# AICUZ

# UPDATE

FOR

## NAS, JRB FORT WORTH
## TEXAS

Southern Division
Naval Facilities Engineering Command

JULY 2002



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# I. INTRODUCTION

## A. PURPOSE AND SCOPE

This update for the Air Installation Compatible Use Zones (AICUZ) Study for Carswell Field, Naval Air Station, Joint Reserve Base (NAS, JRB) Fort Worth, Texas was prepared by private contractor for Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM). The foundation of the AICUZ program is an active local command effort, working with the host community, to prevent incompatible development of land adjacent to military fields. Incompatible land use, which is a form of encroachment, has become detrimental to the mission and operations of many military air installations. The potential for such encroachment is aggravated in built-up, urban areas, those which are rapidly developing, and those with attractive environmental resources in proximity to such military facilities.

This AICUZ update involves several basic steps:

- Quantification of Aircraft Noise Exposure Zones and Accident Potential Zones;
- Development and implementation of a noise reduction strategy for affected land, both on and off-station;
- Preparation of a Compatible Land Use Plan for the installation and surrounding civilian areas;
- Identification of strategies to promote compatible land use development within these areas;
- Analysis of the impact that potential future military missions will have on AICUZ implementation;
- Coordination with federal, state, and local officials to maintain public awareness of AICUZ; and



- Identification and programming of property rights acquisition in critical areas where action to achieve compatibility through AICUZ and local regulatory controls is either impossible or has been attempted and proven unsuccessful.

## B. AUTHORITY AND SUMMARY

Authority for the AICUZ update for NAS, JRB Fort Worth is found in two separate federal references. This document is authorized by:

- Department of Defense (DoD) Instruction 4165.57, *Air Installations Compatible Use Zones*, November 8, 1977.
- Chief of Naval Operations Instruction (OPNAVINST) 11010.36A, *Air Installations Compatible Use Zones (AICUZ) Program*, April 11, 1988.

The previous AICUZ update documented airfield conditions at the former Carswell Air Force Base (AFB), now NAS, JRB Fort Worth, for calendar year (CY) 1986 (NOTE: Unless otherwise specified, “year” refers to calendar year, not

military fiscal year (FY)). This AICUZ study is based upon air operations data for 1997, and examines the projected impacts for CY 2000, including the transition of VF-201 from F-14 Tomcat aircraft to F/A-18 Hornet aircraft.

## C. LOCATION

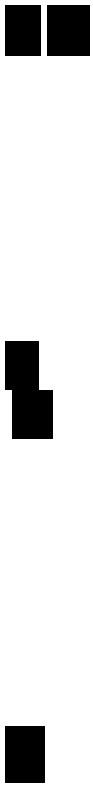
As shown on Figure I-1, Vicinity Map, NAS, JRB Fort Worth is located in northeastern Texas, six miles west of downtown Fort Worth and immediately south of Lake Worth in Tarrant County. The activity lies within the cities of Fort Worth, Westworth Village and White Settlement and is five miles southwest of Merchison Airport.

The area in the vicinity of the Air Station has developed with a suburban character, and is a mix of strip commercial and residential development literally up to the perimeter fence line. Immediately west of the Air Station is Lockheed



FIGUREI-1

SR 58



LEGEND

N

NAS, JRB Fort Worth Lockheed Martin

NAS, JRB Fort Worth AICUZ

0 5,000 10,000

Vicinity Map

SCALE IN FEET

**AIR INSTALLATIONS COMPATIBLE USE ZONES NAS, JRB FORT WORTH, TX**

Martin Air Force Plant No. 4, which is bordered on the west side by the

community of White Settlement.

On the east, the Air Station is bordered by the West Fork of the Trinity River and by State Road (S.R.) 183. Existing suburban residential areas include River Oaks, Westworth Village, Westover Hills, and Fort Worth.

The Station is bounded on the north by Lake Worth, a reservoir operated by the Fort Worth Water Department, and on the south by White Settlement and, farther south, by the community of Benbrook.

**D. MISSION**

NAS, JRB Fort Worth has been previously known as Lake Worth Industrial Airport, Tarrant Field Airdome, Fort Worth Army Airfield, Fort Worth Airfield, Griffiss Air Base and Carswell Air Force Base.

As part of the consolidation efforts of the DoD's 1991 Base Realignment and Closure Commission (BRAC), the decision was made to relocate the 7th Bomb Wing from Carswell AFB. During a 1992 Air Force-wide reorganization, the famed Strategic Air Command was officially disestablished. On October 1, 1993, the Air Force Reserve (AFRES) 301st Fighter Wing assumed base responsibilities, establishing Carswell as an Air Reserve Base.

In 1993, BRAC recommended the relocation of Naval Air Station (NAS) Dallas and its tenant commands to the former Carswell AFB. NAS, JRB Fort Worth was officially established on October 1, 1994 as the first joint-service reserve base, with the Navy acting as the host command. In July and August 1994, additional tenant commands from other closing installations were also directed to relocate to the Air Station, including U.S. Marine Corps Reserve squadrons from Memphis, Tennessee and Glenview, Illinois.

The current mission of NAS, JRB Fort Worth is to provide a high quality training environment for active and reserve components of all branches of the Armed



Services. By carrying out the Goldwater-Nichols Defense Reorganization Act of 1986, the mission is to improve the operability among all four military services and to reduce redundancy and overhead by developing joint doctrine and

operating procedures amongst host and tenant commands in base support and community service programs.

The Station supports the activities of units from other air reserve forces, including the Navy Reserve (VR 59 and VFA 201), Marine Corps Reserve (VMFA 112 and VMGR 234), AFRES (457th Fighter Squadron), and Texas Air National Guard (TANG, 136th Air Wing).

## E. AIRFIELD FACILITIES

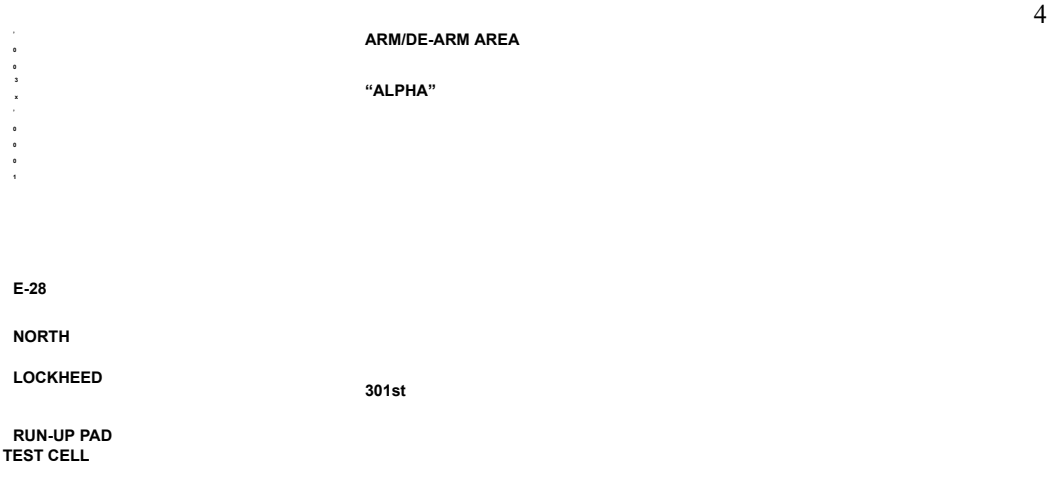
NAS, JRB Fort Worth, Carswell Field, is a Category III B airfield, with a field elevation of 650 feet above Mean Sea Level (MSL). Runway 17/35 is 12,000 feet in length and 200 feet in width. The calm wind runway is 17. The primary instrument runway is 35. (Note: the runway number (e.g. Runway 17) is the number you read as the aircraft sits on, or approaches, the runway.)

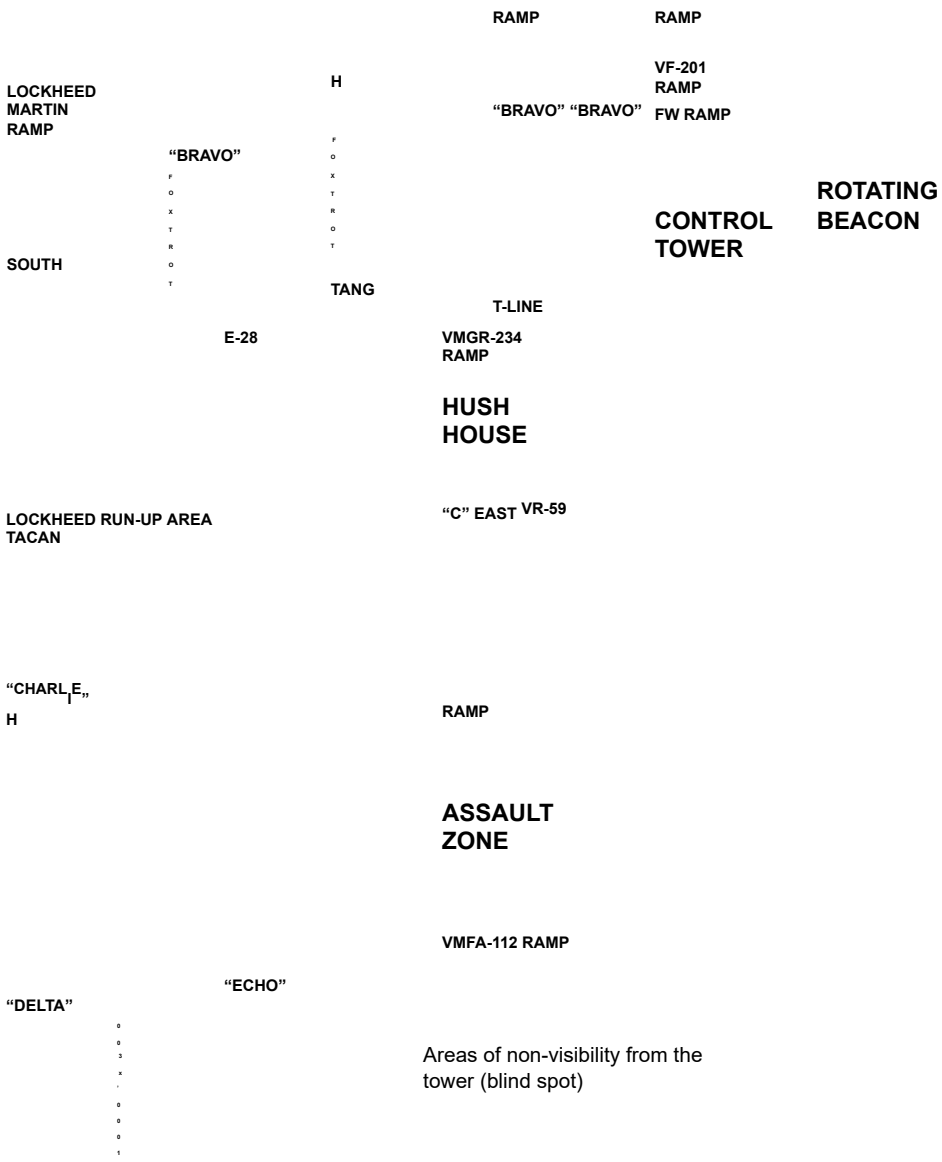
Figure I-2, Airfield Diagram, depicts the layout of Carswell Field and indicates the runway configuration, flightline facilities, and jet engine maintenance run-up locations. The Aircraft Operations Building and Control Tower (Building 1425) is located east of the runway abeam Taxiway Bravo. As marked on Figure I-2, there is a line of sight restriction to the south end of taxiways Foxtrot and Charlie East. Two helicopter pads are located along Taxiway Foxtrot.

## F. GOAL AND OBJECTIVES

The specific goals and objectives of the AICUZ program at NAS, JRB Fort Worth are directed at encouraging land use compatibility between the military air facility and local communities, while maintaining the operational integrity of the Air Station. Specific objectives of the AICUZ update program are to:








NAS, JRB Fort Worth AICUZ Source:

Air Operations Manual, NAS, JRB Fort Worth (May 4,1999)

**AIR INSTALLATIONS COMPATIBLE USE ZONES NAS, JRB FORT WORTH, TX**

- Protect health, safety, and welfare of the civilian and military communities by discouraging land uses which are incompatible with aircraft operations.
- Reduce noise impacts caused by aircraft operations, while meeting

operational, training, and flight safety requirements, both on and in the vicinity of the Station.

- Encourage continued liaison between the Navy and the community, and inform the general public about the AICUZ program. Seek cooperative efforts to help minimize noise impacts and accident potential impacts in the vicinity of NAS, JRB Fort Worth.

- Protect the Navy's in investment in, and the operational capabilities of, NAS, JRB Fort Worth.

## G. RESPONSIBILITY FOR COMPATIBLE LAND USE

Military installations and local government agencies with planning and zoning authority both share the responsibility for preserving land use compatibility near the military installation. Cooperative action by both parties is essential to prevent land use incompatibility and encroachment. If local governments choose not to implement land development controls within the airfield environment, or is incapable of doing so in a consistent and legally defensible manner, the Navy is left with the less desirable alternative of having to acquire property rights to protect its operational integrity.

NAS, JRB Fort Worth has a two-fold responsibility within the AICUZ program. First, there is the responsibility to mitigate the impacts of aircraft noise, encourage land use compatibility, and increase safety, to the extent feasible, through operational guidance and procedures. Second, it is the responsibility of the Air Station Commanding Officer to actively work with state and local planning and regulatory officials to implement the objectives of the AICUZ program, and to continuously strive to educate and inform the local civilian community of the mutual benefit of an effective AICUZ program.



Local governments, including the cities of Fort Worth, Westworth Village and White Settlement, also share a responsibility to protect their respective residents by enforcing aspects of the Federal Aviation Regulations, Part 77, *Objects Affecting Navigable Airspace*, as they pertain to NAS, JRB Fort Worth. Although this can be accomplished through a restrictive airfield zoning district within the composite AICUZ footprint, local zoning ordinances do not addresses this issue.

Refer to Section VII, Impact Analysis, for more discussion on this issue.

# II. AIRSPACE

## A. VICINITY AIRSPACE

Airspace is three dimensional. In addition, special use airspace is scheduled ona regular basis thus establishing time as another dimension in describing air space for military purposes. The Federal Aviation Administration (FAA) is responsible for the overall management of airspace and has established different airspace designations that are designed to protect aircraft while operating to or from an airport, transiting en route between airports, or operating within “special use” areas identified for defense-related purposes.

Rules of flight and air traffic control procedures have been established which govern how aircraft must operate within each type of designated airspace. All aircraft operate under either instrument flight rules (IFR) or visual flight rules (VFR).

The type and dimension of individual airspace areas established within a given region, and their spatial and procedural relationship to each other, is contingent upon the different aviation activities conducted in that region. The airspace in the vicinity of NAS, JRB Fort Worth currently accommodates military, civilian and commercial aircraft.

The NAS, JRB Fort Worth Control Tower provides air traffic control services to all aircraft operating in the Class D airspace, which is defined as that airspace



located within 4.5 nautical miles (NM) of the geographic center of the airport, including a 2 NM final approach course extension to the north, 1.3 NM on each side of the FWH TACAN 359 radial; and a 2 NM extension to the south, 1.3 NM on each side of the FWH TACAN 182 radial. Altitudes are surface up to and including 2,300 feet AGL (3,000 feet MSL), excluding that airspace east of the airfield classified as Meacham Field Class D Airspace.

The local flying area for the Air Station is that area within a 350 NM radius of the airport, excluding Mexican airspace.

NAS, JRB Fort Worth Operations Department is the scheduling agency for the Brownwood Military Operating Area (MOA). This airspace is located 60 NM southwest of NAS, JRB Fort Worth. The area extends 85 miles westward with approximately 3,200 square miles of training airspace within its boundaries. Altitudes encompass from 7,000 feet MSL to 34,000 feet MSL.

Class B airspace extends 30 NM from the center of the Dallas-Fort Worth Regional Airport and overlies NAS, JRB Fort Worth. The base altitudes vary from the surface at the center of the area and graduate to 2,500, 3,000, 4,000 and 5,000 feet at various sectors with a ceiling of 11,000 feet. Primary responsibility for the control of IFR traffic in the general vicinity of the Dallas-Fort Worth Terminal Area rests with the Regional Approach Control, located at Dallas/Fort Worth Regional Airport. Joint procedures and responsibilities are outlined in the Regional Approach Control/Fort Worth Air Route Traffic Control Center (ARTCC)/NAS, JRB Fort Worth Letters of Agreement.

**B. AIRPORT CONTROL ZONES AND FLIGHT PROCEDURES** Within the airspace controlled by NAS, JRB Fort Worth Tower, very specific flight procedures have been developed which must be adhered to by military pilots. Table II-1 provides a summary of pertinent flight procedures and "course rules" that dictate flight tracks and profiles of military aircraft operating in the vicinity of NAS, JRB Fort Worth.



**TABLE II-1**

**SUMMARY, FLIGHT PROCEDURES AND COURSE RULES**

| **General** |
|---|
| 1. NAS, JRB Fort Worth is located at 32 degrees 46' north latitude and 97 degrees 26' west longitude. Field elevation is 650 feet above mean sea level. Variation is 6 degrees east as of June 1998. |
| 2. NAS, JRB Fort Worth operates from 0700 to 2300 daily, with occasional operations conducted outside of published airfield hours. |
| 3. Engine Maintenance Turns: High power engine maintenance turns shall be accomplished in the high power turn area. F-16 high power turns may be done on Taxiway DELTA not to interfere with compass turns. |

4. Quiet Hours: Air Traffic Control Tower Supervisor shall ensure the following procedures are adhered to:

a. Departing Aircraft: Aircraft are authorized to takeoff during quiet hours unless specific direction has been issued not to depart aircraft due to the nature of the ceremony. Ensure that aircraft are not issued taxi instructions that will place the aircraft in close proximity to the ceremonial area. Aircraft requiring taxi routes shall be towed to the runway warm-up area for turn up or pre-positioned prior to the commencement of quiet hours.

b. Landing Aircraft: Landing aircraft are authorized a straight-in full stop only. No practice approaches will be authorized including overheads and simulated flame out approaches. Aircraft can be taxied to parking areas that are well clear of the ceremonial area; otherwise the aircraft will be directed to shut down in a suitable parking area. The aircraft can then be towed to their parking area or re-positioned upon completion of the quiet hours.

c. High/Low Power Turn Ups: High/low power turn ups are authorized during quiet hours except for aircraft that are located in close proximity to the ceremonial area or when deemed disruptive based on the nature of the ceremony. Aircraft may be towed to a suitable area on the airfield that will not affect quiet hours.



**TABLE II-1**

**SUMMARY, FLIGHT PROCEDURES AND COURSE RULES**

**Course Rules**

1. No aircraft may operate at a speed in excess of 250 KIAS below 10,000 feet, or greater than 200 KIAS under Class B airspace/within Class D airspace, unless a greater speed required to maintain safe flight maneuverability is specified in applicable NATOPS/ Tech Orders.

2. Fixed Wing Departure Procedures:

a. Pilots shall notify NAS, JRB Fort Worth Tower when ready for departure. b. Clearance for climbs to altitude shall be obtained from the control tower. Unrestricted/high performance climbs are not authorized except in accordance with applicable Letters of Agreement.

c. VFR Departures.

i. Runway 17 - Fly runway heading, maintain 3,000 feet. Contact approach control on 257.95/125.8.

ii. Runway 35 - Fly runway heading 330, maintain 3,000 feet. Contact approach control on 257.95/125.8.

3. Fixed Wing Pattern Entry and Landing: The fixed wing pattern is a standard rectangular traffic pattern with upwind, crosswind, downwind, base and final approach segments. Pattern altitude is 1,700 feet. Pattern width 1½ - 2 miles. Entry into the pattern may be via standard entry procedures or by conducting an overhead approach. a. The following visual reporting points should be used for entry into the fixed wing traffic pattern:

i. Eagle: Eagle Mountain Lake (FWH 326/6.6)

ii. Brook: North end of Benbrook Lake (FWH 190/07)

b. Landing Runway 17:

i. Following initial contact, or when transferred to tower by a RADAR controller, jet aircraft shall proceed to and report "Eagle," remaining at

or below 2,700 feet. Proceed direct to the Initial at 2,200 feet



**TABLE II-1**

**SUMMARY, FLIGHT PROCEDURES AND COURSE RULES**

(4 NM from the end of the runway) to enter the break. Aircraft shall fly a right overhead approach and enter the traffic pattern as directed by the control tower. Downwind altitude is 1,700 feet.

ii. Prop/Turbo Prop aircraft proceed to and report "Eagle"or "Brook," at 2,700 feet descending to 1,700 feet for a straight-in approach or right downwind entry as appropriate. Downwind altitude is 1,700 feet.

c. Landing Runway 35:

i. Following initial check-in, jet aircraft shall proceed to and report "Brook," remaining at or below 2,700 feet, then direct to a 4 NM Initial at 2,200 feet to enter the break. Use a left-hand overhead approach and enter the traffic pattern as directed by the control tower. Downwind altitude is 1,700 feet. **When proceeding to initial, pilots shall avoid overflying the Benbrook residential area located between Texas Highway 80 and St. Mary's Creek (3-5 DME SW).**

d. Prop/Turbo Prop aircraft proceed to and report "Brook", at 2,700 feet descending to 1,700 feet for a straight-in approach or left downwind entry as appropriate. Downwind altitude is 1,700 feet.

4. Multiple Approaches and Landings:

a. Touch and go landings may be authorized by the control tower during periods of low terminal traffic. **Because of the variety of aircraft traffic types that use the airfield, and a single runway configuration, it may be necessary to terminate touch and go landings or modify patterns due to traffic complexity or congestion.**

b. Commence downwind turns at or above 1200 feet.

c. Touch and go's will not normally be authorized during scheduled FCLP periods.



**TABLE II-1**

5. Field Carrier Landing Practice (FCLP):

a. FCLP DELTA pattern shall be flown as depicted in Plates 15 and 16 of the *Air Operations Manual*. Downwind altitude will be 1,250 feet (600 feet AGL). b. Minimum weather for FCLP operations day or night is 1,300 feet ceiling and three miles visibility.

c. When urgent fleet operational requirements exist, minimum weather may be reduced to 800 feet ceiling and two miles visibility with the approval of the Operations Officer.

d. The maximum number of aircraft in the FCLP pattern shall be SIX during daylight, FOUR at night, and TWO under SVFR conditions.

e. In the event of an emergency situation, the control tower may instruct all aircraft to orbit in the Delta pattern (2,700 feet). Pilots are expected to respond immediately and maintain their respective sequence in the pattern.

f. When IFR conditions exist, all FCLP aircraft shall land prior to inbound traffic reaching ten miles from the airport, or as directed by control tower.

g. Aircraft shall climb to 1,200 feet MSL (500 feet AGL) prior to turning crosswind.

6. Helicopter Operations:

a. All helicopter operations within NAS, JRB Fort Worth's Airport Surface Area shall be under positive control of the control tower.

b. Helicopters arriving/departing shall utilize the standardized VFR/SVFR routes as depicted in Plate 19 of the *Air Operations Manual*. Other routes may be approved by the control tower.

c. Helicopter departure and arrival operations will normally use the Helicopter Landing Area or a designated helipad as depicted in Plate 1 of the *Air Operations Manual*.

d. Transient helicopters will normally use Runway 17/35 unless directed otherwise by the tower.



**TABLE II-1**

**SUMMARY, FLIGHT PROCEDURES AND COURSE RULES**

e. Maximum altitude within the Airport Surface Area is 1,200 feet (500 feet AGL) unless otherwise cleared by the tower.

f. Departure Procedures:

i. All helicopters will depart the traffic pattern on the 260 degree heading from the southwest corner of the helo traffic pattern maintaining 1,200 feet and parallel I-30 until clear of the Airport Surface Area.

ii. Requests for departures, other than above, will be approved subject to traffic conditions. Climb to 1,200 feet, as rapidly as possible.

g. Arrival Procedures: Arrivals from the south and west will report over Point Alpha or Bravo at 1,200 feet. Point Alpha is defined as the intersection of I-30 and Highway 80. Point Bravo is defined as the intersection of Confederate Park Road and Silver Creek Rd.

7. Texas Air National Guard Operations: Texas Air National Guard training includes single ship and multiple ship formation flights using Airborne RADAR Station Keeping Equipment (SKE). Because of this reduced maneuverability, other aircraft operating in the traffic pattern may expect slight delays when SKE operations are being conducted.

8. F-16 Simulated Flameout Approaches:

a. Overhead SFOs: Overhead SFOs are authorized for 301 FW, Lockheed Martin and DCMC F-16s during day VMC. Weather minima ceiling 1,000 feet above requested altitude, 5 miles visibility.

b. Overhead SFO Parameters: SFOs from high key to touchdown take approximately one minute to complete. Airspeed departing High Key varies between 200-250 KIAS. Airspeed on final is approximately 190 KIAS, target airspeed at touchdown is 150 KIAS. Aircraft conducting SFOs may not be visible to controllers or other aircraft for a major portion of the maneuver.



**TABLE II-1**

**SUMMARY, FLIGHT PROCEDURES AND COURSE RULES**

| |
|---|
| 9. Lockheed Martin Air Show/Test Flights: When coordinated and approved, Lockheed Martin flight demonstrations will be conducted within a three statute mile radius of the runway at the following altitudes:<br>a. Low Show/Test: Surface to 2,500 feet<br>b. High Show/Test: Surface to 6,000 feet |
| **Air Traffic Control** |
| 1. All aircraft operating within the NAS, JRB Fort Worth Class D Surface Area are under positive control at all times. **Pilots and controllers must exercise extreme vigilance in order to minimize the risk of collision.** |
| 2. Approach Control Procedures: Primary responsibility for the control of instrument traffic in the general vicinity of the Dallas-Fort Worth area Terminal Area rests with Regional Approach Control located at Dallas/Fort Worth Regional Airport. |
| 3. RADAR Procedures: Radio Air Traffic Control Facility (RATCF) services include ASR/PAR approaches, RADAR vectors to visual approach, VFR flight following, RADAR traffic advisories, RADAR monitored TACAN, ILS, and Airborne RADAR Approaches (ARA), and MATCALS Mode II and III. |

Source: *Air Operations Manual*, NAS, JRB Fort Worth, Instruction 3710.1B, 4 May 1999. **III.**

## BACKGROUND

### A. CHANGES REQUIRING AICUZ UPDATE

Under the AICUZ program, each plan must be tailored to the specific characteristics of that installation's air operations. Numerous variables are included in the calculations for determining the noise contours, including aircraft type and mix, flight patterns, power settings, and time of day of noise-generating activities. Considerable change to any of these variables could affect a change in the Activity's noise contours. Other characteristics, such as a change in training



mission, can have an effect on total air operations within a given flight path and,

therefore, further affect the configuration of Accident Potential Zones (APZs).

This study is an update of the 1986 (amended) AICUZ. The basis of the update is the *Aircraft Noise Study for Naval Air Station, Joint Reserve Base Fort Worth, Texas*, prepared by Wyle Laboratories and distributed in May 1999. The noise study included collection of operations data for 1997 and the development of projected noise exposure contours for CY 2000, including the transition of VF-201 from F-14 aircraft to F/A-18 aircraft. Under this action, all other aircraft operations would remain unchanged from the existing (1997) modeled conditions.

There are currently six squadrons stationed at NAS, JRB Fort Worth. Aircraft include the F-16 Fighting Falcon, F/A-18 Hornet, C-40 Clipper, C-12 Huron, and C-130 Hercules. Transient aircraft include these aircraft as well as the F-14 Tomcat, T-37 and T-38 and C-130/KC 130.

## B. SURVEY METHODOLOGY

Analyses of aircraft noise exposures around Department of the Navy facilities are normally accomplished using two groups of computer-based programs, NOISEMAP and MR_NMAP. Both programs were developed by the U.S. Air Force.

NOISEMAP consists of BASEOPS Version 5.0, Master Control Module (MCM) Version 6.4, OMEGA10, OMEGA11, NOISEMAP version 6.5, NMPLOT Version 3.05 and NOISEFILE Version 6.4. The results of the NOISEMAP suite of computer programs provide a relative measure of noise levels around airfield facilities. NOISEMAP is most accurate and useful for comparing “before and after” noise levels which would result from proposed aircraft changes or alternative noise control actions when calculations are made in a consistent manner. It allows noise predictions for such proposed actions without actual implementation of noise monitoring of those actions. NOISEMAP also has the



flexibility of calculating sound levels at any specified point so that noise levels at representative locations around an airfield can be obtained directly.

The second group of programs, MR_NMAP, is a model for predicting aircraft

noise from aircraft operating in three types of special use airspace; Military Operating Areas, Range/Restricted Area, and Military Training Routes (MTR). The suite of programs consists of MR_OPS Version 1.0, OMEGA10R, MR_NMAP Version 1.0, NMPLOT Version 3.05, and NOISEFILE Version 6.4. Like NOISEMAP, MR_NMAP is most accurate for comparing "before and after" noise levels which would result from proposed aircraft changes or alternative noise control actions.

To develop noise contours, NOISEMAP requires the number of daily operations at the airfield. This calculation is based on the number of operations on an "average busy day" (defined as a typical day when the airfield is in full operation) rather than the "average annual day." A day is considered to be "busy" when its total operations are at least 50 percent of the average annual daily operations. The number of operations occurring on an average busy day is higher than that for an average annual day, and is a better indicator of probable community response to long-term aircraft noise exposure.

The number of average busy day operations is determined by calculating the mean of the operations on all of the busy days over a period of one year.

The 1999 noise study concluded that 276 days out of 365 days in 1997 were "busy", with ninety-four percent of the total operations occurring on "busy" days. Therefore, the average busy day operations for each modeled aircraft type were calculated by multiplying the number of annual operations by 0.94 and then dividing by 276 busy days.



## C. ANNUAL FLIGHT OPERATIONS

Daily flight operations are recorded and totaled by local ATC, and subsequently documented on Air Traffic Activity Reports (ATAR). These reports provide annual operation information by aircraft category (Navy/Marine Corps, Other Military, Air Carrier and General Aviation) and by operation category (IFR and VFR).

Because ATC does not keep a record of operations for specific types of aircraft, interviews were conducted with ATC personnel and airfield users to determine operational percentages for departures, arrivals and pattern operations. Where this information was not available (mainly for transient aircraft), operational percentages from the 1993 noise study were utilized as directed by ATC personnel.

Table III-1 lists annual operations (excluding overflights) for the years 1996-1999, based on ATAR reports. During CY 1997, the base year of the noise study, military aircraft accounted for 29,443 operations, with closed patterns counted as two operations. Military flight operations accounted for 75 percent of the total airfield operations. The dominant aircraft was the F-16, followed by the F/A-18 and C-9.



**TABLE III-1**

**TOTAL ANNUAL FLIGHT OPERATIONS (1996-1999[1])**

| Year | Military | | | Civilian | | | Total |
|---|---|---|---|---|---|---|---|
| | Navy/ Marine | Other Military | Total | Air Carrier | General Aviation | Total | |
| 1996 | 8,634 | 15,620 | 24,254 | 64 | 10,770 | 10,834 | 35,088 |
| 1997 | 12,635 | 16,808 | 29,443 | 19 | 9,987 | 10,006 | 39,449 |
| 1998 | 13,085 | 17,236 | 30,321 | 1 | 8,052 | 8,053 | 38,374 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1999 (part) | 7,351 | 11,616 | 18,967 | 0 | 4,241 | 4,241 | 23,208 |

Source: Air Operations Department, NAS, JRB Fort Worth, Texas. [1]

January through June 1999.



The number of military operations increased by three percent between 1997 and 1998, while the overall number of operations decreased by three percent, corresponding to a drop in civil air operations. Based on the first six months of 1999, the number of military operations for this year will increase by 19 percent over 1998 figures, while the civil operations will remain about the same.

The Air Station is heavily utilized by transient aircraft, which conducted nearly 55 percent of flight operations in 1997. Transient aircraft include the F-14, F-16, F/A-18, F-16, C-9, C-12 and C-130. Aircraft in the “Other Transient” category include the A-4, B-1, B-52, E-6, CH-46, KC-135, T-2, T-34, and T-45.

Table III-2 lists the projected modeled annual flight operations for 2000. With the exception of the conversion of VF-201 to F/A-18 aircraft, the number of

operations remains unchanged from 1997.

## D. RUNWAY AND FLIGHT TRACK UTILIZATION

Data for runway usage is evaluated based upon total annual operations by runway as well as average busy day operations. Runway use percentages were obtained from ATC personnel. The modeled jet aircraft utilized Runway 17 and Runway 35 for 35 percent and 65 percent of the time, respectively.

Frequency of runway usage affects both the noise model for determining the acoustical footprint and the delineation of APZs within a given flight "shadow." Flight tracks are usually depicted as single lines representing the median flight track of all flights along that track, although considerable variation on either side of the flight path may be expected. The variations could be due to weather conditions, geographical features, level of pilot proficiency, or number of aircraft on a particular flight track.

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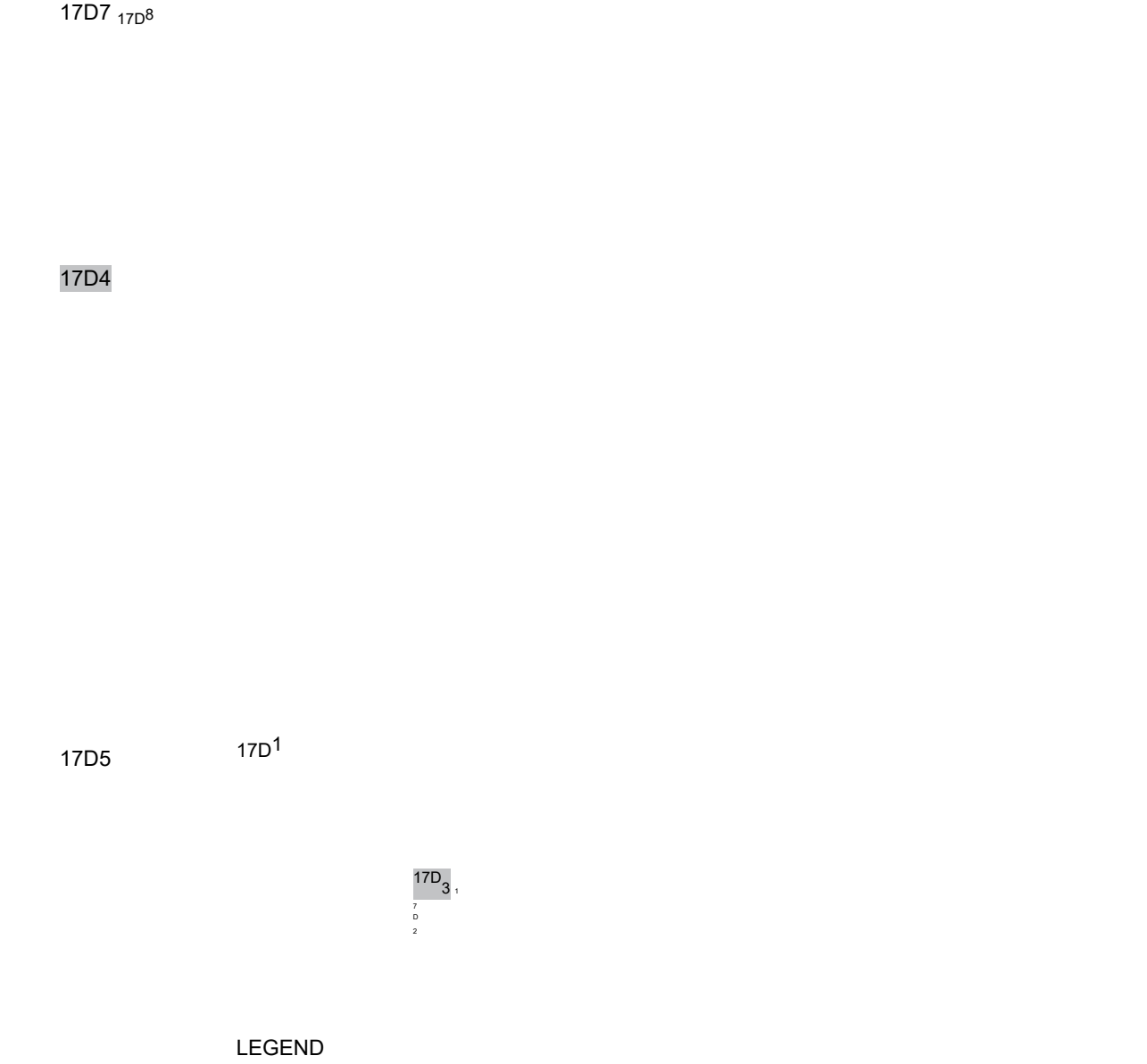
Figures III-1 through III-10 indicate flight tracks for departure, arrival and pattern operations. All but two of the departure flight tracks turn to a westerly heading as they depart the Air Station, because westerly headings provide the most direct route to the Brownwood MOA. Similarly for arrivals, most flight tracks arrive from the west because they are coming from the Brownwood MOA. The touch and go pattern flight tracks are utilized by both station-based and transient aircraft. The simulated flame out (SFO) pattern tracks are utilized by Lockheed F-16 aircraft.

For each aircraft type, average busy day operations were divided by 0.94 and multiplied by 276 busy days to yield the number of annual flight operations. Annual modeled operations per flight track are presented in Table III-3. See Appendix A for calculations for individual aircraft type.

## E. PRE-FLIGHT AND MAINTENANCE RUN-UP OPERATIONS

Pre-flight run-ups were modeled for the F-16 and KC-130 station based aircraft. F-16 aircraft were modeled on the runway prior to brake release at takeoff power for a duration of five seconds. KC-130 aircraft were modeled in the Hammerhead Areas at a power setting of 900 C TIT for a duration of two minutes. F/A-18 aircraft do not typically conduct pre-flight run-ups.

Single engine maintenance run-ups were modeled for the F-16, F/A-18, and KC-130 aircraft. The run-up pad locations are shown in Figure III-11. Most maintenance run-ups occur at pads 17RU and 35RU, depending on which runway is active. About one maintenance run-up per week for station-based F-16 aircraft occurs in the High Power Hush House (“HH”). Run-ups conducted for Lockheed F-16 aircraft are distributed through nine run-up hangars (“LHRU”) and one test cell (“LHTC”).




# FIGURE III - 1

## Departure Flight Tracks for Runway 17

Flight Track

NAS, JRB Fort Worth AICUZ

Source: Wyle Laboratories Aircraft Noise Study for Naval Air Station, Joint Reserve Base Fort Worth (May 1999)

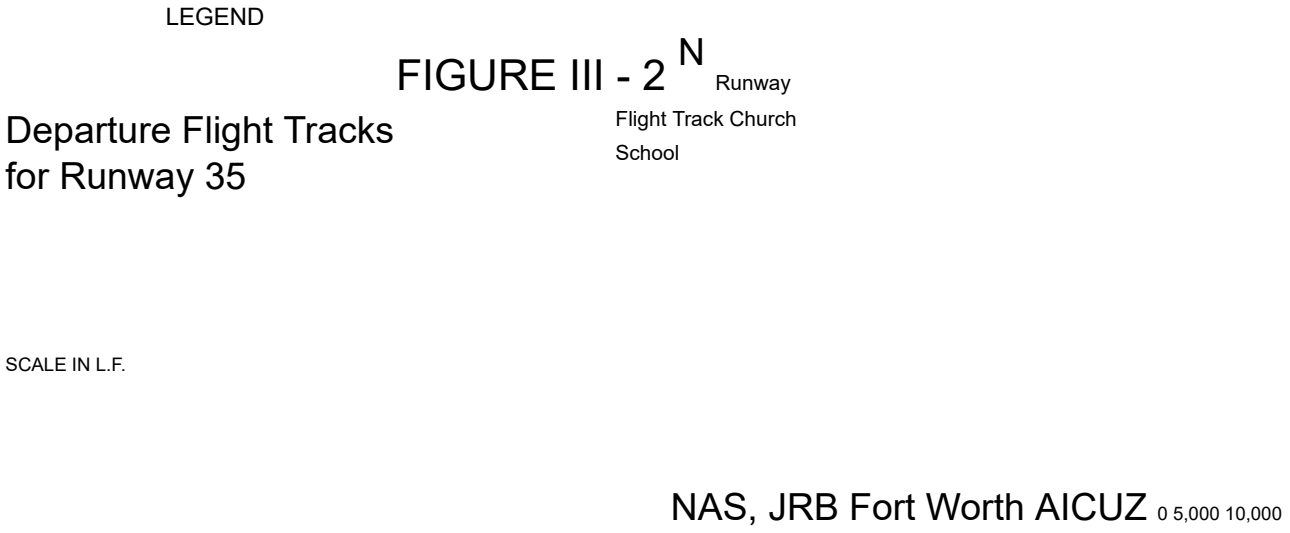
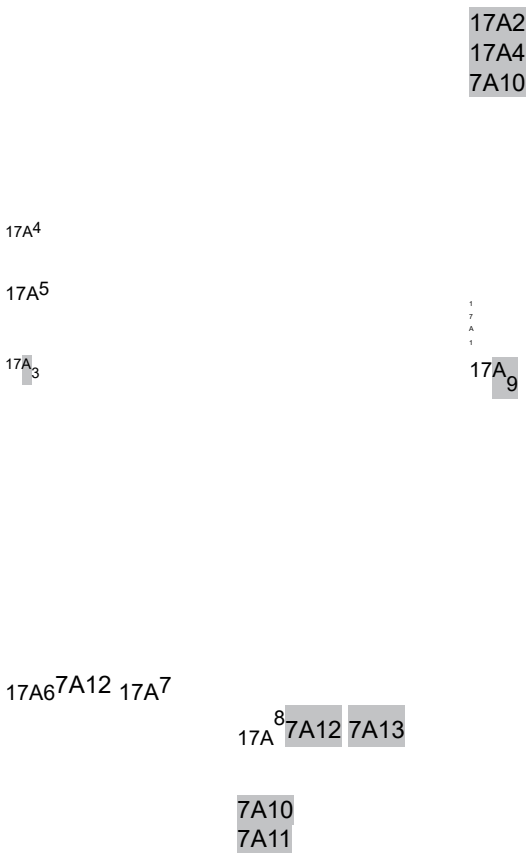



FIGURE III - 2

Departure Flight Tracks
for Runway 35

Source: Wyle Laboratories Aircraft Noise Study for Naval Air Station, Joint Reserve Base Fort Worth (May 1999)




LEGEND

FIGURE III - 3 N Runway

Straight-in Arrival Flight
Tracks for Runway 17

Flight Track Church
School

SCALE IN L.F.

NAS, JRB Fort Worth AICUZ 0 5,000 10,000

Source: Wyle Laboratories Aircraft Noise Study for Naval Air Station, Joint Reserve Base Fort Worth (May 1999)

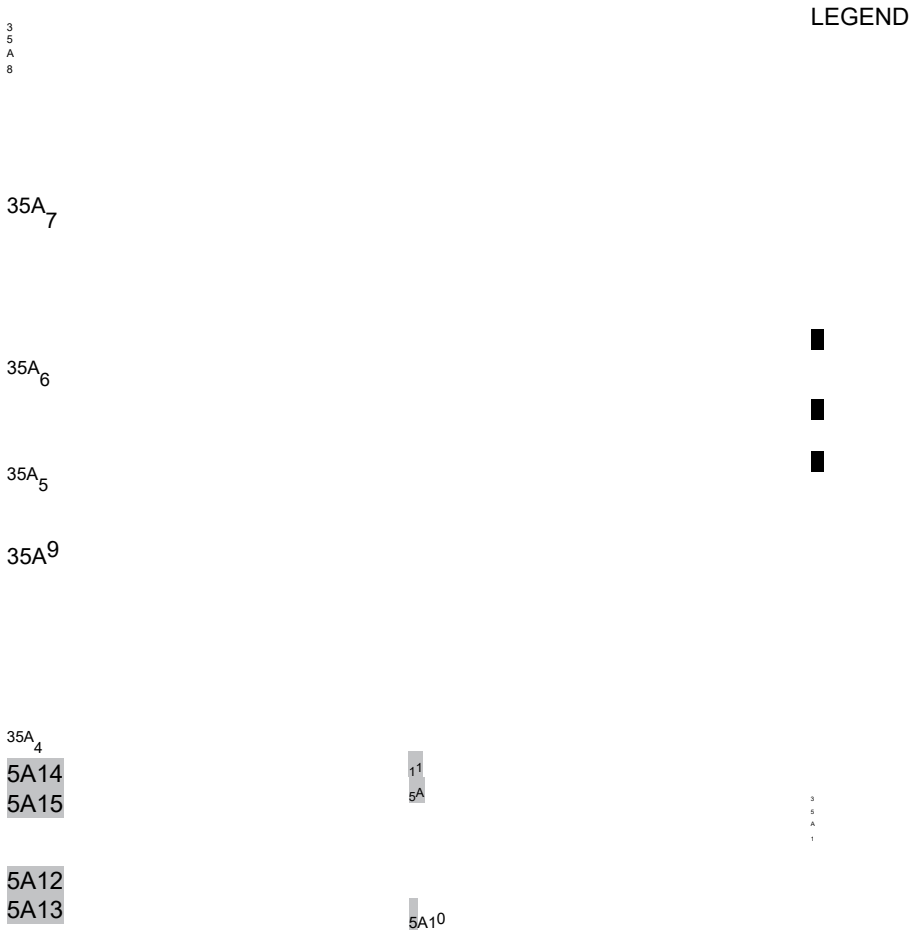



FIGURE III - 4 N Runway

Straight-in Arrival Flight Tracks for Runway 35

SCALE IN L.F.
Flight Track Church
School
Hospital

NAS, JRB Fort Worth AICUZ 0 5,000 10,000

Source: Wyle Laboratories Aircraft Noise Study for Naval Air Station, Joint Reserve Base Fort Worth (May 1999)

17O2

17O3

17O1

17O4

17O5

17O6

17O8

17O7

LEGEND

FIGURE III - 5

Overhead Arrival Flight Tracks for Runway 17


SCALE IN L.F.

NAS, JRB Fort Worth AICUZ 0 5,000 10,000

Source: Wyle Laboratories Aircraft Noise Study for Naval Air Station, Joint Reserve Base Fort Worth (May 1999)

35O7

35O3

35O4

35O1

35O6

35O4

35O3

35O5

35O2

35O7 35O1

LEGEND

Runway

Flight Track Church

School

# FIGURE III - 6

## Overhead Arrival Flight Tracks for Runway 35

N

SCALE IN L.F.

NAS, JRB Fort Worth AICUZ 0 5,000 10,000

Source: Wyle Laboratories Aircraft Noise Study for Naval Air Station, Joint Reserve Base Fort Worth (May 1999)

35T1

17T1

LEGEND

# FIGURE III - 7

N

Runway

## Closed Pattern Flight Tracks (Within 6,200 Feet Abeam Distance)

SCALE IN L.F.

Flight Track

Church

School

Hospital

NAS, JRB Fort Worth AICUZ 0 5,000 10,000

Source: Wyle Laboratories Aircraft Noise Study for Naval Air Station, Joint Reserve Base Fort Worth (May 1999)

17T2

35T2

LEGEND

# FIGURE III - 8

N

Runway

## Closed Pattern Flight Tracks (Within 10,800 Feet Abeam Distance)

SCALE IN L.F.

Flight Track Church

School

Hospital

NAS, JRB Fort Worth AICUZ 0 5,000 10,000

Source: Wyle Laboratories Aircraft Noise Study for Naval Air Station, Joint Reserve Base Fort Worth (May 1999)

35T3

LEGEND

FIGURE III - 9

N

Runway

Closed Pattern Flight Tracks (Within 16,200 Feet Abeam Distance)

Flight Track

Church

School

Hospital

SCALE IN L.F.

NAS, JRB Fort Worth AICUZ 0 5,000 10,000 Source: Wyle Laboratories Aircraft Noise Study for Naval Air Station, Joint Reserve Base Fort Worth (May 1999)

17S1

35S1

LEGEND

FIGURE III - 10

N

Runway

SFO Pattern Flight Tracks

Flight Track

Church

School

NAS, JRB Fort Worth AICUZ 0 5,000 10,000 Source: Wyle Laboratories Aircraft Noise Study for Naval Air Station, Joint Reserve Base Fort Worth (May 1999)

**AIR INSTALLATIONS COMPATIBLE USE ZONES NAS, JRB FORT WORTH, TX**

**TABLE III-3**
**TOTAL MODELED (2000) ANNUAL OPERATIONS**
**PER FLIGHT TRACK**

| Runway | Flight Track | Annual Ops |
|---|---|---|
| 17 | 17D1 | 743 |
| | 17D2 | 549 |
| | 17D3 | 561 |
| | 17D4 | 534 |
| | 17D5 | 1,110 |
| | 17D6 | 82 |
| | 17D7 | 79 |
| | 17D8 | 6 |
| | 17A1 | 3 |
| | 17A2 | 866 |
| | 17A3 | 38 |
| | 17A4 | 567 |
| | 17A5 | 103 |
| | 17A6 | 73 |
| | 17A7 | 109 |
| | 17A8 | 23 |
| | 17A9 | 59 |
| | 17A10 | 35 |
| | 17A11 | 35 |
| | 17A12 | 420 |
| | 17A13 | 420 |
| | 17O1 | 47 |

| | | |
|---|---|---|
| | 17O2 | 0 |
| 17 | 17O3 | 35 |
| | 17O4 | 332 |



**TABLE III-3**
**TOTAL MODELED (2000) ANNUAL OPERATIONS**
**PER FLIGHT TRACK**

| Runway | Flight Track | Annual Ops |
|---|---|---|
| | 17O5 | 92 |
| | 17O6 | 379 |
| | 17O7 | 223 |
| | 17O8 | 23 |
| | 17T1 | 117 |
| | 17T2 | 1,465 |
| | 17T3 | 117 |
| | 17S1 | 106 |
| Subtotal | | 9,351 |
| | | |
| 35 | 35D1 | 2,020 |
| | 35D2 | 834 |
| | 35D3 | 922 |
| | 35D4 | 887 |
| | 35D5 | 1,856 |
| | 35D6 | 153 |
| | 35D7 | 147 |
| | 35D8 | 12 |
| | 35A1 | 6 |
| | 35A2 | 1,700 |
| | 35A3 | 73 |

| | | |
|---|---|---|
| 35 | 35A4 | 440 |
| | 35A5 | 120 |
| | 35A6 | 56 |
| | 35A7 | 56 |



**TABLE III-3**
**TOTAL MODELED (2000) ANNUAL OPERATIONS**
**PER FLIGHT TRACK**

| Runway | Flight Track | Annual Ops |
|---|---|---|
| | 35A8 | 109 |
| | 35A9 | 109 |
| | 35A10 | 85 |
| | 35A11 | 85 |
| | 35A12 | 21 |
| | 35A13 | 21 |
| | 35A14 | 784 |
| | 35A15 | 784 |
| | 35O1 | 0 |
| | 35O2 | 620 |
| | 35O3 | 458 |
| | 35O4 | 620 |
| | 35O5 | 255 |
| | 35O6 | 23 |
| | 35O7 | 132 |
| | 35T1 | 217 |
| | 35T2 | 2,719 |
| | 35T3 | 217 |
| | 35S1 | 194 |
| Subtotal | | 16,735 |

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| **TOTAL**[1] | **26,086** |

[1] Number of operations per flight track do not match the number of total annual operations in Table III-2 due to rounding error.



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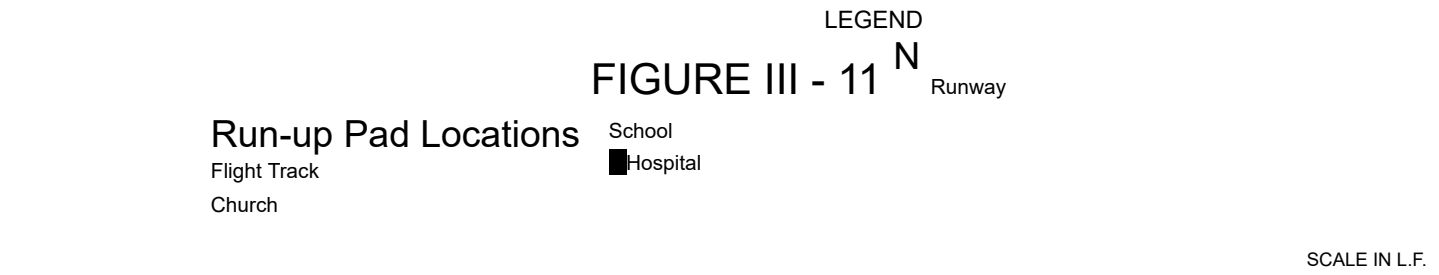



FIGURE III - 11

**AIR INSTALLATIONS COMPATIBLE USE ZONES NAS, JRB FORT WORTH, TX**

### F. LOCKHEED MARTIN AIRSHOW DEMONSTRATION PRACTICE

Approximately 50 times per year, Lockheed Martin F-16 aircraft conduct an airshow demonstration practice session over the airfield at NAS, JRB Fort Worth. The typical practice session lasts approximately five minutes, 80 percent of which is conducted using afterburners and 20 percent using a non-afterburner, high power setting. The airspeeds vary depending on the maneuver being executed.

MR_NMAP was utilized by Wyle Laboratories to model the noise associated with this activity. The noise contours for the average busy day case were added to the noise exposure generated by typical flight operations.

## IV. NOISE

### A. AVERAGE NOISE LEVELS

The noise environment around an air station is typically described using a measure of the cumulative noise exposure that results from all aircraft operations. These operations generally include flight activity in the immediate vicinity of the installation, plus stationary in-frame and/or out-of-frame engine run-ups associated with aircraft maintenance operations.

Recently, various federal agencies involved in environmental noise analyses and mitigation have agreed on common noise metrics for environmental impact analysis documents, and both the DoD and FAA have specified use of the Day Night Average Sound Level noise descriptor, abbreviated as DNL and symbolized by Ldn. DNL is the methodology used to depict community noise in current AICUZ studies.

In general, DNL may be thought of as an accumulation of all the noise produced by individual events that occur throughout a 24-hour period. The noise of each event is accounted for by a noise metric that integrates the changing sound level over time as, for example, when an aircraft approaches, flies overhead, then continues into the distance. These integrated sound levels for individual events



are referred to as Sound Exposure Levels, or SELs. The SEL is the measure of the accumulation of all noise energy produced by a single noise event; in this case, a single aircraft as it flies over a specific location. The logarithmic accumulation of SELs from all operations during a 24-hour period determines the DNL for the day.

DNL also takes into consideration the time of day that noise events occur. This measure recognizes that events during the nighttime hours may be more intrusive, and thus more annoying, due to a lower level of exterior background noise and a decrease in the interior sound level generated by normal household activities. To account for this additional impact, a penalty of ten dB is added to each noise event that occurs during nighttime hours, defined as 2200 to 0700 hours the next day. At NAS, JRB Fort Worth, virtually all aircraft operate during the hours of 0700 to 2200, with a negligible number of operations occurring between 2200 and 2300 hours. The airfield is closed from 2300 to 0700 hour, so no night time penalty was assessed.

DNL values around an air station are presented not just for a single specific 24-hour period, but rather for a typical busy 24-hour period that is based on average operations for a full year. As described in Section III. B, there were 276 busy days at NAS, JRB Fort Worth in 1997.

This averaging is accomplished to obtain a stable representation of the noise environment free of fluctuations in wind directions, runway use, temperature, aircraft performance and total airfield operations, any one of which can significantly influence noise exposure levels from one day to the next. The accumulation of noise computed in this manner provides a quantitative tool for comparing overall noise environments and developing compatible land use plans. The day-night average sound levels (Ldn) are depicted as contours connecting points of equal value, usually in 5 dB increments from 60 or 65 dB up to 75 or 80 dB.



As a minimum, DoD requires that sound level contours be plotted for Ldn values of 65, 70, 75 and 80 in AICUZ studies. Three general noise zones are defined: areas with an Ldn of 65 or lower; areas with an Ldn between 65 and 75; and areas with a Ldn of 75 or greater. These three areas are defined as Noise Zones 1, 2 and 3, respectively. Recently, values of 60 Ldn have been added to account for potential noise impacts in rural areas of low ambient noise levels, although there are no land use controls associated with the 60 Ldn contour.

Noise Zone 1 is essentially an area of no impact. Noise Zone 2 is an area of moderate impact where some land use controls are needed. Noise Zone 3 is the most severely affected area and requires the greatest degree of land use regulatory control to assure compatibility of the civilian environment with the military air station and its operations. In addition to the noise zones, areas of concern may be defined where noise levels are considered to be objectionable (less than 65 Ldn, e.g.), but land use controls are recommended; e.g., areas under flight tracks used for repetitive pattern work.

## B. NOISE COMPLAINTS

The origin and nature of noise complaints within a geographic region is the most tangible barometer of the success or failure of noise abatement procedures. A summary of the number of complaints received at NAS, JRB Fort Worth is included in Table IV-1.

For 1998, the greatest number of complaints originated in White Settlement, a residential community located to the west of the Air Station and under the touch and go and simulated flame out flight tracks. Noise levels in this area range from 65 Ldn to 80 Ldn (adjacent to the Air Station fence line). More complaints are to be expected from this area because it lies underneath the arrival and departure flight tracks for Brownwood MOA. Complaints were also received from Westworth Village and Westover Hills, although the complainants homes were located outside the 60 Ldn contour.



Although any noise complaint received from civilian communities should be of concern to military authorities, the Air Station receives an average of only 1.32 complaints per 1,000 operations. This indicates relatively few noise conflicts with local residents, especially in view of the large number of air operations conducted within the same period and the large number of people residing within the NAS, JRB Fort Worth area of operation.

**TABLE IV-1**
**NOISE COMPLAINTS**

| Year | Complaint Type | | Total | Percent Difference from Previous Year |
|---|---|---|---|---|
| | Noise | Sonic Boom | | |
| 1995 | 26 | 22 | 48 | |
| 1996 | 33 | 3 | 36 | -33% |
| 1997 | 48 | 11 | 59 | 39% |
| 1998 | 25 | 1 | 26 | -127% |
| | | | | |

| | | | | |
|---|---|---|---|---|
| Total | 132 | 37 | 169 | |
| | | | | |
| Average | 33 | 9 | 42 | |



## C. NOISE ABATEMENT/FLIGHT PROCEDURES

In recognition of community response to aircraft noise at the Air Station, noise abatement procedures have been prepared to provide strict guidance to pilots and air traffic controllers. Table IV-2 provides a list of noise abatement /turn-up procedures currently in effect at NAS, JRB Fort Worth. Although typically implemented in response to community noise complaints, many of these procedures serve a dual purpose by minimizing accident potential hazards.

## D. NOISE CONTOURS

The proposed (2000) noise contours for NAS, JRB Fort Worth are shown on Figure IV-1. The basis for these Ldn contours are the flight patterns shown in Figures III-1 through III-10, further defined by data from Table III-3. These noise contours correspond to those provided in the noise study, published in May 1999.

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

It must be understood that this noise contour map is a planning tool, not a clear cut, scientific determination of a drop in noise threshold at each contour. The change in noise level may be imperceptible within a zone several hundred feet to either side of a particular contour line and can fluctuate with temperature, humidity, wind and other environmental factors. Furthermore, the true level of aircraft noise projected across large bodies of water, such as Lake Worth, is unknown. Water acts as a hard surface and has the tendency to propagate noise over longer distances. DoD is currently studying this phenomenon; upon completion of the study, the Navy will update the noise contours to include water propagation.

**TABLE IV – 2**

**NOISE ABATEMENT**

Flight paths and procedures at NAS, JRB Fort Worth are designed to minimize disruption to the civilian populace. Strict adherence with these procedures, consistent with flight safety, is required.

1. Takeoff Runway 17
    a. Climb expeditiously to assigned altitude.
    b. Secure afterburner prior to the airfield boundary. Do not re-engage afterburner below 10,000 feet.
    c. Operation of afterburner is not authorized in the VFR traffic pattern. d. Aircraft remaining in the VFR traffic pattern shall turn crosswind prior to I-30 (2.2 DME).
2. Takeoff Runway 35
    a. Climb expeditiously to assigned altitude.
    b. Secure afterburner prior to the airfield boundary. Do not re-engage afterburner below 10,000 feet.
    c. Operation of afterburner is not authorized in the VFR traffic pattern. d. Aircraft remaining in the VFR traffic pattern shall turn crosswind prior to I-820 (1.8 DME).
3. Landing Runway 17/35
    a. After touch and go or low approach, climb immediately to normal traffic pattern altitude.
    b. Do not commence crosswind turn until reaching a minimum altitude of 1,200 feet.
    c. Base leg turn to Runway 35 should be completed prior to Texas Highway 80 (3 DME) to avoid overflying Benbrook housing (3-5 DME south).
    d. Low altitude overflight of populated areas shall be avoided to the maximum extent possible while entering and operating within airport traffic patterns.

**TABLE IV – 2**

**NOISE ABATEMENT**

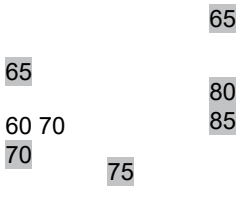
e. Airspeeds in excess of 200 KIAS in Class D airspace and below an underlying Class B airspace are prohibited in accordance with FAR 91.117 except when safe flight maneuverability cannot be maintained.

4. Rotary wing arrivals/departures shall maintain a minimum altitude of at least 1,200 feet unless directed otherwise by the control tower.

5. Outdoor high power turn-ups are not authorized between 2200-0700 daily, or prior to 1200 Sundays, except with prior approval from the CO, NAS, JRB Fort Worth. 6. Overhead/circling approaches are not authorized between 2300 and 0700 local. During these times, aircraft will be permitted to execute one approach, straight-in to a full stop landing only. ***No multiple approaches are authorized after 2230.***

Source: *Air Operations Manual*, NAS, JRB Fort Worth, Instruction 3710.1B, 4 May 1999.





LEGEND

FIGURE IV - 1 N Runway

Flight Track Church

School

DNL Noise Contours for Proposed (2000) Airfield Operations

SCALE IN L.F.

NAS, JRB Fort Worth AICUZ 0 5,000 10,000

Source: Wyle Laboratories Aircraft Noise Study for Naval Air Station, Joint Reserve Base New Orleans (May 1999)

**AIR INSTALLATIONS COMPATIBLE USE ZONES NAS, JRB FORT WORTH, TX**

A summary of the off base land area affected within the noise footprint is included as Table IV-3. As calculated in the noise study, there are an estimated 6,947 acres (not including base property and water bodies) contained within the 65 Ldn contour. Within this affected area, there are an estimated 10,742 dwelling units (DU), and an estimated population of 26,030. The 75 Ldn contour extends off base to the north, south and west, encumbering 659 acres, 649 DUs, and 1,772 persons. The 80 Ldn contour extends off the base to the north and south, affecting

a total of 60 acres, 29 DUs, and 104 persons. The 85 Ldn contour is entirely contained within base property.

Figure IV-2 provides a comparison between the 2000 and 1993 noise footprints. The 1993 contour was based on anticipated operational levels following the conversion from Carswell AFB to NAS, JRB Fort Worth, whereas the 1997 and 2000 contours were based on historical data. The 1993 65 Ldn contour extended almost as far north as Eagle Mountain Lake and as far south as I-20. The overall width of the 65 Ldn contour remained approximately the same as the 2000 contour, except that the 1993 contour is shifted to the east, encumbering more off base property.



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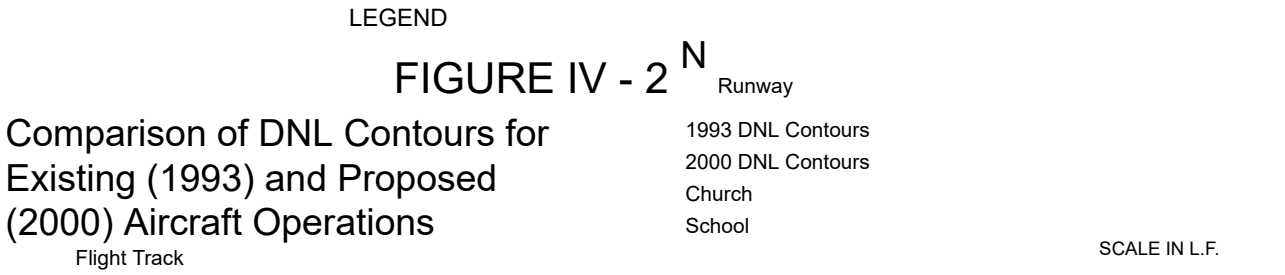


FIGURE IV - 2

Comparison of DNL Contours for Existing (1993) and Proposed (2000) Aircraft Operations

Source: Wyle Laboratories Aircraft Noise Study for Naval Air Station, Joint Reserve Base Fort Worth (May 1999)



**TABLE IV-3**

**OFF BASE NOISE EXPOSURE FOR THE 2000 DNL CONTOURS[1]**

| DNL Contour Band | Land Area (Acres) | Housing Units (HU) | Population (PN) |
|---|---|---|---|
| 60-65 dB | 4,663 | 9,152 | 20,592 |
| 65-70 dB | 4,222 | 7,306 | 17,822 |

| | | | |
|---|---|---|---|
| 70-75 dB | 2,066 | 2,787 | 6,436 |
| 75-80 dB | 599 | 620 | 1,668 |
| 80-85 dB | 60 | 29 | 104 |
| 85+ dB | 0 | 0 | 0 |
| | | | |
| **Total** | **11,610** | **19,894** | **46,622** |
| | | | |
| **Summary of Exposure** | | | |
| 65-75 dB | 6,288 | 10,093 | 24,258 |
| 75+ dB | 659 | 649 | 1,772 |

[1] Area does not include base property and water bodies.

# V. SAFETY

## A. GENERAL

In addition to community noise exposure, the potential for aircraft accidents near the military airfield is an important consideration of the AICUZ program. Although impossible to predict an aircraft accident event, a rational thought process has been applied in developing AICUZ to establish geographic limits of the probable impact area should an accident occur.

In planning for the protection of both civilian and military communities, both the Navy and local government share the responsibility to enact all reasonable safeguards. This chapter discusses both the safety of pilots and their aircraft



within the vertical airspace, as well as the protection of life and property on the ground from potential aircraft accidents.

## B. IMAGINARY SURFACES

Aircraft operations are always constrained by the surrounding natural terrain and manmade features such as buildings, towers, poles, and other potential vertical obstructions to navigation. Acceptable limitations on the height of manmade

structures is dictated through the application of "imaginary surfaces." These zones radiate at variable, increasing heights from the airfield runway. Such height limitations are discussed in both NAVFAC P-80.3 and Federal Aviation Regulations, Part 77. Strict criteria are provided for the implementation of each imaginary surface, which are described below for both fixed wing aircraft and helicopters.

**1. Fixed Wing Aircraft**

Figure V-1 depicts the threshold and elevations of the fixed wing imaginary surfaces, as measured in feet above the runway, for NAS, JRB Fort Worth. The Air Station has a Class B runway classification.

- Primary Surface - A surface on the ground or water centered lengthwise on the runway and extending 200 feet beyond each end of that runway. The width of the primary surface is 1,500 feet for a Class B runway constructed prior to June 1981.

- Clear Zone Surface - A surface on the ground or water beginning at the runway end and symmetrical about the runway centerline extended. The length of the clear zone is 3,000 feet. For Class B runways, the DoD AICUZ program allows a rectangular clear zone with a 3,000-foot width; however, Navy accident data indicates that a fan-shaped clear zone is adequate for Class B runways at Navy installations. The width of the clear zone is the same as the approach-departure clearance surface, or 2,284 feet.

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• Approach-Departure Clearance Surface - An inclined plane or combination inclined and horizontal plane, symmetrical about the runway centerline extended. The inclined plane flares outward and upward from the primary surface, beginning with the same width as the primary surface and starting with the centerline elevation at the runway end.

  For a Class B runway, the slope ratio of the inclined plane is 50 to 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 point of beginning. The outer width is 16,000 feet.

• Inner Horizontal Surface - An oval-shaped plane at a height of 150 feet above the established airfield elevation. It is constructed by scribing an arc with a radius of 7,500 feet about the centerline at each end of each runway and interconnecting these arcs with tangents.

• Conical Surface - An inclined plane that extends from the periphery of the inner horizontal surface outward and upward at a slope of 20 to 1 for a horizontal distance of 7,000 feet to a height of 500 feet above the established airfield elevation.

• Outer Horizontal Surface - A plane located 500 feet above the established airfield elevation, extending outward from the outer

periphery of the conical surface for a horizontal distance of 30,000 feet.

• Transitional Surface - Inclined planes that connect the primary surface and the approach-departure clearance surface to the inner horizontal surface, conical surface, outer horizontal, or other transitional surfaces. The slope is 7 to 1 outward and upward at right angles to the runway centerline and runway centerline



extended. To determine the elevation for the beginning of the transitional surface slope at any point along the lateral boundary of the primary surface, draw a line from the point perpendicular to the runway centerline or to the runway centerline extended. The elevation of the runway, or of the runway centerline extended, at that intersection is the elevation for the beginning of the 7 to 1 slope.

**2. Helicopters**

Although imaginary surfaces are also defined for helicopters, these surfaces are encompassed within the imaginary surfaces for fixed wing aircraft, which are more restrictive.

**3. Airfield Waivers**

In general, manmade structures may be constructed to higher elevations as distance from the runway surface increases. However, as one approaches the operational runway and its corresponding flight path, height limitations are appropriately imposed.

NAS JRB Fort Worth currently has two NAVFAC waivers for airfield equipment/ obstructions that do not meet NAVFAC P-80/P-80.3 criteria. NFW-3 waives the following obstructions in the primary surface area: AN/FPN-63, Telephone Junction Box 1125, Electrical Power Junction Box 501, AN/FMQ-13, and AN/FMQ-8. NFW-4 waives the following obstructions in the primary surface area: TACAN, TACAN Antenna, all ILS equipment, Lockheed Martin Run Stations, Lockheed Martin Hangars,

all windsocks, Pole North/South field markers, Water Sample Test Wells, Weather Transiometer, and Light/Striped Assault Strip.



### 4. Obstructions

Beyond the boundaries of NAS, JRB Fort Worth and even beyond the limits of the AICUZ composite footprint, other land uses may have a bearing on flight safety. These uses may produce smoke, glare, or electrical emissions, or pose hazards due to height of structures.

Local landmarks, obstructions and airports in the vicinity of the Air Station are identified in Table V-1. Obstructions that are within NAS, JRB Fort Worth Class D airspace are noted by an "*".

## C. ACCIDENT HISTORY

The Naval Aviation Safety Center in Norfolk, Virginia keeps extensive records on the incidence of military aircraft accidents. If necessary, this information can be used to impose stricter than normal accident potential zone criteria within the AICUZ planning area. Since its inception as NAS, JRB Fort Worth, there have been no accidents in the area of Carswell Field.

## D. ACCIDENT POTENTIAL ZONES

The accident potential concept describes the probable impact area if an accident were to occur and not the probability of an accident occurring. Accident Potential Zones (APZ) are based upon the review of historical accident and operations data throughout the military, and the application of reasonable margins of safety within those areas. General guidance regarding the delineation of APZs is outlined in OPNAVINST 11010.36A, Section 3.

### 1. Fixed Wing Aircraft

DoD fixed-wing runways are separated into two classes for the purpose of defining accident potential areas. Class A runways are used primarily by

light aircraft and do not have the potential for intensive use by heavy or high performance aircraft. Typically, these runways have less than ten percent of their operations involving heavier aircraft and are usually less



than 8,000 feet long. Class B runways are all other fixed-wing runways. Naval Air Systems Command (NAVAIRSYSCOM) and NAVFAC concurrence and Chief of Naval Operations (CNO) approval are required prior to classifying or reclassifying any runway. Runway 17/35 at Carswell Field is categorized as Class B.

**TABLE V-1**

**MANMADE OBSTRUCTIONS**

| Description | Bearing | Distance (NM) | Elevation (MSL) |
|---|---|---|---|
| Utility Pole | 350 | 8.25 | 921 |
| Water Tower* | 005 | 4.00 | 948 |
| Water Tower* | 034 | 2.50 | 890 |
| Water Tower* | 028 | 5.00 | 855 |

| | | | |
|---|---|---|---|
| Elevator | 033 | 6.50 | 995 |
| Control Tower* | 075 | 0.50 | 726 |
| Tower | 070 | 7.50 | 1,049 |
| Building | 093 | 6.00 | 1,177 |
| Building | 093 | 5.50 | 1,198 |
| Tower | 086 | 8.50 | 1,743 |
| Tower* | 127 | 4.00 | 925 |
| Building* | 140 | 3.75 | 901 |
| Tower | 125 | 5.00 | 972 |
| Tower | 113 | 6.75 | 1,218 |
| Tower | 125 | 10.00 | 1,092 |
| Radio Tower | 150 | 8.00 | 1,235 |
| Tower | 170 | 8.00 | 895 |
| Stadium Lights* | 187 | 2.00 | 840 |
| Utility Pole* | 203 | 2.50 | 930 |
| Building | 206 | 6.00 | 909 |
| Windmill | 225 | 8.00 | 1,031 |
| Antenna* | 235 | 2.50 | 949 |
| Theodolite Tower* | 315 | 0.20 | 760 |
| Utility Pole | 250 | 9.00 | 1,142 |
| Radio Tower* | 320 | 1.00 | 847 |



**TABLE V-1**

**MANMADE OBSTRUCTIONS**

| | | | |
|---|---|---|---|
| Tower | 270 | 10.00 | 1,426 |
| Tower | 277 | 10.00 | 1,327 |
| Water Tower* | 355 | 2.50 | 830 |
| Smoke Stack | 340 | 8.50 | 885 |
| Tower | 308 | 8.50 | 1,124 |

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|---|---|---|---|
| Tower | 310 | 10.00 | 1,058 |
| Elevator | 053 | 6.50 | 877 |
| Copeland (Private) Airport | 340 | 12.50 | 4,800' Hard Surface |
| Hicks Airport (T67) | 360 | 10.00 | 3,700' Hard Surface |
| Alliance Airport (AFW) | 018 | 14.50 | 9,600' Hard Surface |
| Saginaw Airport (F04) | 022 | 6.50 | 2,600' Hard Surface |
| Meacham Airport (FTW) | 043 | 5.00 | 7,500' Hard Surface |
| Spinks Airport (FWS) | 142 | 14.00 | 6,000' Hard Surface |
| Luck Airport (F71) | 142 | 12.00 | 3,500' Hard Surface |
| Sycamore Airport (9F9) | 150 | 10.00 | 4,000' Hard Surface |

Source: *Air Operations Manual*, NAS, JRB Fort Worth, Instruction 3710.1B, 4 May 1999.



The U.S. Navy recognizes three APZs for Class B runways: the Clear Zone, APZ I and APZ II, which are defined as follows:

• Clear Zone - The trapezoidal area lying immediately beyond the end

of the runway and outward along the extended runway center line for a distance of 3,000 feet. For U.S. Navy installations, the dimensions are 1,500 feet in width at the runway threshold and 2,284 feet in width at its outer edge. The Clear Zone is required for all active runway ends and represents the highest potential for aircraft accidents.

- Accident Potential Zone I - The rectangular area beyond the Clear Zone which still has a measurable potential for aircraft accidents relative to the Clear Zone. This zone is typically provided under flight tracks which experience 5,000 or more annual operations. APZ I is typically 3,000 feet in width by 5,000 feet in length, and may be either rectangular or curved to conform to the shape of the predominant flight track.

- Accident Potential Zone II - The rectangular area beyond the APZ I (or Clear Zone if APZ I is not used) which has a measurable potential for aircraft accidents relative to APZ I or the Clear Zone. APZ II is provided whenever an APZ I is required. The dimension of this zone is typically 3,000 feet in width by 7,000 feet in length, and as with APZ I may be curved to correspond with the predominant flight track.

Figure V-2 depicts APZs for NAS, JRB Fort Worth, as determined by runway usage and flight track data found in Section III, Background. While Clear Zones are established for all runways, APZ I and APZ II are established only for those flight tracks or combinations of closely aligned flight tracks which are projected to experience 5,000 or more annual

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operations. At NAS, JRB Fort Worth, there are no individual flight tracks

that received greater than 5,000 annual operations. However, the overlapping paths of various flight tracks produced straight out APZs at each end of Runway 17/35.

**2. Helicopters**

Although DoD provides separate guidance for rotary wing aircraft (helicopters) for the purpose of defining accident potential areas, the resulting APZs are encompassed by those for fixed wing aircraft.

## 6. AICUZ

### A. AICUZ FOOTPRINT

The AICUZ footprint is a composite image incorporating 1) the geographical expanse within the 65 Ldn noise contour and 2) the primary surface, clear zones and APZs. The superimposed noise exposure levels and APZ boundaries create eleven potential subzones containing various levels of noise and accident potential exposure. The AICUZ footprint is shown in Figure VI-1, and encompasses approximately 11,870 acres, including base property.

### B. LAND USE COMPATIBILITY IN NOISE ZONES

In conjunction with the analysis of noise exposure and anticipated community response, a designation of land uses compatible with the various noise zones has been made. The compatibility of a particular land use with different levels of sound is a function of the sensitivity to noise of the various human activities that occur in that land use. The compatibility of a residential land use in an area, for example, depends upon the sensitivity to sound of a variety of human activities such as sleeping, eating and casual conversation.

The DoD and Navy have developed guidelines for land uses which are acceptable within noise exposure zones. These guidelines are contained in the Federal Interagency Committee on Aviation Noise (FICAN) “Federal Agency Review of

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Selected Airport Noise Analysis Issues" (August 1992). This document is used by the DoD, Department of Transportation (DOT), Environmental Protection Agency (EPA), Department of Housing and Urban Development (HUD), and Department of Veterans Administration (VA). Table 6-1, Suggested Land Use Compatibility in Noise Zones, shows the land uses which would be best suited in various noise zones. This table is derived from OPNAVINST 11010.36A, and can be used to identify the incompatible land uses in the affected area.

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**C. LAND USE COMPATIBILITY IN ACCIDENT POTENTIAL ZONES** The compatibility of land uses in accident potential zones is primarily a function of type and intensity of use - in terms of the number of people potentially exposed. Those uses more compatible in an APZ are those which have no permanent improvements and do not result in significant population concentrations. In the Clear Zone, only uses free of obstruction are desirable; in APZ I, uses which do not have a high concentration of density or activity are acceptable although there may be some above-ground improvements; in APZ II, the risk of exposure to accidents is less, allowing a greater range of compatible activities.

Table VI-2, Suggested Land Use Compatibility in Accident Potential Zones, can be used to identify the incompatibilities of existing and projected land uses in the affected area. The degree to which each of the specified uses is compatible is determined by an evaluation of the characteristics of the use, including dwelling unit and population density, and ground coverage.

**D. LAND USE SUITABILITY IN AICUZ**

Compatible land use objectives are derived from the suggested land use suitability tables for noise and APZs. To find the recommended suitability of a particular land use for any AICUZ subzone, locate that use on both the Noise and APZ Suggested Land Use Tables. Both tables apply, and where conflicting guidance appears, the more restrictive criteria takes precedence.

**E. CHANGES IN LAND USE COMPATIBILITY GUIDELINES** The previous versions of noise/land use guidelines described general land use categories and

four classifications of compatibility. The previous classes were: Clearly Acceptable, Normally Acceptable, Normally Unacceptable, and Clearly Unacceptable.



**TABLE VI-2**

**SUGGESTED LAND USE COMPATIBILITY IN ACCIDENT POTENTIAL ZONES**

| LAND USE | | CLEAR ZONE | APZ I | APZ II |
|---|---|---|---|---|
| SLUCM NO. | NAME | | | |
| 10 | Residential | | | |
| 11 | Household units | | | |
| 11.11 | Single units; detached | N | N | Y[1] |
| 11.12 | Single units; semidetached | N | N | N |
| 11.13 | Single units; attached row | N | N | N |
| 11.21 | Two units; side-by-side | N | N | N |
| 11.22 | Two units; one above the other | N | N | N |
| 11.31 | Apartments; walk up | N | N | N |
| 11.32 | Apartments; elevator | N | N | N |
| 12 | Group quarters | N | N | N |
| 13 | Residential hotels | N | N | N |
| 14 | Mobile home parks or courts | N | N | N |
| 15 | Transient lodgings | N | N | N |
| 16 | Other residential | N | N | N[1] |
| 20 | Manufacturing | | | |
| 21 | Food & kindred products; manufacturing | N | N[2] | Y |
| 22 | Textile mill products; manufacturing | N | N[2] | Y |
| 23 | Apparel and other finished products made from fabrics, leather, and similar materials; manufacturing | N | N | N[2] |
| 24 | Lumber and wood products (except furniture); manufacturing | N | Y[2] | Y |
| 25 | Furniture and fixtures; manufacturing | N | Y[2] | Y |

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| 26 | Paper & allied products; manufacturing | N | Y[2] | Y |
| 27 | Printing, publishing, and allied industries | N | Y[2] | Y |
| 28 | Chemicals and allied products; manufacturing | N | N | N[2] |
| 29 | Petroleum refining and related industries | N | N | N |
| 30 | Manufacturing | | | |
| 31 | Rubber and misc. plastic products; manufacturing | N | N[2] | N[2] |
| 32 | Stone, clay and glass products; manufacturing | N | N[2] | Y |
| 33 | Primary metal industries | N | N[2] | Y |



**TABLE VI-2**

**SUGGESTED LAND USE COMPATIBILITY IN ACCIDENT POTENTIAL ZONES**

| LAND USE | | CLEAR ZONE | APZ I | APZ II |
|---|---|---|---|---|
| SLUCM NO. | NAME | | | |
| 34 | Fabricated metal products; manufacturing | N | N[2] | Y |
| 35 | Professional, scientific, and controlling instruments; photographic and optical goods; watches and clocks - manufacturing | N | N | N[2] |
| 39 | Miscellaneous manufacturing | N | Y[2] | Y[2] |
| 40 | Transportation, communication, and utilities | | | |
| 41 | Railroad, rapid rail transit and street railway transportation | N[3] | Y[4] | Y |
| 42 | Motor vehicle transportation | N[3] | Y | Y |
| 43 | Aircraft transportation | N[3] | Y[4] | Y |
| 44 | Marine craft transportation | N[3] | Y[4] | Y |
| 45 | Highway & street right-of-way | N[3] | Y | Y |
| 46 | Automobile parking | N[3] | Y[4] | Y |
| 47 | Communication | N[3] | Y[4] | Y |
| 48 | Utilities | N[3] | Y[4] | Y |
| 49 | Other transportation, communication and utilities | N[3] | Y[4] | Y |
| 50 | Trade | | | |
| 51 | Wholesale trade | N | Y[2] | Y |
| 52 | Retail trade - building materials hardware and farm equipment | N | Y[2] | Y |

| | | | | |
|---|---|---|---|---|
| 53 | Retail trade - general merchandise | N | N[2] | Y[2] |
| 54 | Retail trade - food | N | N[2] | Y[2] |
| 55 | Retail trade - automotive, marine craft, aircraft and accessories | N | Y[2] | Y |
| 56 | Retail trade - apparel and accessories | N | N[2] | Y[2] |
| 57 | Retail trade - furniture, home furnishings and equipment | N | N[2] | Y[2] |
| 58 | Retail trade - eating and drinking establishments | N | N | N[2] |
| 59 | Other retail trade | N | N[2] | Y[2] |
| 60 | Services | | | |
| 61 | Finance, insurance and real estate services | N | N | Y[6] |