

Appendix C

INVENTORY

14 CFR Part 150 Review
Ryan Airfield

INTRODUCTION

The purpose of this review is to provide an assessment for the current Noise Compatibility Study by reexamining the noise and land use conditions at Ryan Airfield and the surrounding area. The information presented in this section will be used to identify existing and future noise-sensitive areas that may be adversely impacted by aircraft noise and to evaluate the current strategies to mitigate or avoid those impacts. The information in this chapter includes:

- A discussion of the purpose and procedures required to undertake a Noise Compatibility Program, as described under Title 14, Part 150 of the Code of Federal Regulations (CFR) (formerly referred to as F.A.R. Part 150).
- A description of airport facilities, airspace, and airport operating procedures.
- A discussion of the roles and responsibilities for each of the entities impacted by aircraft activity from Ryan Airfield.
- An overview of the land use planning documents and tools applicable within the area surrounding the airport.

The information outlined in this appendix was obtained through on-site inspections, interviews with airport staff, airport tenants, and representatives of Pima County Planning, the Arizona Department of Transportation (ADOT), and the Federal Avia-

tion Administration (FAA). Information was also obtained from available documents concerning the airport and the Tucson area.

This review is being prepared concurrently with the Airport Master Plan Update for Ryan Airfield. This provides ample opportunity for the full assessment of potential noise impacts of alternative master planning strategies. At the same time, it enables a thorough analysis of potential airport modifications that could promote noise abatement.

WHAT IS A NOISE COMPATIBILITY PROGRAM?

Before presenting background information related to the airport and surrounding communities, the definition and purpose of a Part 150 Noise Compatibility Study is necessary. A Noise Compatibility Program is intended to promote aircraft noise control and land use compatibility. Three things make such a study unique: (1) it is the only comprehensive approach to preventing and reducing airport and community land use conflicts; (2) eligible items in the approved plan may be funded from a special account in the Federal Airport Improvement Program; and (3) it is the only kind of airport study by the FAA primarily for the benefit of airport neighbors.

The principal objectives of any Noise Compatibility Program are to:

- Identify the current and projected aircraft noise levels and their impact on the airport environs.
- Propose ways to reduce the impact of aircraft noise through changes in aircraft operations or airport facilities.
- In undeveloped areas where aircraft noise is projected to remain, encourage future land uses which are compatible with the noise, such as agriculture, commercial or industrial.
- In existing residential areas which are expected to remain impacted by noise, determine ways of reducing the adverse impacts of noise.
- Establish procedures for implementing, reviewing, and updating the plan.

JURISDICTION AND RESPONSIBILITIES

From the national to local level, each government has specific responsibilities to reduce or limit aviation noise impacts. At Ryan Airfield, the federal, state, and county governments each have a role in airport land use compatibility planning.

FEDERAL GOVERNMENT

The federal government, primarily through the FAA, has the authority and responsibility to control aircraft noise sources with the following methods:

- Implement and Enforce Aircraft Operational Procedures – Where and how aircraft are operated is under the complete jurisdiction of the FAA. This includes pilot responsibilities, compliance with Air Traffic Control instructions, flight restrictions, and monitoring careless and reckless operation of aircraft.
- Manage the Air Traffic Control System – The FAA is responsible for the control of navigable airspace and review of any proposed alterations in the flight procedures for noise abatement.
- Certification of Aircraft – The FAA requires the reduction of aircraft noise through certification, modification of engines, or aircraft replacement as defined in CFR Title 14, Part 36. Additionally, CFR Title 14, Part 91 outlines the phase-out of aircraft not meeting the requirements of Part 36.
- Pilot licensing – Individuals licensed as pilots are trained under strict guidelines concentrating on safe and courteous aircraft operating procedures.
- Noise Compatibility Studies – The FAA collaborates with airport sponsors to fund and evaluate Noise Compatibility Studies in accordance with Part 150 regulations.

14 CFR Parts 36 and 91 Federal Aircraft Noise Regulations

The FAA requires the reduction of aircraft noise with the regulations adopted under 14 CFR Parts 36 and 91. These regulations apply only to civilian aircraft and do not address noise generated by military aircraft.

Part 36 prohibits the escalation of noise levels from small, piston-driven aircraft, subsonic civil turbojet and transport aircraft, and supersonic transport aircraft. Part 36 also requires new aircraft types to be markedly quieter than earlier models by limiting the noise emissions allowed by newly certified aircraft. To achieve this, Part 36 has four stages of certification.

- Stage 1 includes all aircraft certificated prior to December 1, 1969.
- Stage 2 applies to aircraft certificated between December 1, 1969 and November 5, 1975.
- Stage 3 applies to aircraft certificated between November 5, 1975 and January 1, 2006.

- Stage 4 is the most rigorous and applies to aircraft certificated after January 1, 2006.

Additionally, Part 91, Subpart 1, known as the “Fleet Noise Rule,” mandates a compliance schedule under which Stage 1 aircraft were to be retired or refitted with hush kits or quieter engines by January 1, 1988. A limited number of exemptions have been granted by the U.S. Department of Transportation for foreign aircraft operating at specified international airports.

Pursuant to the Congressional mandate outlined in the *Airport Noise and Capacity Act of 1990* (ANCA), FAA has established amendments to Part 91 by setting December 31, 1999 as the date for discontinuing use of all Stage 2 aircraft exceeding 75,000 pounds within the contiguous United States. Stage 2 aircraft operating non-revenue generating flights can operate beyond the deadline for the following purposes:

- To sell, lease, or scrap the aircraft;
- To obtain modifications to meet the most recent noise standards;
- To undergo scheduled heavy maintenance or significant modifications;
- To deliver the aircraft to a lessee or return it to a lessor;
- To park or store the aircraft;
- To prepare the aircraft for any of these events; or
- To operate under an experimental airworthiness certificate.

Additional restrictions or phase-out dates have not been adopted for Stage 3 and Stage 4 aircraft.

14 CFR, Part 161 Regulation of Noise and Access Restrictions

14 CFR, Part 161, sets forth requirements for notice and approval of local restrictions on aircraft noise levels and airport access. Part 161 was developed in response to ANCA. It applies to local airport restrictions that would limit operations of Stage 2 weighing less than 75,000 pounds and Stage 3 aircraft. Restrictions addressed by Part 161 include direct limits on maximum noise levels, nighttime curfews, and special fees intended to encourage changes in airport operations to reduce noise.

To implement noise or access restrictions on Stage 2 aircraft, the airport proprietor must provide public notice of the proposal and a 45-day comment period. This includes FAA notification and publication of the proposed restriction in the Federal Register.

An analysis must be prepared describing the proposal, alternatives to the proposal, and the costs and benefits of each. The FAA will either accept the analysis for the restriction or return it with a request for additional study. Following acceptance, the restriction may be implemented. It should be noted that although the study is accepted, the restriction may violate an airport's federal grant assurances, which could jeopardize project funding.

Noise or access restrictions on Stage 3 aircraft must meet the following criteria outlined in the statute:

- (1) The restriction is reasonable, non-arbitrary, and non-discriminatory.
- (2) The restriction does not create an undue burden on interstate or foreign commerce.
- (3) The proposed restriction maintains safe and efficient use of the navigable airspace.
- (4) The proposed restriction does not conflict with any existing federal statute or regulation.
- (5) The applicant provides adequate opportunity for public comment on the proposed action.
- (6) The proposed restriction does not create an undue burden on the national aviation system.

The airport operator's application must include an Environmental Assessment (EA) prepared under the provisions of the *National Environmental Protection Act* (NEPA) and a complete analysis addressing the six previously discussed conditions. Within 30 days of receipt of the application, the FAA must determine whether the application is complete. After a completed application has been filed, the FAA must publish a notice of the proposal in the Federal Register. The FAA must approve or disapprove the restriction within 180 days of receipt of the completed application. More information regarding the status of Part 161 studies can be found in the TIP titled, *Federal Aviation Noise Regulations*, located at the end of this document.

Airport operators that implement noise and access restrictions in violation of Part 161 are subject to termination of eligibility for airport grant funds and authority to impose and collect passenger facility charges (PFCs).

STATE AND LOCAL

Control of land use in noise-impacted areas around airports is a key tool in limiting the number of residents exposed to aircraft noise. The FAA encourages land use compatibility within the vicinity of airports, and Part 150 has guidelines relating to land use compatibility based on varying levels of noise exposure. Nevertheless, the federal gov-

ernment has no direct legal authority to regulate land use. That responsibility rests exclusively with state and local governments.

State

The State of Arizona, through enabling legislation, has given the power to administer land use regulations to counties, cities, and towns. *Arizona Revised Statutes* do not require the establishment of planning commissions, agencies, or departments in municipalities; however, where such appointments are made, the municipality is required to prepare and adopt a long-range general plan and may regulate zoning, subdivision of land, and land development, consistent with the plan.

The State of Arizona provides for the disclosure of aviation activities to prospective buyers of real estate. In 1997, the state adopted legislation allowing airport sponsors to identify Airport Influence Areas (AIA) around public and commercial use airports. The establishment of an AIA is voluntary and requires a public hearing. The boundary of the AIA must be recorded with the county in which the airport resides.

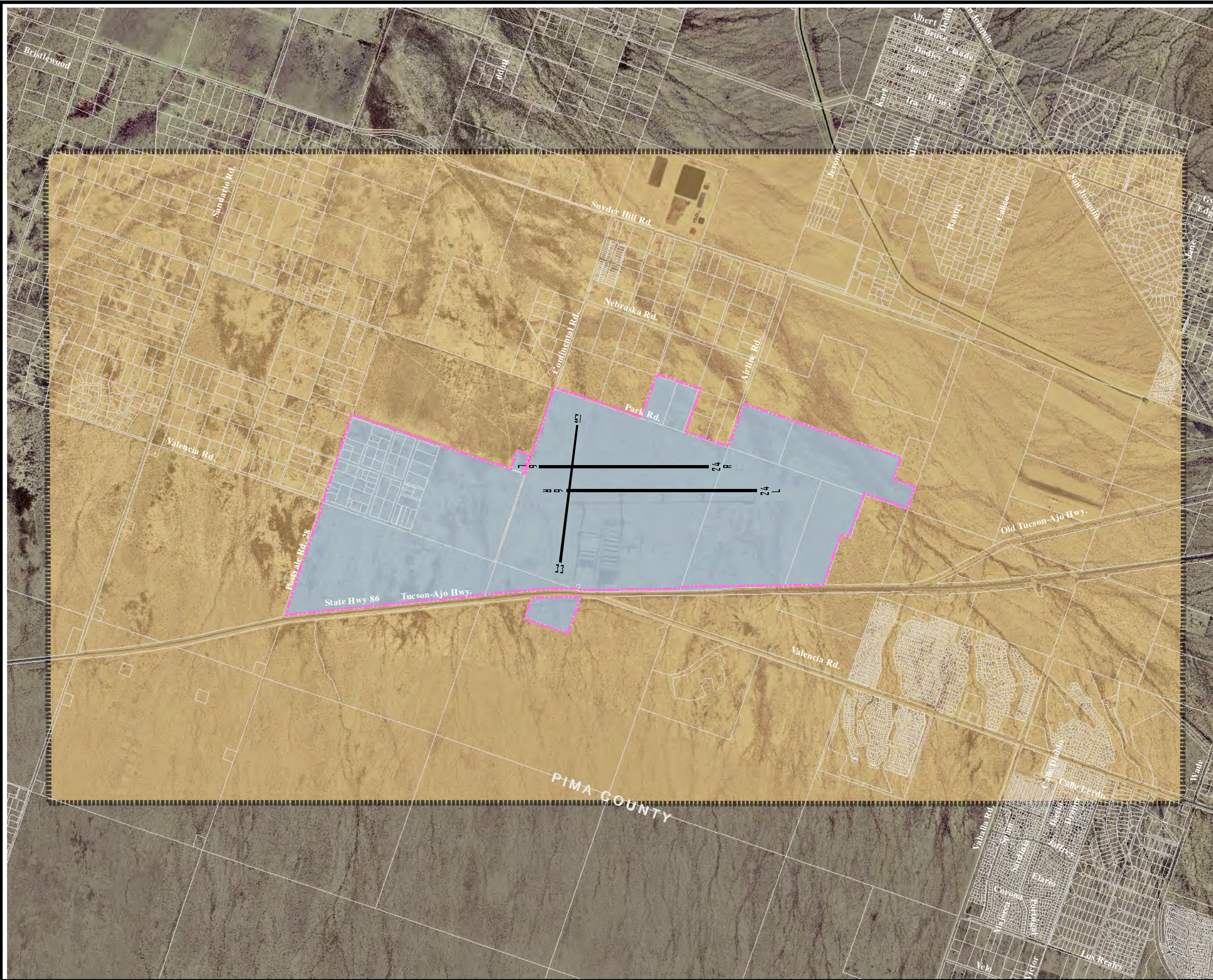
In addition, the 1999 Arizona State Legislature adopted legislation requiring the state real estate department to prepare and maintain a series of maps depicting the traffic pattern airspace of each public airport in the state. These maps are to be provided to the public on request. The intent of the maps is to provide disclosure of the location of the airport as well as the potential influence the airport may have on the surrounding property.

The Public Disclosure Map for Ryan Airfield was updated in January 2005 and is depicted on **Exhibit C1**. The boundary of this area is based on the traffic pattern airspace for the airport. The issuance of aviation easements and fair disclosure notices is required for development within the public disclosure area.




Local Government

In the Ryan Airfield study area, Pima County is responsible for off-airport land use regulations.

In addition to regulating land use, local governments may acquire property to mitigate or prevent airport noise impacts or may sponsor sound insulation programs for this purpose. They are also eligible to apply for FAA grants under Part 150 if they are designated as a sponsor of a project in an approved noise compatibility program.



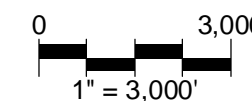
LEGEND

-  Airport Property Boundary
-  Public Airport
-  Airport Disclosure Area

Source: Pima County Department of Transportation Geographic Information System, (June, 2008).
 Aerial Photo, U.S. Department of Agriculture, Service Center Agencies, (June, 2003).



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OWNERSHIP AND MANAGEMENT

Ryan Airfield is owned by the City of Tucson and is operated and maintained by the TAA. The Tucson Airport Authority is a non-profit organization that was created by state charter in 1948 to promote air transportation and commerce in the state, to maintain the Tucson International Airport and Ryan Airfield facilities, and to encourage economic growth in Tucson and southern Arizona. The TAA is made up of 115 community volunteers and a nine-person board which oversees policy decisions. The TAA also has a staff of approximately 300 employees who handle daily operations at Tucson International Airport and Ryan Airfield.

AIRPORT SETTING AND ROLE

Ryan Airfield is located approximately ten miles southwest of the City of Tucson at the intersection of Ajo Highway (State Route 86) and West Valencia Road. Ryan Airfield is situated on 1,754 acres at 2,417 feet above mean sea level (MSL) and is one of five public-use airport facilities in Pima County. Exhibit 1A following page 1-2 of this document depicts the airport in its regional and state setting.

Ryan Airfield is included in the Pima Association of Governments' (PAG) *2002 Regional Aviation System Plan* (RASP). The RASP provides an overview for airport planning in the region, reflecting the overall plans for each airport in the region and assessing proposed project costs and the proper phasing of each project. Ryan Airfield is one of six public-use airports included in the RASP. The RASP classifies public-use airports as either Level I or Level II. Level I airports are those that are essential to meeting the region's transportation and economic needs, whereas Level II airports are thought of as support facilities. Ryan Airfield is classified as a Level I airport in the PAG RASP.

At the state level, Ryan Airfield is also included in the *Arizona State Aviation System Plan* (SASP). The purpose of the SASP is to ensure that the state has an adequate and efficient system of airports to serve its aviation needs. The SASP defines the specific role of each airport in the state's aviation system and establishes funding needs. Through the state's continuous aviation system planning process, the SASP is updated every five years. The most recent update to the SASP was in 2000, when the *State Aviation Needs Study* (SANS) was prepared. The SANS provides policy guidelines that promote and maintain a safe aviation system in the state, assess the state's airports' capital improvement needs, and identify resources and strategies to implement the plan. Ryan Airfield is one of 112 airports included in the 2000 SANS, which includes all airports and heliports in Arizona that are open to the public, including tribal and recreational airports. The SANS classifies Ryan Airfield as a reliever airport.

At the national level, Ryan Airfield is designated within the FAA's *National Plan of Integrated Airport Systems* (NPIAS). Inclusion within the NPIAS allows the airport to be eligible for Federal Airport Improvement Program (AIP) funding. Ryan Airfield is classified as a reliever airport in the NPIAS. A total of 3,489 airports across the country are included in the NPIAS. This number includes existing and proposed airports. Ryan Airfield is one of 59 airports in the State of Arizona that are included in the NPIAS and one of seven airports in Arizona classified as a reliever airport.

AIRPORT FACILITIES

Ryan Airfield is served by a three-runway system including parallel Runways 6R-24L and 6L-24R and crosswind Runway 15-33. **Exhibit C2** depicts the existing facility at Ryan Airfield. Runways 6R-24L and 6L-24R are both asphalt and oriented in a north-east to southwest manner with Runway 6R-24L measuring 5,500 feet in length and 75 feet wide, and Runway 6L-24R measuring 4,900 feet in length and 75 feet wide. The parallel runways both slope upward from the southwest to the northeast. The Runway 24L end elevation is 3.3 feet higher than the Runway 6R end, equating to a runway gradient (difference in runway elevations divided by the length of the runway) of 0.07 percent. The Runway 24R end elevation is 4.6 feet higher than the Runway 6L end, equating to a runway gradient of 0.08 percent.

The crosswind runway (Runway 15-33) is oriented in a northwest-southeast manner and has a length of 4,000 feet and a width of 75 feet. This runway is also asphalt, but the load bearing strength has not been certified to date. Runway 15-33 slopes upward from southeast to the northwest. The Runway 33 end elevation is 32 feet higher than the Runway 15 end, resulting in an effective runway gradient of 0.8 percent.

OTHER AREA AIRPORTS

There are six other airports in the vicinity that are open to the public, one military base (Davis-Monthan AFB), and approximately five private, restricted-use airports. These airports are described in detail in Chapter 1, pages 1-16 and 1-17, and depicted on Exhibit 1D of this document.

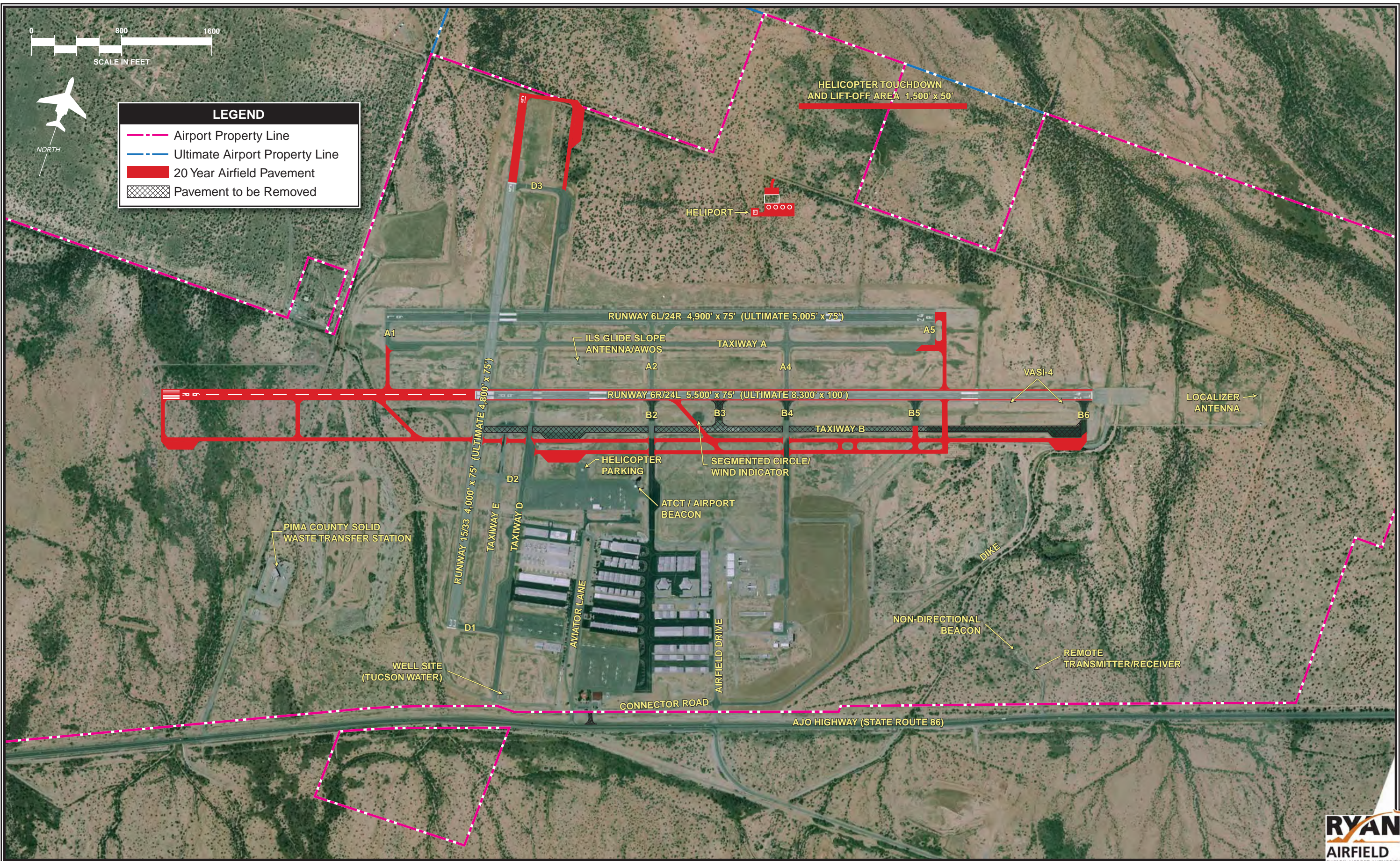
AIRSPACE ENVIRONMENT

Airspace, navigational aids and flight procedures have a significant impact on a number of aircraft operating criteria such as altitude, communications, navigation, air traffic services, reduced visibility procedures, and pilot qualifications. These factors aid in defining the types of aircraft operations which can be expected in the region. Since aviation noise is directly related to aircraft operations in the vicinity of an airfield, an examination of a region's flight environment is helpful in defining potential sources of aircraft noise.



LEGEND

- Airport Property Line
- Ultimate Airport Property Line
- 20 Year Airfield Pavement
- ▨ Pavement to be Removed



AIRSPACE STRUCTURE

Since the inception of aviation, nations have set up procedures within their territorial boundaries to regulate the use of airspace. Airspace relates primarily to requirements for pilot qualifications, ground-to-air communications, navigation and air traffic services, and weather conditions. Chapter 1, pages 1-9 to 1-16, and Exhibits 1C and 1D of this document describe the air traffic controlling facilities and categories of airspace for the Tucson area. A discussion of the Ryan Airfield navigational aid, instrument procedures, and visual procedures can also be found in this section.

EXISTING LAND USE

Exhibit C3 shows existing land use in the Ryan Airfield study area. The map was developed from aerial photography, a field survey made by the consultant in September 2007, and the aid of existing land use maps obtained from Pima County Development Services Department.

As indicated on **Exhibit C3**, the areas in the immediate vicinity of the airport are largely undeveloped. Land cover in these areas consists of open rangeland with scrub vegetation. North of the airport development is limited. There is a small industrial development located south of Snyder Hill Road and a wastewater treatment facility north of the airport. Additionally, there are scattered single-family and mobile home residences in this area. To the west of the airport, there are several low-density single-family and mobile home residences. East of the airport, there are two commercial properties including a gun shooting range and a salvage yard. The area directly south of the airport is undeveloped rangeland. Southeast of the airport, along Valencia Road, there are multiple single-family residential developments with existing residences, houses under construction, and available lots. The density of these developments is greater than the existing single-family developments north and west of the airport.

SCHOOL DISTRICTS

There are two school districts within the Ryan Airfield Study Area: The Tucson Unified School District and the Altar School District. **Exhibit C4** depicts the school districts in the Ryan Airfield study area. The Tucson Unified School District owns several parcels that could be used for future school sites in the western Tucson area; however, none of these sites are within the immediate vicinity of the airport.

LAND USE PLANNING POLICIES AND REGULATIONS

In most cities and counties, the chief land use regulatory document is the zoning ordinance which regulates the types of uses, building height, bulk, and density permitted in

various locations. Subdivision regulations are another important land use tool, regulating the platting of land. Local communities also regulate development through building codes. Non-regulatory policy documents which influence development include the general plan and the local capital improvements program. The general plan provides the basis for the zoning ordinance and sets forth guidelines for future development. The capital improvements program is typically a short-term schedule for constructing and improving public facilities, such as streets, sewers and water lines.

The following paragraphs describe each of the above areas as a means towards understanding the land use planning policies and regulations impacting the study area.

REGULATORY FRAMEWORK

In the Ryan Airfield environs, Pima County is responsible for land use regulation. The county administers zoning ordinances, subdivision regulations, and building codes.

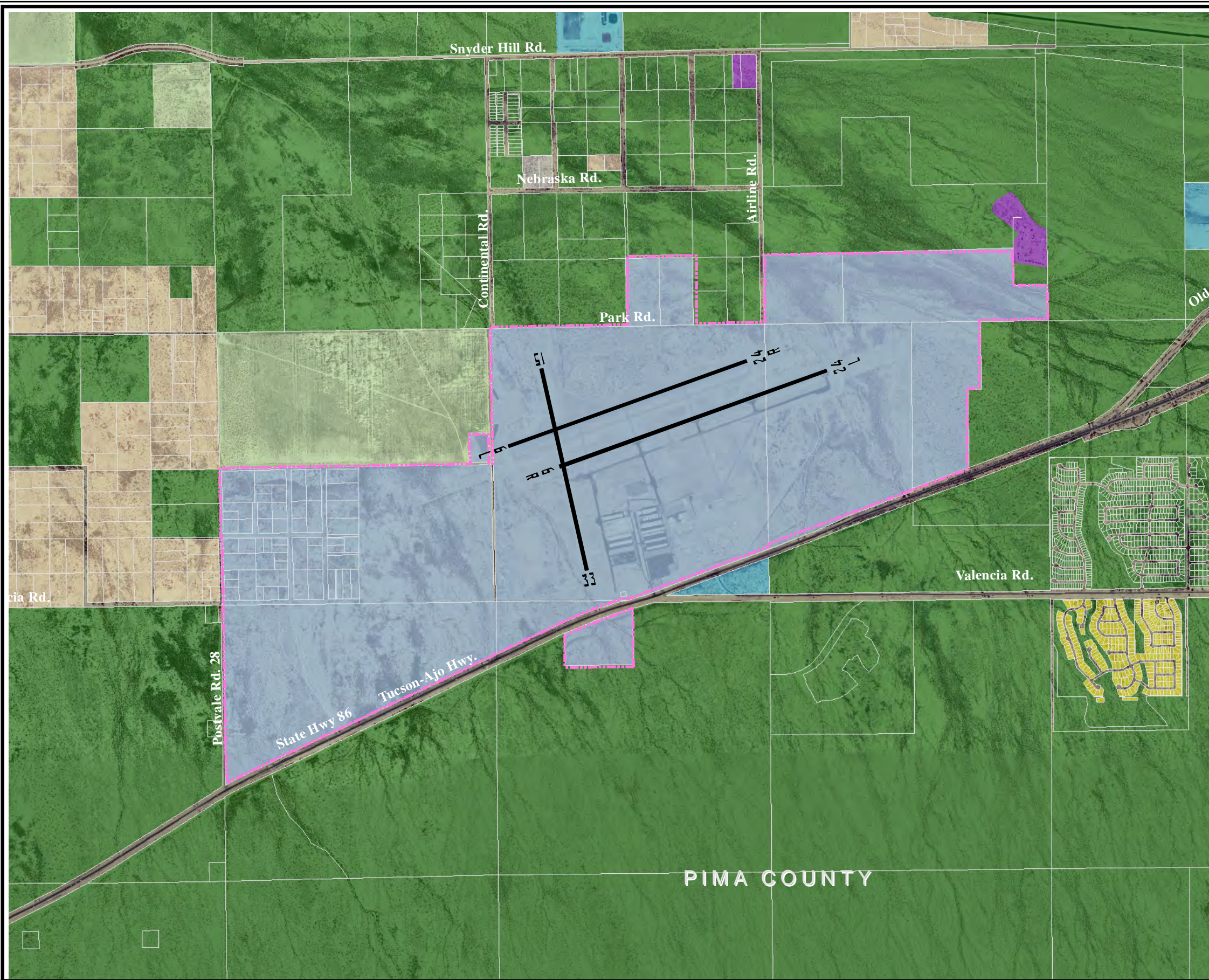
Arizona state law requires counties to prepare a comprehensive, generalized land use plan for development of their area of jurisdiction. The county plan shall also provide for zoning and the delineation of zoning districts. The county is also responsible for regulating the subdivision of all lands within its corporate limits, except subdivisions which are regulated by municipalities. Adoption of building codes are optional for those counties which have adopted zoning. Pima County does regulate land use within the study area.

Within the Ryan Airfield environs, Pima County has prepared and adopted general plans, zoning ordinances, subdivision regulations, building codes, and capital improvement programs. These planning and development tools are described below.












General Plans

Comprehensive, long-range plans serve as a guide to individual communities and jurisdictions to provide quality growth and development. The plans represent a generalized guideline, as opposed to a precise blueprint, for locating future development. The plan generally consists of elements which examine existing land uses and designates proposed future land uses and facilities. By illustrating preferred land use patterns, including extraterritorial areas, a general plan can be used by community decision-makers and staff, developers, investors, and citizens to assist them in evaluating future development opportunities. **Exhibit C5** depicts the proposed future land uses for the study area as adopted in the *Pima County Comprehensive Land Use Plan*.

Chapter 18.89 of the Pima County Code sets forth requirements for the preparation and adoption of land use plans. It defines the county comprehensive plan as a plan covering the entire county, prepared in conjunction with the incorporated municipalities of the county.



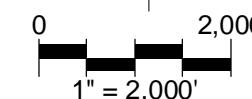
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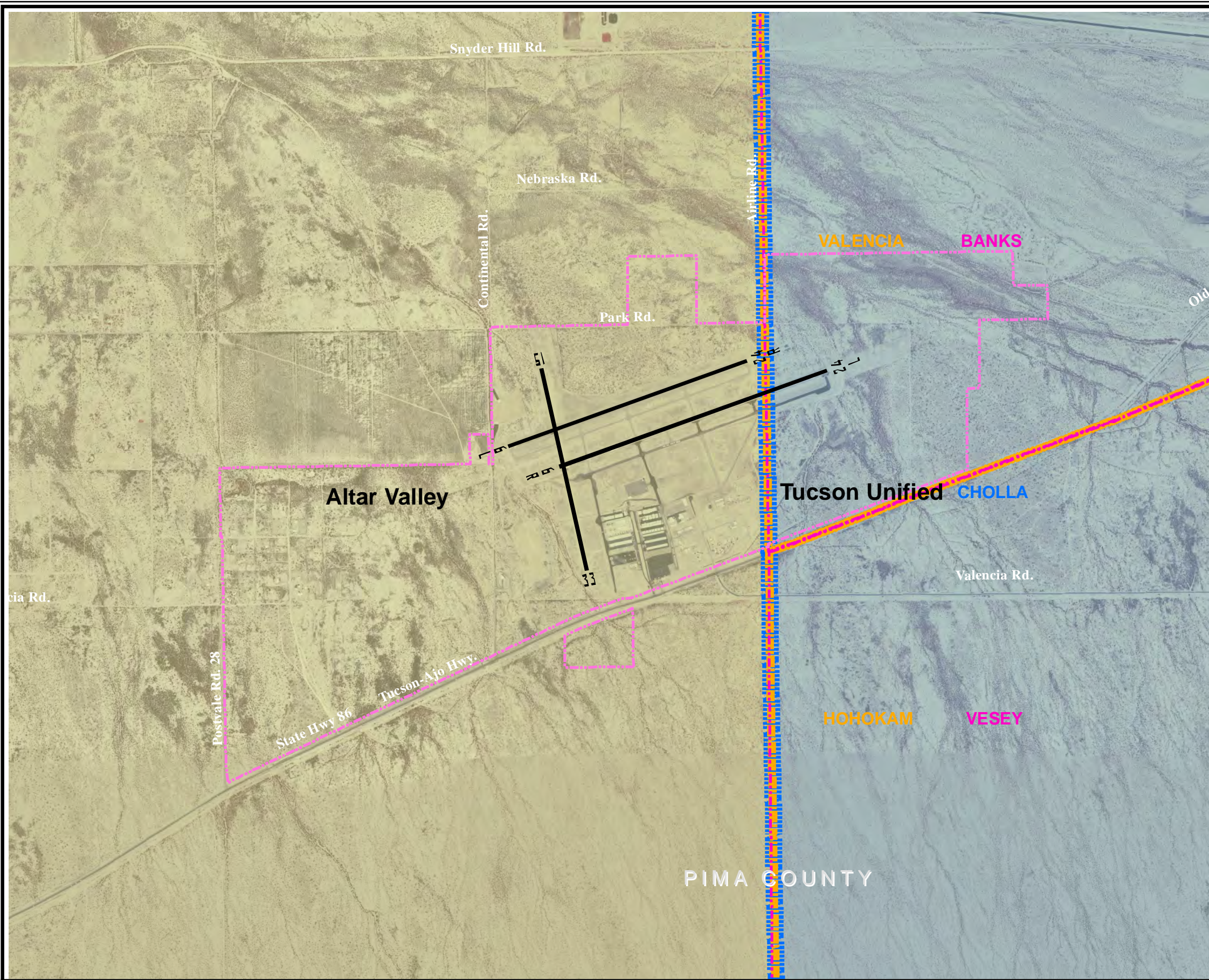
-  Airport Property Boundary
-  Agriculture
-  Very Low Density Residential
-  Low Density Residential
-  Commercial
-  Industrial
-  Park / Open Space / Public Reserve
-  Vacant
-  Public Institutions
-  Public Airport
-  Water

Source: Pima County Department of Transportation Geographic Information System, (June, 2008).
 Aerial Photo, U.S. Department of Agriculture, Service Center Agencies, (June, 2003).
 Windsheild survey completed September 6, 2007.



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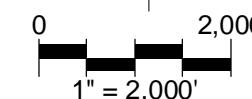
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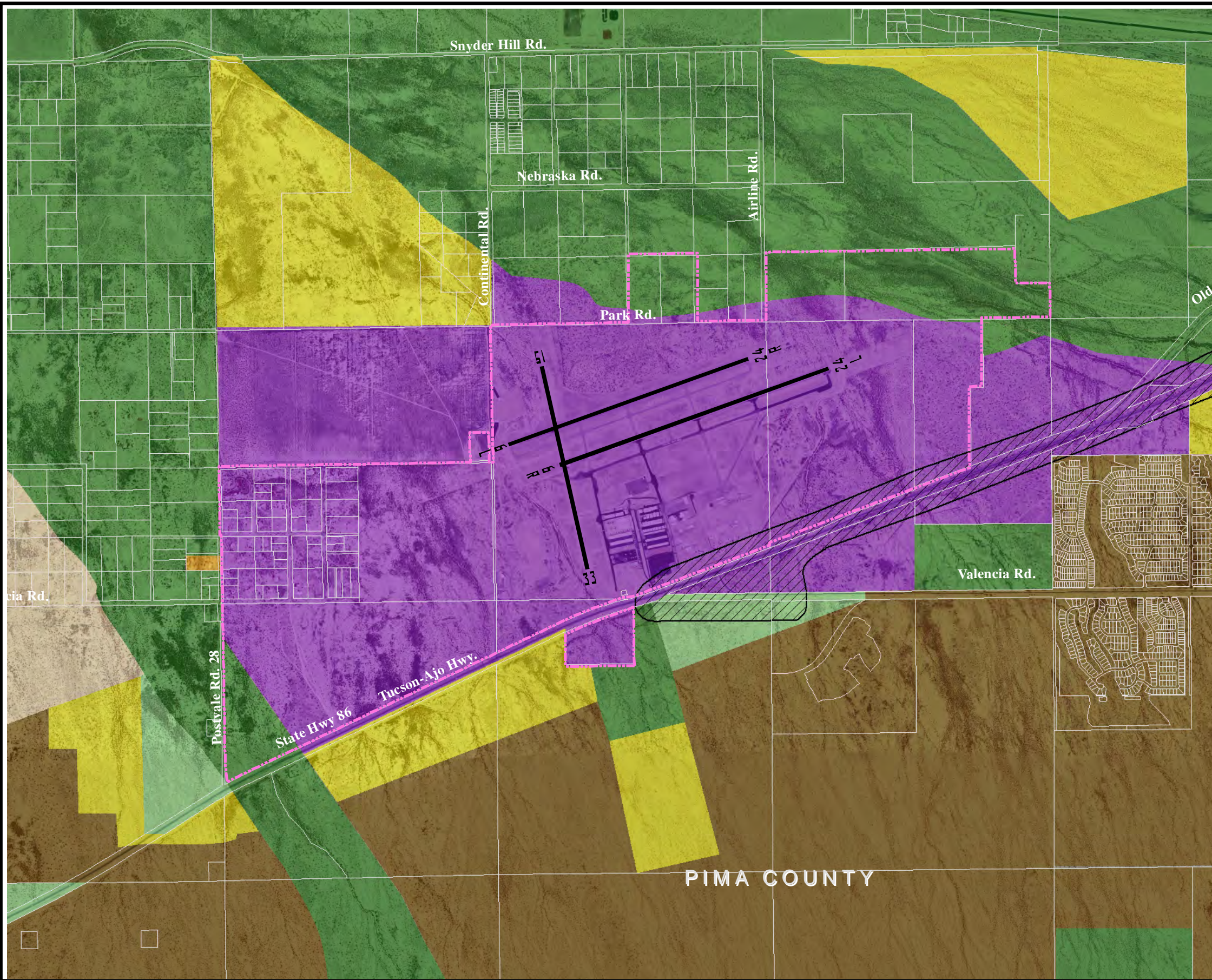
- Airport Property Boundary
- Altar Valley School District
- Tucson Unified School District
- Elementary School Districts
- Middle School Districts
- High School Districts

Source: Pima County Department of Transportation Geographic Information System, (June, 2008).
 Aerial Photo, U.S. Department of Agriculture, Service Center Agencies, (June, 2003).












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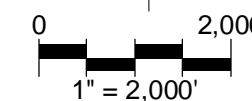
LEGEND

-  Airport Property Boundary
-  Low Intensity Rural Residential
-  Low Intensity Urban Residential
-  Medium Intensity Urban Residential
-  Medium-High Intensity Urban Residential
-  Industrial
-  Resource Transition
-  Community Activity Centers
-  AJO Corridor

Source: Pima County Department of Transportation Geographic Information System, (June, 2008).
 Aerial Photo, U.S. Department of Agriculture, Service Center Agencies, (June, 2003).



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The code also establishes procedures for the periodic review and updating of land use plans.

In December 2001, Pima County adopted its *Comprehensive Plan Update*. The Plan divides Pima County into six sub-regions based on specific sub-regional characteristics. Each sub-region is assigned key issues which create a foundation for planning within that sub-region. Ryan Airfield is contained in the Southwest Sub-region, which is dominated by characteristics such as high natural resource content, scenic value, and an expansive 100-year floodplain. Currently, much of this area is rural in character and contains mostly low density residential uses and large tracts of undeveloped land. The northeast portion of this sub-region, however, borders the City of Tucson and is therefore becoming urbanized.

The *Pima County Comprehensive Land Use Plan* designates Special Areas as a means to accomplish site-specific planning objectives. The 2-01 Ajo Corridor/Western Gateway Special Area has been established to encourage appropriate development in the vicinity of Ryan Airfield. This development is designed to promote planned nodal development along the Ajo Corridor, preserve scenic quality, and mitigate the negative impacts of large planned industrial areas. The specific policies contained in this Special Area are as follows:

- The gateway area in the vicinity of Ryan Airfield shall accommodate support business for the airport and shall have design standards which will incorporate an airport/aviation/industrial theme.
- Site planning and design of industrial and support businesses within this Special Area shall be designed to promote internal circulation and minimize curb cuts and/or strip commercial development.
- Landscaping shall promote preservation of natural vegetation and application of xeriscape concepts in landscape design.
- Areas to remain natural in this gateway corridor area shall be supplementally planted with plant materials natural to this area and broadcast with desert wildflower seed mix for an area of 40 feet on both sides of the right-of-way.
- The area of Black Wash within this special area shall be preserved and restored as riparian habitat. All development affecting Black Wash, including public works, shall be required to preserve and restore riparian habitat, and provide opportunities for view enhancement and interpretive signage. A scenic pull-off to include interpretation of the riparian area and a view orientation to the visible mountain ranges shall be encouraged.

Zoning

While general land use plans are broad-spectrum land use policy guidelines, cities and counties actually control land use through zoning ordinances. In the study area, Pima County has established a zoning ordinance.

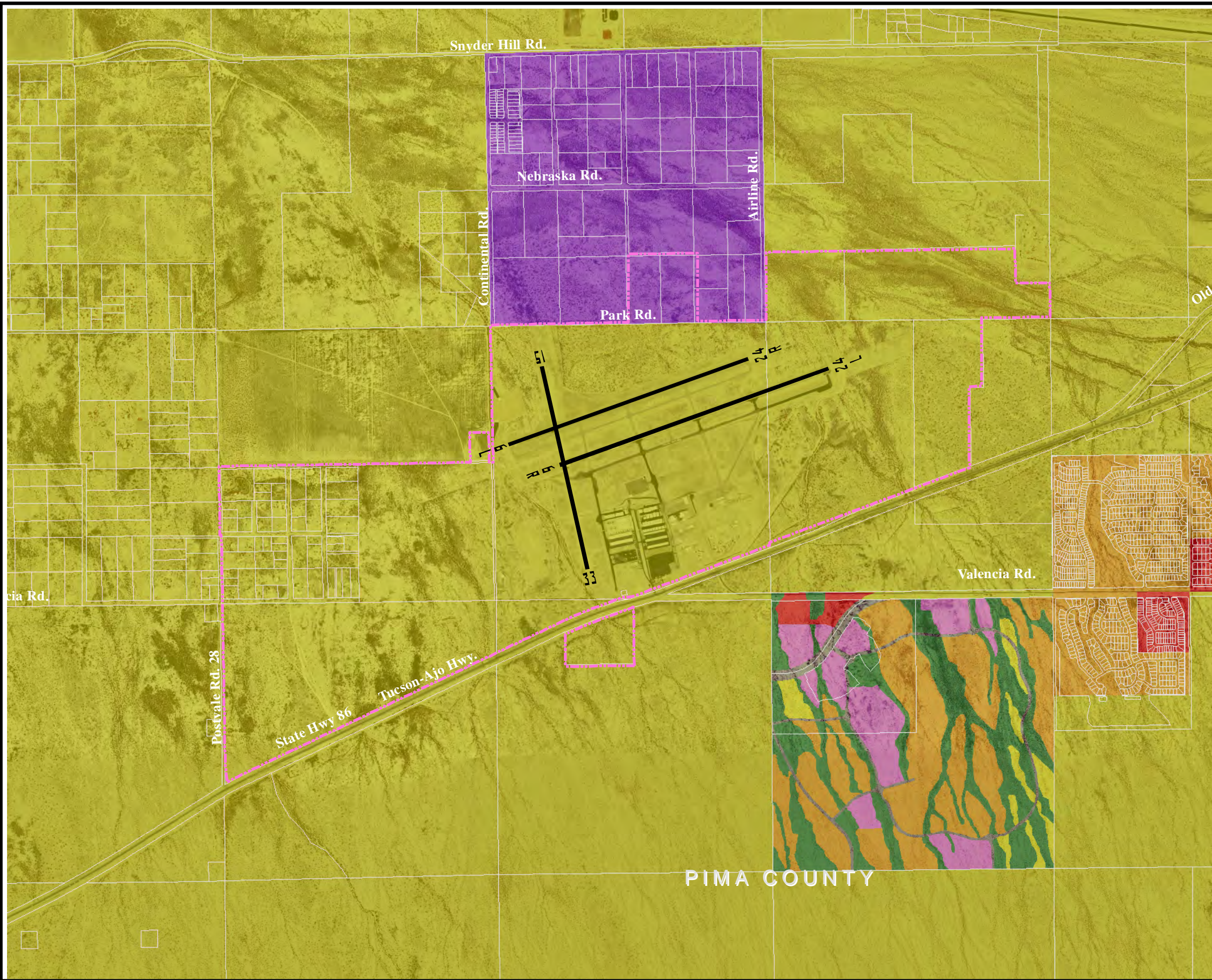
The Pima County Zoning Code is administered by the Pima County Development Services Department. The regulations require that building permits, zoning use permits, and zoning construction permits cannot be issued until compliance with the Zoning Code has been established.

Rezoning must be reviewed and analyzed by the Pima County Development Services Department. The Planning and Zoning Commission then reviews the proposal and conducts a public hearing. The recommendations of the commission are then transmitted to the Board of Supervisors, which holds another public hearing and then makes the final decision on the rezoning. The Zoning Code provides a number of mechanisms for detailed review of development proposals and the negotiation of development concepts and details. The Code requires the filing of a detailed development plan for all developments involving more than three dwelling units on a single lot. The plan must show proposed building placement, easements, landscaping, and grading, among other things.

The Code also provides for the conditional approval of certain land uses. This involves the review of the proposed land use by a hearing administrator or the Board of Supervisors, depending on the type of use. Special conditions on the development may be imposed to protect the public interest. The Code also establishes procedures for specific plans. This involves the preparation and approval of a detailed development plan for an area. It is approved by ordinance by the Board of Supervisors and becomes a special zoning district. All future development within the specific plan boundaries must conform to the details of the approved plan.

The **Pima County Zoning Code** establishes standard zoning districts and overlay zoning districts to control development within the county. The provisions of these districts, as they apply to noise compatibility planning, are summarized in **Table C1**. A generalized zoning map is shown in **Exhibit C6**. In order to simplify the map and improve its legibility, the districts have been combined into larger, simpler categories on the map. **Table C2** shows how the zoning districts were assigned to the map categories.

Although much of the area near Ryan Airfield is undeveloped, the potential for development remains. An examination of the Pima County zoning designations, although not permanent, can provide some insight into how the land could be developed. A parcel's zoning classification determines the type of development that may occur on the property as outlined in the county's zoning ordinance. According to the Pima County Assessor's office, the areas immediately surrounding the airport are zoned as Rural Homestead (RH). This classification allows residential uses and commercial and industrial development appropriate and necessary to serve the needs of rural areas. The land north of the airport is zoned as General Industrial (CI-2) which allows a variety of



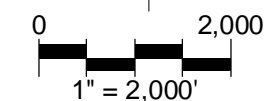
LEGEND

- Airport Property Boundary
- Single-Family Residential
- Rural Residential
- Multiple Residential
- General Business
- General Industrial
- Mixed Use
- Park and Open Space

Source: Pima County Department of Transportation Geographic Information System, (June, 2008).
 Aerial Photo, U.S. Department of Agriculture, Service Center Agencies, (June, 2003).



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industrial and manufacturing land uses and airport facilities. There are also several smaller parcels zoned for a variety of residential and supporting commercial land uses located throughout the airport area. These parcels are zoned as Mixed Dwelling (CR-4), Rural Residential (GR-1), Transitional (TR), and Local Business (CB-1). A detailed listing of the allowable uses within each of these zones can be found in Chapter 18 of the Pima County Code.

TABLE C1 Summary of Zoning Provisions Pima County			
Zoning Districts	Noise-Sensitive Uses		Minimum Lot Size or Density Units/Acre
	Permitted	Conditional	
<i>RURAL DISTRICT</i>			
IR, Institutional Reserve Zone	Single-family dwelling Manufactured or mobile home Farm labor housing Guest dwelling Public school Places of worship Health care clinic	Minor Resort Museum Private school	36 acres
RH, Rural Homestead Zone	Single-family dwelling Manufactured or mobile home Guest dwelling Public school Places of worship Child care center Group foster home Health care clinic	Minor resort Private school Museum Rest home Manufactured home park Cluster development	180,000 ft. ²
GR-1, Rural Residential Zone	Same as RH	Same as RH	36,000 ft. ²
SR, Suburban Ranch Zone	Single-family dwelling Places of worship Public school	Minor resort College Private school Residential substance abuse diagnostic and treatment facility Library Museum	144,000 ft. ²
SR-2, Suburban Ranch Estate	Same as SR	Same as SR	72,000 ft. ²
SH, Suburban Homestead Zone	Duplex Manufactured or mobile home Others per SR	Manufactured home park Cluster development Others per SR	18,000-36,000 ft. ² *
<i>RESIDENTIAL DISTRICTS</i>			
TH, Trailer Home site Zone	Single-family dwelling Manufactured or mobile home Trailer park	--	2,000 ft. ²
ML, Mount Lemmon Zone	Private school other than parochial Others per SR	Cluster development	36,000 ft. ²
CR-1, Single Residence Zone	Private school College Other per SR	Same as ML	36,000 ft. ²
CR-2, Single Residence Zone	Same as CR-1	Same as CR-1	16,000 ft. ²
CR-3, Single Residence Zone	Same as CR-2	Same as CR-2	8,000 ft. ²

TABLE C1 (Continued)
Summary of Zoning Provisions
Pima County

Zoning Districts	Noise-Sensitive Uses		Minimum Lot Size or Density Units/Acre
	Permitted	Conditional	
RESIDENTIAL DISTRICTS (Continued)			
CR-4, Mixed-Dwelling Type Zone	Duplex Multiple dwelling Private school Others per SR	--	3,500-7,000 ft. ² *
CR-5, Multiple Residence Zone	Same as CR-4	--	2,000-6,000 ft. ²
TR, Transitional Zone	College Library Museum Hospital or sanitarium Child care center Motel or hotel Other residential Others per CR-5	--	1,000-10,000 ft. ² *
CMH-1, County Manufactured and Mobile Home-1 Zone	Single-family dwelling Places of worship Manufactured or mobile home Private school College Health care clinic Library Museum	Cluster development	8,000 ft. ²
CMH-2, County Manufactured and Mobile Home-2 Zone	Child care center Places of worship Museum Others per CMH-1	--	3,500 ft. ²
BUSINESS DISTRICTS			
MR, Major Resort Zone	Major resort	--	--
RVC, Rural Village Center Zone	Child care center Places of worship Health care clinic Library Museum	--	--
CB-1, Local Business Zone	Trade and craft schools Places of worship Library Others per TR	--	1,000-10,000 ft. ² *
CB-2, General Business Zone	Auditorium Others per CB-1	--	1,000-7,000 ft. ² *

TABLE C1 (Continued) Summary of Zoning Provisions Pima County			
Zoning Districts	Noise-Sensitive Uses		Minimum Lot Size or Density Units/Acre
	Permitted	Conditional	
INDUSTRIAL DISTRICTS			
MU, Multiple Use Zone	Single-family dwelling Duplex Places of worship Public school Multi-family dwelling Manufactured or mobile home Trailer or trailer court Boarding/rooming house Private school other than parochial College Hospital or sanitarium	--	3,500-7,000 ft. ² *
CPI, Campus Park Industrial Zone	Child care centers	--	--
CI-1, Light Industrial/Warehouse Zone	Auditorium Trade school Commercial school Hotel	Public assembly facility	--
CI-2, General Industrial Zone	Doctors office or clinic Others per CI-1	--	--
CI-3, Heavy Industrial Zone	--	--	--
OVERLAY ZONES			
GC, Golf Course	--	--	--
HD, Hillside Development	--	--	--
H-1, Historic Zone-1	--	--	--
AE, Airport Environs and Facilities **	--	--	--
BOZO, Buffer Overlay Zone	--	--	--
* The larger number is the minimum lot size. The smaller number is the minimum lot area per dwelling unit for duplex and multi-family dwellings.			
** Within the AE overlay zone, 10 other overlay zones have been established – ADC-1, ADC-2, ADC-3, NCZ-A, NCZ-B, RSZ, CUZ-1, CUZ-2, CUZ-3, and CUZ-4.			
Source: The Pima County Zoning Code, 2008.			

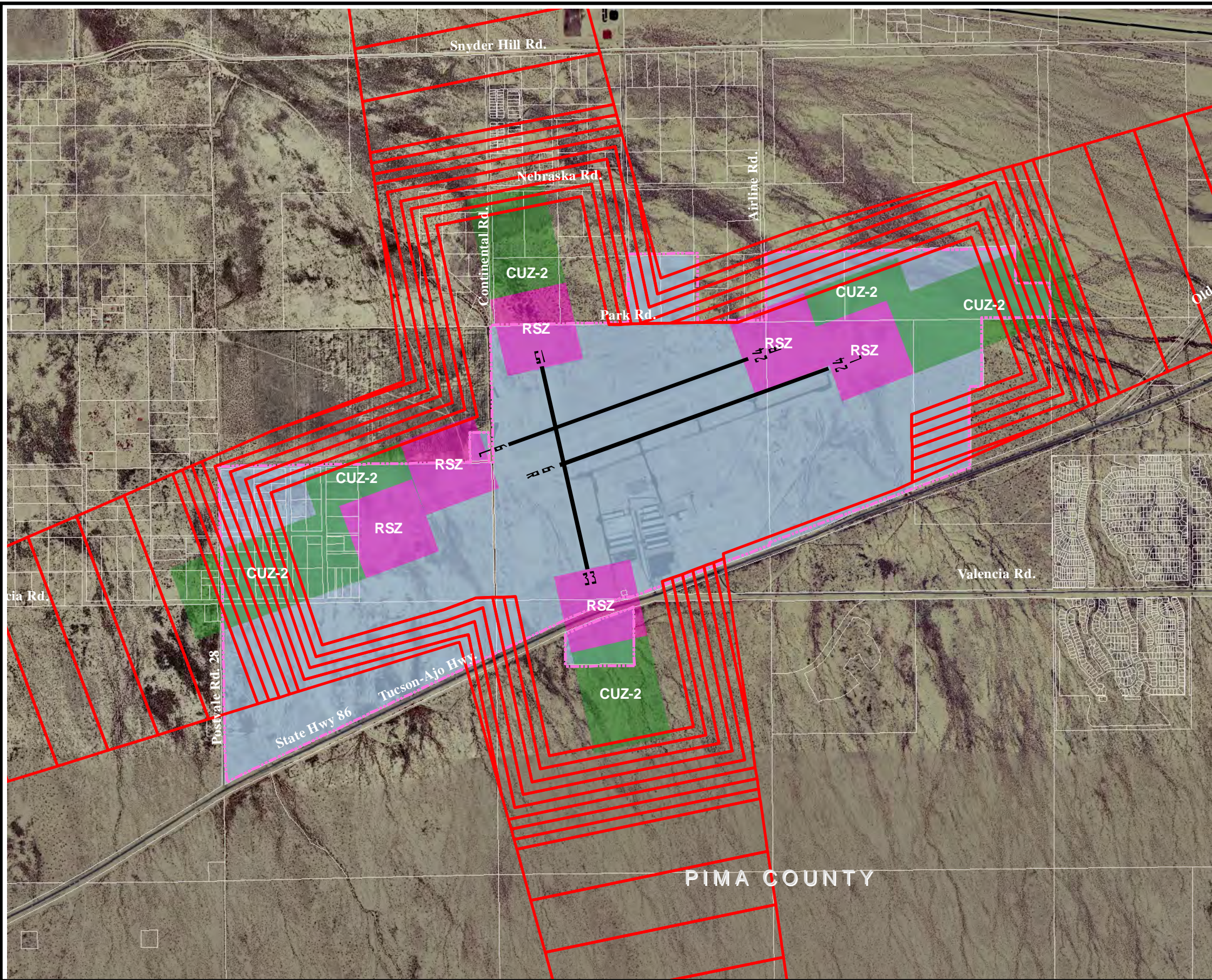
In addition to the primary zoning classifications, Pima County has established an airport overlay zone for Ryan Airfield that consists of a height overlay and a land use overlay. The height overlay establishes a maximum allowable height for structures near the airport. The intent of this zone is to protect the airspace in the arrival and departure corridors at the airport from potential obstructions. The land use overlay zone permits a variety of non-residential uses that are considered compatible with airport operations and establishes a maximum density of one dwelling unit per acre for residential land uses.

TABLE C2 Classification of Zoning Districts	
Generalized Pima County Zoning Districts	
Single-Family Residential	TH, Trailer Home site Zone ML, Mount Lemmon Zone CR-1, Single Residence Zone CR-2, Single Residence Zone CR-3, Single Residence Zone CMH-1, County Manufactured and Mobile Home-1 Zone CMH-2, County Manufactured and Mobile Home-2 Zone
Multiple Residential	CR-4, Mixed-Dwelling Type Zone CR-5, Multiple Residence Zone TR, Transitional Zone
Rural Residential	IR, Institutional Reserve Zone RH, Rural Homestead Zone GR-1, Rural Residential Zone SR, Suburban Ranch Zone SH, Suburban Homestead Zone
General Industrial	MU, Multiple Use Zone CPI, Campus Park Industrial Zone CI-1, Light Industrial/Warehouse Zone CI-2, General Industrial Zone
General Business	MR, Major Resort Zone RVC, Rural Village Center Zone CB-1, Local Business Zone CB-2, General Business Zone

Chapter 18.57 of the Zoning Code has provisions for land use control near airports. Ten overlay zones are established to control the height of structures in airport environs and to regulate land uses within runway approach areas and within noise-impacted areas. These regulations apply to Tucson International Airport, Davis-Monthan Air Base, Pinal Airpark, and Ryan Airfield.

The Airport Environs overlay districts applying in the Ryan Airfield vicinity are shown on **Exhibit C7**. These include the HOZ-Height Overlay Zone, and the RSZ and CUZ-2 compatible use overlay zones. These zones were established to regulate height and land use in the environs of civilian and military airports in order to ensure safe aircraft approach and departure, avoid the concentration of population in potential accident areas, and reduce the harmful effect of noise exposure on humans and animals. Within the RSZ zone, crop raising is the only permitted use. Within the CUZ-2 zone, commercial, industrial, and institutional uses are permitted, although a number of uses which are sensitive to noise or which might compromise safety near the runway approaches are prohibited. These permitted and excluded uses are listed in **Table C3**. Residential

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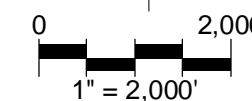
LEGEND

- Airport Property Boundary
- Airport Height Overlay Zone
- Public Airport
- Runway Protection Zone (RPZ)
- Compatible Use Zone (CUZ-2)

Source: Pima County Department of Transportation Geographic Information System, (June, 2008).
 Aerial Photo, U.S. Department of Agriculture, Service Center Agencies, (June, 2003).



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uses in the CUZ-2 zone at Ryan Airfield are permitted if the density does not exceed one residence per acre.

TABLE C3 Permitted Uses in the CUZ-2 Overlay Zone	
Uses Per Pima County Code	
(a) Commercial, Industrial, and Institutional uses as per CB-1, CB-2, CPI, CI-1, CI-2, and CI-3, EXCEPT of the following:	
<ul style="list-style-type: none"> Amusement or recreational enterprises (indoor) Auctions Auditoriums or assembly halls Clubs Department stores Drive-in theaters Fairs, carnivals, or tent shows Grocery stores (except delicatessens and convenience stores) Gymnasiums Industrial or trade schools Hotels Libraries Racetracks Sports arenas or stadiums Religious rescue missions or temporary revivals Rifle ranges Schools or colleges Swimming pools Theaters Trade shows or exhibitions 	
And within the first one thousand feet of the CUZ-2 zone (nearest the runway): retail and office uses are prohibited as primary uses.	
(b)	Enclosed sales and display areas incidental to light manufacturing and assembly.
(c)	Accessory uses for employees only (including cafeterias, offices, and indoor entertainment facilities).
(d)	Ryan Airfield only: Until the runway is realigned, residential uses not exceeding one residence per acre.
Source: Pima County Zoning Code , 1988, Section 18.57.030(c).	

Further development constraints are posed by the presence of a designated Riparian Habitat associated with several unnamed washes on the eastern side of airport property. Any proposed alteration of these habitats would require a Mitigation Plan and rationale explaining the absence of alternative options, per Pima County Code.

Subdivision Regulations

Subdivision regulations apply in cases where a parcel of land is proposed to be divided into lots or tracts. They are established to ensure the proper arrangement of streets, adequate and convenient open space, efficient movement of traffic, adequate and properly located utilities, access for firefighting apparatus, avoidance of congestion, and the orderly and efficient layout and use of land.

Subdivision regulations can be used to enhance noise-compatible land development by requiring developers to plat and develop land so as to minimize noise impacts or reduce the noise sensitivity of new development. The regulations can also be used to protect the airport proprietor from litigation for noise impacts at a later date. The most common requirement is the dedication of a noise or aviation easement to the local government by the land subdivided as a condition of development approval. The easement authorizes overflights of the property, with the noise levels attendant to such operations. It also requires the developer to provide noise insulation in the construction of the buildings.

Pima County administers subdivision regulations in the study area. The regulations, which are set forth in Chapter 18.69 of the zoning code, do not include any special requirements pertaining to airport noise.

Building Codes

Building codes regulate the construction of buildings, ensuring that they are built to safe standards. Building codes may be used to require noise insulation in new residential, office, and institutional building construction when warranted by existing or potential high aircraft noise levels.

Pima County administers the 2006 edition of the International Building Code (IBC) promulgated by the International Code Council (ICC). Pima County amended the IBC to include additional noise-level reduction requirements for properties within the vicinity of Tucson International Airport and Davis-Monthan Air Force Base. The amendment does not include any requirements for the properties within the vicinity of Ryan Airfield.

Capital Improvement Programs

Capital improvement programs are multi-year plans, typically covering five or six years, which list major capital improvements planned to be undertaken during each year. Most capital improvements have no direct bearing on noise compatibility. The obvious exceptions to this are schools and, in certain circumstances, libraries, medical facilities, and cultural and recreational facilities.

Some capital improvements exert a strong influence on development trends and may have an important indirect relationship to noise compatibility. For instance, sewer and water facilities may open up large vacant areas for residential development. Pima County has a five-year Capital Improvement Program. Currently, the program proposes no Capital Improvement Projects in the immediate vicinity of the airport.

Infrastructure Plan

As previously stated, Ryan Airfield is located within the Southwest Sub-region planning area. Pima County accepted the *Pima County Southwest Infrastructure Plan* in December 2007 to plan for anticipated increases in density and demand for infrastructure in this region. Approximately 14,000 residences are located in the Southwest Sub-region, and the plan assumes that an additional 44,000 could be constructed in this area. The plan focuses on the infrastructure needed to accommodate the addition of these residences and associated retail and business development.

The plan outlines the following infrastructure improvements within the immediate vicinity of Ryan Airfield:

- Adoption of a Compatibility Overlay Zone. The Tucson Airport Authority adopted this airport compatibility zone concept in May 2007. It has not been incorporated into the Pima County zoning ordinance. Shown on **Exhibit C8**, the overlay includes the following zones.
 - Commercial and industrial uses preferred. Residential uses are discouraged but acceptable at existing densities.
 - Industrial and commercial uses. Location and area to be expanded in balance with proposed developments.
 - Industrial and commercial uses recommended. Existing residential densities preferred. Low density residential uses considered.
 - No residential or increase in residential density per TAA policy.
 - Open space/No residential uses which result in the congregation of large numbers of people.
- New or improved drainage culvert road crossings at five points along Ajo Highway adjacent to Ryan Airfield Property.
- Widen Ajo Highway to six-lane parkway from Sandario Road to Interstate 19. This improvement includes the section of Ajo Highway that provides service to Ryan Airfield. The plan also identifies the intersection of Ajo Highway and Valencia Road as the site for an interchange.

- Construction of a high-capacity transit service line on Valencia Road terminating at Ajo Highway south of the airport.
- Construction of new sanitary sewer trunk lines north and south of the airport.

LAND USE COMPATIBILITY

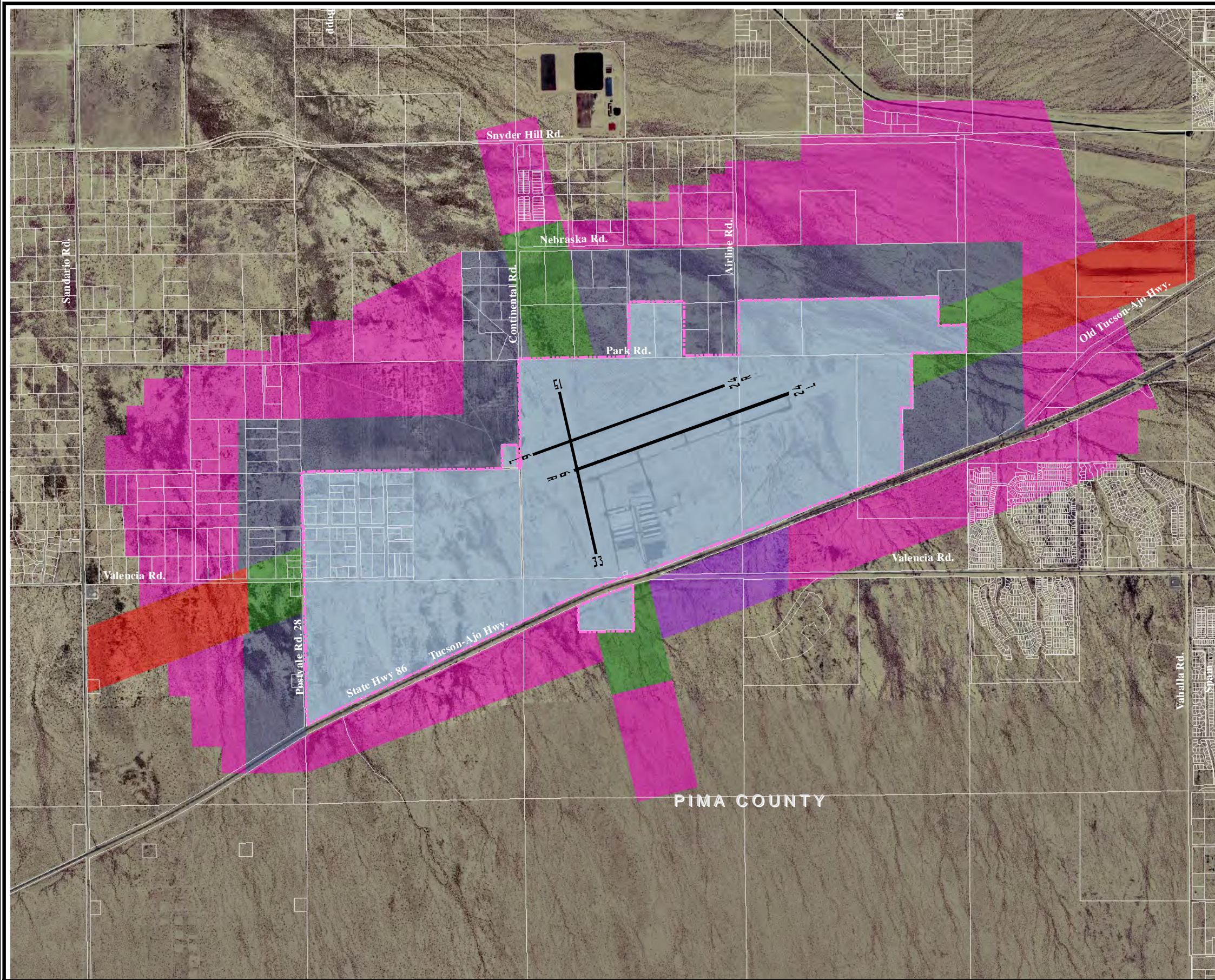
The degree of annoyance which people experience from aircraft noise varies depending on their activities during the time of exposure. Studies regarding airport noise revealed that people rarely are as disturbed by aircraft noise when they are working, shopping, or driving as when they are at home. Occupants of hotels and motels seldom express as much concern with aircraft noise as do permanent residents of an area. To standardize the assessment of airport land use compatibility, the Federal Aviation Administration (FAA) has established guidelines, codified within 14 CFR Part 150, that identify suitable land uses for development near airport facilities.

14 CFR PART 150 GUIDELINES

In the early 1980s, the FAA promulgated Code of Federal Regulations Title 14, Part 150 to guide airport land use compatibility studies. These guidelines were based on earlier studies and guidelines by federal agencies (*Federal Interagency Committee on Urban Noise*, 1980). These land use compatibility guidelines are advisory in nature, rather than regulatory. **Part 150 explicitly states that determinations of land use compatibility are purely local responsibilities.** (See Section A150.101(a) and (d) and explanatory note in Table 1 of 14 CFR Part 150.) **Exhibit C9** summarizes the FAA airport noise land use compatibility guidelines.

The FAA uses Part 150 guidelines as the basis for defining areas within which noise compatibility projects, such as sound insulation or property acquisition, may be eligible for federal funding. Federal grants are available through the noise set-aside funds from the Airport Improvement Program (AIP). In general, noise compatibility projects must be within the 65 DNL noise contour to be eligible for federal funding. According to the AIP handbook, “Noise compatibility projects usually are located in areas where aircraft noise is significant, as measured in day-night average sound level (DNL) or 65 decibels (dB) or greater.” (See FAA Order 5100.38C, Chapter 8, paragraph 810.b.) However, projects may also be approved and made eligible in areas of less noise exposure. In these cases, the following criterion apply: the airport operator must adopt a designation of non-compatibility different from federal guidelines, the noise exposure maps (NEM) and noise compatibility program (NCP) must identify areas as non-compatible, and measures proposed for mitigation within the area must meet Part 150 criteria.

The FAA guidelines outlined in **Exhibit C9** state that residential development, including standard construction (residential construction without acoustic treatment), mobile homes, and transient lodging are all incompatible with noise above 65 DNL. Homes of



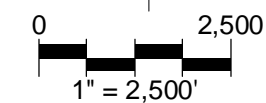
LEGEND

- Airport Property Boundary
- Public Airport
- Commercial and Industrial Uses Preferred. Residential Uses are Discouraged but Acceptable at existing Densities.
- Industrial and Commercial Uses. Location and Area to be expanded in Balance with Proposed Developments.
- Industrial and commercial Uses Recommended. Existing residential Densities Preferred. Low Density residential Uses Considered.
- No Residential or Increase in Residential Density per TAA Policy
- Open Space / No Residential or Uses which Results in the Congregation of Large Numbers of People.

Source: Pima County Department of Transportation Geographic Information System, (June, 2008).
 Aerial Photo, U.S. Department of Agriculture, Service Center Agencies, (June, 2003).



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LAND USE	Yearly Day-Night Average Sound Level (DNL) in Decibels					
	Below 65	65-70	70-75	75-80	80-85	Over 85
RESIDENTIAL						
Residential, other than mobile homes and transient lodgings	Y	N ¹	N ¹	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N ¹	N ¹	N ¹	N	N
PUBLIC USE						
Schools	Y	N ¹	N ¹	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Government services	Y	Y	25	30	N	N
Transportation	Y	Y	Y ²	Y ³	Y ⁴	Y ⁴
Parking	Y	Y	Y ²	Y ³	Y ⁴	N
COMMERCIAL USE						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail-building materials, hardware and farm equipment	Y	Y	Y ²	Y ³	Y ⁴	N
Retail trade-general	Y	Y	25	30	N	N
Utilities	Y	Y	Y ²	Y ³	Y ⁴	N
Communication	Y	Y	25	30	N	N
MANUFACTURING AND PRODUCTION						
Manufacturing, general	Y	Y	Y ²	Y ³	Y ⁴	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y ⁶	Y ⁷	Y ⁸	Y ⁸	Y ⁸
Livestock farming and breeding	Y	Y ⁶	Y ⁷	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
RECREATIONAL						
Outdoor sports arenas and spectator sports	Y	Y ⁵	Y ⁵	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts, and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

The designations contained in this table do not constitute a federal determination that any use of land covered by the program is acceptable under federal, state, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally-determined land uses for those determined to be appropriate by local authorities in response to locally-determined needs and values in achieving noise compatible land uses.

See other side for notes and key to table.



KEY

Y (Yes)	Land Use and related structures compatible without restrictions.
N (No)	Land Use and related structures are not compatible and should be prohibited.
NLR	Noise Level Reduction (outdoor-to-indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25, 30, 35	Land Use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structure.

NOTES

- 1 Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB, respectively, should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB; thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.
- 2 Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
- 3 Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
- 4 Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
- 5 Land use compatible provided special sound reinforcement systems are installed.
- 6 Residential buildings require a NLR of 25.
- 7 Residential buildings require a NLR of 30.
- 8 Residential buildings not permitted.

Source: *14 CFR Part 150*, Appendix A, Table 1.

standard construction and transient lodging may be considered compatible where local communities have determined these uses are permissible; however, sound insulation methods are recommended. Schools and other public use facilities are also generally considered to be incompatible with noise exposure above 65 DNL. As with residential development, communities can permit these uses to be acceptable with appropriate sound insulation measures.

Examples of incompatible land uses at various noise levels include outdoor music venues and amphitheatres at levels exceeding 65 DNL; zoos and nature exhibits above 70 DNL; and hospitals, nursing homes, places of worship, auditoriums, concert halls, livestock breeding, amusement parks, resorts, and camps above 75 DNL.

Historic properties, such as those listed on the National Register of Historic Places, have been deemed to be in compliance with Part 150, Section 4(f) of the *Department of Transportation Act* (DOT Act), and the *National Historic Preservation Act of 1966*, as amended. In general, these properties are not any more sensitive to noise than are other properties of similar uses; however, federal regulations require that noise effects on these uses be considered when evaluating the effects of an action, such as a noise abatement or land use management procedure.

The strictest of these requirements is the *Department of Transportation (DOT) Act*. Section 4(f) of the DOT Act provides that the U.S. Secretary of Transportation shall not approve any program (such as a Noise Compatibility Program) or project which requires the use of any historic site of national, state, or local significance unless there is no feasible and prudent alternative to the use of such land. The FAA is required to consider the direct physical taking of eligible property (such as acquisition and demolition of historic structures) and the indirect use of, or adverse impact to, eligible property (such as noise exposure within the 65 DNL noise contour). When evaluating the effects of the noise abatement and land use management alternatives later in this report, it will be necessary to also identify whether the proposed action conflicts with or is compatible with the normal activity or aesthetic value of any historic properties not already significantly affected by noise. The NEM contours are not evaluated under Section 4(f).

POTENTIAL GROWTH RISK

Before evaluating the impact of future aircraft noise, the likelihood of noise-sensitive development in the area must be understood. This is of particular importance for Ryan Airfield as much of the area surrounding the airport is undeveloped. Calculating the number of potential residents near the airport should emphasize the importance of airport noise compatibility planning. Understanding development trends in the vicinity of Ryan Airfield is also critical to compatibility planning as future residential growth can constrain airport operations if it occurs beneath aircraft flight tracks and within areas subject to increased noise levels. The following sections describe population growth and potential residential development within the airport environs. The focus of this

discussion includes population projections, residential development projections, and a discussion of other potential noise-sensitive development.

As presented in **Table C4**, population within the Pima County area is anticipated to continue growing through 2027. According to the Arizona Department of Commerce, population in the Pima County area is expected to increase by over 280,029 people during the next 20 years. With the increase in population, it is assumed that additional residences will be constructed and demand will increase for noise-sensitive institutions such as schools, places of worship, and daycare facilities.

TABLE C4						
Population Trends						
Year	State of Arizona	Avg. Annual % Change	Pima County	Avg. Annual % Change	City of Tucson	Avg. Annual % Change
1960	1,302,161	--	265,660	--	212,892	--
1970	1,770,900	3.1%	351,666	2.8%	262,933	2.1%
1980	2,718,215	4.4%	531,433	4.2%	330,537	2.3%
1990	3,665,228	3.0%	666,880	2.3%	405,390	2.1%
2000	5,130,632	3.4%	843,746	2.4%	486,699	1.8%
2007	6,432,007	3.3%	1,003,918	2.5%	541,132	1.5%
Forecasts						
2012	7,370,993	2.9%	1,113,749	2.2%	578,769	1.4%
2027	9,898,153	2.3%	1,393,778	1.7%	657,788	0.9%

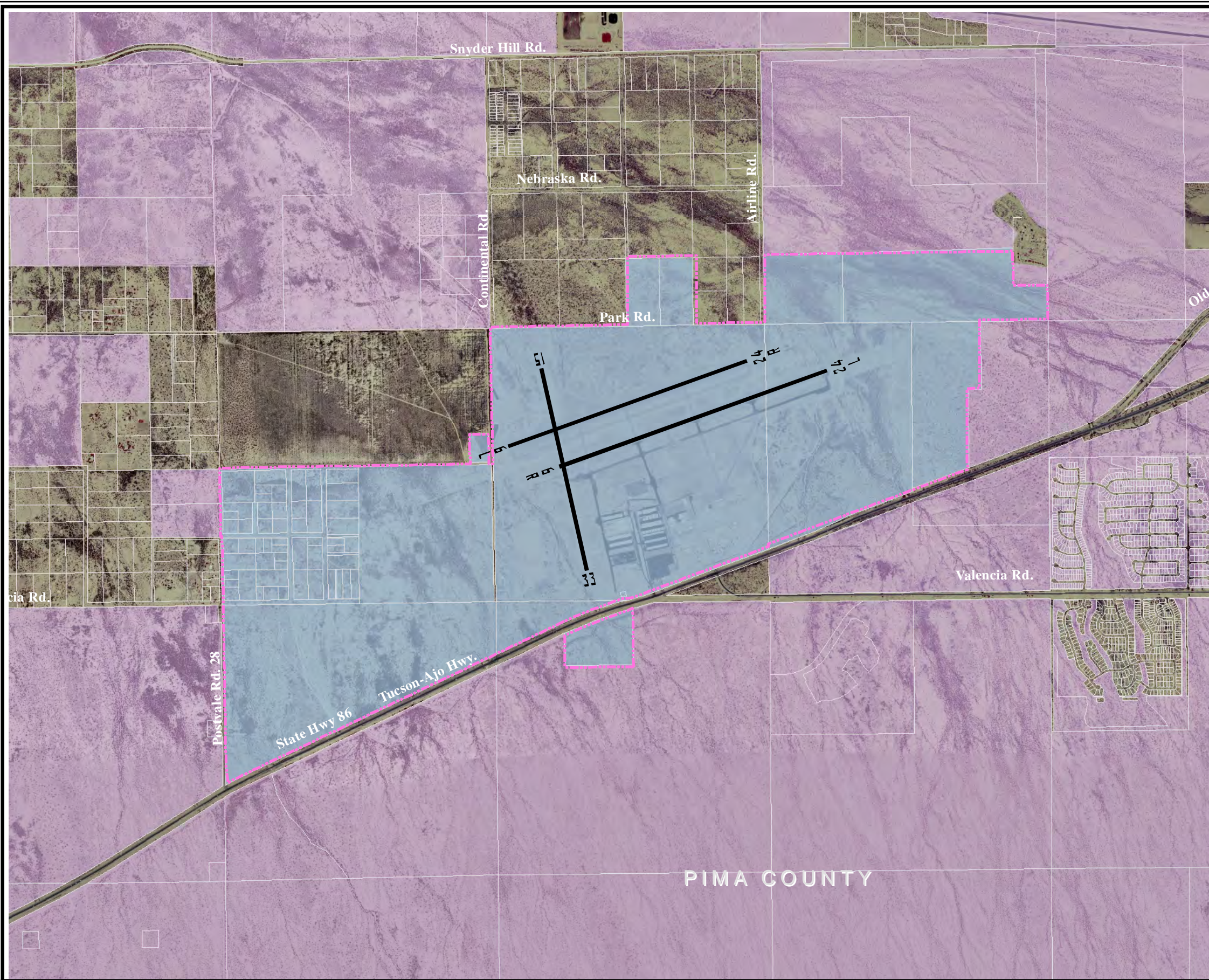
Sources: U.S. Census Bureau (1960-2000)
Pima Association of Governments (2007)
Forecast information from the Arizona Department of Commerce (2006)

Growth Risk Analysis




The growth risk analysis for Ryan Airfield focuses on the undeveloped land which is planned or zoned for residential or noise-sensitive land uses. In order to identify areas of potential future development, existing land use (**Exhibit C3**), community general plans (**Exhibit C5**), and zoning designations (**Exhibits C6** and **C7**) were evaluated. Future residential development will be influenced by zoning on undeveloped parcels, the physical constraints of the individual sites, the availability of sewer and water infrastructure, and the market for residential development in the area. Areas identified as growth risk are illustrated on **Exhibit C10**.

The determination of the number of dwelling units per acre is calculated using the highest density allowed in the zoning district or land use plan designation, minus 33 percent for infrastructure such as roads, sidewalks, and utilities.

Growth risk population is calculated by multiplying the number of dwelling units by the average number of people per household from the U.S. Census Bureau. The average household size for the Pima County area is 2.51 persons.



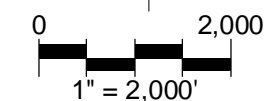
LEGEND

-  Airport Property Boundary
-  Public Airport
-  Growth Risk Areas

Source: Pima County Department of Transportation Geographic Information System, (June, 2008).
 Aerial Photo, U.S. Department of Agriculture, Service Center Agencies, (June, 2003).



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AIRCRAFT NOISE ANALYSIS METHODOLOGY

Part 150 guidelines mandate that the prevailing noise conditions at an airport must be analyzed using a computer simulation model. The FAA has approved the use of the Integrated Noise Model (INM) for analysis in noise compatibility studies. The most recent version of the INM is quite sophisticated in predicting noise conditions at a given geographic location and accounts for variables such as airfield elevation, temperature, headwinds, and local topography. Version 7.0a of the INM was used to prepare updated noise exposure contours for Ryan Airfield.

The purpose of the noise model is to graphically represent noise conditions at the airport and to identify areas that are exposed to aircraft noise. To achieve an accurate representation, data regarding various airport operations characteristics must be gathered.

Input categories for the INM include runway configuration, flight track locations, aircraft fleet mix, terrain, and numbers of daytime and nighttime operations by aircraft type. **Exhibit C11** depicts the various INM input categories for developing the noise exposure contours.

The INM includes information regarding the noise characteristics for aircraft that commonly operate at Ryan Airfield. For each aircraft, the INM computes typical profiles for aircraft operating at the specified airport location based on its field elevation, temperature, and flight procedure data provided by aircraft manufacturers. The INM will also accept user-provided input, although the FAA reserves the right to accept or deny the use of such data depending on its statistical validity.

To develop the noise exposure contours, the INM calculates aircraft noise levels at a set of grid points surrounding the airport. The numbers and locations of the grid points are established by the user during the noise modeling process to assess noise levels in areas where operations are concentrated, depending on tolerance and level of refinement specified. The noise level values at the grid points are used to prepare noise contours which connect points of equal noise exposure.

INM INPUT

AIRPORT INFORMATION

Runway position information for Ryan Airfield was input into the INM according to the longitude, latitude, and elevation of the runway ends. As previously mentioned, the INM computes typical flight profiles for aircraft operating at the airport location. Ryan Airfield's field elevation is 2,417 feet above mean sea level (MSL), and its average annual temperature is 68.7 degrees Fahrenheit (F). The INM also allows the user to in-

corporate topographic data to account for changes in elevation in the surrounding terrain, which can alter the way noise is experienced. Incorporating this information allows the INM to recreate, as realistically as possible, the existing conditions surrounding the airport. Topographic data from the United States Geological Survey was used to develop the noise contours for Ryan Airfield.

AIRCRAFT ACTIVITY DATA

This study uses current and forecast operations (takeoffs and landings) data from Chapter Two of this document. Table 2H, on page 2-13 of this document, summarizes the operations data. The annual operations data in the table are divided by 365 to get the average daily operations data required for input to the model.

FLEET MIX

Table 2E, on page 2-9 of this document, presents the current and forecast fleet mix for Ryan Airfield. This information and operations by aircraft type from the instrument flight rules (IFR) database formed the basis for the fleet mix input data for the noise analysis. **Table C5** summarizes the fleet mix and annual aircraft operations.

TABLE C5				
Annual Operations by Aircraft Type				
Ryan Airfield				
	INM Designator	2008	2012	2027
<i>ITINERANT OPERATIONS</i>				
Light Single-variable pitch propeller	GASEPF	29,143	28,285	43,238
Light Single-fixed pitch propeller	GASEPF	29,143	28,285	43,238
Multi-Engine	BEC58P	1,158	1,165	1,635
Turboprop	BEC100	225	600	4,000
Lear 35	LEAR35	25	150	2,000
Cessna Mustang	CNA510	0	175	1,000
Gulfstream IV	GIV	0	50	500
Robinson R22	R22	1,156	3,165	5,265
S-70 Blackhawk	S70	920	875	875
Subtotal, Itinerant Operations		61,770	62,750	101,750
<i>LOCAL OPERATIONS</i>				
Light Single-variable pitch propeller	GASEPF	51,349	52,698	73,425
Light Single-fixed pitch propeller	GASEPV	51,349	52,698	73,425
Multi-Engine	BEC58P	521	535	900
Robinson R22	R22	2,003	1,945	3,125
S-70 Blackhawk	S70	960	875	875
Subtotal, Local Operations		106,182	108,750	151,750
<i>TOTAL OPERATIONS</i>		167,952	171,500	253,500

DATA BASE SELECTION

The INM includes aircraft noise data for most of the aircraft operating at Ryan Airfield. **Table C5** indicates the INM identifier used for modeling each aircraft. Designators for the following business jets are available in the INM: Lear 35, Cessna Mustang 510, and Gulfstream IV. Each of these was modeled with the corresponding identifier.

In cases where an aircraft is not included, the INM includes an aircraft substitution list that identifies aircraft with comparable noise characteristics. The aircraft substitution list indicates that the general aviation single-engine variable-pitch propeller model, identified as GASEPV in the INM, can be used to model noise for several general aviation aircraft. These include the Beech Bonanza, Cessna 177 and 180, and Piper PA-32, among others. Additionally, a variety of general aviation single-engine fixed-propeller aircraft are modeled with the GASEPF aircraft. Included among these are the Cessna 150, Piper Archer, and Piper Tomahawk.

The FAA aircraft substitution list recommends the Beech Baron, identified as BEC58P, to represent light multi-engine piston aircraft such as the Piper Navajo, Beech Duke, Cessna 310, and others. The BEC100 represents the small multi-engine turboprop aircraft in the fleet.

General aviation and military helicopter operations were modeled using the Robinson R-22 (R22). Military operations were also modeled using the S70 designator.

All substitutions are commensurate with published FAA guidelines.

Flight Profiles

The INM program uses a three-degree approach as the standard arrival profile. Nothing in the inventory interviews for the Master Plan or in the published airport information indicates any variation in this standard procedure at Ryan Airfield. Therefore, the models in this study use the standard approach procedure as representative of local operating conditions.

The INM computes takeoff profiles based on the user-supplied airport elevation and the average annual temperature entries in the input data.

Ryan Airfield lies at 2,417 feet mean sea level (MSL) with an average annual temperature of 68.7 degrees F. The INM automatically computes the takeoff profiles using the airplane performance coefficients in the data base and the equations in the Society of Automotive Engineers Aerospace Information Report 1845 (SAE/AIR 1845). The INM computes separate departure profiles (altitude at a specified distance from the airport with associated velocity and thrust settings) for each of the various types of aircraft using the airport.

Time-of-Day

The INM attaches special significance to the time-of-day at which operations occur because of the extra weighting of nighttime flights. In calculating airport noise exposure, one nighttime operation has the same noise emission value as 10 daytime operations (a weight of 10 extra decibels). At Ryan Airfield, the Airport Traffic Control Tower (ATCT) is operated from 6 a.m. to 8 p.m. and the airport closes Runway 6L-24R from sunset to sunrise because it does not have runway lighting. Runway 15-33 is also not equipped with runway lights and is limited to daytime activity. These airfield limitations also limit statistics on nighttime activity. Recognizing that nighttime flying constitutes an important part of any flight training program, a representative model must show some activity at night. Based on interviews with airport management, the noise exposure models in this study assume three percent of total operations occur between the hours of 10 p.m. and 7 a.m.

Runway Use

For modeling purposes, wind data analysis usually determines runway use percentages. However, wind analysis provides only the directional availability of a runway and does not consider pilot selection, primary runway operation, or local operating conventions. At Ryan Airfield, local operating convention designates Runways 6R and 6L as the preferential runways up to a 10-knot tailwind. ATCT staff indicated that Runways 6L/R are used approximately 71 percent of the time given this preferential runway use program. Aircraft use Runways 24L/R approximately 25 percent of the time. Runways 15 and 33 each accommodate two percent of the operations. **Table C6** shows the runway use percentages for the noise exposure models of this study.

Runway	Turboprop, Business Jet, Military, other large aircraft	Light Singles, Light Twins, Rotorcraft
6R	87.5	35.5
24L	12.5	12.5
6L	0	35.5
24R	0	12.5
15	0	2
33	0	2

Flight Tracks

Coordination with ATCT staff and airport management personnel and a review of the previous Part 150 study provided the basis for flight track determination. Observed itinerant departures turn right or left to destination headings when using any runway, therefore, the models in this study do not use straight-out departures. However, all arrival tracks were modeled on straight-in tracks. A standard left-hand pattern is used as the local training pattern on all runways except for Runways 6R and 24R. These runways were modeled with right-hand patterns.

Although the consolidated flight tracks and sub-tracks shown on **Exhibits C12, C13, C14, and C15** appear as distinct paths, they actually represent average flight routes and illustrate the areas where aircraft operations most likely will occur. As the exhibit shows, air traffic density generally increases nearer the airport as the aircraft funnel into and disperse from the runway system. The tracks presented on the accompanying exhibit do not represent the only flight paths used. Variations by individual aircraft along these tracks may occur based on pilot technique, aircraft type, weather conditions, and air traffic control needs. Generally speaking, an observer may expect to see an aircraft almost anywhere in the sky around the airport.

Assignment of Aircraft To Flight Tracks

The assignment of aircraft and their related operations values to specific flight tracks completes the input data for the INM. No predominate destination heading emerged from the inventory interviews or from a review of the previous study. Therefore, the technician split itinerant departure operations equally between north and south turning departure tracks off the main 6L/R-24R/L runway system. The previously discussed runway use assumptions based on wind data and the preferential runway use program dictated the assignment of aircraft and operations to the itinerant arrival tracks and to the touch-and-go tracks (local training pattern). In general, the technician factored the number of operations by a specific aircraft by the runway use, the directional assignment, and the time-of-day. That process continued to cover the assignment of all operations to flight tracks.

INM OUTPUT

The INM offers a wide variety of metrics as output options. For this study, average annual noise contours in DNL are required. Part 150 requires 65, 70, and 75 DNL contours for the official Noise Exposure Maps. The following paragraphs present the results of the contour analysis for current and forecast noise exposure conditions as developed from the Integrated Noise Model.

2008 Noise Exposure Contours

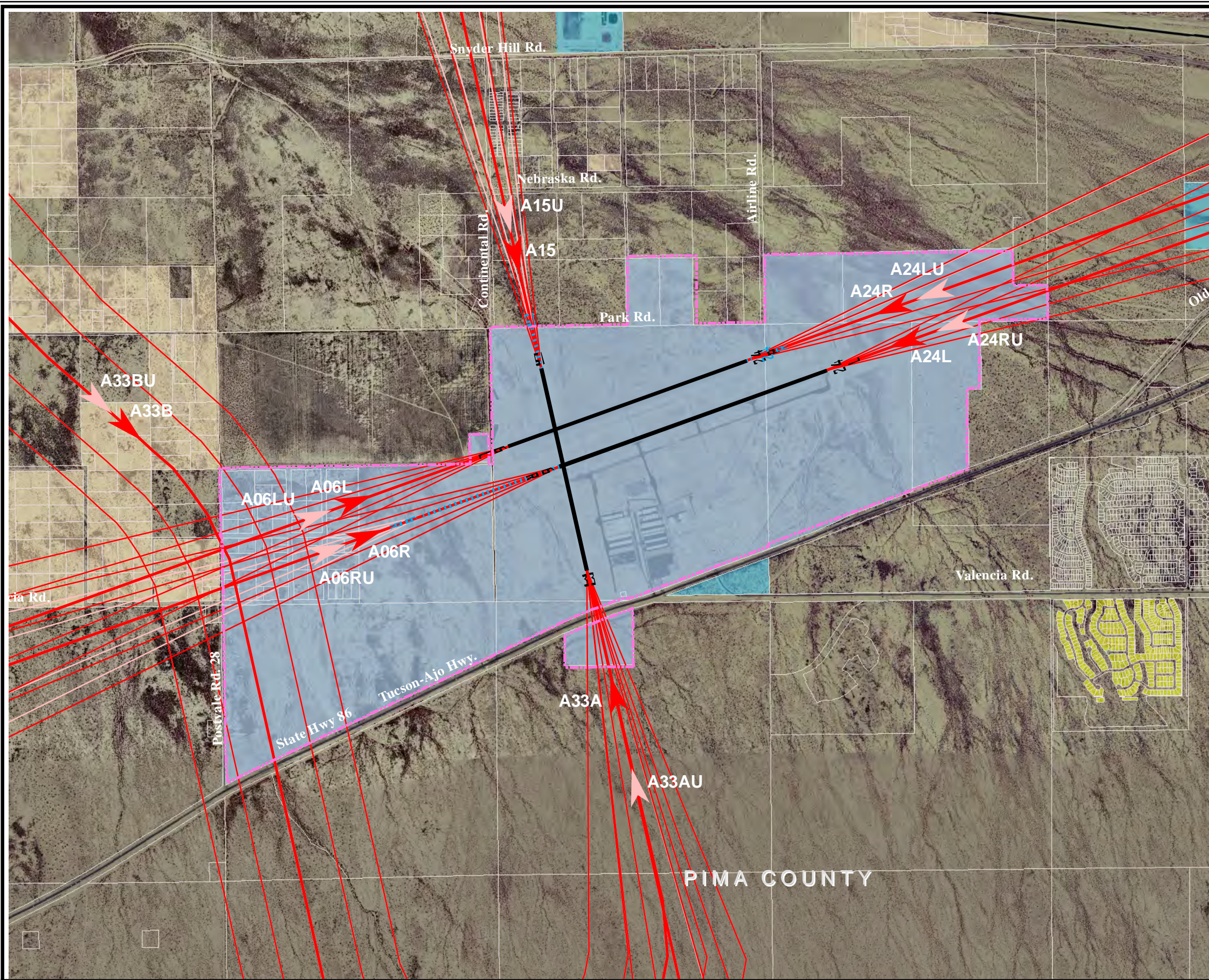
Exhibit C16 presents the plotted results of the INM contour analysis for 2008 conditions using input data described in the preceding pages. **Table C7** shows the surface areas and noise-sensitive land uses within each contour.

TABLE C7					
Summary of Noise Exposure And Impacts					
DNL Contour	Total Area Inside Contours (acres)	Contour Area Inside Airport Property (acres)	Contour Area Outside Airport Property (acres)	Existing Dwelling Units/Noise-Sensitive Uses	Potential Dwelling Units/Noise-Sensitive Uses²
2008 - EXISTING CONDITIONS					
65-70	179.0	176.8	2.2	0	0
70-75	142.8	142.8	0.0	0	0
75+	61.0	61.0	0.0	0	0
Total	382.8	380.6	2.2	0	0
2012 - FORECAST¹					
65-70	177.6	174.9	2.7	0	0
70-75	153.5	153.4	0.1	0	0
75+	60.9	60.9	0.0	0	0
Total	392.0	389.2	2.8	0	0
2027 - FORECAST¹					
65-70	257.2	247.2	10.0	0	0
70-75	203.8	203.2	0.6	0	0
75+	96.3	96.3	0.0	0	0
Total	557.3	546.7	10.6	0	0
¹ Includes future acquisition areas.					
² Area outside airport property within the noise exposure contours is owned by the City of Tucson and is unlikely to be developed with noise-sensitive land uses.					
Source: Coffman Associates analysis.					

The overall shape of the noise pattern around the airport shows the effects of the preferential runway use program. The contours extend to the east, reflecting the higher portion of departures using Runways 6L and 6R.

The rounded shape which extends west of Runway 6R represents departure noise. The 65, 70, and 75 DNL contours, except for a very small portion, remain on airport property. The 65 DNL contour escapes airport property on the north side, just north and west of the end of Runway 6L, by about 200 feet. Approximately 2.2 acres of the 65 DNL noise contour is not on airport property. All the 70 and 75 DNL contour remains on airport property.

There are no existing noise-sensitive land uses within the 2.2 acres of noise exposure contour not contained on airport property. The property north of the airport is planned for future airport acquisition. The area to the northwest is currently owned by the City of Tucson and managed by the Pima County Waste Water Department. Therefore, the development of noise-sensitive land uses in the future in this area is unlikely.



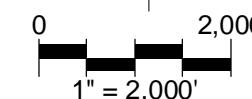
LEGEND

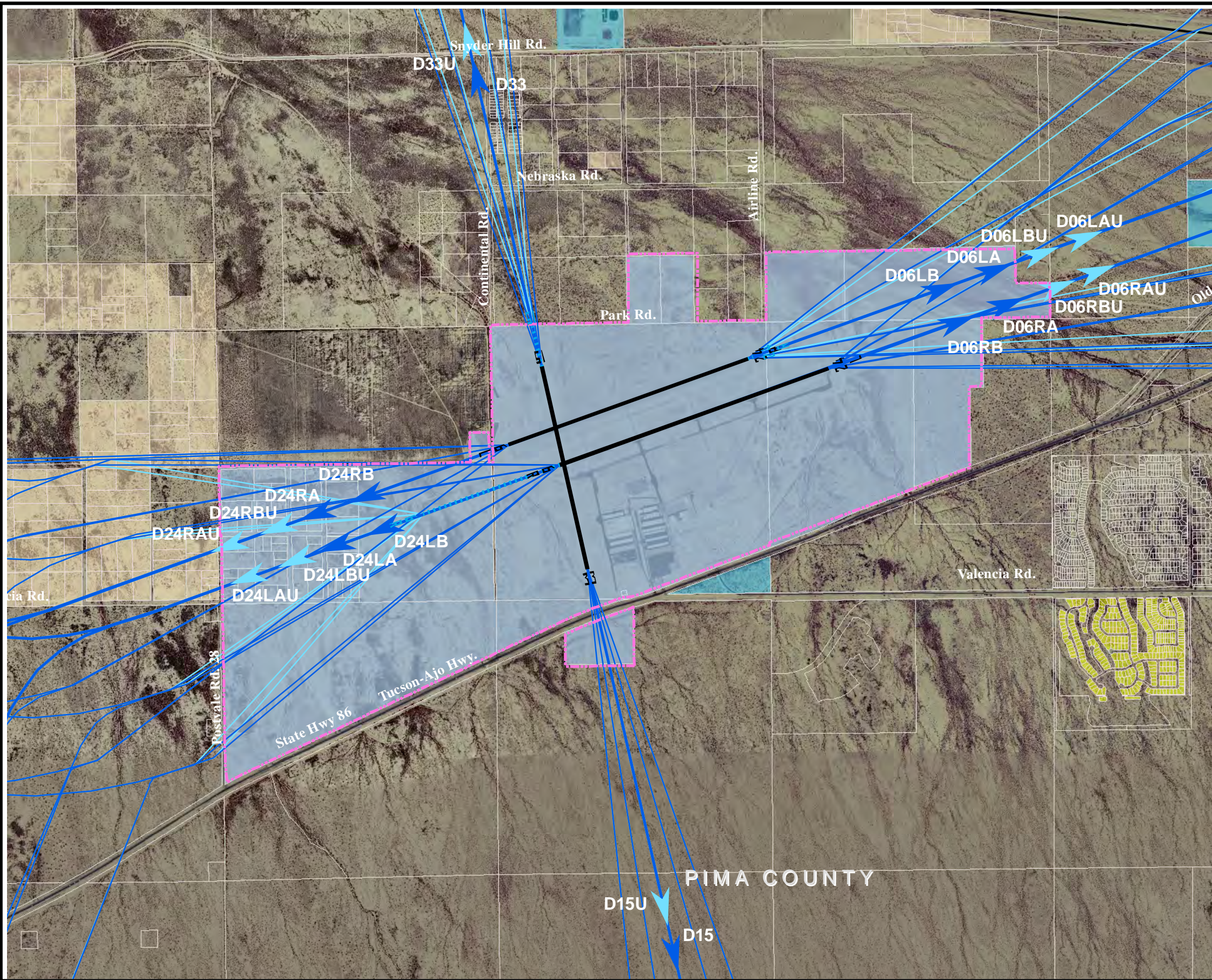
- Airport Property Boundary
- Consolidated Arrival Tracks
- Consolidated Arrival Sub-Tracks
- Consolidated Future Arrival Tracks
- Consolidated Future Arrival Sub-Tracks
- Runway Extension
- Very Low Density Residential
- Low Density Residential
- Public Institutions
- Public Airport

Source: Pima County Department of Transportation Geographic Information System, (June, 2008).
 Aerial Photo, U.S. Department of Agriculture, Service Center Agencies, (June, 2003).



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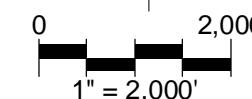
LEGEND

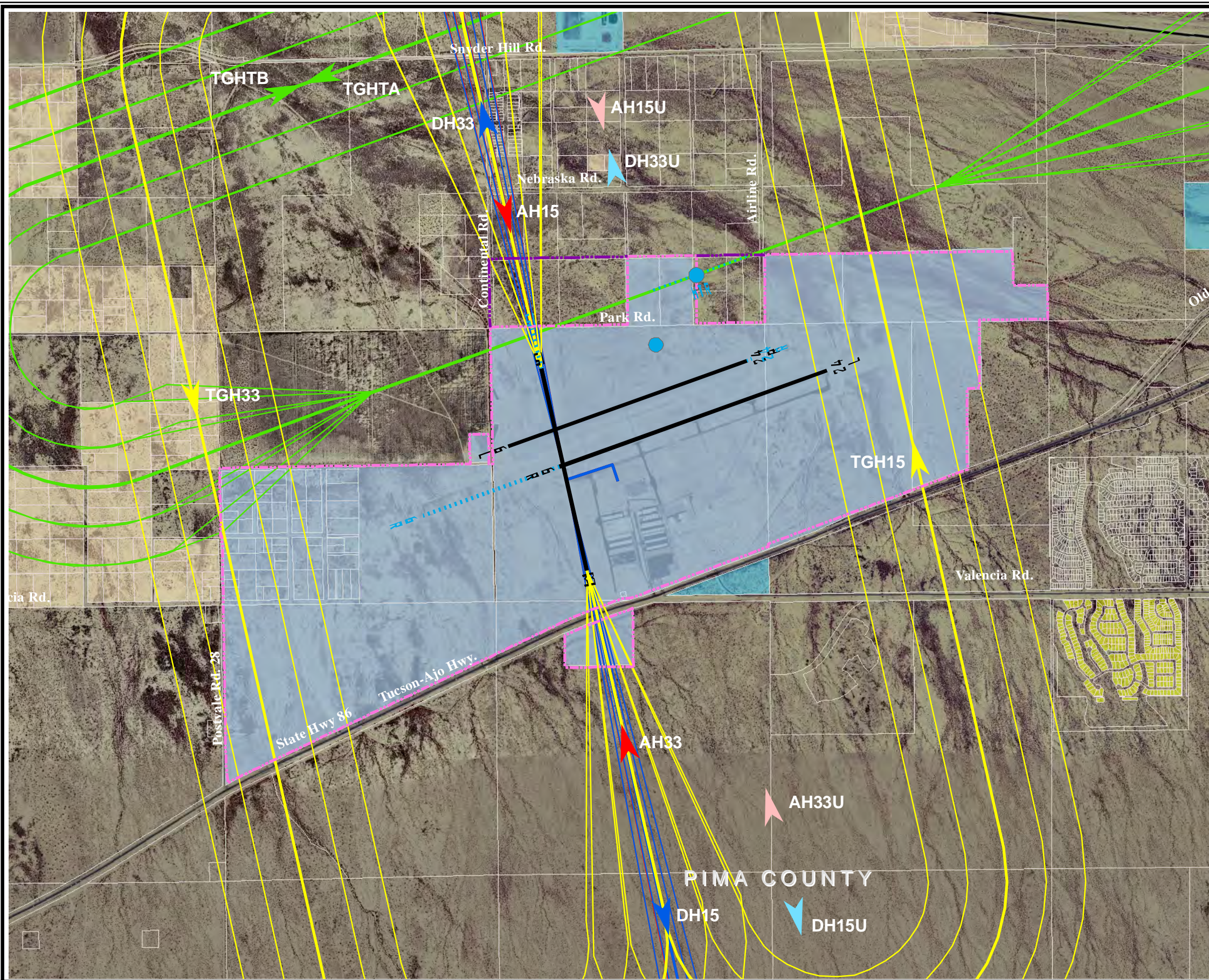
- Airport Property Boundary
- Consolidated Departure Tracks
- Consolidated Departure Sub-Tracks
- Consolidated Future Departure Sub-Tracks
- Consolidated Future Departure Sub-Tracks
- Runway Extension
- Very Low Density Residential
- Low Density Residential
- Public Institutions
- Public Airport

Source: Pima County Department of Transportation Geographic Information System, (June, 2008).
 Aerial Photo, U.S. Department of Agriculture, Service Center Agencies, (June, 2003).



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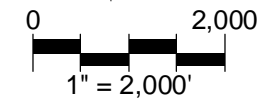
LEGEND

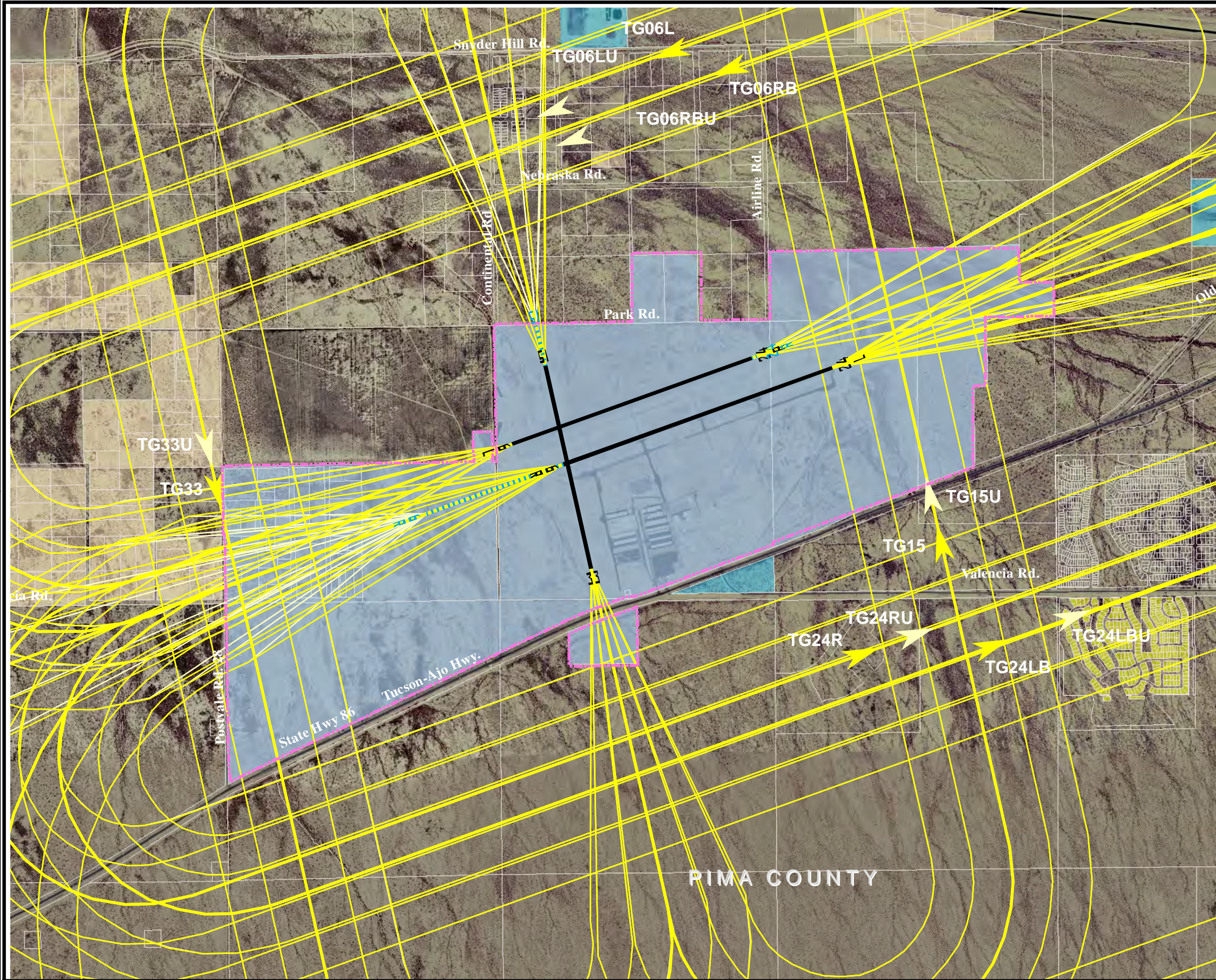
- - - Airport Property Boundary
- Consolidated Arrival Tracks
- Consolidated Arrival Sub-Tracks
- Consolidated Departure Sub-Tracks
- Consolidated Departure Sub-Tracks
- Consolidated Touch & Go Sub-Tracks
- Consolidated Touch & Go Sub-Tracks
- Consolidated Future Arrival Tracks
- Consolidated Future Arrival Sub-Tracks
- Consolidated Future Departure Sub-Tracks
- Consolidated Future Departure Sub-Tracks
- Consolidated Future Touch & Go Tracks
- Consolidated Future Touch & Go Sub-Tracks
- - - Runway Extension
- Future Helipad
- Very Low Density Residential
- Low Density Residential
- Public Institutions
- Public Airport

Source: Pima County Department of Transportation Geographic Information System, (June, 2008).
 Aerial Photo, U.S. Department of Agriculture, Service Center Agencies, (June, 2003).



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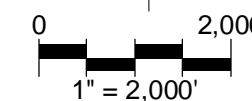
LEGEND

- - - Airport Property Boundary
- Consolidated Touch & Go Tracks
- Consolidated Touch & Go Sub-Tracks
- Consolidated Future Touch & Go Sub-Tracks
- Consolidated Future Touch & Go Sub-Tracks
- - - Runway Extension
- Very Low Density Residential
- Low Density Residential
- Public Institutions
- Public Airport

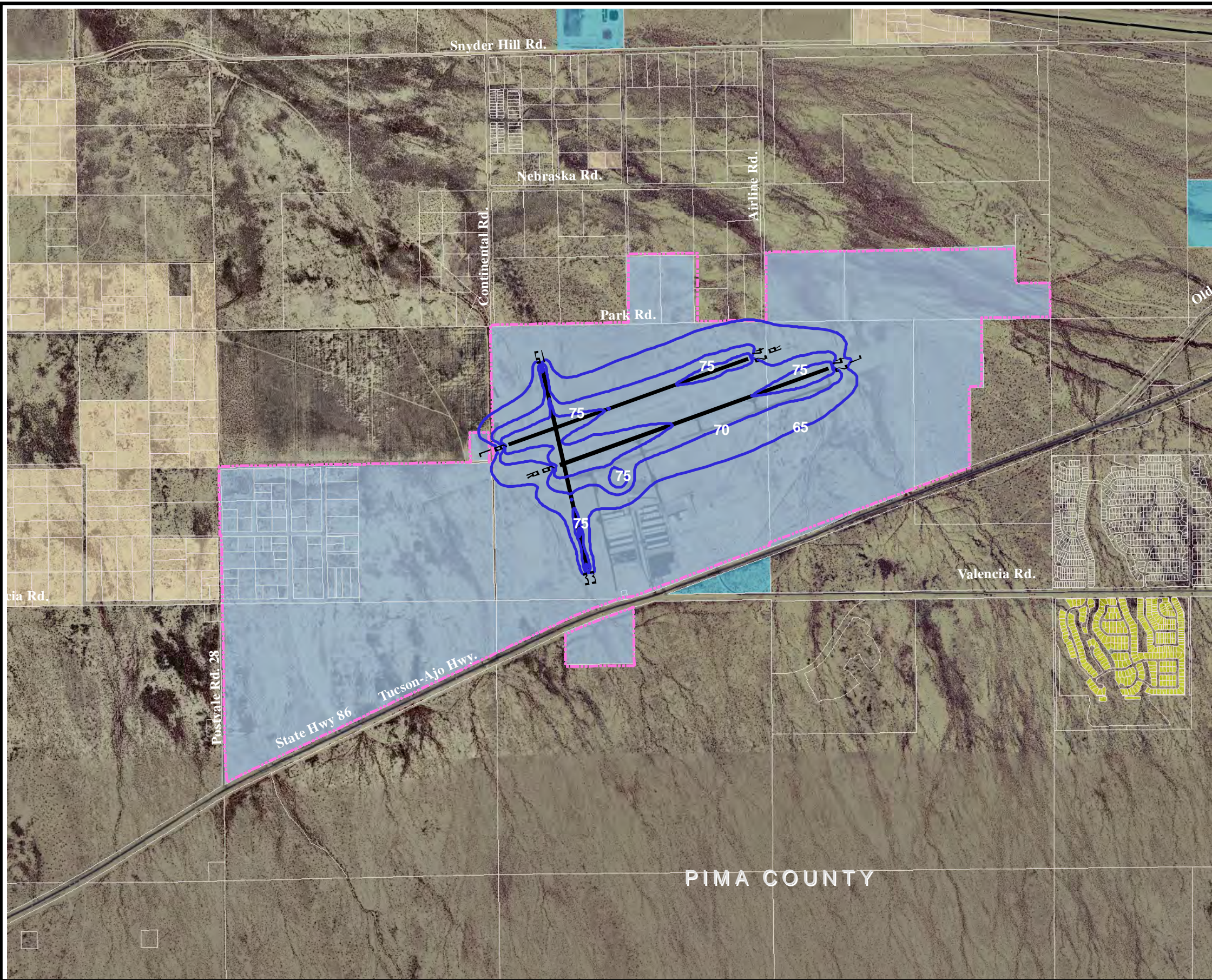
Source: Pima County Department of Transportation Geographic Information System, (June, 2008).
 Aerial Photo, U.S. Department of Agriculture, Service Center Agencies, (June, 2003).



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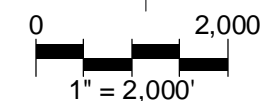
LEGEND

- - - Airport Property Boundary
- DNL Noise Exposure Contour
- Very Low Density Residential
- Low Density Residential
- Public Institutions
- Public Airport

Source: Pima County Department of Transportation Geographic Information System, (June, 2008).
 Aerial Photo, U.S. Department of Agriculture, Service Center Agencies, (June, 2003).



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2012 Noise Exposure Contours

The 2012 noise contours represent the estimated noise conditions based on the forecasts of future operations. **Exhibit C17** presents the plotted results of the 2012 conditions using input data described in the preceding pages.

The 2012 contours maintain the same general shape as their 2008 counterparts. There is one noticeable change to the noise exposure contours to the west. An extension to Runway 6R to the west caused the noise contour to shift into this area. The overall increase in the size of the noise contours reflects the forecast increase in annual operations. **Table C7** shows the surface areas and noise-sensitive impacts for this contour set.

The proposed property boundaries would contain the noise exposure contours north of the airport. Much like its counterpart in the 2008 scenario, the 65 DNL contour gets off airport property about 300 feet on the northwest. Approximately 2.7 acres of the 65 DNL noise contour is not on airport property. The 70 DNL contour stays on airport property, except for a northwest bulge of approximately 50 feet (approximately 0.1 acres). As in 2008, the 75 DNL contour, which separates into several parts, remains on airport property, staying very close to the runways.

There continues to be no existing noise-sensitive land uses within the 2.8 acres of noise exposure contour not contained on airport property. As previously mentioned, this area is currently owned by the City of Tucson and managed by the Pima County Waste Water Department. Therefore, the development of noise-sensitive land uses in the future in this area is unlikely.

2027 Noise Exposure Contours

The 2027 noise contours represent the estimated noise conditions based on the long-range forecast future operations with a change in airport configuration. The master plan has recommended an additional extension on the west end of Runway 6R, bringing its total length to 8,300 feet. In addition, the recommendation of extending Runway 15-33 800 feet to the north has been incorporated. A new heliport facility is planned north of the existing runways. A training helipad is also planned on the north side of the airport. As shown on **Exhibit C18**, although the long-range contours retain the same general shape as the near-term, the forecast increase in operations make the contour set bigger, and they shift to the north and west, following the runway extensions. A small noise exposure contour bubble also occurs over the planned helipad facility to the north. **Table C7** shows the surface areas for this contour set. The 65 DNL contour escapes airport property on the west by about 500 feet. The 70 DNL contour remains on the airport except for the small bulge on the west side. The 75 DNL noise exposure contours is contained on airport property.

Similar to 2008 and 2012, there continues to be no existing noise-sensitive land uses within the 10.6 acres of noise exposure contour not contained on airport property. As previously mentioned, the area within the 65 and 70 DNL is currently owned by the City of Tucson and managed by the Pima County Waste Water Department. Therefore, the development of noise-sensitive land uses in the future in this area is unlikely. The 75 DNL noise contour is contained on airport property.

PREVIOUS NOISE COMPATIBILITY STUDY

The previous Noise Compatibility Plan was completed in July 1990. The primary objective of the Plan was to improve the compatibility between Ryan Airfield aircraft operations and noise-sensitive land uses within the airport environs, while allowing the airport to continue to serve its role in the community, region, and nation. The Plan contained two closely related program measures aimed at satisfying this objective: noise abatement measures and land use management alternatives.

Although no noise abatement measures were recommended in the previous Plan, the following were given as possible considerations towards noise abatement alternatives:

NA-1: Construction of a 2,800-foot extension of Runway 6R/24L, ultimately extending this runway to the east. In addition, the construction of a 4,900-foot parallel Runway 6L/24R located 700 feet north of existing Runway 6R/24L.

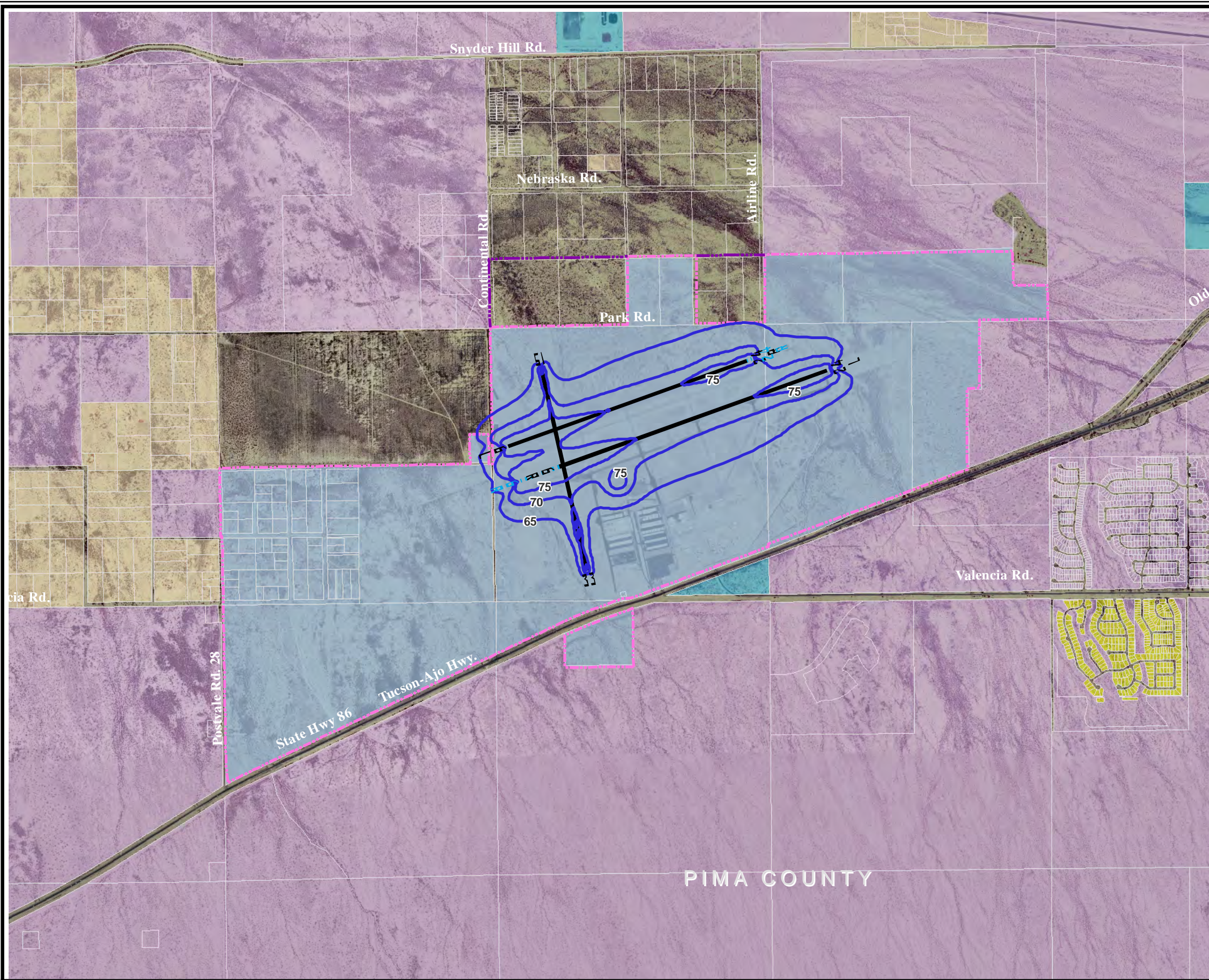
Status: Runway 6R/24L has been extended to the east by 2,800 feet. An additional 4,900-foot runway (Runway 6L/24R) was constructed in 1993, 700 feet north of Runway 6R/24L as suggested in NA-1.

NA-2: As an option to runway configuration to NA-1, Runway 6R/24L could be extended to the west. The location of the additional parallel Runway 6L/24R would be moved further west in this option compared to NA-1.

Status: Noise Abatement Measure 1 has been implemented. Therefore, implementation of this measure will not be pursued.

NA-3: A second runway configuration option considered was abandoning Runway 6R/24L and replacing it with an 8,300-foot runway located near the east end of the Runway 6L/24R. An additional parallel 4,900-foot runway would be constructed 700 feet south in this option.

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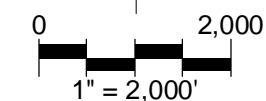
LEGEND

- Airport Property Boundary
- Ultimate Airport Property Boundary
- DNL Noise Exposure Contour
- Runway Extension
- Very Low Density Residential
- Low Density Residential
- Public Institutions
- Public Airport
- Growth Risk Areas

Source: Pima County Department of Transportation Geographic Information System, (June, 2008).
 Aerial Photo, U.S. Department of Agriculture, Service Center Agencies, (June, 2003).



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Status: Noise Abatement Measure 1 has been implemented. Therefore, implementation of this measure will not be pursued.

NA-4: A third runway configuration option considered was a new 8,300-foot runway 700 feet south of Runway 6L/24R and extending 1,500 feet west of Runway 15-33. This option also considered converting Runway 6L/24R from the main runway to a secondary runway.

Status: Noise Abatement Measure 1 has been implemented. Therefore, implementation of this measure will not be pursued.

NA-5: As a means of marketing Ryan Airfield as an airline training facility, a runway configuration identical to that in NA-1 would be beneficial. Such an anticipated training facility would utilize nine single engine and six multi-engine aircraft performing 8,000 annual flight operations each.

Status: The current school uses a 10,000-square-foot facility along with a 10,500-square-foot apron. Space is available for up to 20 single and multi-engine piston-driven aircraft.

Land Use Management Strategies

The following land use management strategies were recommended in the previous Plan:

LU-1: Pima County should maintain existing industrial and commercial zoning areas beneath commonly used flight tracks at Ryan Airfield. Consider industrial rezonings of land designated for industrial use in the Southwest Area Plan, consistent with the recommendations in the Black Wash Drainage Analysis and Policy Assessment Report.

Status: The *2001 Pima County Comprehensive Plan Update* designates the area surrounding Ryan Airfield as Urban Industrial (I). This Industrial classification supports rezoning to Commercial (CB-1 & CB-2) and Industrial (CPI, CI-1, & CI-2). The airport vicinity also contains Special Area Plan Policy 2-01, for encouraging specific airport-related land uses.

LU-2: Pima County should maintain existing airport environs overlay zoning. Make adjustments in zoning boundaries to reflect runway layout recommendations of the Airport Master Plan. Consider prohibiting residential use or increasing the minimum lot size for residences in the CUZ-2 zone.

Status: Pima County has continued to maintain airport environs overlay zoning in conjunction with Ryan Airfield. This was updated in 1992 and included an expansion of the RSZ and CUZ-1 overlay zoning areas to reflect airport configuration changes adopted from the previous Airport Master Plan.

Pima County chose to increase the minimum lot size to one acre instead of prohibiting residential development in the CUZ-2 zone.

The *Pima County Southwest Infrastructure Plan* recommends adoption of a new overlay zone concept, approved by the Tucson Airport Authority, to further encourage compatible development within the airport vicinity.

LU-3: Pima County should adopt the recommendation of the Black Wash Drainage Analysis and Policy Assessment Report, defining a regulatory floodway north and east of Ryan Airfield and promoting the preservation of that area in its natural state.

Status: The *Black Wash Drainage Analysis and Policy Report* was adopted by the county in September 1990. The area surrounding the wash is designated as Resource Conservation (RC) in the *Pima County Comprehensive Plan*. This designation supports rezonings to Institutional Reserve (IR), Rural Homestead (RH), and Suburban Ranch (SH).

LU-4: Pima County should amend subdivision regulations to require the recording of a note with the final plat review within the AE and CUZ-2 overlay zones stating the risk of aircraft overflights and high noise level.

Status: Subdivision reviews require a note stating the potential of high noise, on the final plat, if the subdivision is located in an Airport Environs Zone (AE) or Compatible Use Zone (CUZ). A note specifically stating risks associated with close proximity to the airport is not required. As previously discussed, the City of Tucson has adopted an Airport Disclosure Map (**Exhibit C1**) which indicates the area surrounding the airport where the issuance of aviation easements and fair disclosure notices is required for development.

LU-5: Pima County should amend the *Southwest Area Plan* by adopting the Part 150 Noise Compatibility Plan, or parts of the 150 Plan. An alternative could be the adoption of the Part 150 Plan as a general planning guideline.

Status: The *Southwest Area Plan* was superseded by the *Pima County Comprehensive Plan* in 1992. The Comprehensive Plan doesn't specifically address issues pertaining to noise compatibility issues. Pima County also has not officially adopted the previous Part 150 Plan for general planning guidance.

LU-6: Pima County should consider special review procedures for evaluating subdivision, rezoning, special use, conditional use, and variance request within the airport environs overlay zones.

Status: Special review procedures have not been adopted for evaluating requests within the Airport Environs Zone. Considerations pertaining to development in this zone have been integrated into the standard review procedures.

RECOMMENDATIONS FROM 1999 REVIEW

Property Acquisition: The review of the *1990 Noise Compatibility Plan* included as part of the *1999 Airport Master Plan* supported the acquisition of three parcels located west of the primary airport facilities. These parcels were completely surrounded by airport property and had the potential to be developed with noise-sensitive land uses.

Status: These parcels have been acquired by the TAA.

Adopt Noise Compatibility Plan for Guidance: The review also recommended that Pima County amend its Comprehensive Plan to reflect recommendations in the Ryan Airfield Master Plan and Noise Compatibility Plan or to adopt the Noise Compatibility Plan as a general planning guideline.

Status: A land use compatibility plan for Ryan Airfield was adopted by TAA. There are additional comprehensive plan policies affecting the area in the vicinity of Ryan Airfield (to the east, west, and south) that were approved by the Pima County Board of Supervisors. These policies are contained in resolutions (Co7-06-12, Co7-06-14, Co7-06-16, and Co7-07-32) for the various 2007 Comprehensive Plan amendments. The policies, in combination with planned land use designations as shown on the 2007 Southwest Area Comprehensive Plan amendments map, essentially set compliance with the airport overlay zoning shown on **Exhibit C18**.

RECOMMENDATIONS FOR NOISE ABATEMENT AND LAND USE STRATEGIES

The previous Noise Compatibility Plan, completed in July 1990 and subsequently reviewed in 1999, presented a number of alternatives for Noise Abatement, Land Use Management, and Program Implementation. Of the recommendations from these two documents, only the encouragement of Pima County to amend the Southwest Area Plan to adopt the Noise Compatibility Plan as a general planning guideline has not been implemented. Efforts to pursue implementation of this measure should still be considered. In addition, following noise abatement and land use management measures should be considered.

Noise Abatement

TAA should consider preparing a pilot guide and other noise abatement promotional materials to inform pilots of current noise abatement procedures. The guide should include an aerial photo showing the airport and the surrounding area, pointing out noise-sensitive land uses, good neighbor policies such as Aircraft Owners and Pilots Association (AOPA) noise awareness steps, and preferred noise abatement procedures. **Exhibit C19** depicts the AOPA noise awareness steps. It could also include other informa-

tion about the airport that pilots would find useful. The guide should be suitable for insertion into a Jeppesen manual so that pilots will be able to conveniently use it.

Land Use Management

First, an amendment to the Pima County Airport Environs Zone should be considered. This would include adoption of the Land Use Compatibility Map approved by TAA, an update to the Height Overlay Zone to reflect current Part 77 surfaces, and adoption of TAA's Avigation Easement Policy.

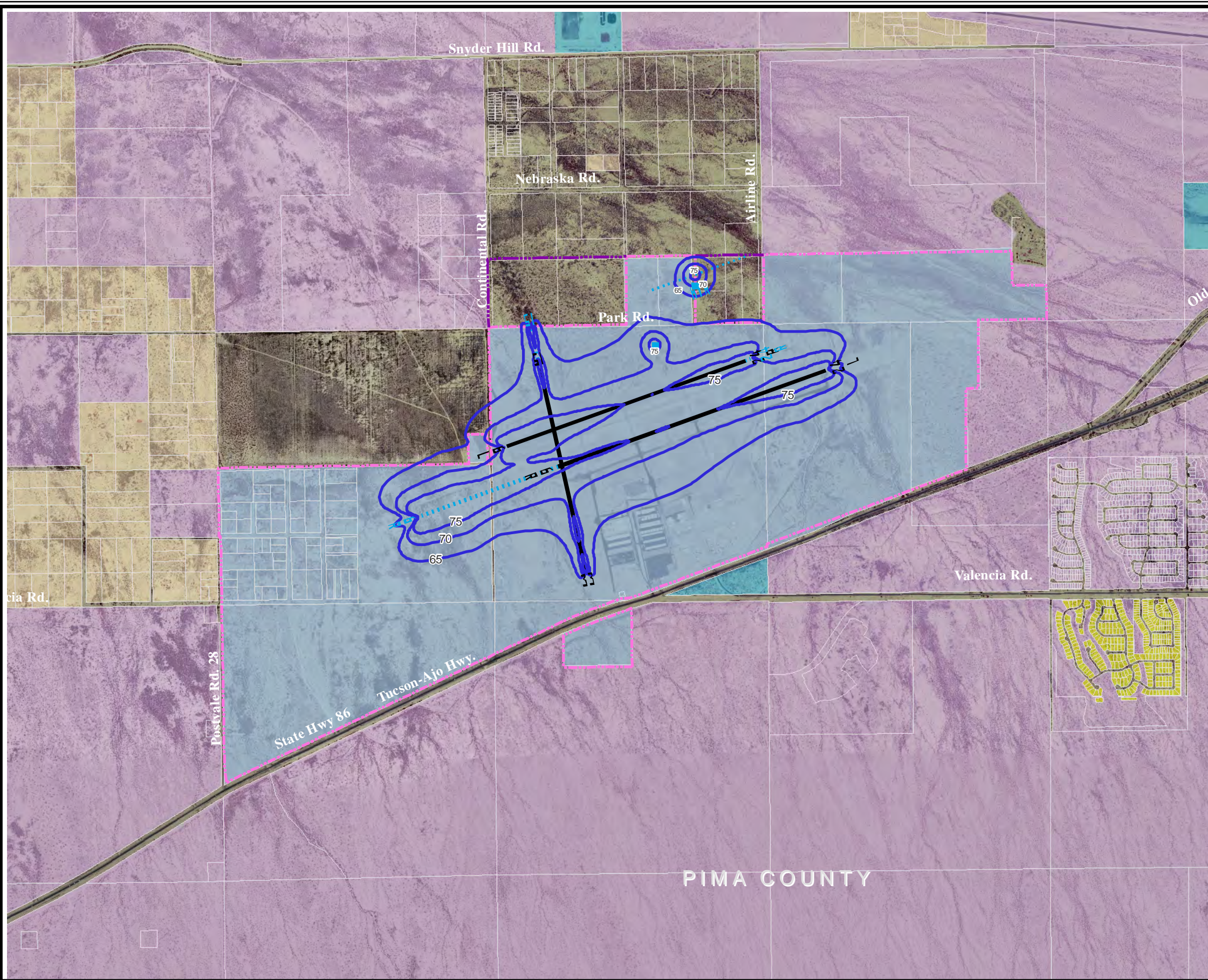
Second, the TAA should continue their community outreach efforts. This includes airport user meetings, staff participation in neighborhood meetings, and coordination with City and County staff on all planning efforts in proximity of Ryan Airfield.

Finally, TAA should review the Noise Compatibility Program and consider revisions and refinements as necessary. A complete plan update will be needed periodically to respond to changing conditions in the local area and in the aviation industry. This can be anticipated every seven to ten years. An update may be needed sooner, however, if major changes in noise conditions or surrounding development occur. Even if the NCP does not need to be updated, it may become necessary to update the noise exposure contours. Part 150 requires the noise exposure contours to be updated if any change in the operation of the airport would create a substantial, new non-compatible use. The Federal Aviation Administration interprets this to mean an increase in noise levels of 1.5 DNL or more, above 65 DNL, over non-compatible areas that had formerly been compatible.

SUMMARY

This appendix has analyzed the impacts of existing and projected future aircraft noise on noise-sensitive land uses and population in the vicinity of Ryan Airfield. With the relatively remote location, in addition to the adoption of recommended property acquisition, no land use or population is expected to be impacted by airport-related noise around Ryan Airfield.

While a majority of the Noise Compatibility Program recommendations have been implemented, four additional measures should be considered to insure the long term compatibility of Ryan Airfield. These include amending the Pima County zoning ordinance with the proposed airport overlay zone, implementation of a pilot and public education program, monitoring the implementation of the program, and updating the noise exposure contours and program as needed in the future.



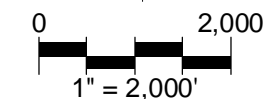
LEGEND

- - - Airport Property Boundary
- - - Ultimate Airport Property Boundary
- DNL Noise Exposure Contour
- - - Runway Extension
- Future Helipad
- Very Low Density Residential
- Low Density Residential
- Public Institutions
- Public Airport
- Growth Risk Areas

Source: Pima County Department of Transportation Geographic Information System, (June, 2008).
 Aerial Photo, U.S. Department of Agriculture, Service Center Agencies, (June, 2003).



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A.O.P.A. NOISE AWARENESS STEPS

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. Begin 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.
13. Flying between 11 p.m. and 7 a.m. should be avoided whenever possible. (Most aircraft noise complaints are registered by residents whose sleep has been disturbed by noisy, low-flying aircraft.)

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.



DOCUMENT SOURCES

A variety of different documents were referenced in the inventory process. The following listing reflects a partial compilation of these sources. The listing does not include the data provided directly by the Tucson Airport Authority staff or airport drawings which were referenced for information. An on-site inventory was also conducted to review the existing facilities for the master planning effort.

Airport Facility Directory, Southwest United States; U.S. Department of Commerce, National Oceanic and Atmospheric Administration, July 31, 2008 Edition.

Pima County Comprehensive Plan; Pima County Development Services Department, Planning Division, adopted December 2001.

Ryan Airfield Airport Master Plan; Tucson Airport Authority, Coffman Associates, June 1999.

The following Web pages were also visited for information during the preparation of the inventory:

www.airnav.com

www.ci.tucson.az.us

www.co.pima.az.us

www.dot.co.pima.az.us

www.tucsonairport.org