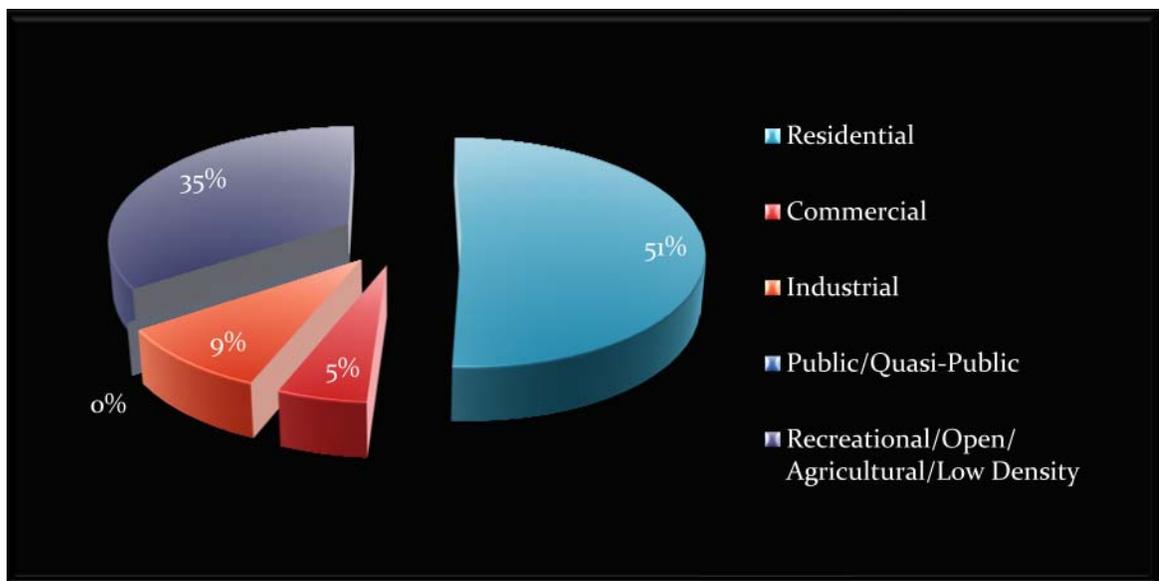
- In the **70 dB – 74 dB DNL**: Approximately 164 acres were residential.
- In the **75 dB DNL or greater**: Approximately eight acres were residential.

This would mean that approximately 217 acres within the 65+ dB DNL classified as residential remained undeveloped outside the APZs at the time of the study.

4.5.2.e Existing Zoning within DNL 65 dB Noise Contour

The 65 dB DNL is the federally defined threshold level at which aircraft noise begins to interfere with everyday activities, such as talking on the phone or watching TV.

Figure 4.6 Zoning Classification Percentages Within 65+ dB Noise Contour



Source: 2006 AICUZ Study for Tinker AFB



The areas that are within the 65 dB DNL contour are where land use and noise abatement measures would likely have the most benefit. These are the areas in which elements such as sound insulation would be eligible for federal participation.

As shown in Figure 4.6, more than half of the AICUZ area was zoned residential. Incompatible residential uses included some single-family residences in APZ I and a portion of the Kristie Manor apartment complex to the northwest of the Base.

4.5.2.f Summary of 2006 AICUZ Study and Existing Land Uses

The AICUZ Study's land use guidelines do not recommend residential uses within the CZ or APZ I and recommend only single-family detached units at a density of one to two dwelling units per acre in APZ II. Existing residential areas are predominantly platted and zoned for a minimum of 6,000 square foot lots at a density in excess of two dwelling units per acre. Section VII of this report recommends standards for ensuring future low density residential, commercial and industrial development within the AICUZ APZs.

4.5.2.g Summary of 2006 AICUZ Study and Future Land Uses

The developed areas within Midwest City and Del City are expected to maintain their mixture of residential, commercial, and public uses. Any development in these areas is likely to consist of infill and redevelopment. Consequently, future land use patterns north and northwest of the installation will reflect existing land use patterns. Continued commercial development is anticipated to occur along the major corridors of I-40, SE 15th Street, SE 29th Street, Air Depot Boulevard, and Midwest Boulevard. Areas within the AICUZ accident or noise zones should be developed in accordance with the AICUZ guidelines on land use compatibility. An 82-acre commercial center along SE 29th Street, between Air Depot and Midwest Boulevards, in Midwest City, is under development and is not located within an APZ or noise contour. This new retail area will offer over 600,000 square feet of building space.



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

4.6 General Effects of Incompatible Land Uses

Incompatible land uses are regarded as those whose cumulative impact puts pressure on military installations and the surrounding communities. The result is increasing environmental controls, 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. DoD requires continued, unobstructed access to those 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 jurisdictions.



Incompatible land uses inside the APZ

Two schools are shown inside this APZ II. Schools, along with other public facilities, are considered incompatible land uses by the DoD. (Source: Google Earth.)

At the same time, military training and testing activities can impose 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 jurisdictions.



Inappropriate land development pressures boil down to a competition for scarce resources. Resources such as land continue to diminish in availability, financial resources of state and local governments will always be limited. Regulatory environments continue to be more stringent. 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, air space congestion and competition, and endangered species and wildlife habitat.

At the moment, depleting availability of land and the increasing urbanization, growth and development surrounding military facilities is the primary short term focus. Understanding of state and local executive jurisdiction and coordination across the broad spectrum of state and local agencies is critical. Solutions need not entirely restrict the use of resources; rather they must ensure “compatible” use. Most importantly, however, solutions must be proactive in order to prevent development problems before they occur.

Depending upon whether the potential impact relates to noise or safety, different actions are available to address incompatibility. This study provides information for each community to use to examine their compatibility with the surrounding environs and work with the State and Tinker AFB to eliminate encroachments. See Appendix G for the State of Oklahoma law that addresses these matters.

4.6.1 Incompatible Land Uses

Identified in the 2006 AICUZ Study are compatible land uses for both noise and accident potential as shown in Table 4.3. Many of the incompatible uses have a higher density than is currently recommended by the Air Force.

It should be noted that the addition of an APZ II to the Crosswind Runway in the 2006 AICUZ Study rendered many existing land uses incompatible. The U.S. Air Force recognizes this and considers all pre-existing land uses to be grandfathered, as stated in the following excerpt from the AICUZ Study:



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

“Tinker AFB has included the Runway 12/30 APZs II in this AICUZ Study with the understanding that existing land uses are grandfathered. While the land uses are incompatible based on new AICUZ land use recommendations, Tinker AFB does not expect or request structures be removed. For all intents and purposes, the land uses are considered pre-existing conditions. This recommended APZ II criteria is intended to apply to new development/future redevelopments only.”

Source: 2006 AICUZ Study

Existing multifamily, townhouse and duplex development became incompatible uses as a result of applying APZ II to the Crosswind Runway due to the concentration of people in a relatively small area.

4.7 2006 AICUZ Recommendations

Noise measurement techniques for the 2006 AICUZ Study are based on recent technology. Data from this study should be considered for incorporation into existing land use plans and ordinances of surrounding communities, and as a basis for decisions on future land development applications.

APZ I, although not as significant as the CZ, possesses a risk factor. This 3,000 foot by 5,000 foot area has land use compatibility guidelines which are sufficiently flexible to allow reasonable economic use of the land, such as industrial/manufacturing, transportation, communication/utilities, wholesale trade, open space, recreation, and agriculture. However, uses that concentrate people are not recommended (pg. A-7 of the 2006 AICUZ Appendices).

The APZ IIs risk factor is less than APZ I, but still possesses potential for accidents. APZ II is 3,000 feet wide and 7,000 feet long extending to 15,000 feet from the runway threshold. Acceptable uses include those of APZ I, as well as low density single-family residential and personal and business services and commercial/retail trade uses of low intensity or scale of operation. High density functions such as multistory buildings, places of assembly (theaters, churches, schools, restaurants, etc.), and high density office uses are not considered appropriate (pg. A-7 of the 2006 AICUZ Appendices).



Synopsis of the 2006 AICUZ recommendations are as follows:

- Continue to incorporate AICUZ policies and guidelines into the comprehensive plans of Oklahoma County and the cities of Oklahoma City, Midwest City, Del City and Spencer.
- Use overlay maps of the AICUZ noise contours, APZs, and Air Force Land Use Compatibility Guidelines to evaluate existing and future land use proposals
- Modify existing zoning ordinances and subdivision regulations to support the compatible land uses outlined in this study
- Modify building codes to ensure new construction within the AICUZ noise contours has the recommended noise level reductions incorporated into its design and construction
- Implement height and obstruction ordinances which reflect current Air Force and FAR Part 77 requirements
- Keep Tinker AFB apprised of any development near the Base that may impact its missions
- Continue to inform Tinker AFB of planning and zoning actions that have the potential of affecting Base operations
- Support the Tinker JLUS to protect the Base from encroachment

It is recognized that the public must be protected from noise and other hazards of air base operations. At the same time it is recognized that lands near air bases often are highly attractive areas for development. Aircraft operations are likely to continue from Tinker AFB for the indefinite future. The types of aircraft, flight tracks, frequency, and other characteristics will be continuously evaluated by Tinker AFB to determine the effects on the community.



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

SECTION V Compatibility Factors



Lake Stanley Draper

Some tracts of land close to Tinker AFB remain undeveloped.

Source: Picture submitted to www.outdoorsok.com by Ellis Evans.



5.1 Acronyms and Abbreviations

ACOG	Association of Central Oklahoma Governments
AE	Airport Environs
AeroEOC	Aerospace Eastern Oklahoma County
AFB	Air Force Base
AFGP	Air Force General Plan
AICUZ	Air Installation Compatible Use Zone
APZ	Accident Potential Zone
CZ	Clear Zone
CRP	Community Relations Plan
dB	decibel
dBA	A-weighted sound level measured in decibels
DNL	Day-Night Average A-Weighted Sound Level
DoD	U.S. Department of Defense
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FAR	Floor Area Ratio
IBC	International Building Code
IRP	Installation Restoration Program
JLUS	Joint Land Use Study
MAP	Management Action Plan
MROTC	Maintenance Repair and Overhaul Technology Center
NLR	Noise Level Reduction



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

OC-ALC	Oklahoma City Air Logistics Center
OCARTS	Oklahoma City Area Regional Transportation Study
ODOT	Oklahoma Department of Transportation
PUD	Planned Unit Development
SLUCM	Standard Land Use Coding Manual
SQSS	Southwest Quadrant Stabilization System
TDR	Transfer of Development Rights
the Base	Tinker AFB

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Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

5.2 History of Land Use Compatibility Planning

Planners at Tinker Air Force Base (AFB) have developed and nurtured a responsible, proactive and cooperative environment with residents and community planners of the surrounding local governments. These local governments are actively involved with and belong to the Association of Central Oklahoma Governments (ACOG). ACOG provides support and facilitates understanding in planning practices and fosters an atmosphere of cooperation in the coordination of sound and responsible regional planning and development.

Adjacent communities have worked with the AFB to identify potential and real land use conflicts that may have an adverse effect on the Base's mission. An example of this identification process is the fate of the former Glenwood residential subdivision built in the northern Accident Potential Zone (APZ) I. In 1973, a large portion of the subdivision, comprising 262 acres north of the Base in Midwest City, was purchased by Oklahoma County and leased back to the AFB. The land, located in the northern APZ I, was cleared of approximately 836 houses and remains undeveloped.

Subsequently, in 1986, the county purchased 29 acres in an APZ I area to prevent development of a shopping center, and Oklahoma County bond funds were used in 2002 to acquire and demolish additional properties in the northern Clear Zone (CZ) and APZ I area of the main runway.

In like manner, Midwest City and Del City have diligently worked to preserve and protect the APZ I. The land acquisitions by Oklahoma County are illustrated in Figure 5.1. For more information about actions by Oklahoma County and these two cities, please refer to Sections 1.4, 1.5 and 1.6.



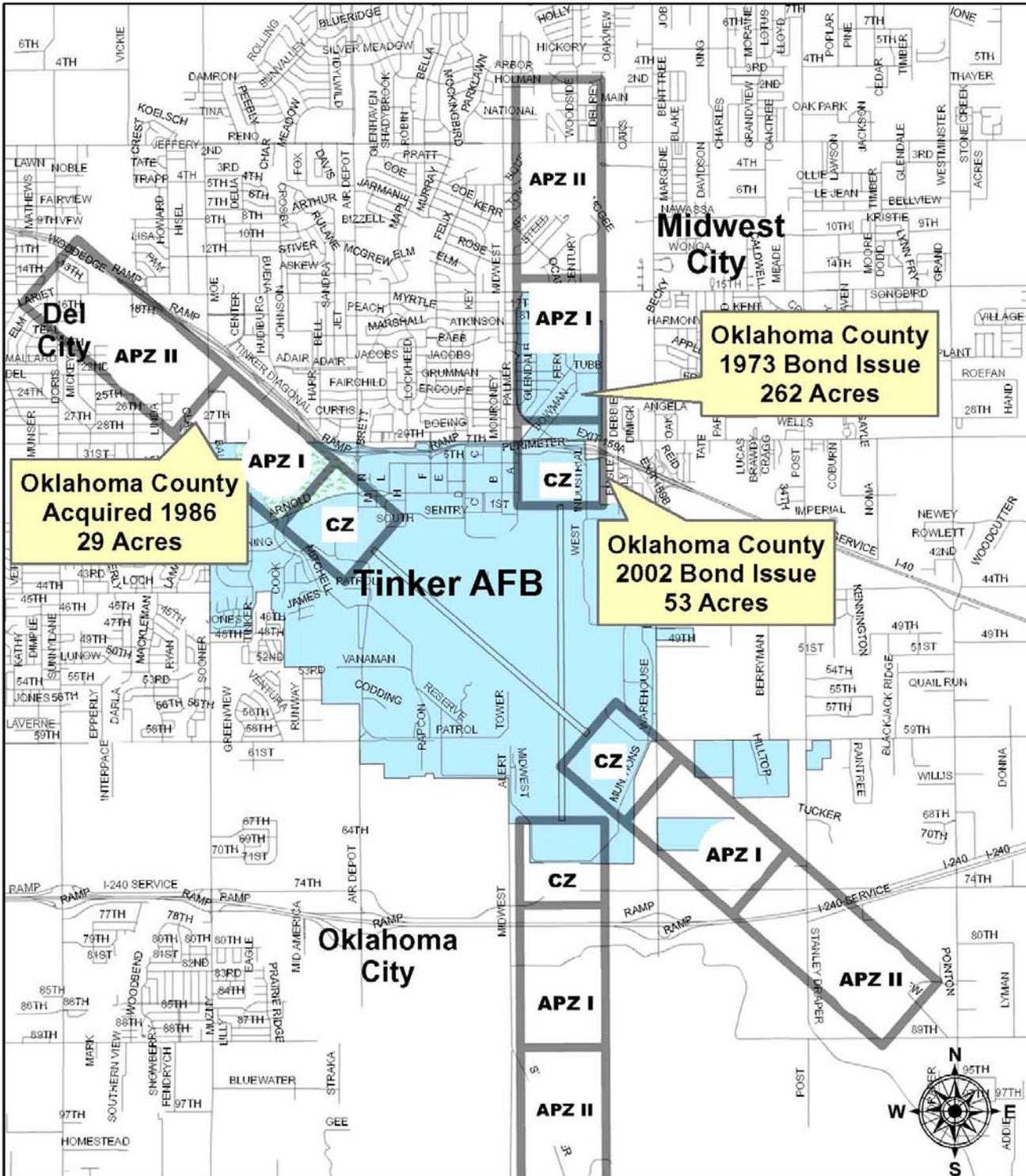
Top-3 Volunteers

Members of the Tinker's Top-3 Organization volunteered with Central Oklahoma Habitat for Humanity to get three houses ready to be dedicated. Habitat for Humanity volunteer coordinator said they could not have stayed on schedule without the Tinker Top-3's efforts. (Courtesy photo)

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Figure 5.1 Community Support - Land Acquisition within CZ and APZ I



Source: Created from Data Received from ACOG and Tinker AFB



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

5.2.1 Tinker AFB General Plan

The Air Force General Plan (AFGP) is the primary document that provides an Air Force installation commander and other military decision makers with a consolidated picture of whether an installation has the physical assets and delivery systems necessary to support its mission. The document provides a general assessment of the installation's infrastructure and resources for the purpose of gauging the installation's development and growth potential.

The Tinker AFB General Plan is a comprehensive master planning document which guides on-base development. It analyzes existing land uses and their functional relationships, makes recommendations for future land use changes, identifies development constraints and opportunities, and gives a focused vision of future development in key areas. In addition to assessing the Base's ability to support its missions, the plan's findings also include a recommendation for Tinker AFB to continue to work with the local governments to implement the recommendations contained within this Joint Land Use Study (JLUS).

5.2.2 Management Action Plan and Community Relations Plan

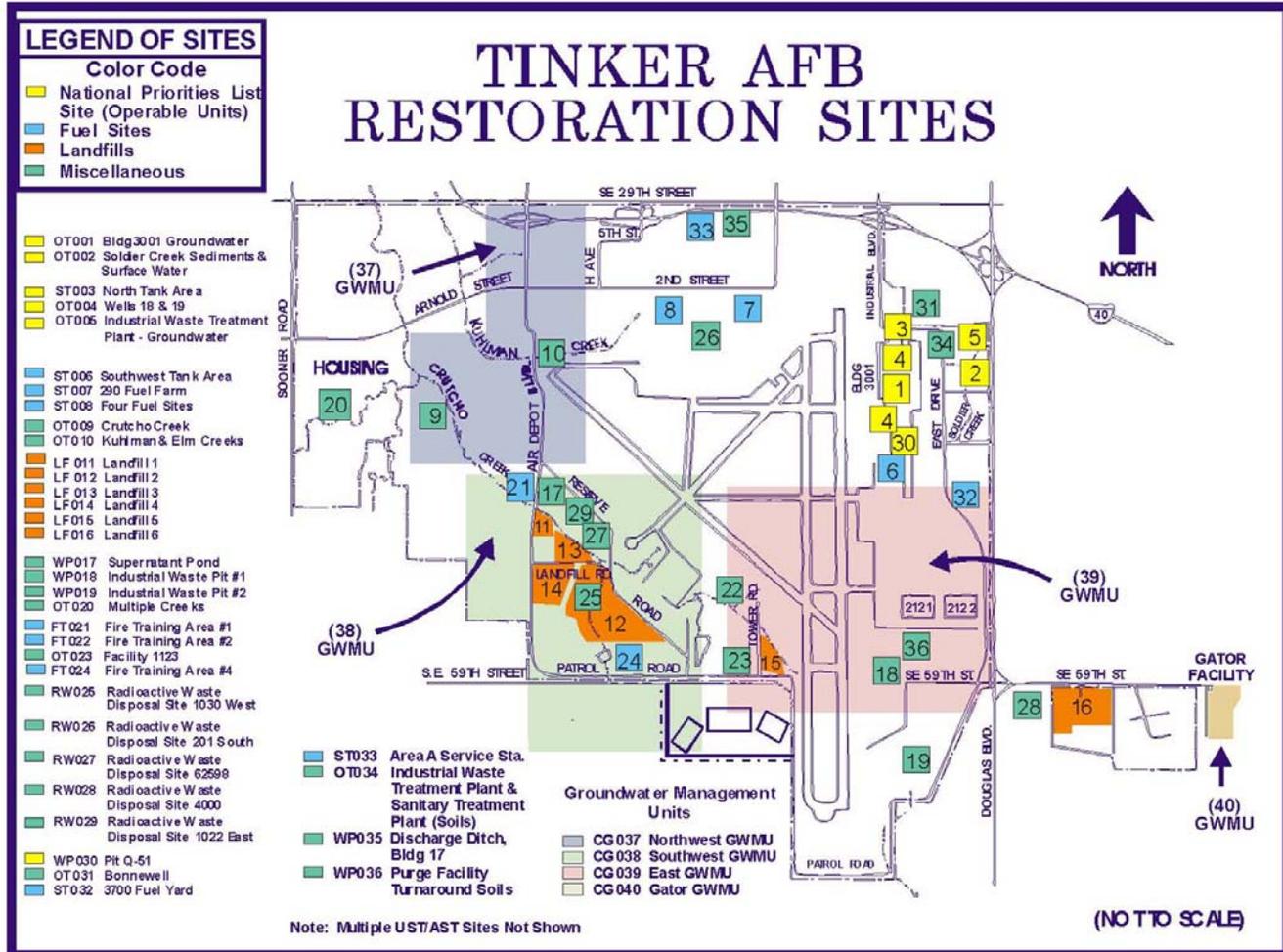
From an initial plan size of 960 acres in 1941, Tinker has grown to 5,020 acres with approximately 15.5 million square feet of floor space in over 700 buildings, 136 acres of indoor maintenance area, and 254 acres of ramp area. The Base serves as a repair depot for a variety of aircraft, weapons, and engines. Repair activities require the use of hazardous materials and result in generation of hazardous wastes including solvents, paint strippers, various industrial wastewaters, and sludges.

The Base properties, situated within the North Canadian River drainage basin, drain into the Crutcho and Soldier Creeks and overlay a complex aquifer system that includes the Garber-Wellington Formation. The Southwest Quadrant Stabilization System (SQSS) area includes two landfills that were used sporadically over a 40-year span for the disposal of household and industrial wastes, including paints and solvents. Starting in the mid-1980s, remediation work has been performed at 40 locations on the Base such as landfills, waste pits, fire training areas, and spill sites.

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Figure 5.2 Tinker AFB Restoration Sites



Source: 2004 Tinker AFB Management Action Plan (MAP)

This Management Action Plan (MAP) was created in order to integrate and coordinate the environmental remediation and cleanup activities required at Tinker AFB. The MAP summarizes the status of the restoration efforts and identifies specific program issues to enhance remediation strategies. Actions taken to date have included contaminated soil removals, landfill caps, and pump and treat systems.

Along with the MAP, the Community Relations Plan (CRP) was also created. The purpose of the CRP was to inform effectively interested citizens about the ways in which they may participate in the restoration process. This CRP was designed as a planned approach to establishing and maintaining two-way communications between the Base and the surrounding communities during what are often lengthy and complex processes.



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An interactive communication process enables the community and those implementing the Installation Restoration Program (IRP) at the Base to convey information to each other. It is designed to provide responses to questions and concerns and formulate more responsive actions. Thus, community relations activities benefit both local citizens and the Base by providing all interested parties with insight and first-hand information on the continuing IRP efforts.

The CRP defines a dynamic program covering all stages of corrective action, including the investigation, planning, and implementation phases which are responsive to technical developments and the concerns of the public. It maps out a recommended course of action that Tinker AFB environmental planning staff should implement to facilitate public involvement. It is important, when changes in land use or land use controls are being considered either on or off the installation, that the installation and the surrounding communities be informed and given the opportunity to comment on any resulting impacts on training capabilities or quality-of-life issues respectively. The CRP states that review of permit applications, issuance of permits and administrative orders, permit modifications, implementation of corrective action programs, and approval of closure plans are activities that should require varying degrees of public involvement with opportunities for all voices to be heard.

5.3 Aerospace Eastern Oklahoma County

Aerospace Eastern Oklahoma County (AeroEOC) is a regional partnership created to brand, promote, and grow the considerable Maintenance, Repair and Overhaul (MRO) and aerospace assets located in Eastern Oklahoma County, especially in and around Tinker AFB and its Oklahoma City Air Logistics Center (OC-ALC). AeroEOC was formed in 2005 by a group of business, military and government leaders with the unified goal of preserving Tinker AFB.

AeroEOC believes additional influences and processes have the potential to significantly impact and increase the MRO and Aerospace businesses located in and around Tinker AFB in Eastern Oklahoma County.

AeroEOC seeks global recognition and valued brand identity for Eastern Oklahoma County's MRO and aerospace assets through greater collaboration/synergy among existing AeroEOC organizations. Retention and growth of business opportunities and recruitment and development of new aerospace and MRO related businesses are included in its goals.

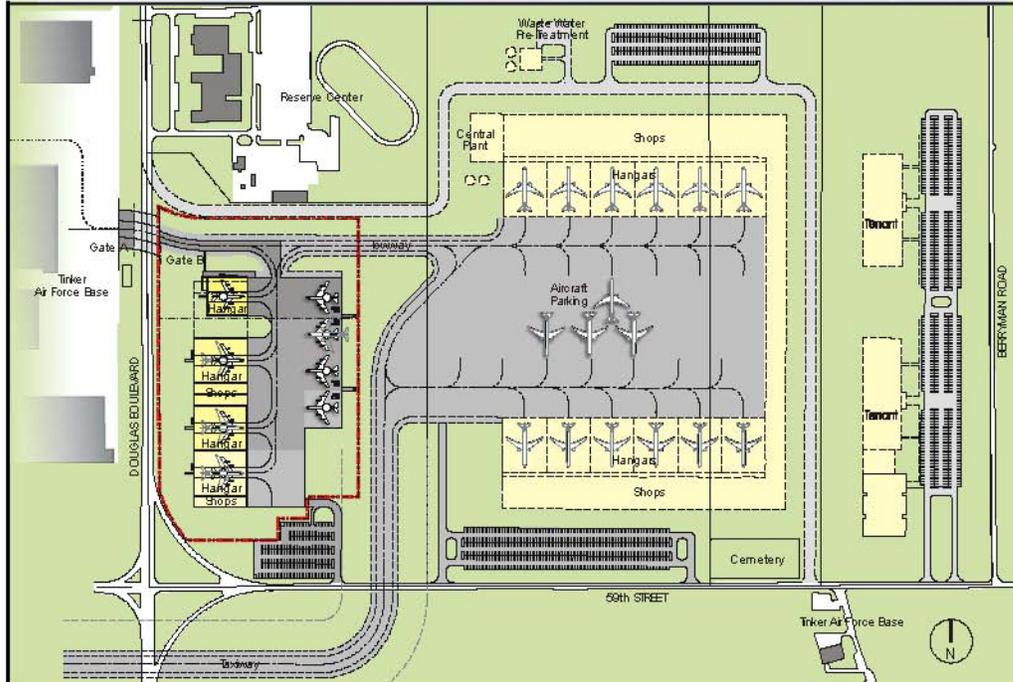
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AeroEOC Milestones

- Tinker 2010 Executive Committee selected Battelle to develop the master plan and business strategy for the MROTC
- Battelle, with community and industry leaders, briefed Air Force Asst. Secretary and Materiel Command on concept and vision
- Oklahoma Industries Authority (OIA) placed Battelle OK on contract to develop, build, lease, operate and manage the MROTC
- Tinker signed a memo stating AF interest in the MROTC and approval of license to construct towway segment on Tinker
- Oklahoma City, Oklahoma County, and The State of Oklahoma agreed to assist in towway construction

Figure 5.3 Oklahoma MROTC Master Plan — Full Development



Source: http://www.aeroeoc.com/pdf/MRO_web.pdf



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5.4 General Compatibility and Comprehensive Plans

The purpose of a Comprehensive Plan is to identify goals, objectives and the policies necessary to achieve them. Goals and policies are meaningless unless there is concurrence on and commitment to the methods to be used toward their achievement. These plans serve to identify major implementation needs and to document the techniques which can be used to implement them. The implementation methods include four broad approaches: (1) regulation of real estate development; (2) construction improvement programs; (3) fiscal assessment and implications of needed improvements and services; and (4) execution of the various processes and procedures necessary for the jurisdiction's planning, development, and operational functions. These approaches are intertwined.

A Comprehensive Plan has been adopted and utilized by most of the communities within the JLUS study area with the exception of Nicoma Park, Spencer and Cleveland County. [Choctaw has a General Plan but it was not assessed as a part of the JLUS due to its distance from Tinker AFB.]

All local governments within the JLUS study area should consider adoption of a comprehensive or general plan to facilitate long term encroachment mitigation strategies.

5.5 General Compatibility and Zoning

A zoning ordinance sets forth what can be done and delineates the development constraints, while the Comprehensive Plan provides general direction for the future of the community. Even though a zoning ordinance is designed to implement the information in a Comprehensive Plan, the zoning ordinance and the plan are not likely to remain identical.

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



5.6 Del City Comprehensive Plan Evaluation

The existing Del City Comprehensive Plan for 1985-2005 does not address the 1976 Air Installation Compatible Use Zone (AICUZ) Study completed for Tinker AFB nor has the plan been amended to include more recent AICUZ updates. However, Del City has been using Interim Development Regulations for parcels within the new Accident Potential Zone II of Runway 12/30 of Tinker Air Force Base to evaluate land use plans being presented by developers. Updates to this municipality's Comprehensive Plan are now being formulated and should be finalized upon completion of this JLUS. Del City desires to incorporate JLUS recommendations contained herein into its new Comprehensive Plan. Del City supports land use planning efforts of the AICUZ Study and recommends that the city: continue to incorporate AICUZ policies and guidelines as necessary, modify ordinances to support AICUZ as deemed necessary, modify building codes to support AICUZ as deemed necessary and implement height and obstruction ordinances.

5.6.1 Del City Zoning Ordinance Evaluation

Del City utilizes a conventional Zoning Ordinance, which was amended in October 2005, to incorporate an airport overlay district under Section 430 of the Del City Zoning Code. Under this section, development within APZ I and APZ II is more closely monitored. The Zoning Ordinance addresses densities of residential development as well as non-residential intensities within these zones.

Based on the 2006 AICUZ Study and the expectations of land use recommendations coming forth from the 2008 JLUS, Del City made the decision to adopt on Nov. 19, 2007, interim development regulations to guide development activities on a short-term basis. The interim development regulations represent the City's best effort to regulate development within the APZ II zone of the crosswind runway (Runway 12/30) in such a manner as to restrict the establishment and growth of uses and structures that could create an encroachment on Tinker AFB.



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5.6.2 Del City and Runway 12/30 APZ II

Table 4.3 of this JLUS (Table 4.3 of the 2006 AICUZ Study) suggests that retail trade-general merchandise and retail uses generally are compatible within APZ II. However, footnote 2 states: *“Within each land use category, uses exist where further definition may be needed due to the variation of densities in people and structures. Shopping malls and shopping centers are considered incompatible in any Accident Potential Zone (CZ, APZ I, or APZ II).”*

The Merriam Webster On-Line Dictionary defines:

Shopping Center: a group of retail stores and service establishments usually with ample parking facilities and usually designed to serve a community or neighborhood.

Del City has plans for retail trade-general merchandise to be constructed at the southwest corner of the intersection of I-40 and Sooner Road. This location is within the boundaries of APZ II of Runway 12/30. No APZ II has ever existed over Del City prior to the 2006 AICUZ Study for Tinker AFB. It is noted that the Del City development was well underway prior to the 2006 AICUZ Study being published and Del City considers it a pre-existing condition.



5.7 Midwest City Comprehensive Plan Evaluation

According to information obtained from Midwest City staff, the City is currently in the process of preparing a new Comprehensive Plan that will replace the 1985 Plan. Though not completed at the time this JLUS report was prepared, a draft of the new Comprehensive Plan was available for review. Similar to the 1985 Plan, the 2008 Comprehensive Plan contains many references to Tinker Air Force Base. The Land Use Plan map reflects the AICUZ for both runways. Among other recommendations, the draft Plan contains the following narrative:

“Midwest City supports land use planning efforts of the AICUZ Study and recommends that the City:

- *Continue to incorporate AICUZ policies and guidelines into the comprehensive plan;*
- *Modify ordinances to support AICUZ study, as deemed necessary;*
- *Modify building codes to support AICUZ study, as deemed necessary;*
- *Implement height and obstruction ordinances;*
- *Keep Tinker AFB apprised of any adjacent development;*
- *Inform Tinker AFB of planning and zoning decisions that have potential of affecting base operations;*
- *Support the Joint Land Use Study (JLUS) for the Tinker AFB area to protect the area from encroachment.”*

It is expected that the 2008 Comprehensive Plan will contain further recommendations stemming from the JLUS report or some form of an addendum to the 2008 Plan will occur after completion of the JLUS effort.



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

5.7.1 Midwest City Zoning Code Evaluation

Appendix B of the existing Code of Ordinances for Midwest City addresses the APZ I and the CZs for Runways 12/30 and 17/35. Airport Environs Zones for APZ I and the CZs have been adopted as follows:

“Accident potential zone is based on past Air Force aircraft accidents and installation operational data. It is less critical than the clear zone but still possesses a significant risk factor. For Runway 12/30, this zone is an area beginning at the end of the clear zone and is three thousand (3,000) feet in width and five thousand (5,000) feet in length. For Runway 17/35, this zone is an area beginning at the end of the clear zone...

Clear zone is established for each runway. For Runway 12/30 the clear zone has a width of two thousand (2,000) feet and a length of three thousand (3,000) feet beginning at the end of the runway. The clear zone for Runway 17/35 begins at the end of the runway and is an area of land lying in the South Half of Section 11, Township 11 North, Range 2 West and the North Half of Section 14, Township 11 North, Range 2 West.”

The Zoning Ordinance addresses densities of residential and nonresidential development within these zones. Various requirements of the Airport Zoning codes, also known as the Tinker AFB Zoning Ordinance, can be found in several other sections of the city’s code of ordinances, including the city’s sign regulations, manufactured homes regulations, and building regulations. Development within APZ II is not addressed.

Although Tinker AFB has its own “zoning ordinance” within Midwest City’s Airport Zoning codes, these regulations are based on data from 1983, with the most recent amendment in 1993.

Today, these zones should be redesigned with the APZ zones as delineated in the 2006 AICUZ Study to reflect a width of 3,000 feet for the Clear Zone. The proposed zoning districts should similarly regulate uses, lot coverage, density, setbacks, building heights, etc. and should have a direct relationship to Midwest City’s Comprehensive Plan.



Midwest City
Oklahoma Welcome Center
Source: www.midwestcityok.org



5.7.2 Midwest City APZ I Boundary for Runway 17/35

Midwest City's legal description of APZ I [Section 4. Definitions. 1. Accident Potential Zone, Appendix B Airport Zoning-Midwest City] is inconsistent with the definition described in the AICUZ Study. Midwest City should amend its legal description of APZ I to be consistent with the description from the AICUZ. [Midwest City describes the Runway 17/35 APZ as 4,450 feet long as compared to the AICUZ length of 5,000 feet].

Note, there is no dimension of 5,000 feet in this description from the the Midwest City Zoning Ordinance. The ordinance states that it only goes to 15th Street. Runway 17/35 APZ I is described as follows:

“Commencing at the Southeast Corner of the Southwest Quarter of Section 11, Township 11 North, Range 2 West, thence east along the south line of said section a distance of seven hundred fifty-six and seventy-nine one-hundredths (756.79) feet; thence north and parallel to the east line of said section a distance of seven hundred seventy (770) feet to the true point of beginning; thence continuing north and parallel to the east line of said section a distance of four thousand four hundred fifty (4,450) feet to a point on the south right-of-way line of S.E. 15th Street; thence west along the south right-of-way line of S.E. 15th Street a distance of three thousand (3,000) feet; thence south and parallel to the west line of said section a distance of three thousand eight hundred seventy (3,870) feet to a point being the intersection of the easterly right-of-way of Palmer Drive and the center line of the right-of-way of Ercoupe Court; thence southeasterly along the eastern right-of-way of Palmer Drive to a point which is seven hundred seventy (770) feet north of the south line of said section and seven hundred twenty-one and seventy-nine one hundredths (721.79) feet east of the west line of said section; thence east and parallel to the south line of said section a distance of two thousand six hundred seventy-five (2,675) feet to the point of beginning.”



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

From the 2006 AICUZ Study for Tinker AFB:

4.6.2 Clear Zones and Accident Potential Zones

*“Figure 4.5 depicts the CZs and APZs for Runways 17/35 and 12/30 at Tinker AFB. Each end of each runway has a 3,000 foot by 3,000 foot CZ, a 3,000 foot by 5,000 foot APZ I, and a 3,000 foot by 7,000 foot APZ II. Accident potential on or adjacent to the runway or within the CZ is so high that the necessary land use restrictions would prohibit reasonable economic use of land. As stated previously, **it is Air Force policy to request that Congress authorize and appropriate funds to purchase the real property interests in this area to prevent incompatible land uses.**”*

Midwest City considers existing land uses in APZ II for Runway 17/35 and the extended APZ I for Runway 17/35 pre-existing conditions that should be grandfathered as incompatible uses. Midwest City intends to allow these uses to continue.

Midwest City will not permit the following:

- New uses that could cause a release of steam, dust, smoke, or any other substance that could impair visibility or otherwise interfere with the operation of aircraft are prohibited. Normal discharges of steam or smoke associated with heating and cooling or preparation of food are excluded from this prohibition.
- New uses that could cause light emissions, such as spotlights or laser projections, that could interfere with pilot vision are prohibited.
- New uses that could cause electrical emissions, such as transmission towers or broadcasting facilities, that could interfere with aircraft communication systems or navigational equipment are prohibited.
- New uses that could attract wildlife capable of creating a hazard to navigation, such as landfills or food processing facilities, are not permitted. Additionally, stormwater conveyance, detention, and retention facilities (including created wetlands), located within the APZ-II zone for Runway 12/30, Tinker Air Force Base, should be designed so as to minimize the attraction of hazardous wildlife, and when possible should conform to the advisory guidance provided for in Federal Aviation Advisory Circular AC 150/5200-33B: Hazardous Wildlife Attractants on or Near Airports.



Midwest City will require aviation easements in the extended APZ I and APZ II at the time of building permit.

Midwest City believes that change to the incompatible uses in APZ I and APZ II should be permitted provided the new use is of similar intensity based on the 2006 AICUZ Study land use table guidelines. Nonconforming uses may be expanded in accordance with the adopted zoning ordinance.

5.7.3 Tinker Business and Industrial Park

Tinker Business and Industrial Park (TBIP) is an example of how a dynamic military installation and adjacent communities work together to develop employment and service centers. However, as development continues to put pressure on installations, comprehensive studies can result in more stringent recommendations. Such is the case with the 2006 AICUZ Study which identifies the TBIP as an incompatible land use within APZ I. The Midwest City Airport Zoning ordinance, No. 1832 adopted in 1983 and subsequently amended, had established business parks as compatible land uses in APZ I. TBIP was conceived in the mid-1980s, and the zoning for the project was ultimately approved by Midwest City. The existing facilities within TBIP appear to be consistent with the standards established by Midwest City prior to the publication of the 2006 AICUZ Study. Midwest City recommends new development within the current limits of TBIP be permitted provided it is consistent with the approved PUD (PC-1181) for said property.

The available record reflects that there was substantial coordination between TBIP, Tinker Air Force Base and Midwest City in the approval and subsequent development of TBIP as currently constructed. (See Appendix F for additional information regarding the development of TBIP.)

Recommendation:

- New construction within TBIP should be compatible with land uses as discussed in Table 4.3 of this study.



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

5.8 Oklahoma City Comprehensive Plan Evaluation

A review of the OKC Plan, 2000-2020 revealed that the two AICUZ studies completed for Tinker AFB were not referenced. Additionally, the City had not delineated the CZs or the APZs on its future land use map. In December 2004, the City adopted a policy allowing “sector” plans to be adopted as amendments to the Comprehensive Plan.

The Southeast Sector Plan, an amendment to the OKC Plan, 2000-2020, has proposed four distinct land use designations that may affect future development with respect to the Base. The areas south and southwest of Tinker AFB are shown as Urban Growth and Environmental Conservation. West of the Base is shown as Urban Growth development while the areas to the south/southeast, including Lake Stanley Draper, are reserved for conservation. East of Douglas Boulevard is shown as industrial/nonresidential.

5.8.1 Oklahoma City Southeast Sector Plan Evaluation

The City’s Southeast Sector Plan, adopted February 2007, specifically addresses development around Tinker AFB by making the following recommendations:

“Allow for the expansion of Tinker and the expansion of specialized industrial development within a strategic area to:

- promote economic development,*
- sustain continued success of the AFB, and*
- prevent adverse impacts of development.”*

These recommendations were derived, in part, from the recommendations of the 2006 AICUZ Study along with established criteria for achieving compatibility with the military installation.

The six criteria were as follows:

- Land Use Compatibility
- Regulation of Heights and Obstructions
- Maintenance and Reduction of Densities

Defending Oklahoma's Future: Tinker AFB Joint Land Use Study



- Participation of Tinker AFB in the Development Review Process
- Mitigation of Noise Impacts
- Road Access

The intent of the policies in the Southeast Sector Plan is to:

- Require adjacent development to be compatible with the airport related activities
- Limit new construction and redevelopment within the flight path
- Prohibit new development which inhibits safe and efficient airport operations within the APZs
- Prohibit noise sensitive development such as residences, schools, hospitals, etc. which do not provide the required noise attenuation features
- Ensure all building regulations (floor area ratio and height) are promoted to guarantee the continued efficient airport operation to ensure public safety
- Protect the natural areas around Tinker AFB from encroachment
- Work with Tinker AFB to address traffic, infrastructure and residential development needs as expansion occurs and endorse future recommendations from this Joint Land Use Study

Two highways, I-240 and I-40, provide east-west access through the Southeast Sector as part of the federal interstate highway system. The planning, design and construction of these thoroughfares is managed by the Oklahoma Department of Transportation (ODOT). Coordination among local, state and federal governments will be necessary to provide transportation configurations that will improve traffic flow without increasing development around Tinker AFB. Oklahoma City does not favor the creation of an Interstate bypass in the Southeast Sector, primarily because of the potential development that could occur as a result of increased traffic capacity. In addition to potential encroachment issues, if high-density land uses are permitted along major thoroughfares, traffic counts could increase to levels that would create security risks for Tinker AFB. The Southeast Sector Plan's recommended policies and actions regarding land development (Chapter 3) and infrastructure (Chapter 4) appear to be the planning tool that could be used to:



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

- Ensure that new development will not obstruct military aircraft operations
- Ensure that a Tinker AFB representative will be included in the review of all rezonings and plan amendments within the APZs
- Promote compatible development within APZs through maintenance of reduced densities
- Ensure that the City will continue to review impacts of development, their visibility characteristics, and penetration of airspace within approach zones
- Prohibit construction of communication towers and antennas in APZ's
- Protect all access roads to and from the Base, from private interest road closures

This zoning code should be modified to include the identification of all APZs and CZs as identified in the 2006 AICUZ Study and detailed descriptions of land uses and associated densities permitted in each of these zones.

The Southeast Sector Plan recommends that a transportation study be conducted related to the possible closure of a portion of Douglas Boulevard adjacent to the Maintenance Repair and Overhaul Technology Center (MROTC). As the MROTC becomes fully developed, there may be a need for the permanent closure of part of Douglas to replace the current practice of taxiing aircraft between the base and the MROTC during low traffic periods. Oklahoma City, in partnership with the Oklahoma Department of Transportation, is expected to address capacity issues of I-40 at Air Depot Boulevard eastward as well as those related to other nearby section line roads. Improvements in ramps, overpasses and interchanges along I-40 and I-240 will also be considered.



5.8.2 Oklahoma City Zoning Code Evaluation

Chapter 59, Article XIII of the existing Zoning Ordinance for Oklahoma City addresses the JLUS study area the same as any other area in the city. The delineation of the APZs on the Future Land Use Plan map and incorporation of policies into the Comprehensive Land Use Plan Have been implemented by the existing zoning code. The 2007 Airport Environs (AE) Zones have been adopted as follows:

“A. Airport Environs Zone One (AE-1) The Airport Environs Zone One (AE-1) shall be governed by the following regulations:

- (1) Certain land uses, such as agricultural, airport property and related uses, industrial uses, wholesale and retail commercial uses, and areas zoned for open space or recreational uses, are deemed compatible, and therefore shall be exempted from the provisions of Division 4 of Article II of Chapter 12 of the Oklahoma City Municipal Code.
- (2) Other uses allowed within the AE-1 Zone shall meet or exceed building code requirements for a minimum noise level reduction of thirty (30) decibels inside the structure as set forth in Division 4 of Article II of Chapter 12 of the Oklahoma City Municipal Code.
- (3) All uses allowed within this zone shall grant an avigation easement right as a condition of subdivision or building permit approval, except as otherwise provided herein. Said avigation easement right shall be granted to the Oklahoma City Airport Trust for uses within the AE-1 Zones for Will Rogers World Airport, Wiley Post Airport and Clarence E. Page Airport.
- (4) Single-family or two-family residential uses, institutional uses such as schools, community centers, churches, etc., are prohibited in this zone.



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

B. Airport Environs Zone Two (AE-2) Airport Environs Zone Two (AE-2) shall be governed by the following regulations:

(1) Certain land uses, such as agricultural, airport property and related uses, industrial uses, wholesale and retail commercial uses, and areas zoned for open space and recreational uses, are deemed compatible, and therefore shall be exempted from the provisions of Division 4 of Article II of Chapter 12 of the Oklahoma City Municipal Code.

(2) Other uses allowed within this zone shall meet or exceed building requirements for a minimum noise level reduction of twenty-five (25) decibels, inside the structure as set forth in Division 4 of Article II of Chapter 12 of the Oklahoma City Municipal Code.

(3) All uses allowed within this zone shall grant an aviation easement right to the Oklahoma City Airport Trust as a condition of subdivision or building permit approval, except as otherwise provided. Said aviation easement right shall be granted to the Oklahoma City Airport Trust for uses within the AE-2 Zones for Will Rogers World Airport, Wiley Post Airport and Clarence E. Page Airport.

C. Aviation easements submitted pursuant to the terms of this section shall conform to the provisions contained within the Oklahoma City Airports Model Aviation Easement, a copy of which shall remain on file in the Office of the City Clerk.”

The AE (1) and AE (2) sections apply to all lands surrounding all airports, including Tinker AFB. None of the airports within the city limits have a specific Comprehensive Land Use Plan category.

Section 59-13150. Airport Zoning Overlay Districts pertains to all airports, including Tinker AFB. According to the code, the intent of this section is:

(1) To prevent the occurrence of airport hazards.



(2) To protect the long-term utility of airports and the public investment involved therein.

(3) To restore or enhance the public health, safety and welfare of residents living around airports.

Subsection 13150.7 includes specific regulations for Tinker AFB proper. These regulations, based on Tinker's zoning map data from 1960, deal primarily with height restrictions. There are no references to the APZs or CZs, associated densities, or uses permitted or prohibited. Furthermore, subsection 13150.10 pertaining to building permits states that variances from Airport Zoning Overlay Districts requirements are permitted through the Board of Adjustment, provided copies of all notices required by the Federal Aviation Administration under Federal Aviation Regulation Part 77, and copies of all Federal Aviation Administration action taken pursuant to the case are included in the variance request.

5.8.3 Oklahoma City Area Regional Transportation Study

The Association of Central Oklahoma Governments (ACOG) has developed the 2030 Oklahoma City Area Regional Transportation Study (OCARTS) Plan. This plan calls for the improvement of nearly 540 miles of streets and highways in the regional network to accommodate increased demand, which is anticipated to grow 53 percent between 2000 and 2030.



Significant projects include the following:

- Widening of US-77, from Etowah Road (S. 329th) to Purcell east city limits
- Widening of Covell Road (N. 206th), from Pennsylvania Avenue to Western Avenue
- Widening of I-35, from I-44 to N. 23rd Street
- Widening of I-240, from I-35 to I-40



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

- Widening of I-44, from I-240 to SH-37
- Construction/relocation of new 10-lane I-40 Crosstown, from Agnew Avenue to I-235
- Reconstruction of interchanges at I-44/I-235 (Broadway Extension) and at I-40/I-35 (Crossroads)
- Widening of Sara Road, from S. 15th Street to S. 74th Street
- Widening of SH-9, from 24th Avenue W. (Eastern Ave.) to Pottawatomie Road
- Widening of I-35, from Waterloo Road (N. 248th) to SH-66
- Widening of I-40, from Choctaw Road to Pottawatomie Road
- Widening of I-35, from SH-9 West Interchange to SH-74/Goldsby Exit
- Widening of SH-74, from Memorial Road (N. 136th) to Waterloo Road (N. 248th)
- Widening of Sooner Road /SH-77H, from I-35 to Classen Avenue /US-77



Projects in the vicinity of Tinker AFB include the widening of I-40 to six lanes east of Tinker AFB, turning Sooner Avenue into a six-lane arterial roadway, and widening I-240 to six lanes. The 2030 OCARTS Plan recommends doubling the miles of bicycle trails/routes throughout the region from nearly 200 miles to over 400 miles by 2030. The OCARTS Plan also adopted the bus and rail transit strategies in the Central Oklahoma Transportation and Parking Authority's (COTPA) long-range plan in terms of developing a system of regional transfer points to increase the frequency and convenience of public transit for the general public, and supporting further study of regional fixed guideway transit.

In recent years, Midwest City added a center turning lane along Douglas Boulevard and Air Depot Boulevard between SE 15th Street and SE 29th Street. Midwest City and the Oklahoma Department of Transportation also reconfigured the interchange at I-40 and F Avenue in 2005 to provide more efficient traffic flow into the new retail district being developed along SE 29th Street. Computer modeling has demonstrated that the queuing of vehicles entering Tinker AFB should not be affected.



**Figure 5.4 2030 OCARTS Plan
Street and Highway Network**

LEGEND

LIMITED ACCESS FACILITIES

<i>COMPLETED PROJECTS AS OF 12-31-2005</i>		<i>PLANNED OR UNDER CONSTRUCTION</i>
	4 LANES	
	5 LANES	
	6 LANES	
	8 LANES	
	10 LANES	

ARTERIALS

<i>COMPLETED PROJECTS AS OF 12-31-2005</i>		<i>PLANNED OR UNDER CONSTRUCTION</i>
	2 LANES	
	3 LANES	
	4 LANES	
	5 LANES	
	6 LANES	

OUTER LOOP STUDY CORRIDOR



The Outer Loop Study final report was completed subsequent to the adoption of the 2030 OCARTS Plan. An environmental impact statement, in conformance with federal guidelines, will be necessary to establish a final alignment within the corridor reflected on this map.

BASE MAP ELEMENTS

	RAIL LINES
	OCARTS BOUNDARY
	COUNTY BOUNDARY
	AIRPORTS
	AMTRAK STATIONS

DISCLAIMER:

This map/data was created and assembled by ACOG for your informational, planning reference and guidance only. None of these materials should be utilized by you or other parties without the benefit of advice and instruction from appropriate professional services. These materials are not verified by a Registered Professional Land Surveyor for the State of Oklahoma and are not intended to be used as such. ACOG makes no warranty, express or implied, related to the accuracy or content of these materials and map/data.



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

Figure 5.4 2030 OCARTS PLAN (cont.)

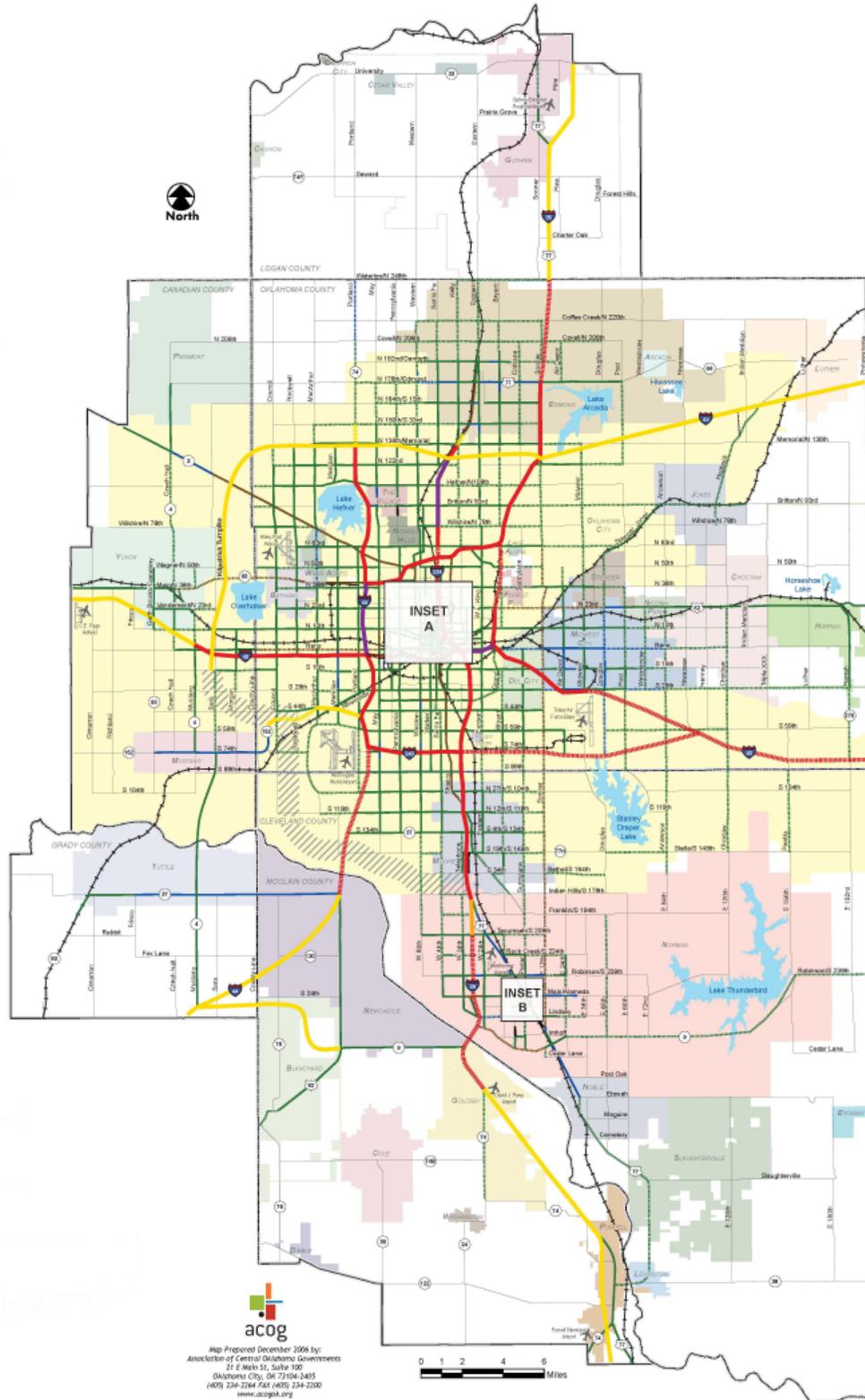
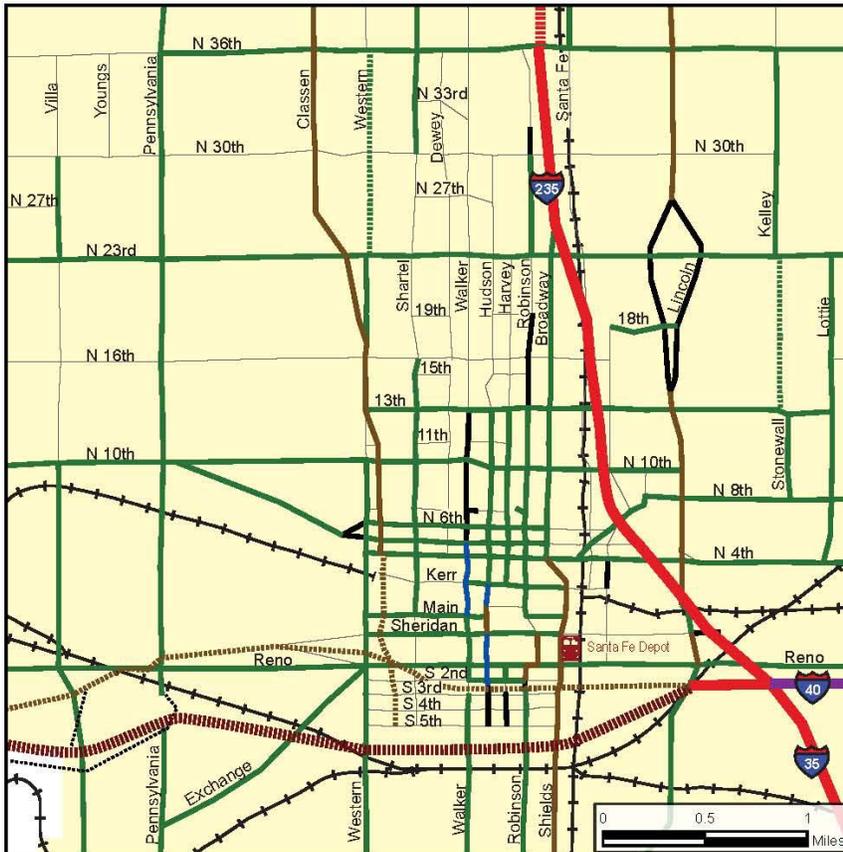


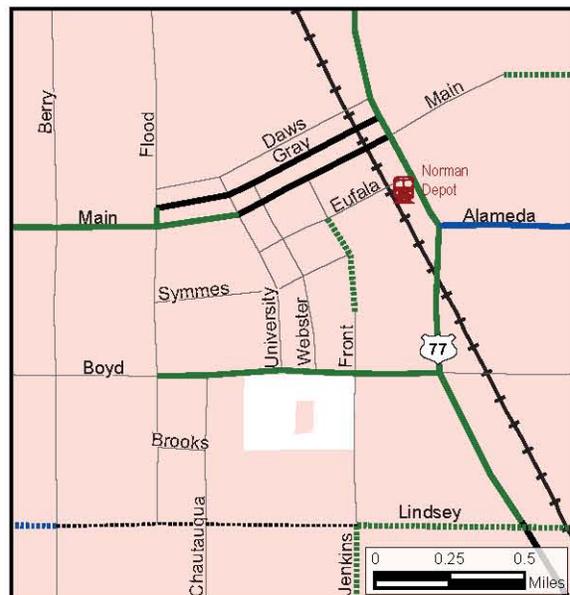


Figure 5.4 2030 OCARTS PLAN (cont.)

INSET A - OKLAHOMA CITY BUSINESS DISTRICT



INSET B - NORMAN BUSINESS DISTRICT





Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

5.9 2007 Oklahoma County Master Plan

Adopted in September 2007, Oklahoma County's Master Plan provides the framework for development through the year 2030. This is the first Comprehensive Plan to be adopted since 1947.

Tinker AFB lies entirely within the boundaries of Oklahoma County. The County owns land that it purchased through a bond issue to protect Tinker AFB. These properties are located within Midwest City and Oklahoma City. The County has no jurisdiction concerning land use decisions on these properties. There is no unincorporated county land that is privately owned within the AICUZ noise contours or APZs.

5.9.1 Oklahoma County Zoning Regulations Evaluation

Existing regulations do not address the 2006 AICUZ Study for Tinker AFB since there is no privately owned unincorporated land within the noise contours or APZs, and the County-owned land is under the jurisdiction of Midwest City, Del City or Oklahoma City. The County has no jurisdiction over land use decisions within the JLUS study area.

5.10 City of Spencer Zoning Regulations Evaluation

Zoning ordinances establish land development standards, that when used appropriately, can contribute to the mitigation of land use compatibility conflicts. Current zoning regulations for the City of Spencer do not prevent development of current and future incompatible uses within the 2006 AICUZ noise contours. Although a relatively small portion of the City of Spencer is affected by the 65 decibel day-night average A-weighted sound level (dB DNL) noise contour, this land use concern could become more critical if activity at Tinker AFB changes/increases.



5.11 Local Government Land Use Strategies

A JLUS is a cooperative land use planning effort between affected local governments and a military installation. The recommendations from a JLUS provide a policy framework to support adoption and implementation of compatible development measures (first identified in the AICUZ Study) designed to prevent urban encroachment, safeguard the military mission, and protect the public health, safety and welfare. Local governments have the authority to implement AICUZ/ JLUS guidelines.

5.11.1 Conservation

Conservation refers to a series of tools designed to eliminate land use incompatibilities 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/silviculture, and conserving open spaces and rural character.

As part of this strategy, local governments in the region would explore partnerships with the U.S. Department of Defense (DoD), the State of Oklahoma, and non-profit conservation entities, such as the Trust for Public Land, The Nature Conservancy, and Land Legacy to secure conservation easements or to purchase development rights from willing sellers of land in proximity to Tinker AFB.

Such an initiative seeks to protect lands primarily through a conservation easement in which a landowner exchanges some of the development potential of a tract for tax 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.



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

5.11.2 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 base operations. Compatible activities generally avoid the concentration of people and have lower sensitivity to noise/vibration, smoke and other possible operational impacts. Local governments implement such guidelines through Comprehensive Plans, zoning ordinances and other legislative tools.

5.11.3 Attenuation

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

Sound attenuation measures required for structures are addressed by the International Building Code (IBC), issue dates 2000, 2003, and 2006. Section 1206.2 of the 2000 IBC; and Section 1207.2 of the 2003 and 2006 IBC require sound transmission classifications of 50 decibels or less from airborne sound for interior environments. Local corrective action may consist of simply upgrading existing local building codes to the latest version of the IBC. **In most cases, compliance with energy code requirements will bring the interior noise levels to an acceptable level, whether for new construction or remodeling.**



Sound attenuation

Energy improvements also reduce sound.
(U.S. Department of Energy)



5.11.4 Disclosure

Disclosure requires the release of information on possible impacts (dust, smoke, noise/vibration, vehicular movements, and air safety zones) to prospective buyers or renters during real estate transactions for properties close to Tinker AFB. Local governments could implement this requirement by adopting a local real estate disclosure ordinance. Disclosure will be discussed in more detail in Section VI of this study.

5.11.5 Infrastructure

As part of implementation of this study, **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 Tinker AFB.** New infrastructure can induce or support incompatible growth patterns, such as high-density residential development, especially if compatible zoning and land use guidelines are not in place.

5.11.6 Coordination

Under this approach, local governments promote collaboration by sharing information on specific community development proposals (rezonings and subdivisions). **The Military also should share information about on-base activity that may increase off-base noise levels or expand noise zones or aircraft operations farther off the installation.**

5.11.7 AICUZ Land Use Guidelines

AICUZ Land Use Guidelines focus specifically on land uses near airfields. They encourage or require land uses that maintain compatibility with safe air space operations, including limiting concentrations of people, as well as properly siting and marking tall structures to protect airspace zones, and meeting the approval of the DoD.



Defending Oklahoma's Future: Tinker AFB Joint Land Use Study

Planners, code enforcement officers and building inspectors should educate local developers and residents on code compliance regulations, methods, and technologies as needed. In regards to land use compatibility with military installations, codes addressing the following areas are especially relevant:

- Excessive garbage or other activities that would attract birds or other animals potentially hazardous to military operations
- Presence of incompatible land uses as per zoning ordinances
- Excessive vegetation or construction of structures exceeding acceptable height or density standards
- Light producing sources above acceptable limits for night navigation or military operations

5.11.8 Clustering and 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. Developers can separate the buildable areas of the parcel from locations 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. Cluster development can:

- Result in the permanent preservation of open space that would not normally be preserved under traditional development
- Encourage creative site planning that is sensitive to the natural characteristics of the land without sacrificing existing, permitted densities
- Provide for economical development and efficient provision of public services
- Minimize road and driveway construction and paving
- Promote aesthetics and other amenities

Defending Oklahoma's Future: Tinker AFB Joint Land Use Study



Cluster development is also referred to as open space zoning, conservation zoning, conservation subdivision, or a type of density transfer. Cluster development may be implemented through the use of a Planned Unit Development (PUD).

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.