WELCOME TO THE PLANNING ADVISORY COMMITTEE

F.A.R. Part 150
Noise Compatibility Study
Williams Gateway Airport

The Williams Gateway Authority and its consultant, Coffman Associates, are pleased to welcome you to the Planning Advisory Committee (PAC) for the F.A.R. Part 150 Noise Compatibility Study. We very much appreciate the interest you have in this project. Over the next several months you will be able to make an important contribution to the study. We believe that you, in turn, will find your participation with the committee to be an interesting and educational experience.

WHAT IS THE ROLE OF THE COMMITTEE?

- **Linkage to the Community** - Each of you represent one or more constituent interests -- neighborhood residents, local businesses, public agencies, and aviation users. We will provide our presentation materials to all PAC members who might wish to volunteer to make presentations to their own constituents. Call the consultants at any time for advice and assistance.

- **Sounding Board** - The consultants need a forum in which to present information, findings, ideas, and recommendations during the study. Everyone involved with the study will benefit from this forum because it allows diverse interests an opportunity to experience the viewpoints, ideas, and concerns of other members directly.

- **Resource** - An airport noise compatibility study is very complex; it has an almost

The PAC will play an important role in the Noise Compatibility Study. We want to benefit from your unique viewpoints, to have access to the people and resources you represent, to work with you in a creative atmosphere, and to gain your support in achieving results. Specifically, your role in the PAC is as follows:

unlimited demand for information. Many of you have access to specialized information and can ensure that it is used in the study to its fullest potential.

- **Think Tank** - "Too many cooks spoil the broth" reflects the difficulty committees have in writing a report. On the other hand, "two heads are better than one" tells us that creative thinking is best accomplished by a group of concerned people who represent a diversity of backgrounds and views on a subject. We need all of the creative input we can get. PAC member ideas have literally "made the difference" on other studies of this type across the country.

- **Critical Review** - The study team needs their work scrutinized closely for accuracy, completeness of detail, clarity of thought, and intellectual honesty. We want you to point out any shortcomings in our work and to help us improve on it.

- **Implementation** - A Part 150 Noise Compatibility Plan depends on the actions of many different agencies and organizations for implementation. Each of you has a unique role to play in implementing the plan and demonstrating leadership among your constituent interests. Inform and educate them about the importance of your effort on their behalf and work with them to see that the final plan is carried out.

WHO IS ON THE COMMITTEE?

Many organizations have been contacted and invited to designate representatives to serve on the Planning Advisory Committee. The attached list shows the broad range of interests to be represented -- local businesses and residents, air traffic controllers, pilots, fixed-base operators, national aviation organizations, and local governments and planning officials.

HOW WILL THE PAC OPERATE?

The PAC will operate as informally as possible -- no rules, no compulsory attendance, no voting, and no offices. The meetings will be conducted by the consultant and will be called at various points in the study (approximately four) when committee input is especially needed. Meetings will be scheduled with sufficient advance notice to permit you to arrange your schedule. We will initially schedule meetings in the afternoon and will continue to do so if the time is generally acceptable.

To keep you informed of the proceedings at the PAC meetings, we will prepare summary minutes and will distribute them prior to the next meeting. These will be particularly helpful if you are unable to attend a meeting.

In the evening after each PAC meeting, we will hold a public information workshop so that we may report to the community at large and elicit their views and input. We invite you to attend these evening workshops. They will be organized to maximize the opportunity for two-way communi-cation. At these important meetings, you will have the chance to hear from local citizens and share your views and expertise with them.

Before each PAC meeting, the consultant will distribute working papers to you. These are draft chapters of the Noise Compatibility Study, and they will be a focus for discussion at the meetings. In addition, we will provide an outline of the

subjects to be covered in the next phase of the project so that you may interject your ideas and concerns and have them addressed in the next working paper.

To help you keep your materials organized, we will give you a study workbook (a three-ring binder with a special cover and tab dividers) to hold working papers, technical information papers, PAC membership lists, meeting notes, and other resource material. Copies of the final reports will also be provided to each committee member at the end of the study.

WHERE CAN YOU GET MORE INFORMATION?

For specific information about the study, please contact:

Trish Shaffstall
Planning Manager
Williams Gateway Airport
6001 South Power Road
Building 41
Mesa, AZ 85206
(602) 988-1013

Jim Harris, P.E.
Project Manager
Coffman Associates, Inc.
11022 N. 28th Drive, Suite 240,
Phoenix, AZ 85029
(602) 993-6999

David Fitz
Technical Manager
Coffman Associates, Inc.
237 N.W. Blue Parkway, Suite 100,
Lee's Summit, MO 64063
(816) 524-3500

SEE YOU AT THE MEETINGS!

Once again, welcome to the PAC and thanks for accepting the invitation to participate. We will do everything we can to make sure your participation is a worthwhile and satisfying experience. All users and neighbors of Williams Gateway Airport will be better served as a result of these efforts.

WILLIAMS GATEWAY AIRPORT PART 150 STUDY PLANNING ADVISORY COMMITTEE (PAC)			
Name and Title	**Representing**	**Address**	**Phone/Fax**
Mr. Gary Adams Director Aeronautics Division	**Arizona Department of Transportation**	255 East Osborn, Ste 101 Phoenix, AZ 85012 Mailing: P.O. Box 13588 Mail Drop 426M Phoenix, AZ 85002-3335	602-294-9144 602-294-9141 f
Mr. Clyde Anderson Planning & Development	**State Land Department**	1616 W. Adams Phoenix, AZ 85007	602-542-2677 602-542-4668 f
Mr. Hamid Arshadi Advanced Planning Director	**Town of Gilbert Community Development**	1025 South Gilbert Road Gilbert, AZ 85296	480-503-6811 602-497-4923 f
Mr. Brian Armstrong Airport Planner	**Airports Division, AWP 611.1 FAA - Western Pacific Region**	PO Box 92007 Worldway Postal Center Los Angeles, CA 90009-2007	310-725-3614 310-536-8601 f
Mr. Dennis Cady Director Planning & Dev. Services Dept.	**Pinal County**	PO Box 2973 Florence, AZ 85232	520-868-6447 520-868-6511 f
Mr. Dave Edens Chief Pilot	**Southwest Airlines**	3800 Sky Harbor Boulevard Phoenix, AZ 85034	602-389-3781 602/286-3776 f
Mr. Urban Giff Community Manager	**Gila River Indian Community**	PO Box 97 Sacaton, AZ 85247	520-562-6050 520-562-3422 f
Ms. Stacy Howard	**Aircraft Owners and Pilots Association**	41695 N. Coyote Road Queen Creek, AZ 85242	480-987-9165 480-987-0352 f
Mr. Terry Isaacson	**Arizona State University - East**	6045 S. Sagewood Mesa, AZ 85212	480-727-3278 480-727-1114 f
Lt. Col. Ken Klesner	**161st Air Refueling Wing**	3200 E. Old Tower Road Phoenix, AZ 85034-7263	602-302-9165 602-302-9199 f
Mr. John Kross Town Planner	**Town of Queen Creek**	22350 S. Ellsworth Road Queen Creek, AZ 85242-9311	480-987-9887 480-987-0109 f

WILLIAMS GATEWAY AIRPORT
PART 150 STUDY
PLANNING ADVISORY COMMITTEE (PAC)

Name and Title	Representing	Address	Phone/Fax
Mr. Lynn Kusy Executive Director	**Williams Gateway Airport Authority**	5835 S. Sossaman Road Mesa, AZ 85212-0919	480-988-1013 480-988-2315 f
Mr. Larry Likes Superintendent	**Higley School District**	15202 S. 170th Street Higley, AZ 85236	480-988-2571
Mr. Gibson McKay	**Home Builders Association**	2111 E. Highland #190 Phoenix, AZ 85016	602-274-6545 602-234-0442 f
Mr. Frank Mizner Planning Director	**City of Mesa**	PO Box 1466 Mesa, AZ 85211-1466	480-644-2181 480-644-2757 f
Mr. Howard Morrison	**Large Property Owner**	690 W. Elliot Road PO Box 464 Gilbert, AZ 85299	602-819-1037 602-818-8235 f
Dr. James Murlless Superintendent	**Queen Creek School District**	20435 S. Ellsworth Queen Creek, AZ 85242	480-987-5938 480-987-9714 f
Mr. Dan Pettyjohn	**Boeing**	6250 S. Taxiway Circle Mesa, AZ 85212-6008	480-891-9612 480-891-9611 f
Mr. Ron Pierce Tower Manager	**Circle Management Services, Inc.** **Barton/ATC - Tower**	6309 S. Taxiway Circle Mesa, AZ 85212	480-988-1710 480-988-9439
Mr. Jack Sellers	**Desert Proving Grounds** **General Motors Corporation**	Box 10100 Mesa, AZ 85216	480-827-5108 480-827-5320 f
Dr. Frank Ramirez	**Chandler-Gilbert Community College**	2626 East Pecos Rd Chandler, AZ 85225-2499	480-732-7125 480-732-7090f
Mr. John Solomon Aviation Director	**City of Phoenix**	3400 Sky Harbor Boulevard Phoenix, AZ 85034-4420	602-273-3321 602-267-0102 f
Mr. George Sullivan Manager	**Arizona Hub, FAA** **Phoenix, TRACON**	2800 Sky Harbor Boulevard Phoenix, AZ 85034	602-379-3684 602-220-4436 f
Mr. James Timm President	**Arizona Pilots Association**	220 E. Ellis Dr. Tempe, AZ 85282	480-839-9187 480-755-4128 f (call first to fax)

WILLIAMS GATEWAY AIRPORT
PART 150 STUDY
PLANNING ADVISORY COMMITTEE (PAC)

Name and Title	Representing	Address	Phone/Fax
Mr. Lou Torres	**Southeast Valley Community Alliance**	4059 E. Redfield Road Higley, AZ 85236	480-632-0034 480-632-0998 f
Mr. Robert Trzepkowski Telecom Real Estate Specialist	**Salt River Project**	Mail Station PAB349 PO Box 52025 Phoenix, AZ 85072-2025	602-236-8173 602-236-8193 f
Mr. Neil Urban Planning Manager	**Maricopa County**	301 W. Jefferson, Ste 300 Phoenix, AZ 85003	602-506-3430 602-506-3601 f
Mr. Glen Van Nimwegen Director, Development Services	**City of Apache Junction**	1001 N. Idaho Road Apache Junction, AZ 85219	480-671-5082 480-671-5102 f
Mr. G. Keith Vaughan Director, Planning & Development	**Gilbert Public Schools**	140 S. Gilbert Road Gilbert, AZ 85296	480-497-3300 480-497-3450 f
Mr. Harry Wolfe	**Maricopa Association of Governments**	302 North 1st Avenue, #300 Phoenix, AZ 85003	602-254-6300 602-254-6490
Ms. Jayne Brenna	**Gilbert Citizen Rep.**	4225 E. San Angelo Ave Higley, AZ 85236	480-981-5786 480-981-0712 f
Mr. Paul Hollar	**Town of Gilbert Citizen**	3940 E. Park Court Gilbert, AZ 85234	480-813-7621 520-473-7012 f
Ms. Georgette Baggett	**Mesa Citizen Rep.**	7704 East Portobello Ave Mesa, AZ 85212	480-838-7772 ext. 121
Mr. Bryan Hubbard	**City Of Mesa Citizen**	7416 E. Lobo Mesa, AZ 85208	480-926-0122 480-926-9178 f
Ms. Bev Selvage	**City of Mesa Citizen**	2627 S. Hibiscus Mesa, AZ 85208	480-380-7493
Ms. Silvia Centoz.	**Town of Queen Creek Citizen Representative**	26226 S. Hawes Queen Creek, AZ 85242	480-987-3933 480-987-3933 f
Mr. David Johnston	**Queen Creek Citizen Representative**	19115 East Via del Verde Queen Creek, AZ 85242	480-987-3536 480-987-0109 f

Appendix B
COORDINATION, CONSULTATION, AND PUBLIC INVOLVEMENT

As part of the planning process, the public, airport users, and local, state, and Federal agencies were given the opportunity to review and comment on the Noise Compatibility Program and supporting documentation. Materials prepared by the consultant were submitted for local review, discussion, and revision at several points during the process.

Much of the local coordination was handled through a special study committee formed specifically to provide advice and feedback on the Part 150 Noise Compatibility Study. Known as the Planning Advisory Committee (PAC), it included representatives of all affected groups, including local residents, airport users, officials from the cities of Apache Junction, Mesa, and Tempe, the towns of Gilbert and Queen Creek, the counties of Maricopa and Pinal, the Gila River Indian Community, the Maricopa Association of Governments, the State of Arizona Department of Transportation, air traffic control, local businesses, school districts, airlines, aviation organizations, and the Federal Aviation Administration (FAA).

The PAC reviewed and commented on the working papers prepared by the consultant and provided guidance for the next phases of the study. Most comments were made orally during the meetings, but some were followed by written confirmation. All comments were appropriately incorporated into this document or otherwise addressed.

The PAC met four times during the preparation of the Noise Compatibility Program. The first meeting was held on May 13, 1999 to introduce the participants, describe the study process, discuss goals and objectives, and distribute the study workbooks, and hear comments and views pertaining to conditions at the airport.

The second PAC Meeting was held on August 25, 1999. Chapters One, Inventory, Two, Aviation Noise, and Three, Noise Impacts were discussed. Many questions and comments were raised at the meeting. A number of questions related to the size of the noise contours and the control of residential development around the airport. Additional discussion related to the noise analysis and aircraft activity at the airport.

Technical Conferences relating to aviation and land use issues were held on November 17, 1999. The Aviation Technical Conference was attended by representatives from the FAA, airlines, air traffic control, airport users, and Arizona State University. A worksheet listing potential noise abatement techniques was distributed. Discussions included the status of current noise abatement procedures and the potential implementation of additional procedures.

The Land Use Technical Conference was attended by representatives of the cities of Following the PAC meetings held on August 25, 1999, January 31, 2000, and June 6, 2000 and the general public was invited to a Public Information Workshop. These workshops were structured as an informal open-house, with display boards and information posted throughout the meeting room. These meetings allowed citizens to acquire information about the F.A.R. Part 150 Study process, baseline noise analysis, alternative analysis, proposed recommendations, ask questions, and express concerns. These meetings also were intended to encourage two-way communication between the airport staff, consultants and local citizens.

Apache Junction and Mesa, the Town of Queen Creek, and the counties Maricopa and Pinal, local school districts and land owners. Discussions primarily focused on the adoption of public disclosure and proposed zoning amendments.

The third PAC meeting, held on January 31, 2000 opened with an explanation of the Noise Compatibility Program as the second portion to a complete Part 150 Study. The working papers for Noise Abatement Alternatives and Land Use Alternatives were presented. This facilitated a number of discussions about the use of the airport's calm wind runway use program. Additional discussions focused on land use compatibility and the use of aircraft procedural turns.

Chapter Six, , the Noise Compatibility Program, was the focus of discussion at the final PAC meeting held on June 6, 2000. Much of this meeting was devoted to methods of implementation for the noise abatement and land use alternatives presented. The meeting commenced with a discussion of methods to effectively acquire, categorize, and monitor and noise complaints.

The Noise Compatibility Study process also included a formal public hearing. This hearing, held on September 6, 2000, offered individuals an opportunity to provide testimony as part of the public record in a controlled setting. The hearing also offered the public another venue for asking questions pertaining to the study's proposed noise abatement, land use management, and implementation recommendations. Comments via

written or oral testimony were evaluated and responded to in the study's supporting documentation.

On November 16, 2000, the Noise Compatibility Program was brought before the Williams Gateway Airport Authority to request its approval for submission to the FAA. The Airport Authority unanimously approved the program for submission (Resolution 00-55).

In addition to these formal meetings, many written and verbal contacts were made between project management staff and officials of local and Federal agencies, representatives of various aviation user groups, and local residents. These were related to the day-to-day management of the project, as well as the resolution of specific questions and concerns arising from the working papers.

Appendix C
IMPLEMENTATION MATERIALS

The materials in this appendix are for use in implementing the Noise Compatibility Program for Williams Gateway Airport and include the following:

- National Business Aviation Association (NBAA) Noise Abatement Procedures;
- "Noise Awareness Steps" published by the Aircraft Owners and Pilots Association (AOPA);
- Federal Aviation Administration Advisory Circular 91-53A Noise Abatement Departure Profiles;
- Sample Letter of Agreement for Helicopter Routes;
- Model Subdivision Regulations Amendment;
- Maricopa Association of Governments Sound Insulation Standards; and
- Aircraft Noise Disclosure Statement.

AIRCRAFT OWNERS AND PILOTS ASSOCIATION
(AOPA)
NOISE AWARENESS STEPS

Following are some general guidelines and techniques to minimize the noise impact produced by aircraft operating near the ground:

1. If practical, avoid noise-sensitive areas such as residential areas; open-air assemblies (e.g., sporting events and concerts), and national park areas. Make every effort to fly at or above 2,000 feet over the surface of such areas when overflight cannot be avoided.

2. Consider using a reduced power setting if flight must be low because of cloud cover or overlying controlled airspace or when approaching the airport of destination. Propellers generate more noise than engines; flying with the lowest practical rpm setting will reduce the aircraft's noise level substantially.

3. Perform stalls, spins, and other practice maneuvers over uninhabited terrain.

4. Many airports have established specific noise abatement procedures. Familiarize yourself and comply with these procedures.

5. Work with airport managers and fixed-base operators to develop procedures to reduce the impact on noise-sensitive areas.

6. To contain aircraft noise within airport boundaries, avoid performing engine runups at the ends of runways near housing developments. Instead, select a location for engine runup closer to the center of the field.

7. On takeoff, gain altitude as quickly as possible without compromising safety. Being takeoffs at the start of a runway, not at an intersection.

8. Retract the landing gear either as soon as a landing straight ahead on the runway can no longer be accomplished or as soon as the aircraft achieves a positive rate of climb. If practical, maintain best-angle-of-climb airspeed until reaching 50 feet or an altitude that provides clearance from terrain or obstacles. Then accelerate to best-rate-of-climb airspeed. If consistent with safety, make the first power reduction at 500 feet.

9. Fly a tight landing pattern to keep noise as close to the airport as possible. Practice descent to the runway at low power settings and with as few power changes as possible.

10. If a VASI or other visual approach guidance system is available, use it. These devices will indicate a safe glidepath and allow a smooth, quiet descent to the runway.

11. If possible, do not adjust the propeller control for flat pitch on the downwind leg; instead, wait until short final. This practice not only provides a quieter approach, but also reduces stress on the engine and propeller governor.

12. Avoid low-level, high-power approaches, which not only create high noise impacts, but also limit options in the event of engine failure.

Note: These recommendations are general in nature; some may not be advisable for every aircraft in every situation. No noise reduction procedure should be allowed to compromise flight safety.

Source: *AOPA's Aviation USA - 1994*

SAMPLE LETTER OF AGREEMENT

HELICOPTER DEPARTURE AND ARRIVAL PROCEDURES

1. PURPOSE. This letter of agreement specifies responsibilities, defines terms, and establishes procedures to be used between _____ Tower and signatory operators for control and operation of helicopters operating within the _____ Class ____ Airspace under VFR and Special VFR weather conditions.

2. CANCELLATION. This Letter of Agreement cancels the Letter of Agreement, _____.

3. SCOPE. Unless otherwise coordinated and approved, the procedures contained herein shall be used by helicopter pilots under the jurisdiction of the signatories of this agreement while conducting flights to or from locations on _____ Airport and within the _____ Class ____ Airspace. The provisions of this agreement are applicable only when _____ Tower is in operation.

4. RESPONSIBILITIES.

a. Helicopter company signatories to this letter of agreement shall be responsible to ensure each pilot, operating a helicopter under their jurisdiction, is thoroughly briefed, is familiar with, and can demonstrate a working knowledge of the procedures contained herein.

b. Helicopter company signatories to this letter of agreement shall be responsible to secure, from the appropriate party, approval to depart, maneuver, and arrive within non-movement areas.

c. _____ Tower shall provide air traffic and advisory services in response to operational requests and as required by immediate circumstances.

5. DEFINITION OF APPLICABLE TERMS.

a. Movement Area. The runways and taxiways utilized for taxiing/hover taxiing, air taxiing, takeoff and landing of aircraft, exclusive of loading ramps and parking areas. Specific approval from the tower is required for entry onto the movement area.

b. Non-movement Area. Ramp, Heliport, Auto-Rotation Pad, and loading area, not controlled by the tower.

c. Auto-rotation pad. *Enter Location Description*.

d. Heliport. Designated helicopter arrival and departure pad located immediately *Enter Location Description*.

e. Reference Points:

(1) North Point – *Enter Location Description*, used in all procedures described in this agreement.

(2) South Point – *Enter Location Description*, used only by the east and south procedures described in this agreement.

f. Transition – airport ingress/egress routes are referred to as north transition (Alpha) and south transition (Bravo).

g. Standard departure/arrival procedures – procedures for operations to/from the north and south reference points.

h. "departure/arrival will be at your own risk" – a phrase used by the tower approving a takeoff or landing from the heliport and any other non-movement area not clearly visible from the tower.

6. PROCEDURES. All departure and arrival profiles are a combination of two phases of flight, a transition phase to egress or ingress the airport and the departure and arrival phase.

a. Helicopters shall:

(1) Use frequency _____, unless otherwise specified by Tower.

(2) State the following on initial contact:

(a) Departures – position, transition and standard departure procedure.

(b) Arrivals – position.

(c) Operations not covered by this agreement – position and specific service request.

(3) Operations, which will cross the runway, shall not be made until specifically authorized by the control tower, see paragraph 6b(4).

(4) Apply internally developed noise abatement procedures, particularly while conducting operations to the north, south, and west.

b. _____ Tower shall:

(1) Issue ATC clearances to aircraft operating to/from movement area.

(2) Approve a pilot's request to operate within the _____ Class ____ Airspace. Approve takeoff and/or landing from a non-movement area by stating, " . . . at your own risk", followed by applicable traffic and/or instructions, as necessary, or

(3) Issue traffic advisories to resolve conflicts within the Class ____ airspace, when appropriate, and as time permits.

(4) Issue a specific ATC clearance, to cross the runways when a departure or arrival profile crosses the airport.

7. DEPARTURE TRANSITIONS.

(a) Alpha – *Enter Location Description*.

(b) Bravo – *Enter Location Description*.

8. ARRIVAL TRANSITIONS. Arriving helicopters will announce transition route prior to reaching North Point.

(a) Alpha – *Enter Location Description*.

(b) Bravo – *Enter Location Description*.

9. STANDARD DEPARTURE PROCEDURES AND ALTITUDE. All standard departure routes originate at *Enter Location Description*.

(a) North – *Enter Location Description*.

(b) East – *Enter Location Description*.

(c) South – *Enter Location Description*.

(d) West – *Enter Location Description*.

10. STANDARD ARRIVAL PROCEDURES AND ALTITUDES. All standard arrival procedures terminate at *Enter Location Description*.

(a) North Arrival – *Enter Location Description*.

(b) East Arrival – *Enter Location Description*.

(c) South Arrival – *Enter Location Description*.

(d) West Arrival – *Enter Location Description*.

MODEL SUBDIVISION REGULATIONS AMENDMENT

SECTION 1.0 PURPOSE. This chapter is intended to protect the public health, safety and welfare by regulating development and land use within noise sensitive areas and airport hazard areas; to ensure compatibility between Williams Gateway Airport and surrounding land uses; and to protect the Airport from incompatible encroachment.

SECTION 2.0 DEFINITIONS.

2.1 Airport Planning Area: The area currently exposed to aircraft noise and low aircraft overflights and at risk of being exposed to aircraft noise and low overflights over the long-term future. It is presented in the Noise Compatibility Plan. See the F.A.R. Part 150 Noise Compatibility Study for Williams Gateway Airport for more information.

2.2. Day-Night Sound Level (DNL): The 24-hour average sound level, in decibels, for the period from midnight to midnight, obtained after the addition of ten decibels to sound levels for the periods between midnight and 7 a.m. and between 10 p.m. and midnight, local time, as averaged over one year. It is the Federal Aviation Administration's standard metric for determining the cumulative exposure of individuals to noise.

2.3 DNL Contour: A line linking together a series of points of equal cumulative noise exposure based on the DNL metric. Such contours are developed based on aircraft flight patterns, number of daily aircraft operations by type of aircraft and time of day, noise characteristics of each aircraft, and typical runway usage patterns.

2.4. Decibel (dB): A unit of measure of a sound expressed from a calibrated sound level meter using an A-level weighting scale.

2.5 Structure: Any object, whether permanent or temporary, including, but not limited to, a building, tower, crane, smokestack, earth formation, transmission line, flagpole, or ship mast, and includes a mobile object.

SECTION 3.0 AREA OF APPLICABILITY. For purposes of this chapter, the standards and requirements provided herein shall apply within the Airport Planning Area.

SECTION 4.0 PLAT NOTICE. A notice of potentially high aircraft noise levels shall be affixed to and recorded with the final plat (or for a minor subdivision, the deed) for properties in the Airport Planning Area. The notice shall be worded as follows:

> "**NOISE WARNING** - All or part of this property is in an area potentially subject to aircraft noise levels high enough to annoy users of the property and interfere with its unrestricted use. Contact Williams Gateway Airport Director for information regarding the most recently calculated levels of current and forecast aircraft noise levels on the property."

SECTION 5.0 AVIGATIONAL EASEMENT. An avigational easement shall be granted to the Williams Gateway Airport Authority before approval of the final plat or deed for all subdivisions where required by the _____ Zoning Ordinance.

SECTION 6.0 FAIR DISCLOSURE AGREEMENT. For all subdivisions, a fair disclosure agreement shall be filed whereby the owner and his or her agents agree fully to disclose to prospective buyers of the property the potential airport noise impacts to which the property may be subject. This agreement shall be written and recorded as a covenant running with the land, binding all succeeding owners of the property within the subdivision.

MARICOPA ASSOCIATE OF GOVERNMENT
SOUND INSULATION STANDARDS

SECTION 1215. DEFINITIONS

In this ordinance, unless the context otherwise requires:

"ASTM (American Society for Testing and Materials)" means an organization which develops and publishes recommended practices and standards for a broad range of testing and material properties issues.

"A-WEIGHTED SOUND LEVEL" means a quantity, in decibels, read from a standard sound level meter which discriminates against the lower frequencies to which the ear is less sensitive. The A-weighted scale attempts to approximate the auditory sensitivity of the human ear.

"DAY-NIGHT AVERAGE SOUND LEVEL (DNL)" means the A-weighted equivalent continuous sound exposure for a 24-hour period with a 10 dB adjustment added to sound levels occurring during nighttime hours (10 p.m. to 7 a.m.)

"INTERIOR NOISE LEVEL" means the sound level of noise in any habitable room with windows and doors closed.

"NOISE CONTOURS" mean lines which connect points subject to equal noise levels expressed in terms of average daily noise over a 24-hour period.

"R-VALUE" means insulation properties of an assembly. Insulation properties are further defined as the ability to reduce the factor of heat transmission or loss.

"SOUND TRANSMISSION CLASS (STC)" means a single-number rating for describing sound transmission loss of a wall, roof, floor, window, door, partition, or other individual building components or assemblies.

SECTION 1217. APPLICATION TO NEW BUILDINGS

The criteria of this ordinance establish the minimum requirements for acoustic design of the exterior envelope of buildings and for through-the-wall ventilation (HVAC) units and their parts. These requirements shall apply to all new buildings and alterations for first occupancy after October 1, 1996 that are located on property on which the average sound level is sixty-five decibels or greater. This noise level is defined by the noise contours for Luke Air Force Base prepared as a part of the 1988 Maricopa Association of Governments Westside Joint Land Use Study. The criteria of this ordinance do not apply to ancillary buildings used in agricultural land use.

SECTION 1219. APPLICATION TO EXISTING BUILDINGS

- Additions may be made to existing buildings without making the entire building comply with all the requirements of this ordinance for new construction.

- If the gross floor area of a building is expanded by less than fifty percent, the requirements of this section apply only to the area of expansion. If the gross floor area of a non-residential building is expanded by fifty percent or more, the requirements of this section apply to the entire building.

- Any change in occupancy or use of a building shall not be permitted unless the building or portion of the building complies with this ordinance.

SECTION 1221. PLANS AND SPECIFICATIONS

The plans and specifications shall show in sufficient detail all pertinent data and features of the building and the equipment and systems, as herein governed, including, but not limited to: exterior envelope component materials; STC ratings of applicable component assemblies; R-values of applicable insulation materials; size and type of apparatus and equipment; equipment and system controls and other pertinent data to indicate conformance with the requirements herein.

SECTION 1223. ALTERNATE MATERIALS AND METHODS OF CONSTRUCTION

- The provisions of this ordinance are not intended to prevent the use of any material or method of construction not specifically prescribed by this ordinance, provided any alternative has been approved and its use authorized by the building official.

- The building official may approve any such alternate, provided the building official finds that the proposed design is satisfactory and complies with the provisions of this ordinance and that the material or method of construction is, for the purpose intended, at least the equivalent of that prescribed in this ordinance in noise level reduction.

- The building official shall require that sufficient evidence or proof be submitted by a licensed architect or engineer to substantiate any claims that may be made regarding the use of alternative materials and methods. The details of any action granting approval of an alternate shall be recorded and entered in the files of the county, city, or town.

SECTION 1225. BUILDING REQUIREMENTS FOR A NOISE LEVEL REDUCTION OF 25 dB

Compliance with Section 1231 through Section 1239 in Appendix A shall be deemed to meet requirements for a minimum noise level reduction (NLR) of 25 decibels.

SECTION 1227. BUILDING REQUIREMENTS FOR A NOISE LEVEL REDUCTION OF 30 dB

Compliance with Section 1241 through Section 1249 in Appendix A shall be deemed to meet requirements for a minimum noise level reduction (NLR) of 30 decibels.

SECTION 1229. BUILDING REQUIREMENTS FOR A NOISE LEVEL REDUCTION OF 35 dB

Compliance with Section 1251 through Section 1259 in Appendix A shall be deemed to meet requirements for a minimum noise level reduction (NLR) of 35 decibels.

SOUND ATTENUATION STANDARDS
April 9, 1996

	25 dB Reduction (Required Within 65-70 DNL Noise Contours)	30 dB Reduction (Required within 70-75 DNL Noise Contours)	35 dB Reduction (Required within 75-80 DNL Noise Contours)
General	Section 1231 a. Brick veneer, masonry blocks, or stucco exterior walls shall be constructed airtight. All joints shall be grouted or caulked airtight.	Section 1241 a. Brick veneer, masonry blocks, or stucco exterior walls shall be constructed airtight. All joints shall be grouted or caulked airtight.	Section 1251 a. Brick veneer, masonry blocks, or stucco exterior walls shall be constructed airtight. All joints shall be grouted or caulked airtight.
	b. At the penetration of exterior walls by pipes, ducts, or conduits, the space between the wall and pipes, ducts, or conduits shall be caulked or filled with mortar.	b. At the penetration of exterior walls by pipes, ducts, or conduits, the space between the wall and pipes, ducts, or conduits shall be caulked or filled with mortar.	b. At the penetration of exterior walls by pipes, ducts, or conduits, the space between the wall and pipes, ducts, or conduits shall be caulked or filled with mortar.
	c. Window and/or through-the-wall ventilation units (HVAC) shall not be used.	c. Window and/or through-the-wall ventilation (HVAC) units shall not be used.	c. Window and/or through-the-wall ventilation units shall not be used.
	d. Through-the-wall/door mail boxes shall not be used.	d. Through-the-wall/door mail boxes shall not be used.	d. Through-the-wall/door mail boxes shall not be used.
	e. All sleeping spaces shall be provided with a sound-absorbing ceiling system and carpeted floors.	e. All sleeping spaces shall be provided with a sound-absorbing ceiling system and a carpeted floor.	e. All sleeping spaces shall be provided with a sound-absorbing ceiling system and a carpeted floor.
		f. Operational vented fireplaces shall not be used.	f. Operational vented fireplaces shall not be used.

	25 dB Reduction (Required Within 65-70 DNL Noise Contours)	30 dB Reduction (Required within 70-75 DNL Noise Contours)	35 dB Reduction (Required within 75-80 DNL Noise Contours)
Exterior Walls	Section 1233 1. Exterior walls, other than as described in this section, shall have a laboratory sound transmission class rating of at least STC 39;	Section 1243 1. Exterior walls, other than as described in this section, shall have laboratory sound transmission class rating of at least STC 44;	Section 1253 1. Exterior walls, other than as described in this section shall have a laboratory sound transmission class rating of at least STC 49;
	2. Masonry walls having a weight of at least 25 pounds per square foot do not require a furred (stud) interior wall. At least one surface of concrete block walls shall be plastered or painted with heavy "bridging" paint.	2. Masonry walls having a weight of at least 40 pounds per square foot do not require a furred (stud) interior wall. At least one surface of concrete block walls shall be plastered or painted with heavy "bridging" paint.	2. Masonry walls having a weight of at least 75 pounds per square foot do not require a furred (stud) interior wall. At least one surface of concrete block walls shall be plastered or painted with heavy "bridging" paint.
	3. Stud walls shall be at least 4 inches in nominal depth and shall be finished on the outside with solid sheathing under an approved exterior wall finish; siding-on-sheathing, stucco or brick veneer.	3. Stud walls shall be at least 4 inches in nominal depth and shall be finished on the outside with solid sheathing under an approved exterior wall finish: siding on sheathing, stucco or brick veneer.	3. Stud walls shall be at least 4 inches in nominal depth and shall be finished on the outside with solid sheathing under an approved exterior wall finish: siding-on-sheathing, stucco, or brick veneer.
	1. Interior surface or the exterior walls shall be of gypsum board or plaster at least ½inch thick, installed on the studs.	1. Interior surface of the exterior walls shall be of gypsum board or plaster at least ½inch thick, installed on the studs. The gypsum board or plaster may be fastened rigidly to the studs if the exterior	1. Interior surface of the exterior walls shall be of gypsum board or plaster at least 5/8 inch thick installed on the studs. The gypsum board or plaster may be fastened rigidly to the

		is brick veneer or stucco. If the exterior is siding-on-sheathing, the interior gypsum board or plaster must be fastened resiliently to the studs.	studs if the exterior is brick veneer or stucco. If the exterior is siding-on-sheathing, the interior gypsum board or plaster must be fastened resiliently to the studs or double thickness must be used.

	25 dB Reduction (Required Within 65-70 DNL Noise Contours)	30 dB Reduction (Required within 70-75 DNL Noise Contours)	35 dB Reduction (Required within 75-80 DNL Noise Contours)
	2. Continuous composition board, plywood, or gypsum board sheathing at least ¼inch thick shall cover the exterior side of the wall studs behind wood or metal siding. Asphaltic or wood shake shingles are acceptable in lieu of siding.	2. Continuous composition board, plywood, or gypsum board sheathing at least 3/4 inch thick shall cover the exterior side of the wall studs behind wood or metal siding. The sheathing and facing shall weigh at least 4 pounds per square foot.	2. Continuous composition board, plywood, or gypsum board sheathing at least 1 inch thick shall cover the exterior side of the wall studs. The sheathing and facing shall weigh at least 4 pounds per square foot.
	3. Sheathing panels shall be butted tightly and covered on the exterior with overlapping building paper. The top and bottom edges of the sheathing shall be sealed.	3. Sheathing panels shall be butted tightly and covered on the exterior with overlapping building paper. The top and bottom edges of the sheathing shall be sealed.	3. Sheathing panels shall be butted tightly and covered on the exterior with overlapping building paper. The top and bottom edges of the sheathing shall be sealed.
	4. Insulation material at least R-11 shall be installed continuously throughout the cavity space behind the exterior sheathing and between wall studs. Insulation shall be glass fiber or mineral wool.	4. Insulation material at least R-15 shall be installed continuously throughout the cavity space behind the exterior sheathing and between wall studs. Insulation shall be glass fiber or mineral wool.	4. Insulation material at least R-19 shall be installed continuously throughout the cavity space behind the exterior sheathing and between wall studs. Insulation shall be glass fiber or mineral wool.
Exterior Windows	Section 1234 1. Windows other than as described in this section shall have a laboratory sound transmission class rating of at least STC-28;	Section 1244 1. Windows other than as described in this section shall have a laboratory sound transmission class rating of at least STC-	Section 1254 1. Windows other than as described in this section shall have a laboratory sound transmission class rating of at least STC-

	28;	33;	38;
	2. Glass shall be at least 3/16 inch thick, double glazed.	2. Windows shall be double glazed with panes at least 3/16 inch thick. Panes of glass shall be separated by a minimum ½inch airspace.	2. Glass of double glazed windows shall be at least 3/16 inch thick. Panes of glass shall be separated by a minimum ½inch airspace and shall not be equal in thickness.

	25 dB Reduction (Required Within 65-70 DNL Noise Contours)	30 dB Reduction (Required within 70-75 DNL Noise Contours)	35 dB Reduction (Required within 75-80 DNL Noise Contours)
	3. All operable windows shall be weatherstripped and airtight when closed so as to conform to an air infiltration test not to exceed 0.5 cubic foot per minute per foot of crack length in accordance with ASTM E-283-65-T.	3. Double-glazed windows shall employ fixed sash or efficiently weather-stripped, operable sash. The sash shall be rigid and weatherstripped with material that is compressed airtight when the window is closed so as to conform to an infiltration test not to exceed 0.5 cubic foot per minute per foot of crack length in accordance with ASTM E-283-65-T.	3. Double-glazed windows shall employ fixed sash or efficiently weatherstripped, operable sash. The sash shall be rigid and weather-stripped with material that is compressed airtight when the window is closed so as to conform to an infiltration test not to exceed 0.5 cubic foot per minute per foot of crack length in accordance with ASTM E-283-65-T.
	4. Glass of fixed sash windows shall be sealed in an airtight manner with a nonhardening sealant or a soft elastomer gasket or glazing tape.	4. Glass of fixed sash windows shall be sealed in an airtight manner with a nonhardening sealant or a soft elastomer gasket or gasket tape.	4. Glass of windows shall be sealed in an airtight manner with nonhardening sealant or a soft elastomer or glazing tape.
	5. The perimeter of window frames shall be sealed airtight to the exterior wall construction with a sealant conforming to one of the following Federal specifications: TT-S-00227, TT-S-00230, or TT-S-00153.	5. The perimeter of window frames shall be sealed airtight to the exterior wall construction with a sealant conforming to one of the following Federal specifications: TT-S-0027, TT-S-00230, or TT-S-00153.	5. The perimeter of window frames shall be sealed airtight to the exterior wall construction with a sealant conforming to one of the following Federal specifications: TT-S-00227, TT-S-00230, or TT-S-00153.
	6. The total area of glass in both windows and	6. The total area of glass of both windows and	6. The total area of glass of both windows and

	doors in sleeping spaces shall not exceed 20% of the floor area.	exterior doors in sleeping spaces shall not exceed 20% of the floor area.	exterior doors in sleeping spaces shall not exceed 20% of the floor area.
Exterior Doors	Section 1235 1. Doors other than as described in this section shall have a laboratory sound transmission class rating of at least STC-28.	Section 1245 1. Doors other than as described in this section shall have a laboratory sound transmission class rating of at least STC-33.	Section 1255 1. Doors other than as described in this section shall have a laboratory sound transmission class rating of at least STC 38.

	25 dB Reduction (Required Within 65-70 DNL Noise Contours)	30 dB Reduction (Required within 70-75 DNL Noise Contours)	35 dB Reduction (Required within 75-80 DNL Noise Contours)
	2. All exterior side-hinged doors shall be solid core wood or insulated hollow metal at least 1-3/4 inches thick and shall be fully weatherstripped.	2. Double door construction is required for all door openings to the exterior. Openings fitted with side-hinged doors shall have one solid core wood or insulated hollow metal door at least 1-3/4 inches thick separated by an airspace of at least 4 inches from another door, which can be a storm door. Both doors shall be tightly fitted and weatherstripped.	2. Double door construction is required for all door openings to the exterior. The doors shall be side-hinged and shall be solid core wood or insulated hollow metal door at least 1-3/4 inches thick, separated by a vestibule or enclosed porch at least 3 feet in length. Both doors shall be tightly fitted and weather-stripped.
	3. Exterior sliding doors shall be weather-stripped with an efficient airtight gasket system with performance as specified in Section 1234 (c). The glass in the sliding doors shall be at least 3/16 inch thick.	3. The glass of double glazed sliding doors shall be separated by a minimum ½inch airspace. Each sliding frame shall be provided with an efficiently airtight weatherstripping material as specified in Section 1244 (c).	3. The glass of double glazed sliding doors shall be separated by a minimum ½inch airspace. Each sliding frame shall be provided with an efficiently airtight weather-stripping material as specified in Section 1254 (c).
	4. Glass in doors shall be sealed in an airtight nonhardening sealant or in a soft elastomer gasket or glazing tape.	4. Glass in all doors shall be at least 3/16 inch thick. Glass in double sliding doors shall not be equal in thickness.	4. Glass of all doors shall be at least 3/16 inch thick. Glass in double sliding doors shall not be equal in thickness.
	5. The perimeter of door frames shall be sealed airtight to the exterior wall construction	5. The perimeter of door frames shall be sealed airtight to the exterior wall construction	5. The perimeter of door frames shall be sealed airtight to the exterior wall construction

	(framing) as described in Section 1234 (e).	(framing) as indicated in Section 1244 (e).	(framing) as indicated in Section 1254 (e).
		6. Glass in doors shall be sealed in an airtight nonhardening sealant or in a soft elastomer gasket or glazing tape.	6. Glass in doors shall be sealed in an airtight nonhardening sealant or in a soft elastomer gasket or glazing tape.

	25 dB Reduction (Required Within 65-70 DNL Noise Contours)	30 dB Reduction (Required within 70-75 DNL Noise Contours)	35 dB Reduction (Required within 75-80 DNL Noise Contours)
Roofs	Section 1236 1. Combined roof and ceiling construction other than described in this section and Section 1237 shall have a laboratory sound transmission class rating of at least STC-39.	Section 1246 1. Combined roof and ceiling construction other than described in this section and Section 1247 shall have a laboratory sound transmission class rating of at least STC-44.	Section 1256 1. Combined roof and ceiling construction other than described in this section and Section 1257 shall have a laboratory sound transmission class rating of at least STC-49.
	2. With an attic or rafter space at least 6 inches deep, and with a ceiling below, the roof shall consist of ½inch composition board, plywood, or gypsum board sheathing topped by roofing as required.	2. With an attic or rafter space at least 6 inches deep, and with a ceiling below, the roof shall consist of 3/4 inch closely butted composition board, plywood, or gypsum board sheathing topped by roofing as required.	2. With an attic or rafter space at least 6 inches deep, and with a ceiling below, the roof shall consist of 1 inch composition board, plywood, or gypsum board sheathing topped by roofing as required.
	3. Open beam roof construction shall follow the energy insulation standard method for batt insulation.	3. Open beam roof construction shall follow the energy insulation standard method for batt insulation, except use 1 inch plywood decking with shakes or other suitable roofing material.	3. Open beam roof construction shall follow the energy insulation standard method for batt insulation, except use 1 inch plywood decking with concrete or clay tiles as roofing material.
	4. If the underside of the roof is exposed, or if the attic or rafter space is less than 6 inches, the roof construction shall have a surface weight of at least 6 pounds per	4. If the underside of the roof is exposed, or if the attic or rafter spacing is less than 6 inches, the roof construction shall have a surface weight of at	4. If the underside of the roof is exposed, or if the attic or rafter spacing is less than 6 inches, the roof construction shall have a surface weight of 9

	square foot. Rafters, joists, or other framing may not be included in the surface weight calculation.	least 9 pounds per square foot. Rafters, joists, or other framing may not be included in the surface weight calculations.	pounds per square foot. Rafters, joists, or other framing may not be included in the surface weight calculation.
	5. Window or dome skylights shall have a laboratory sound transmission class rating of at least STC-28.	5. Window or dome skylights shall have a laboratory sound transmission class rating of at least STC-33.	

	25 dB Reduction (Required Within 65-70 DNL Noise Contours)	30 dB Reduction (Required within 70-75 DNL Noise Contours)	35 dB Reduction (Required within 75-80 DNL Noise Contours)
Ceiling	Section 1237 1. Gypsum board or plaster ceilings at least ½ inch thick shall be provided where required by Section 1236 (b). Ceilings shall be substantially airtight with a minimum of penetrations.	Section 1247 1. Gypsum board or plaster ceilings at least 5/8 inch thick shall be provided where required by Section 1246 (b), above. Ceilings shall be substantially airtight with a minimum of penetrations.	Section 1257 1. Gypsum board or plaster ceilings at least 5/8 inch thick shall be provided where required by Section 1256, above. Ceilings shall be substantially airtight with a minimum of penetrations. The ceiling panels shall be mounted on resilient clips or channels.
	2. Glass fiber or mineral wool insulation at least R-19 shall be provided above the ceiling between joists.	2. Glass fiber or mineral wool insulation at least R-25 shall be provided above the ceiling between joists.	2. Glass fiber or mineral wool insulation at least R-30 shall be provided above the ceiling between joists.
Floors	Section 1238 Openings to any crawl spaces below the floor of the lowest occupied rooms shall not exceed 2% of the floor area of the occupied rooms.	Section 1248 The floor of the lowest occupied rooms shall be slab on fill, below grade, or over a fully enclosed basement or crawl space. All door and window openings in the fully enclosed basement shall be tightly fitted. Crawl space ventilation shall comply with Section 1238.	Section 1258 1. The floor of the lowest occupied rooms shall be slab on fill or below grade.

	25 dB Reduction (Required Within 65-70 DNL Noise Contours)	30 dB Reduction (Required within 70-75 DNL Noise Contours)	35 dB Reduction (Required within 75-80 DNL Noise Contours)
Ventilation	Section 1239 1. A ventilation system shall be installed that will provide the minimum air circulation and fresh air supply requirements for various uses in occupied rooms without the need to open any windows, doors, or other openings to the exterior. The inlet and discharge openings shall be fitted with sheet metal transfer ducts of at least 20 gauge steel, which shall be lined with 1 inch thick coated glass fiber, and shall be at least 5 feet long with one 90 degree bend.	Section 1249 1. A mechanical ventilation system shall be installed that will provide the minimum air circulation and fresh air supply requirements for various uses in occupied rooms without the need to open any windows, doors, or other openings to the exterior. The inlet and discharge openings shall be fitted with sheet metal transfer ducts of at least 20 gauge steel, which shall be lined with 1 inch thick coated glass fiber, and shall be at least 5 feet long with one 90 degree bend.	Section 1259 1. A mechanical ventilation system shall be installed that will provide the minimum air circulation and fresh air supply requirements for various uses in occupied rooms without the need to open any windows, doors, or other openings to the exterior. The inlet and discharge openings shall be fitted with sheet metal transfer ducts of at least 20 gauge steel, which shall be lined with 1 inch thick coated glass fiber, and shall be at least 10 feet long with one 90 degree bend.
	2. Gravity vent openings in attics shall not exceed code minimum in number and size, as practical.	2. Gravity vent openings in attics shall not exceed code minimum in number and size, as practical. The openings shall be fitted with transfer ducts at least 3 feet in length containing internal 1 inch thick coated fiberglass sound-absorbing duct lining. Each duct shall have a lined 90 degree bend	2. Gravity vent openings in attics shall be as close to code minimum in number and size, as practical. The openings shall be fitted with transfer ducts at least 6 feet in length containing internal 1 inch thick coated fiberglass sound-absorbing duct lining. Each duct shall have a lined 90 degree

		in the duct such that there is no direct line-of-sight from the exterior through the duct into the attic.	bend in the duct such that there is no direct line-of-sight from the exterior through the duct into the attic.

	25 dB Reduction (Required Within 65-70 DNL Noise Contours)	30 dB Reduction (Required within 70-75 DNL Noise Contours)	35 dB Reduction (Required within 75-80 DNL Noise Contours)
	3. If a fan is used for forced ventilation, the attic inlet and discharge openings shall be fitted with sheet metal transfer ducts of at least 20 gauge steel, which shall be lined with coated glass fiber 1 inch thick, and shall be at least 5 ft. long with one 90 degree bend.	3. If a fan is used for forced ventilation, the attic inlet and discharge openings shall be fitted with sheet metal transfer ducts of at least 20 gauge steel, which shall be lined with coated glass fiber 1 inch thick, and shall be at least 5 ft. long with one 90 degree bend.	3. If a fan is used for forced ventilation, the attic inlet and discharge openings shall be fitted with sheet metal transfer ducts of at least 20 gauge steel, which shall be lined with 1 inch thick coated glass fiber, and shall be at least 10 ft. long with one 90 degree bend.
	4. All other vent ducts connecting the interior space to the outdoors, shall contain at least a 5-foot length of internal sound-absorbing duct lining. Each duct shall be provided with a bend in the duct such that there is no direct line-of-sight through the duct from the venting cross-section to the room-opening cross-section. Duct lining shall be coated glass fiber duct liner at least 1 inch thick approved and suitable for the intended use.	4. All other vent ducts connecting the interior space to the outdoors, shall contain at least a 10-foot length of internal sound-absorbing duct lining. Each duct shall be provided with a lined 90 degree bend in the duct such that there is no direct line-of-sight through the duct from the venting cross-section to the room opening cross-section. Duct lining shall be coated glass fiber duct liner at least 1 inch thick approved and suitable for intended use.	4. All other vent ducts connecting the interior space to the outdoors, shall contain at least a 10-foot length of internal sound-absorbing duct lining. Each duct shall be provided with a lined 90 degree bend in the duct such that there is no direct line-of-sight through the duct from the venting cross-section to the room-opening cross-section. Duct lining shall be coated glass fiber duct liner at least 1 inch thick approved and suitable for intended use.

	25 dB Reduction (Required Within 65-70 DNL Noise Contours)	30 dB Reduction (Required within 70-75 DNL Noise Contours)	35 dB Reduction (Required within 75-80 DNL Noise Contours)
	5. Domestic range exhaust ducts connecting the interior space to the outdoors shall contain a baffle plate across the exterior termination which allows proper ventilation. The dimensions of the baffle plate should extend at least one diameter beyond the line-of-sight into the vent duct. The baffle plate shall be of the same material and thickness as the vent duct material.	5. Domestic range exhaust ducts connecting the interior space to the outdoors shall contain a self-closing baffle plate across the exterior termination which allows proper ventilation. Each duct shall be provided with a bend in the duct such that there is no direct line-of-sight through the duct from the venting cross-section to the room-opening cross-section. The dimensions of the baffle plate should extend at least one diameter beyond the line-of-sight into the vent duct. The baffle plate shall be made of the same material and thickness as the vent duct material.	5. Domestic range exhaust ducts connecting the interior space to the outdoors shall contain a self-closing baffle plate across the exterior termination which allows proper ventilation. The dimensions of the baffle plate should extend at least one diameter beyond the line-of-sight into the vent duct. The baffle plate shall be of the same material and thickness as the vent duct material. The duct shall be offset such that there is no direct line-of-sight through the duct.
	6. Fireplaces shall be provided with well fitted dampers as required for the type of fuel being used and tightly fitted glass doors.	6. Building heating units with flues or combustion air vents shall be located in a closet or room closed off from the occupied space by doors.	6. Building heating units with flues or combination air vents shall be located in a closet or room closed off from the occupied space by doors.
		7. Doors between occupied space and mechanical equipment	7. Doors between occupied space and mechanical equipment

		areas shall be solid core wood or 20 gauge insulated steel hollow metal at least 1-3/4 inch thick and shall be fully weather-stripped.	areas shall be solid core wood or 20 gauge insulated hollow metal at least 1-3/4 inch thick and shall be fully weatherstripped.

Appendix D
Noise Measurements

AIRCRAFT NOISE MEASUREMENT PROGRAM

A supplemental noise measurement program was conducted over a two-day period from August 25, 1999 through August 26, 1999. The supplemental field measurement program was undertaken to re-measure two monitor sites in which technical problems occurred with the noise monitor equipment.

It must be recognized that field measurements made over a 24-hour period are applicable only to that period of time and may not -- in fact in Information collected during the noise monitoring program included 24-hour measurements for comparison with computer-generated DNL values. DNL -- day-night sound level -- is a measure of cumulative sound energy during a 24-hour period. In addition, all noise occurring from 10:00 p.m. to 7:00 a.m. is assigned a 10 dB penalty because of the greater annoyance many cases, do not -- reflect the average conditions present at the site over a much longer period of time. The relationship between field measurements and computer-generated noise exposure forecasts is analogous to the relationship between weather and climate. While an area may be characterized as having a cool climate, many individual days of high temperatures may occur. In other words, the modeling process derives overall average annual conditions (climate), while field measurements reflect daily fluctuations (weather).

typically caused by nighttime noise. Use of the DNL noise metric in airport noise compatibility studies is required by F.A.R. Part 150. Additional information collected on single event measurements is used as an indicator of typical dBA and Sound Exposure Levels (SEL) within the study area as well as comparative ambient

noise measurements in areas affected by aircraft noise.

ACOUSTICAL MEASUREMENTS

This section provides a technical description of the acoustical measurements which were performed for the Williams Gateway Airport F.A.R. Part 150 Noise Compatibility Study. Described here are the instrumentation, calibration procedures, general maturement procedures, and related data collection items and procedures.

Instrumentation

Two sets of acoustical instrumentation, the components of which are listed in **Table D1**, were used to measure noise. Each set consisted of a high quality microphone connected to a 24-hour environmental noise monitor unit. Each unit was calibrated to assure consistency between measurements at different locations. A calibrator, with an accuracy of 0.5 decibels, was used for all measurements. At the completion of each field measurement, the calibration was rechecked, the accumulated output data was downloaded to a portable computer.

TABLE D1
Acoustical Measurement Instrumentation

2	Larson Davis 820 Portable Noise Monitors and Preamplifiers
2	Larson Davis Model 2559 - ½ Microphones
1	Model CA250 Sound Level Calibrator
1	Portable Computer

The equipment indicated in the table was supplemented by accessory cabling, windscreens, tripods, security devices, etc., as appropriate to each measurement site.

Two methods were used to attempt to minimize the potential for non-aircraft noise sources to unduly influence the results of the measurements. First, for single-event analysis, minimum noise thresholds of five to ten decibels (dB) greater than ambient levels were programmed. This procedure resulted in the requirement that a single noise event exceed a threshold of 60 dB at each site. Second, a minimum event duration longer than the time associated with ambient single events above the threshold (for example, road traffic) was set (generally at five seconds). The combination of these two factors limited the single events analyzed in detail to those which exceeded

Measurement Procedures

the preset threshold for longer than the preset duration. In spite of these efforts, contamination of the single event data is always possible.

Although only selected single events were specially retained and analyzed, the monitors do, however, cumulatively consider all noise present at the site, regardless of its level, and provide hourly summations of Equivalent Noise Levels (Leq). Additionally, the equipment optionally provides information on the hourly maximum decibel level, SEL values for each event which exceeds the preset threshold and duration, and

distributions of decibel levels throughout the measurement period.

Weather Information

The noise measurements taken during this study were obtained during a period of average summer weather for the Williams Gateway area. Conditions were generally clear throughout the program with only one intermittent rain shower during the monitor period. Winds were generally light and from the north in the mornings, switching to the south in the afternoons. Daily temperatures ranged from high of 105 degrees to lows in the low 80s.

Aircraft Noise Measurement Sites

Noise measurement sites are shown on **Exhibit D1**. Both sites were measured for 24-hours periods.

Site E is located at 21787 E. Nightingale in Queen Creek. This home is approximately 13,000 feet southeast of the airport. The area is a single-family residential area of contemporary homes on large lots. The site is in an area that would likely receive regular arrival and departure overflight noise from all three runways.

The equipment was set up at the side yard of the house. A small dog was present in the backyard. There were no overflights during the equipment setup.

The 24-hour equivalent sound level (Leq) for the 24-hour period at Site E was 45.4. The DNL level for this site was computed for the period was 51.5. The mode noise level, that is, the most commonly recorded level, was 39.9 for the 24-hour measurement period.

Site F is located at 17208 E Sagosa in Gilbert approximately 12,000 feet west of the airport. The area is a large single-family residential area of contemporary homes on large lots.

The equipment was set up at the rear of the house near a horse stable. Horses and a large dog were present during the monitor setup. The Southern Pacific Railroad tracks are approximately 2,000 feet from the monitor location. There were no aircraft overflights during the monitor setup.

The 24-hour Leq for Site F was 47.2. The DNL level for this site was computed to be 62.2 for the measurement period. The most commonly recorded level was 43.7 for the 24-hour measurement period.

MEASUREMENT RESULTS SUMMARY

The noise data collected during the measurement period are presented in **Table D2**. The information includes the average 24-hour Leq for each site. The Leq metric is derived by accumulating all noise during a given period and logarithmically averaging it. It is similar to the DNL metric except that no extra weight is attached to nighttime noise.

Three DNL values are presented for each site. DNL(24) represents the DNL from all noise sources. DNL(t) is developed only from noise exceeding the loudness and duration thresholds defined at each measurement site. The DNL(t) is a reasonable approximation of the DNL attributable to aircraft noise alone. Aircraft noise events are usually the only ones exceeding these thresholds if the site and the thresholds are carefully selected. It is this DNL(t)

TABLE D2
Measurement Results Summary
Williams Gateway Airport

	Site E	Site F
Measurement Dates	8/25 -85/26	8/25 -85/26
Cumulative Data		
LEQ(24)	45.4	47.2
DNL(24)	51.6	62.2
DNL(t)	46.0	50.6
DNL(b)	50.2	61.7
MODE dB	39.9	43.7
L(50)	42.4	50.8
Single Event Data		
L(max)	86.2	78.4
SEL(max)	88.3	98.5
Max Duration (sec)	38	2396
Number of Single Events above 60 dB (Lmax)	67	175
Number of Single Events Above		
SEL 70 dB SEL	45	92
SEL 80 dB	5	32
SEL 90 dB	0	4
SEL100 dB	0	0

Source: Coffman Associates Analysis

value against which modeled noise may be compared to assess the adequacy of the computer predictive model in describing actual conditions. DNL(b) provides a measure of the residual background noise resulting from subtracting the DNL(t) value from the DNL(24) value.

In addition, the L(50) values for each site are presented. These values represent the sound levels above which 50 percent of the samples were recorded. All of the cumulative data presented represents the average values for the duration of the measurements at each site.

The table also presents data on other measures of noise that may be useful for comparisons. These include:

- Maximum recorded noise level in dB (Lmax);
- Maximum recorded sound exposure level (SELmax);
- Longest single-event duration in seconds (Dur max);
- Most frequently recorded decibel level (Mode dB);
- Number of single events above sound exposure levels (SEL) 70, 80, 90, and 100.

For comparative purposes, normal conversation is generally at a sound level of 60 decibels while a busy street is approximately 70 decibels along the adjacent sidewalk.

The program resulted in a total of two 24-hour periods from two sites south and west of the Airport. A total of 242 single events were recorded during the program.

COMPARATIVE MEASUREMENT ANALYSIS

A comparison of the measured versus the computer-predicted cumulative DNL noise values for each measurement site has been developed. In this case, it is important to remember what each of the two noise levels indicates. The computer-modeled DNL contours are analogous to the climate of an area and represent the noise levels on an average day of the period under consideration. In contrast, the field measurements reflect only the noise levels on the specific day of measurement. Additionally, the field measurements consider all of the noise events that exceed a prescribed threshold and duration (DNL(t)), while the computer model only calculates the noise due to the aircraft events. As previously discussed, the field measurements can easily be contaminated by ambient noise sources other than aircraft around the measurement sites. With this understanding in mind, it is useful to evaluate the comparative aircraft DNL levels of the measurement sites.

DNL Comparison

This analysis provides a direct comparison of the measured and predicted average daily DNL values for both 24-hour noise measurement site. In order to facilitate such a comparison, it is necessary to ensure that the computer model input is representing the observed reality as accurately as possible within the capabilities of the model.

During the measurements, the airport operated in both a south flow and a north flow. The flow tended to vary throughout the day during the program. Consequently, in order to evaluate the INM based on this field data, it is reasonable to look at the average annual noise contours developed as a requirement of F.A.R. Part 150.

A difference of three to four DNL is generally not considered a significant deviation between measured and calculated noise, particularly at levels above 65 DNL. Additional deviation is expected at levels below 65 DNL. For comparison, the average human ear cannot distinguish changes in sound levels of less than two or three decibels. The measured and predicted noise levels are presented for each aircraft noise measurement site in **Table D3**.

For the most part, the measurements reflect the predicted sound levels in the area surrounding the airport. As seen in **Table D3**, in both cases the predicted sound levels fall within the three to four decibel deviation. Measured values at Site E, southeast of the Airport, were 4.0 DNL below the INM predicted values. Measured values at Site F, located west of the Airport, are slightly higher (4.4 DNL) than predicted. The nearby Southern Pacific Railroad tracks and horse stable are possible contributors to the higher DNL values measured at this location. There were several events recorded at Site F that lasts longer than a typical aircraft overflight (20 to 60 seconds). The longest event recorded lasted almost 40 minutes.

TABLE D3
Noise Measurement vs. Predicted DNL Values

	Site #E Day 1	Site #F Day 1
INM-Predicted Values	50.4	46.2
Measured Values	46.0	50.2
Difference	+4.4	-4.0

Source: Coffman Associates Analysis

SUMMARY

The noise measurement values recorded at Sites E and F are within acceptable deviation between measured and calculated noise levels. It must be recognized, however, that field measurements made over a one-day period are applicable only to that period of time and may not -- in fact, in many cases, do not -- reflect the average conditions at the site over a much longer period of time. The computer-modeled contours represent noise levels on an average day of the year. In contrast, the measurements reflect only the noise levels present at the time of measurement. In other words, the modeling process derives overall average annual conditions, while field measurements reflect daily fluctuations.

Appendix E
State of Arizona
Revised Statutes

This appendix depicts the State of Arizona Revised Statutes pertaining to Public Airport Disclosure and Airport Influence Areas.

Arizona Revised Statute 28-8485 Airport Influence Areas

1 After notice and hearing, this state or the governing body of a political subdivision that has established or operates an airport may designate as an airport influence area all property that is in the vicinity of the airport, that is currently exposed to aircraft noise and overflight and that either has a day-night average sound level of sixty-five decibels or higher or is within such geographical distance from an existing runway that exposes the area to aircraft noise and overflights as determined by the airport owner or operators.

2 If this state of the governing body of a political subdivision establishes an airport influence area, this state or the governing body shall prepare and file a record of the airport influence area in the office of the county recorder in each county that contains property in the airport influence area. The record shall be sufficient to notify owners or potential purchasers of property in the airport influence area that property in the area is currently subject to aircraft noise and aircraft overflights.

Arizona Revised Statute 28-8486 Public Airport Disclosure

3 The state real estate department shall have and make available to the public on request a map showing the exterior boundaries of each territory in the vicinity of a public airport. The map shall

clearly set forth the boundaries on a street map. The real estate department shall work closely with each public airport and affected local government as necessary to create a map that is visually useful in determining whether property is located in or outside of a territory in the vicinity of a public airport.

4 Each public airport shall record the map prepared pursuant to Subsection A in the office of the county recorder in each county that contains property in a territory in the vicinity of the public airport. The recorded map shall be sufficient to notify owners and potential purchasers of property that the property is located in or outside of a territory in the vicinity of a public airport.

5 For the purposes of this section:

1. "Public airport" means an airport that is owned by a political subdivision of this state or that is otherwise open to the public.

2. "Territory in the vicinity of a public airport" means property that is within the traffic pattern airspace as defined by the federal aviation administration and includes property that experiences a day-night average sound level as follows:

   (1) In counties with a population of more than five hundred thousand persons, of sixty decibels or higher at airports where such an average sound level has been identified in either the Airport Master Plan for the twenty year planning period or in a noise study prepared in accordance with Airport Noise Compatibility Planning. 14 code of Federal Regulations Part 150.

   (2) In counties with a population of more than five hundred thousand persons or less, sixty-five decibels or higher at airports where such an average sound level has been identified in the Airport Master Plan for the twenty year planning period.

   (3)