

JOINT LAND USE PLAN
LAND USE ELEMENT
AMENDMENT

CITY OF YUMA GENERAL PLAN
YUMA COUNTY COMPREHENSIVE PLAN

PREPARED BY:

CITY OF YUMA
YUMA COUNTY
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SEPTEMBER 1996 (REVISED FEBRUARY 2007)

**AMENDMENT TO THE
CITY OF YUMA AND YUMA COUNTY
GENERAL PLANS**

Adopted by Resolution No. 96-38 by the City Council, City of Yuma, Arizona on 9/12/96.
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Revised by Resolution No.04-07 on 12/13/04.

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September 1996

**AMENDMENT TO THE
CITY OF YUMA AND YUMA COUNTY
GENERAL PLANS**

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EXECUTIVE SUMMARY

The Joint Land Use Plan represents the combined efforts of the City and County of Yuma to achieve the following:

- A common “blue print” of land uses and land use development policies for the future economic growth and development of lands within the incorporated and unincorporated areas around the City of Yuma.
- A foundation for the compatibility of land use activities in the vicinity of the Marine Corps Air Station – Yuma/Yuma International Airport. The primary economic assets of the area (agriculture, the air station and tourism) are protected, reinforced and supplemented by the expansion of industrial sector opportunities that will provide more year-round employment prospects.

The Joint Land Use Plan (Plan) is an amendment to the respective City and County General Plans. It is comprised of a land use map to guide planning commissioners and elected officials in their deliberations on development opportunities and zoning actions. The map identifies the various types of land use activities (e.g., residential, commercial, industrial) and the corresponding general development intensities and population densities. Another component of the Plan is the addition of policies to the respective City and County General Plans. These policies supplement the City and County’s current General Plan policies furthering their adopted goals and objectives. These will be used to guide and direct development activities and implementation programs. The final component of the Plan is the Implementation Program. The Implementation Program identifies specific actions needed to effectively carry out the Plans’ objectives and indicates the recommended time frame for each of those program tools and methods to be carried out.

The Joint Land Use Plan map promotes concentration of urban development within areas currently provided or planned to receive City of Yuma water or waste water services. This urban pattern minimizes encroachment on the prime agricultural lands in the Gila and Yuma Valleys. Also promoted are public and commercial recreational opportunities adjoining the areas key water resource: the Colorado River. Commercial nodes or centers are proposed to minimize congestion created by strip commercial development along major highways and roads. Rural and semi-rural lifestyles are also accommodated through rural density development proposed on lands on the mesa with agricultural potential having lower productivity than the Gila and Yuma Valleys. Significant opportunities for additional industrial development are provided to support continued economic growth resulting from the North American Free Trade Agreement (NAFTA), the General Agreement of Trade and Tariffs (GATT) and the Area Service Highway. The City of Yuma and Yuma County desire to pursue the mutual objectives and policies of the Joint Land Use Plan committing their resources toward the furthering of their adopted General Plan goals and objectives. The Implementation Program component of the Joint Land Use Plan represents a significant commitment of time and financial resources necessary to affect the Joint Land Use Plan. The process has begun with joint meetings of the City and County Planning & Zoning Commissions and the City Council and Board of Supervisors and the adoption of this Joint Land Use Plan as an amendment to the City and County General Plans. Continued cooperation will provide the best opportunities to achieve common long range planning goals.

PURPOSE

The City and County of Yuma have prepared a Joint Land Use Plan as amendments to their respective General Plans covering land areas of mutual interest. The Plan has been developed with two principal objectives:

- To plan for land uses in the vicinity of Marine Corps Air Station (MCAS) Yuma and the Yuma International Airport that will be compatible with airfield operations, and
- To plan for other land uses meeting City and County growth objectives within a study area that extends beyond the immediate airfield environment (see Joint Land Use Plan – Appendix A)

The Joint Land Use Plan provides comprehensive guidelines concerning the primary land uses, guiding development policies and implementation measures for the physical development of the planning area. The Plan is designed to achieve the best use of land resources based on community input on how the Yuma metropolitan area should grow. It also provides the community a common vision of desired development and the actions required to meet that vision.

For the City, the Joint Land Use Plan (land use element) replaces that portion of the current General Plan land use map that has provided the primary guidance for planning. The County amends their General Plan by adding the Joint Land Use Plan (Land Use Element) map to the County's General Plan. Both General Plans are also amended to include the objectives, policies and implementation programs in the Joint Land Use Plan providing practical guidance for planning and zoning decisions and an overall context for the consideration of development proposals. The Plan is but one element of each jurisdiction's general plan. The Plan is designed to be a part of the overall process of attaining the form and character of the community that will provide a safe and attractive environment and a high quality of life for its citizens.

The implementation of the Joint Land Use Plan will depend upon the existence of supporting community services and activities. For the planning area, the following infrastructure and services will be of primary importance in realizing development objectives:

- Water and wastewater distribution systems
- Surface transportation and circulation systems
- Schools, parks and recreation facilities
- Fire and police protection and refuse collection services
- Economic development
- Capital improvement plans and budgets

The City and County may use different methods and processes to accomplish Joint Land Use Plan objectives but the overall purpose of the Plan is to have a common means of reaching the shared development visions and objectives represented in this Joint Land Use Plan. The City and County have committed to and will mutually work together to achieve these Joint Land Use Plan objectives.

COMMUNITY ASSESSMENT

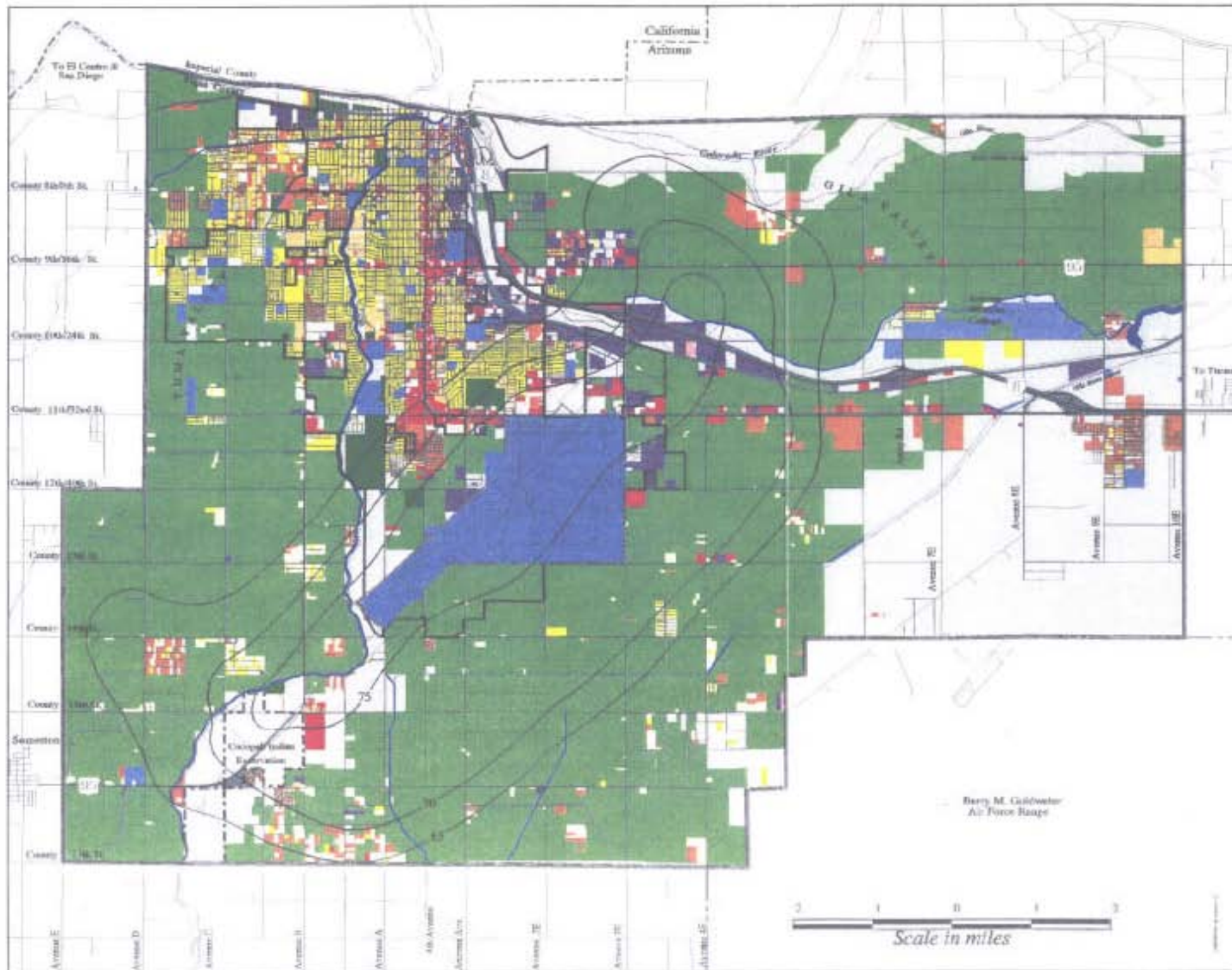
The development of the Plan first required an inventory of community conditions, assets, and constraints. This included an examination of the planning area's history, which provides the context for future development. The growth of Yuma has depended largely upon three economic activities – agriculture, tourism and government employment, including MCAS. Although the growth of industrial activities has been less pronounced, it provides a fourth economic element for future planning. The Joint Land Use Plan public involvement activities, and the public input resulting from those activities, identified the need to provide land uses supporting a balance of these economic sectors.

Existing Land Uses

Existing land uses and proposed developments have been examined as the context within which a new plan is being considered. A map of existing land uses (Figure 1) within the planning area provides a visual context for the community's development patterns to date. Several significant existing land use forms were identified within the community.

- The north Yuma Mesa is the primary location of existing urban development. This includes the principal commercial corridor and concentrations of residential and industrial uses. The area has a relatively lower water table compared to the valley regions and the mesa's sandy soil is not conducive to high productivity for agricultural uses.
- MCAS Yuma and the Yuma International Airport dominate the southwestern region of the Yuma Mesa. The joint use airfield is heavily utilized by military aircraft and civilian activities have significant potential for expansion. These activities, and their associated effects (such as noise levels and overflights) on existing and proposed developments in the area are important considerations in the development of a joint land use plan.
- Yuma and Gila Valleys are the locations of prime farmland and much of these areas are currently in high yield, year-round agricultural production. High water tables and soil conditions found here impact urban developments and limit some agricultural productivity.
- North Yuma was the location of the original City settlement and is now the site of recreation/tourism attractions along the river, City and County government buildings, older historic residences and various commercial activities.

Recent urban development in the eastern part of the planning area has occurred along the major transportation corridors, particularly Interstate 8. This is also the location identified in public involvement activities and discussions with City and County staff as a promising area for new development.



Existing Land Use

City and County of Yuma
Joint Land Use Study

Legend

- Rural Residential
- Single Family Residential
- Multi-Family Residential
- Mobile Home Park/Subdivision
- Commercial
- Office
- Industrial
- Public/Quasi Public
- Recreation
- Agricultural
- Open Space/Undeveloped
- City Boundary
- MCAS Yuma Boundary
- Planning Area Boundary



Dames & Moore
April 27, 1995

Figure 1

Airfield Operations

Updated airfield operations information from MCAS Yuma and the Yuma International Airport provides a basis for review of the potential impacts on surrounding land uses. MCAS Yuma is a major employer within the planning area and the third largest contributor to the economic base of Yuma County. Noise contours and accident potential zones prepared in the late 1970s have been the basis for both City and County planning for compatible land uses within the vicinity of MCAS Yuma. This has included specific zoning regulations and policies. The operation of the airfield today may create potentially different noise and accident impacts. Current airfield operations were examined to provide a basis for potential actions to help ensure that the health and safety of residents and workers within the airport environment are protected and that new land uses are compatible with airfield operations. A summary of the MCAS Yuma/Yuma International Airport operations between 1992 and 1994 is provided in Table 1.

Table 1
Operations Summary
Marine Corps Air Station - Yuma/Yuma International Airport

| | 1992 | 1993 | 1994 | Est. 1995 | '93-'94 Variance |
|-----------------------------|---------|---------|---------|-----------|---------------------|
| Airfield Operations (local) | 155,607 | 149,273 | 149,485 | (1) | 0.1% |
| Military | 105,063 | 97,197 | 95,174 | 118,000 | -2.0% |
| Civilian | 50,544 | 52,076 | 54,311 | (1) | 4.0% |

(1) Information not available at the time plan was prepared.

MCAS Growth Changes

Within the current climate of military force downsizing, it is difficult to predict the future of MCAS Yuma. All indications are that it will remain as a military base and that its operations and size may not change significantly. Several scenarios increasing and decreasing base staffing were prepared to assess the implications for the future growth within the planning area. Those scenarios, noted in Table 2, indicate that slight increases or decreases of military or civilian personnel at the base will not substantially affect the economic conditions or physical resources of the community.

Table 2

Consequences of Marine Corps Air Station – Yuma Growth Changes

| Rate of Change | Employment | | Additional Civilian | Housing Demand Military* | Estimated Economic Contribution |
|----------------|------------|----------|---------------------|--------------------------|---------------------------------|
| | Civilian | Military | | | |
| Current (1994) | 1,128 | 5,541 | na | na | \$196,485,000 |
| 5% | 1,184 | 5,818 | 56 | 166 | \$206,309,250 |
| 10% | 1,240 | 6,095 | 112 | 332 | \$216,133,500 |
| 20% | 1,354 | 6,649 | 226 | 665 | \$235,782,000 |
| -5% | 1,072 | 5,264 | (56) | (166) | \$186,660,750 |
| -10% | 1,015 | 4,987 | (112) | (332) | \$176,836,500 |
| -20% | 902 | 4,433 | (226) | (665) | \$157,188,000 |

*Based on 60% military personnel requiring community housing.
 Source: Dames & Moore, Phoenix, AZ calculation and estimate

Natural and Man-made Features

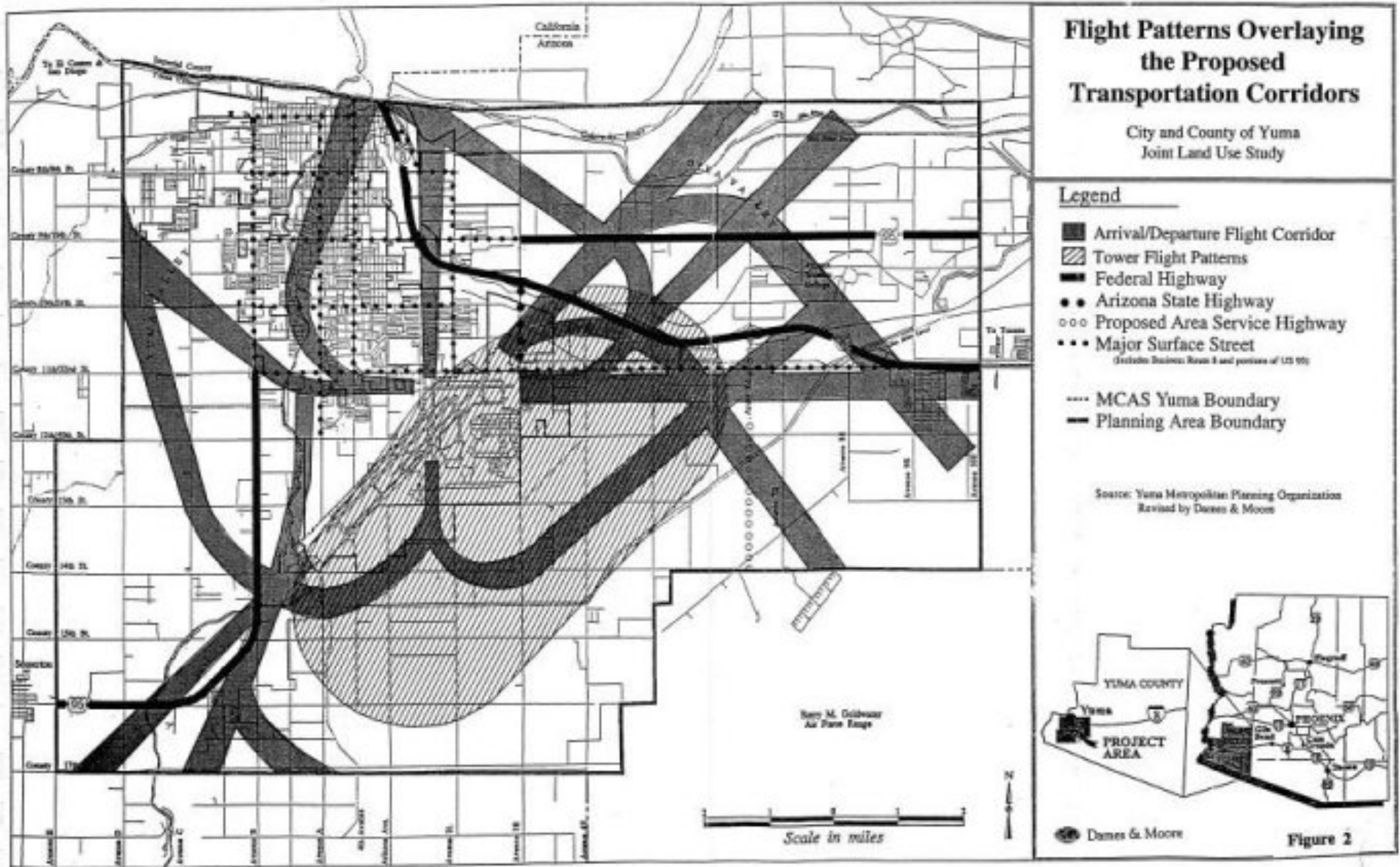
Natural and man-made features present both constraints and opportunities for development. Specific natural features examined to determine the growth potential within the planning area included:

- Soil characteristics
- Ground water
- Floodplains
- Seismicity

Man-made features with implications for development included:

- Potable water, irrigation and wastewater distribution systems
- Transportation systems
- Land ownership
- Existing uses
- Airfield operations

Development will particularly depend on the availability of water. The principal source of potable water within the planning area is the City of Yuma. The City receives a water allotment of 50,000 acre-feet/year (AFY) from the Colorado River and has established priorities for extending water service that will guide both the nature and timing of new developments within its water service area as well as provide directions for land use planning and development.



Other sources of water include those providers currently authorized to deliver water. The City and County should evaluate expansion of water service areas for other potential water purveyors and sources including but not limited to local irrigation and drainage district's conversion of agricultural water allocations to municipal and industrial allocations. Agricultural water conversions will require substantial negotiation, coordination and cooperation between the districts or other entities and the agencies or entities that would treat and deliver the potable water.

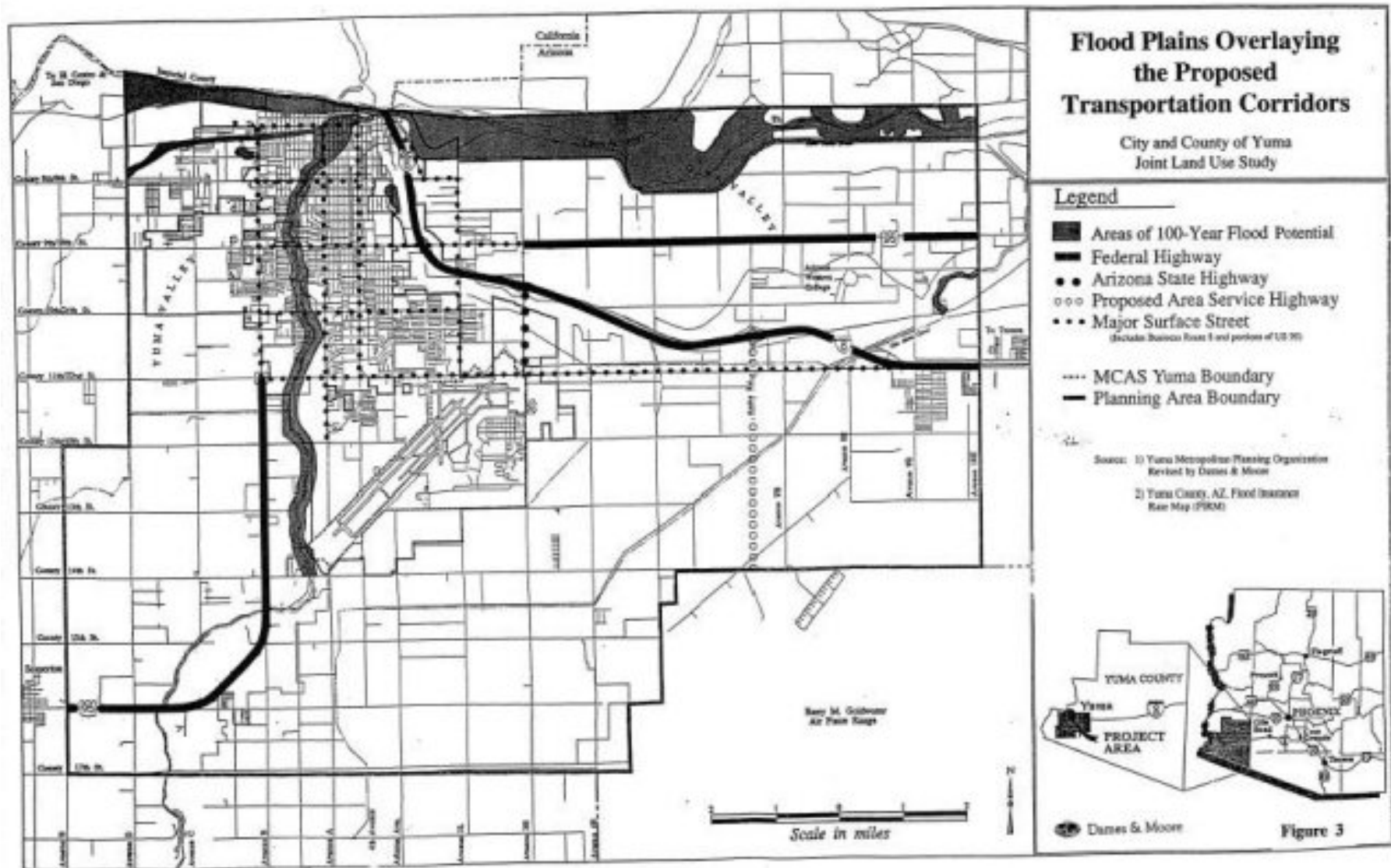
Previous wastewater and transportation systems planning efforts serving the planning area were evaluated in the preparation of the Joint Land Use Plan. Updates of those plans to meet or address the needs created from Joint Land Use Plan adoption is an essential element in the build out of the Plan. Examples include the 208 Waste Water Plan and the Regional Transportation Plan.

Population Growth

Population growth predictions for the planning area, together with historical trends in economic activities, were used to plan for future land uses. The population of the planning area is predicted to grow by as much as 58 percent over the 20-year planning period (1995-2015) (See Table 3) and to continue accommodating large numbers of winter visitors (Table 4).

Table 3

| POPULATION ESTIMATES * (selected years) | | | | | |
|--|-----------|-----------|-----------|-----------|---------|
| | 1995 | 2000 | 2005 | 2010 | 2015 |
| City of Yuma | 60,698 | 67,189 | 74,898 | 80,154 | 87,146 |
| Yuma County | 123,100 | 140,000 | 157,000 | 175,600 | 195,500 |
| Study Area** | 97,400 | 110,500 | 123,700 | 138,100 | 153,000 |
| State of Arizona | 4,134,894 | 4,632,818 | 5,132,727 | 5,652,569 | |
| *Estimates for the City and County are from Arizona Department of Economic Security, 1993 and 1995. ** Study area estimated by consultant team from DES projections, 1995. Population of MCAS Yuma held constant. | | | | | |



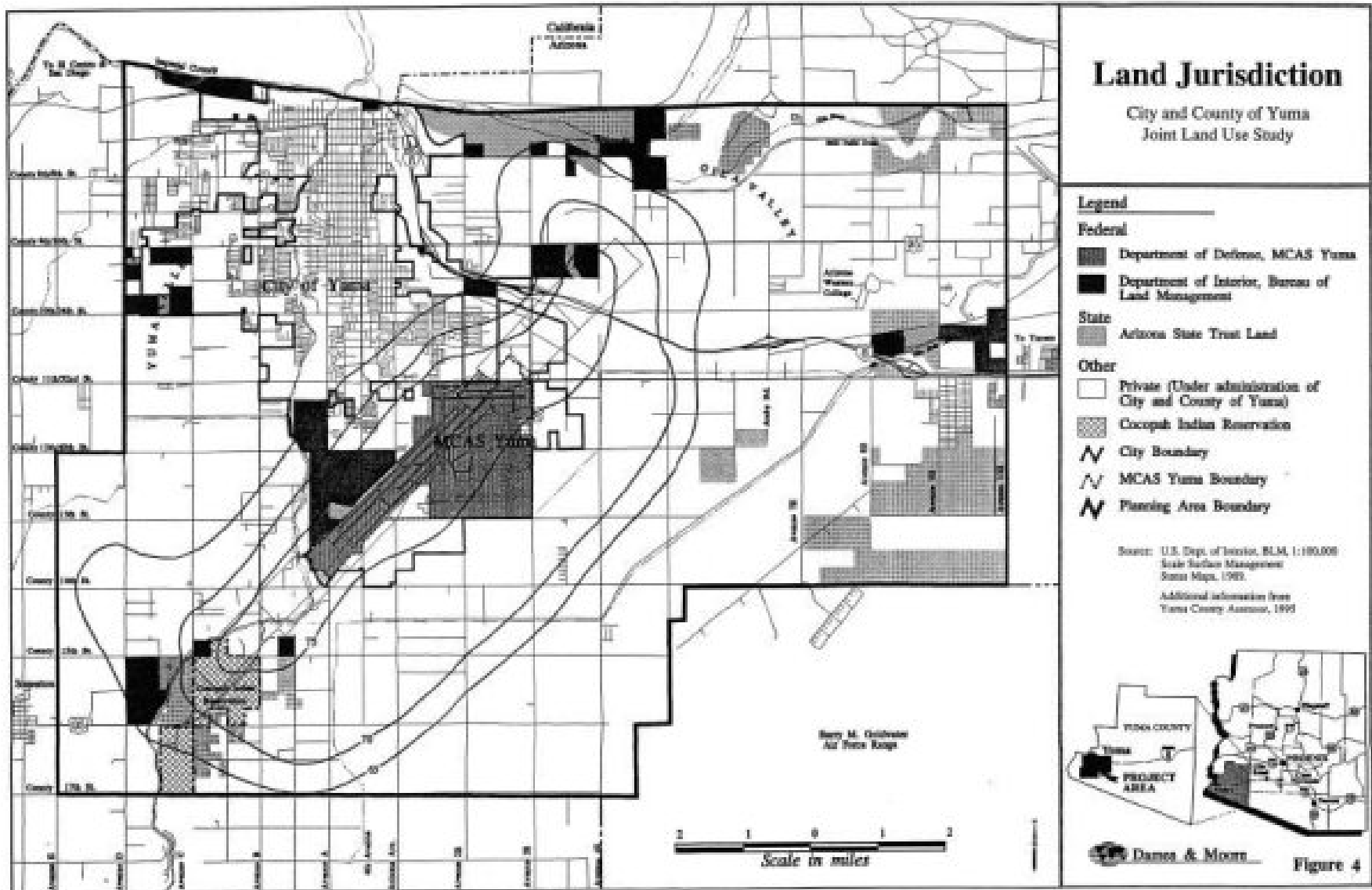


Table 4

| YUMA AREA WINTER VISITORS/RESIDENTS BY ACCOMMODATION | | | |
|--|---------|---------|----------|
| | 1993-94 | 1994-95 | % Change |
| RV Park occupancy (persons) | 35,676 | 36,000 | 0.9 |
| Winter Resident population* | 15,843 | 16,040 | 1.2 |
| RV Lot population** | 13,450 | 13,690 | 1.9 |
| Mobile Home Park occ. (pers.)*** | 3,800 | 3,845 | 1.2 |
| Hotels/Motels & Apts. (persons) | 550 | 524 | -4.7 |
| Public Lands (persons) | 2,940 | 3,792 | 29.0 |
| Total | 72,259 | 73,891 | 2.2 |
| Notes: * Owners of dwellings who are here 4 to 8 months. ** Own a lot in an RV Subdivision *** Rent a mobile home in a MH Park for 3 to 6 months. Source: Norton Consulting, Yuma, AZ | | | |

PLANNING APPROACH

Several planning strategies have assisted in developing the Plan. These include:

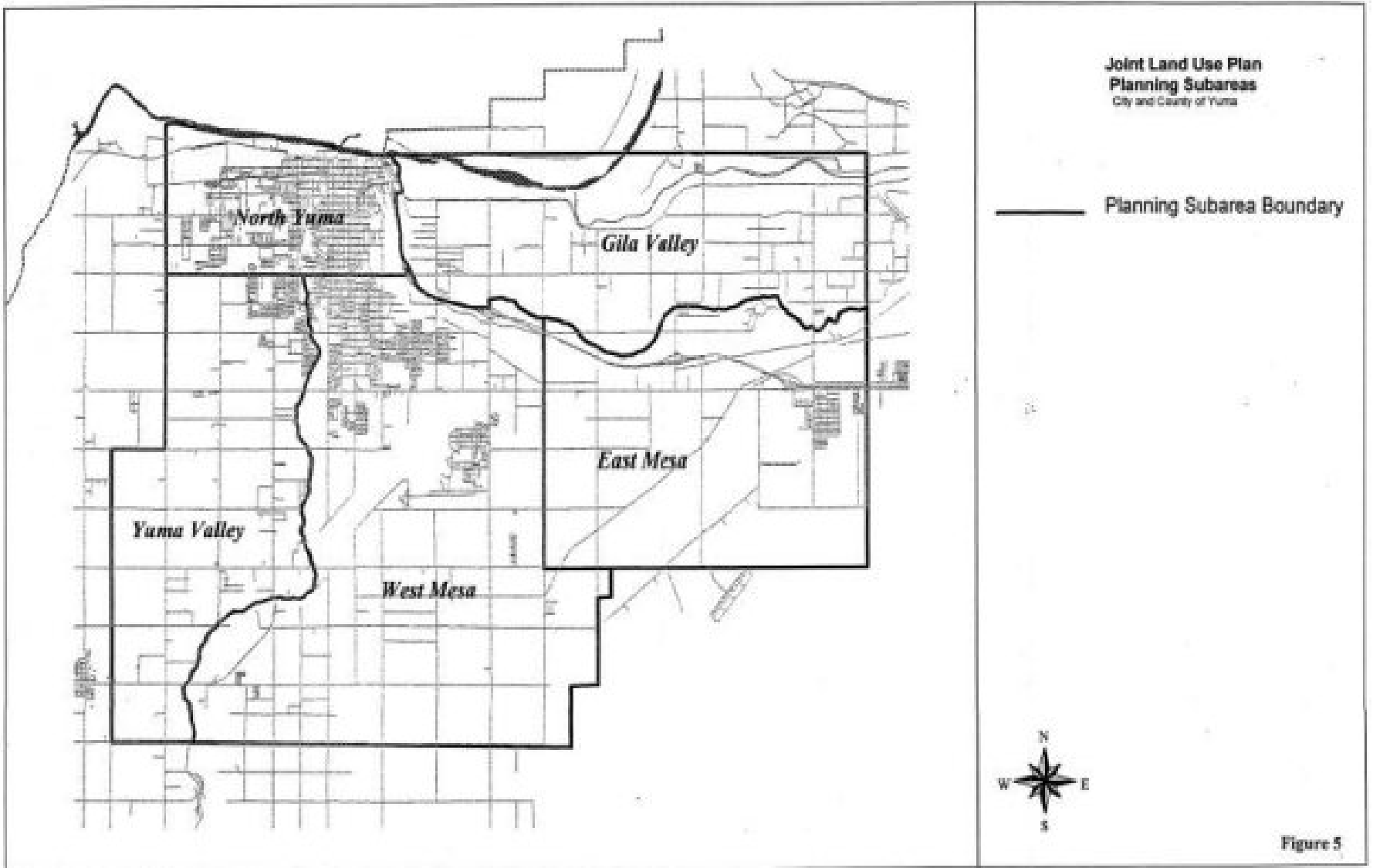
- maintain consistency with the adopted philosophies, goals, objectives and policies of the City and County General Plans
- protect and reinforce community assets to:
 - ✓ provide land uses, policies and implementation measures which support and balance its' economic assets (i.e., agriculture, government, tourism)
 - ✓ encourage the growth and significance of the industrial component of the economy providing stable, year-round employment.
- establish buffer areas between incompatible uses consisting of lower density residential areas between agricultural and urban areas, and "mixed use" areas between commercial and residential land uses.
- examine adjacent land uses for compatibility, including land uses in the vicinity of the airfield.

- explore concepts for development of commercial land uses, including maintenance of existing strip development in the 32nd Street/4th Avenue corridor, but use nodes or commercial clusters for new commercial developments. Planned neighborhood community or regional commercial clusters will facilitate traffic flow and access.
- determine the existence of and potential for infrastructure development, especially water and wastewater and transportation systems.
- maintain existing, non-conforming developments that are not in character with surrounding land uses but do not promote expansion of nonconforming development and uses.
- locate industrial uses in areas where City services exist or are planned and which have convenient access to major transportation systems, such as the airport, railway lines and the interstate highway.
- locate business parks in visually sensitive areas along major road corridors (e.g., Interstate 8) or other locations as a buffer to lower intensity land uses. Such business park uses will combine office, commercial and/or light industrial uses.

Planning Sub-areas

To facilitate planning, the plan area was divided into five sub-areas (See Figure 5). Each of these have unique land use characteristics and opportunities. The overall planning goal is to attain the desired area-wide balance of land uses through the coordination of the optimum development potential in each sub area. Sub area development plan analysis and evaluation resulted in the following characteristics and opportunities:

- North Yuma – Commercial, government, business, and industrial activities as local employment centers; resort, recreation, and open space development along the Colorado and Gila Rivers; continued agricultural uses west of Figueroa Avenue pending the availability of infrastructure and services when industrial activities would be deemed appropriate; industrial uses in the northwest section; and moderate and low density residential development. This, essentially, maintains existing land uses. Some of the neighborhoods may present opportunities for rehabilitation or redevelopment of older housing and commercial structures.
- Yuma Valley – Continuation of agricultural uses south of County 12th Street and west of Avenue D; a suburban density residential buffer adjoining agricultural lands along County 12th St./City 40th St.; neighborhood commercial areas; an additional community commercial area and expansion of existing, large commercial/office areas (e.g., Super K-Mart).
- West Mesa – Continuation of urban land uses (residential, commercial, and industrial) in the already developed northwest section; business park and industrial uses west of the airfield; industrial uses east of the airfield; continued agricultural activities; rural



development densities and intensities south of County 12th Street within the Rural Development Area (RDA); maintenance of existing residential uses; and linear park along East Main Canal. Completion of plans to address urban infrastructure, services and a long-term water source for those lands within the 70 Ldn noise contour noted on the Joint Land Use Plan Map as “Agriculture/Industrial” would allow future industrial development to be considered.

- East Mesa – Growth of residential, commercial, and industrial uses as “infill” development north of County 12th Street; industrial and commercial development at the accesses to the proposed Area Service Highway (Araby Road) and Highway 80; neighborhood commercial nodes along Business 8 (Highway 80); business park development north of Interstate 8 to preserve “Gateway to Yuma” views; rural development densities and intensities south of County 12th Street within the Rural Development Area (RDA). Completion of plans to address urban infrastructure, services and a long-term water source for those lands within the 70 Ldn noise contour noted on the Joint Land Use Plan Map as “Agriculture/Industrial” would allow future industrial development to be considered.
- Gila Valley – Maintenance of current agricultural activities and associated industrial and agricultural support services; and resort, recreation, and open space development along the Colorado and Gila Rivers.

RECOMMENDED LAND USE PLAN

On the basis of the City’s and County’s adopted goals and objectives, public comments received during the planning program, the community assessment and the examination of the development potential within each sub area, the City and County Planning & Zoning Commissions have recommended a Joint Land Use Plan.

Project Population Growth and Future Land Use Needs

The plan is based on a projected population growth of approximately 58 percent over the planning period. Holding the growth of MCAS constant, the population of the planning area is expected to reach 153,000 by the year 2015. Estimates of future land use needs were based on straight-line population growth projections. This assumes that all lands currently designated for specific existing land uses are fully developed and that the proportion of land uses developed in the future will be consistent with today’s patterns. Although neither of these conditions is precisely accurate, the result is an overestimate of future land use acreage needed for expanding community growth while providing a variety of land use choices for development. The following tables (Tables 5, 6a, 6b and 7) summarize these projections and plans.

TABLE 5

| EXISTING, PROJECTED, AND PROPOSED LAND USE ACREAGE | | | |
|---|--|-----------------------------|------------------------------------|
| Land Use Category | Existing Acreage ⁽⁵⁾ | Acreage Need in 2015 | Joint Land Use Plan Acreage |
| Residential | 6,793 | 10,655 | 28,409 ⁽¹⁾ |
| Commercial | 1,392 | 2,120 | 1,630 |
| Mixed Use | ⁽²⁾ | ⁽²⁾ | 1,207 |
| Industrial | 1,906 | 2,930 | 12,828 |
| Business Park | ⁽²⁾ | ⁽²⁾ | 846 |
| Public/Quasi-Public | 4,162 | ⁽³⁾ | 5,873 |
| Resort/Recreation/Open Space | 16,395 ⁽⁴⁾ | ⁽³⁾ | 7,160 |
| Agriculture | 40,336 | ⁽³⁾ | 17,603 |
| Cocopah lands, Infrastructure, Unknown, Nonconforming (in Commission's Proposed Plan only) | 6,893 | | 2,321 |
| TOTAL | 77,877 | | 77,877 |
| <p>(1) Residential category includes: Rural, Suburban, Low, Medium and High Density Residential categories. (2) Category not used for existing land use plan. (3) Future need not projected. (4) Includes "vacant" lands (5) Estimated acreage based on consultant map products</p> | | | |

The land use plan provides a guide for the range of densities in each residential category but actual densities will vary with individual development plan approvals. Calculations of several ranges of densities for build out of the Joint Land Use Plan have been provided. These are especially useful for predicting future water and other infrastructure needs. In addition, residential construction may occur within the Agriculture and the Resort, Recreation and Open Space land use designations. Those units would be developed based on the density requirements of the Joint Land Use Plan land use categories and underlying zoning districts. Much of the lands indicated in the Rural Density Residential, Resort, Recreation and Open Space and Agriculture land use categories will utilize wells as the primary source of water for individual home sites.

**TABLE
6A
Build Out Density Ranges**

| | Minimum Density | Medium Density | High Density |
|------------------------------|-----------------|----------------|--------------|
| Rural Density Residential | 1 Du/5 AC | 1 Du/3 AC | 1 Du/2 AC |
| Estate Residential | 1 Du/5 AC | 1 Du/3 AC | 2 Du/1 AC |
| Suburban Density Residential | 1 Du/2 AC | 1.5 Du/AC | 3 Du/AC |
| Low Density Residential | 1 Du/AC | 3 Du/AC | 6 Du/AC |
| Medium Density Residential | 7 Du/AC | 10 Du/AC | 12 Du/AC |
| High Density Residential | 13 Du/AC | 16 Du/AC | 18 Du/AC |
| Mixed Use | 5 Du/AC | 5 Du/AC | 10 Du/AC |

The land use densities and population estimated from the build out of the residential land use categories results in the following estimated number of dwelling units and population.

**TABLE 6B
Dwelling Unit and Population Comparisons**

| | Current (1995) | Projected Need 2015 | Joint Land Use Plan ⁽⁴⁾ | | |
|--|-------------------|------------------------|------------------------------------|-------------------|-----------------|
| | | | Minimum Density | Medium Density | High Density |
| Total residential acres ⁽¹⁾ | 5,732 | 9,056 | 14,296 | 14,296 | 14,296 |
| Number of dwelling units | 31,378 | 49,587 | 40,979 | 73,837 | 109,584 |
| Population accommodated ⁽²⁾ | 90,996 | 143,802 | 117,610 | 211,912 | 314,506 |
| Population estimated ⁽³⁾ | 97,400 | 153,000 | 153,000 | 153,000 | 153,000 |

⁽¹⁾ Does not include Rural Density Residential south of County 12th St., Resort, Recreation & Open Space or Agricultural acreage.

⁽²⁾ Population that can be accommodated assuming full occupancy at the given densities, based on average household size of 2.7. Joint Land Use Plan densities use 1990 Census numbers from Dept. of Economic Security of 2.87 person per household.

⁽³⁾ Population estimated from DES projections for 1995 and 2015.

⁽⁴⁾ Densities based on Table 6A

NOTE: Housing units in Yuma County for 1990: 46,541; for 1995 (mid-decade census): 53,716

Table 7 indicates the expected number of dwelling units for build out of each land use category in the Joint Land Use Plan. The information found in the table or in subsequent discussions in the Plan do not estimate the time frame for reaching plan build out, only the ultimate density and population accommodated within the land use categories at expected densities.

**TABLE 7
Dwelling Unit and Population Projections**

| Land Use Categories | Density (Expected) | Acreage | Units per acre | Units | Persons per Household | No. of Persons |
|------------------------------|--------------------|---------|----------------|--------|-----------------------|----------------|
| Rural Density Residential | 1u/2ac | 14,832 | 0.500 | 7,416 | 2.87 | 21,284 |
| Estate Residential | 1u/1ac | 450 | 1.000 | 450 | 2.87 | 1,292 |
| Suburban Density Residential | 2.5u/ac | 876 | 2.500 | 2,190 | 2.87 | 8,251 |
| Low Density Residential | 4u/ac | 8,955 | 4.000 | 35,820 | 2.87 | 98,803 |
| Medium Density Residential | 10u/ac | 2,845 | 10.000 | 28,450 | 2.87 | 80,096 |
| High Density Residential | 16u/ac | 451 | 16.000 | 7,216 | 2.87 | 20,191 |
| Mixed Use | 5u/ac | 1,207 | 5.000 | 6,035 | 2.87 | 18,770 |
| Resort, Recreation & O.S. | 1u/5ac | 7,160 | 0.200 | 1,432 | 2.87 | 4,326 |
| Agricultural | 1u/40ac | 17,603 | 0.025 | 440 | 2.87 | 1,271 |
| Total | | 54,379 | | 88,449 | | 254,284 |

Assumptions:

Rural Density Residential areas are mostly located in areas where urban water sources are not available. Suburban Density Residential areas are located mostly in areas where urban water sources exist or are planned. Mixed Use areas are likely to include higher concentrations of commercial activities versus residential development. Resort, Recreation & Open Space areas located within the 100 year flood plain will reduce the number of dwellings indicated in the table above because of potential flooding and additional construction costs for flood protection. Agricultural areas are not expected to provide for 1 residence per 40 acres but residences are permitted on such lands.

Fourteen land use categories were used in the Joint Land Use Plan. These are described as follows:

■ **Residential**

- ▶ Rural Density Residential – Maximum density of one dwelling unit per two acres
- ▶ Estate Residential – 1 dwelling unit per 5 acres to 2 dwelling units per 1 acre
- ▶ Suburban Density Residential – 3 dwelling units per acre to 1 dwelling unit per 2 acres
- ▶ Low Density Residential – 1 to 6 dwelling units per acre
- ▶ Medium Density Residential – 7 to 12 dwelling units per acre
- ▶ High Density Residential – 13 to 18 dwelling units per acre

- Commercial
 - limited/local commercial uses
 - general commercial uses
 - offices
 - wholesale or retail activities

- Mixed Use – area with more than one primary use category; for example, commercial and residential

- Business park

In a high visual quality, business park or campus-type setting, the following are allowed:

 - businesses and retail uses (retail uses are excluded from the 70-75 db noise contour)
 - offices
 - light industrial uses and related offices
 - commercial outlets or combination enterprises

- Industrial
 - light industrial uses with related offices
 - heavy industrial uses with related offices
 - general commercial uses
 - industrial park settings considered in higher visibility areas along transportation corridors or other appropriate locations

- Agriculture/Industrial
 - continued agricultural uses
 - site-built residences with noise attenuation subject to the zoning densities in effect at the time of the Joint Land Use Plan adoption
 - aviation-compatible industrial uses subject to the demonstration and completion of the appropriate public infrastructure, public services and long term water allocation needed for development

- Public/Quasi-Public – publicly owned and operated facilities or those devoted to public use by governmental and quasi-public or non-profit entities; includes schools, churches, hospitals, military installations, government buildings, etc.

- Resort, Recreation and Open Space
 - very low density residential (5 acre homesite)
 - agriculture
 - resort commercial development (such as but not necessarily limited to the following: resort, hotels, theme parks, tennis or golf resorts or camps, water parks and slides, conference centers, golf courses, exotic animal parks, parks, zoos or amphitheaters)
 - areas available for public visitation and recreation with or without developed facilities and associated businesses (such as dude ranches, off-road vehicle parks or trails, horse riding academies, horse stables, arenas and trails, botanical gardens, lakes and waterways, campgrounds).

- Agriculture
 - lands principally devoted to agricultural production
 - Yuma Valley – minimum parcel size of 40 acres
 - Gila Valley – minimum parcel size of 40 acres
 - homesites on existing legal lots of record

Nonconformity

- Those land uses and developments established prior to the adoption date of the Joint Land Use Plan which are of a different character and development density than the predominant uses on adjoining lands. Such land uses and developments, though not necessarily compatible with the predominant surrounding uses, are considered permissible, nonconforming uses.

The locations of these land use categories are displayed on the Joint Land Use Plan Map (Appendix A).

POLICIES

The development of lands within the Joint Land Use Plan boundaries and Plan implementation efforts of the City and County warrant mutual understanding and explicit delineation of the General Plan policies to guide the respective agency’s decision-making. To implement this Joint Land Use Plan, additional policies are deemed necessary supplementing existing General Plan policies for inclusion into the respective City and County General Plans. The added General Plan policies are listed in Appendix B of this Land Use Element Amendment to the City and County General Plans.

IMPLEMENTATION PLAN

Implementation of the Joint Land Use Plan will require incorporating the Plan into the City and County development decision-making process. It will also need the commitment of City and County officials and staff to initiate and complete the steps needed to fulfill the Plan’s objectives. Coordination will be required between the City and County including regular joint meetings of the City Council and the Board of Supervisors and of the two Planning and Zoning Commissions and City and County staff. Similar or easily comparable zoning regulations and districts will be extremely valuable. Continuing public involvement activities will be a feature of plan implementation.

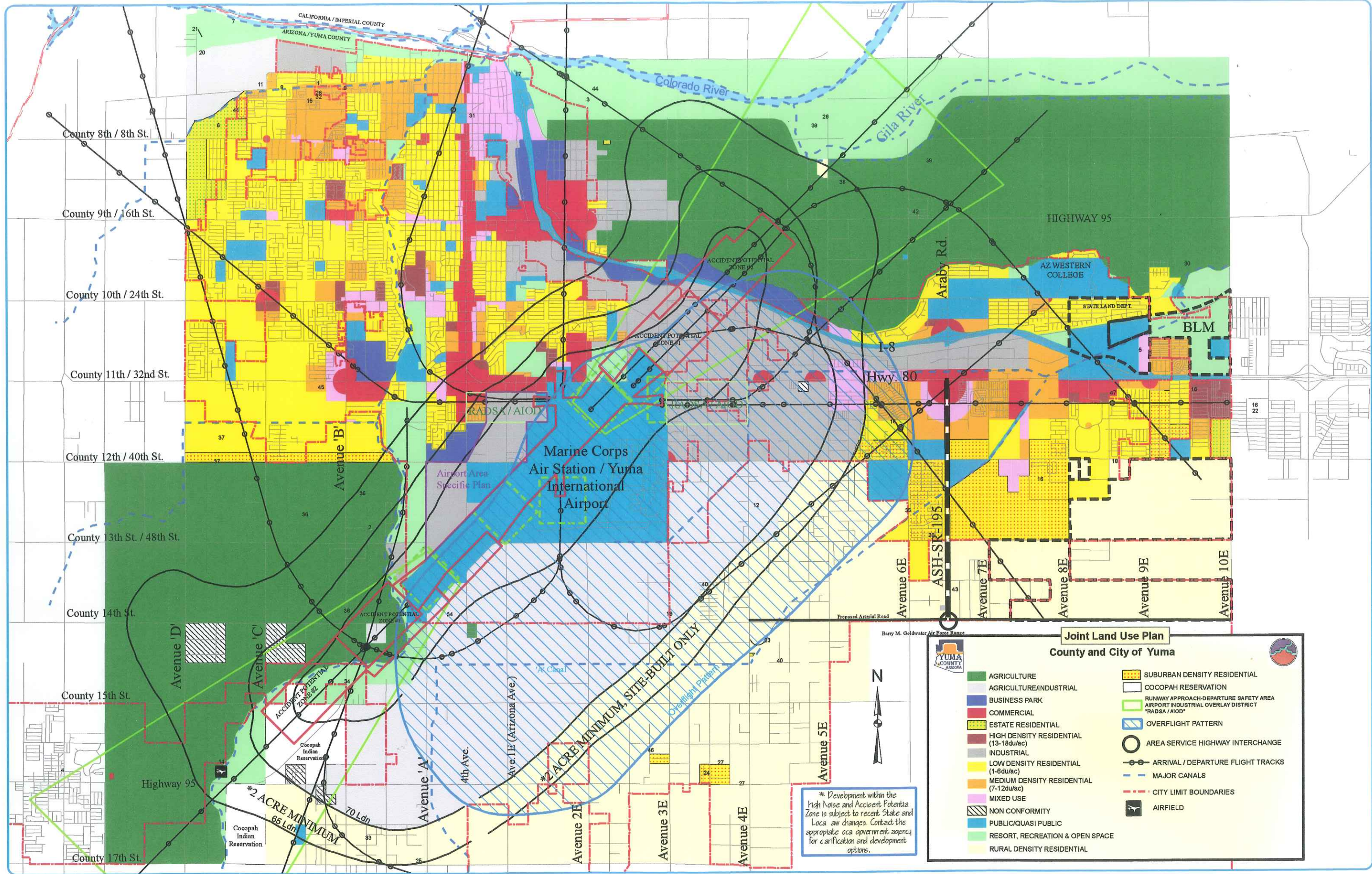
Specific implementation programs or tools of the Joint Land Use Plan include those listed in Appendix C of this Land Use Element. The Priority 1 programs identified reflect those that can reasonably be considered and completed within the first two years following the Joint Land Use Plan’s adoption. Those Priority 2 programs will require significant time and substantive work to evaluate and will occur after the Priority 1 programs are initiated or completed.

SEISMIC ASSESSMENT

A brief overview of seismic risk considerations in the planning area is provided in Appendix D. This includes a description of historic seismic events, evaluation of potential seismic risk areas, review of the consequences of earthquakes, and measures to reduce seismic damage. Recommended measures include:

- Continuation and expansion of public information and awareness program
- Site-specific investigations and seismic evaluations prior to developments and to guide retrofitting
- Land use planning guidelines in areas of seismic risk
- Development and/or application of building codes that address design and construction for seismic loads

These measures should be included in the respective General Plans or considered in subsequent planning efforts by the City and County.



Appendix B
Joint Land Use Plan
General Plan Policies

A. RESIDENTIAL NEIGHBORHOODS ADJOINING AGRICULTURAL OPERATIONS

1. Use of design to minimize conflicts - Residential neighborhoods which adjoin agricultural operations should be designed and built to limit the exposure of the residents to such agricultural operations. This can be accomplished by such techniques as (a) limitations on the number of houses abutting agricultural operations, (b) the location of public areas such as retention areas along farm lands, or (c) the use of landscaping or walls to limit noise and dust, (d) the use of extended yards or setback areas, (e) the limitation of road access points to agricultural areas.

2. Disclosure statements – Homebuyers in residential neighborhoods near agricultural operations shall be given an agriculture disclosure statement making them aware of such operations.

3. School locations – Schools should not be located within one quarter of a mile of agricultural lands.

B. URBAN DEVELOPMENT BETWEEN COUNTY 11½ AND COUNTY 12TH STREET, BETWEEN AVENUE D AND THE EAST MAIN CANAL.

1. Ground water control. Improvement districts or similar districts should be established in this area such that the land owners within the improvement district pay for the installation and operation of any ground water control system required for the safe urban development of this area. The creation of such districts should be required prior to the final approval of any zoning or subdivision plats within the area.

2. This policy should be used elsewhere in the planning area where ground water problems may create problems for the safe development of a site.

C. RUNWAY APPROACH & DEPARTURE SAFETY AREA/AIRPORT INDUSTRIAL OVERLAY DISTRICT (RADSA/AIOD) FOR RUNWAY 8-26

1. Amendments to City and County zoning or development codes. The zoning codes of the City and the County should be amended to include land use regulations and recommendations as described in Appendix E (Runway Approach Departure Safety Area/Airport Industrial Overlay District) for land uses within the boundaries of the RADSA/AIOD areas. These areas, shown on the Joint Land Use Plan Map and described in Appendix E, are to be identified on the respective City and County zoning maps as Runway Approach Departure Safety Areas/Airport Industrial Overlay Districts.

2. Height Limitations. A Runway Approach/Departure Clearance Surface slope ratio of 40:1 should be implemented for the development of lands off the ends of Runway 8-26 and within the Runway Approach Departure Safety Areas/Airport Industrial Overlay Districts noted above. All structures should comply with the height restrictions of the lesser of the runway approach departure clearance surface or zoning on the property.

3. Runway Approach Departure Safety Area/Airport Industrial Overlay District – Land Use Compatibility. A land use compatibility matrix should be developed and adopted into the City and County zoning codes similar to that specified in Appendix E.

4. Grandfathered Rights. Fully grandfather all current uses in the entire RADSA/AIOD area consistent with recommendations identified in Appendix E.

Appendix B

Joint Land Use Plan General Plan Policies

D. AGRICULTURE/INDUSTRIAL AREAS

1. Development of lands within such designated areas should be permitted when the following conditions are met:
 - A. Public Infrastructure. The project proponents demonstrate that they will design, construct and finance appropriate required infrastructure. In the alternative, the project proponents may show that they will contribute, in a pro rata manner, towards the provision of such infrastructure construction as identified in a public infrastructure plan for the area.
 - B. Public Services. The project proponents demonstrate that they will provide for a permanent source of funding to pay for the operation and maintenance of the facilities in “A” above, as well as the increased urban services required for the sustained orderly use of the project. Such sources could include improvement districts or annexation agreements.
 - C. Water Allocation. The project proponents have demonstrated that they have a source of water adequate to support the project.
2. Time limits. Zoning or subdivision approvals for projects within these areas should be such that the zoning or subdivision approval will be void if substantial construction has not occurred within a reasonable time frame (stipulated by the corresponding jurisdictions) after initial approval by the Council or Board.

E. AIRPORT AREA SPECIFIC PLAN

Development of lands west of the Yuma International Airport as shown on the Joint Land Use Plan should occur in conjunction with or subsequent to the preparation of a specific plan authorized under the Arizona Revised Statutes (Specific Plan) addressing land uses, infrastructure – including but not necessarily limited to water, sewer and transportation - and services.

Appendix B

Joint Land Use Plan General Plan Policies

F. TRAFFIC CIRCULATION NEAR SCHOOLS

Promote the efficient and safe movement of vehicles and pedestrians near existing school sites or future sites by coordinating development with the affected school districts in a manner to reduce vehicle and pedestrian conflicts. Development mitigation measures to be considered in such areas should include, but not necessarily be limited to, a complete pedestrian access plan, separate loading/pickup areas for buses and parents, bike lanes or paths, elementary school site locations interior to neighborhoods on collector residential streets or high school site locations at major arterial roads with signalized intersections. Road patterns and access to school sites should provide for the maximum feasible amount of right-hand vehicular turning movements.

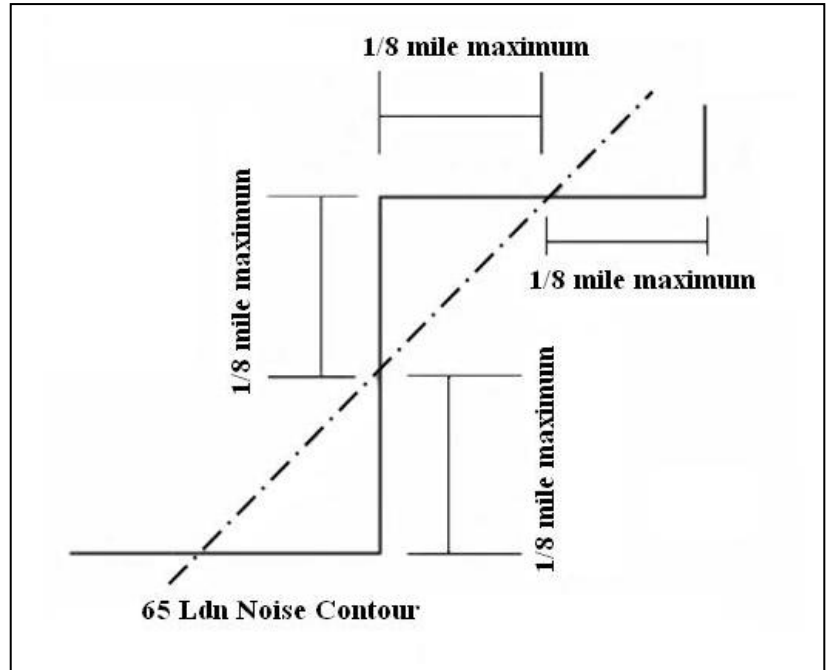
G. FUTURE ROAD RIGHTS-OF-WAY

Arterial, major collector and residential road rights-of-way within the Joint Land Use Plan area should be obtained for the future build-out of the development density within the road's anticipated or planned service area thus maintaining the long term public benefit and interest of all tax payers and residents located within the boundaries of the Plan area for an efficient and safe transportation network. Road rights-of-way obtained should be in conformance with the street and road standards of the governing jurisdiction.

H. NOISE CONTOUR IMPLEMENTATION

Where properties are divided by a noise contour line, the development requirements of the property should be determined by connecting property boundaries as chords/lines up to 1/8 mile in length defined by the noise contour as the mean point of the chord. The chords/lines do not eliminate and/or replace the noise contours; rather, they provide a technical tool for determining development opportunities and requirements for properties divided by a noise contour line.

When the connecting chords/lines divide an individually designated or identified parcel or lot consisting of forty (40) acres or less, the parcel or lot, at the election of the owner, shall be treated as lying within the noise zone as provided for by the adopted regulations of the applicable jurisdiction in which fifty-one percent (51%) or more of the property is situated. New residences, which were not previously allowed inside the 70+ dB noise zone by the 51% rule (Section 704.01, paragraph N of the Yuma County Zoning Regulations) in effect prior to the adoption of the Joint Land Use Plan, shall not be allowed by the application of this policy.



Appendix C

Joint Land Use Plan Implementation Programs and Policies

Implementation programs should be based on the directives and work plans for the City of Yuma and Yuma County. These are likely to be affected by fiscal resources and the support staff to perform the necessary work. Implementation programs should be analyzed for fiscal effects with appropriate budgeting and agency manpower and/or consultant services assigned to accomplish those implementation measures.

Priority 1 Programs (programs recommended within the first 2 years of the Plan's adoption)

1. Establish a Joint City and County Planning and Zoning Commission Working Group that would review matters of interest to both the City and County on planning matters. Create a meeting schedule for the Group to facilitate communication and coordinate decisions, issues and concerns of the respective Commissions.
2. Recommend a Joint City and County Planning and Zoning Commission Working Group to review the Zoning Codes and subdivision regulations of both agencies and formulate a set of recommendations that both bodies would forward to the City Council and Board of Supervisors for consideration. The goal of this effort is to develop, as closely as possible, a common and clear set of definitions, uses, development standards and procedures that remove as many differences between the respective zoning codes and subdivision regulations as possible.
3. The City and County should adopt common or readily comparable zoning designations or district classifications. Priority consideration should be given toward establishing an "aviation compatible" land use matrix for use by both the City and the County.
4. The City and County Planning and Zoning Commissions, as well as the respective staffs of the two agencies, should meet on a regularly scheduled basis to address planning and development issues within, or affecting lands within the Plan area.
5. All recommended plan implementation actions of the City and County should include a public review and participation process. Examples of community involvement activities may include, but not necessarily be limited to, workshops, public presentations, newsletters, and media releases.
6. The City and County review and approval of development applications, including rezonings, development plans and use permits, should contain a determination that the proposed action(s) is/are consistent with the Joint Land Use Plan objectives and policies.
7. New development should be encouraged contiguous to existing urban areas and have reasonable access to public services and facilities.

8. Recommend design review on development proposals located at gateways, along transportation corridors or at other entry points to the Pan area to improve the visual appearance of such properties and the community's image (City and County).
9. Allow flexibility in the application of land use densities on properties having more than one land use density so that property development, design opportunities, use of space and traffic movements may be improved or enhanced.
10. Utilize Planned Development/Planned Unit Development zoning for development areas covered by a specific or master development plan encouraging creativity in planning and design and providing for the integration and continuity of land use activities with the Joint Land Use Plan objectives and adjoining lands.
11. The City and County should adopt similar or comparable building codes.
12. The City and County should identify and pursue opportunities for redevelopment of blighted areas or neighborhoods using all available funding sources, including grants, bonds, subsidies, loans or foundation grants where appropriate. Enterprise zones should be considered where appropriate to encourage redevelopment.
13. The City and County should consider the implementation of credits or bonuses to attract timely and orderly development. Such programs may include tax credits, reduced fees, transfer of development rights and density increases promoting development proposals that exceed development standards.
14. The City and County should consider adopting development impact fees for identified public facilities or services needed to support new development. This could include expansion of the City's Pro Rata Public Facilities Fee program to cover other services and infrastructure and the County's adoption of development fees as authorized under State statutes.
15. The City and County should consider amendments to their respective General Plans on an on-going basis providing for the long-range vision (plan element) of infrastructure and support services needs of the community's growth. Such areas should or may include: public services, public facilities, circulation, resource conservation, recreation, housing, redevelopment, safety, historic resources or other significant components of the Yuma Community.

Priority 2 Programs (programs recommended after 2 years of the Plan's adoption)

1. The City and County Planning and Zoning Commissions should meet on a regularly scheduled basis for the review of development and zoning requests within the Plan area.
2. Community or neighborhood plans should include the location of parks, schools, commercial areas, public facilities and availability of utilities. Ten (10) percent of a neighborhood plan area should be set aside for "usable open space." A statement of

impacts on schools, community facilities and commercial outlets should be provided with each development proposal.

3. The City and County should consider adopting environmental compliance regulations providing for environmental evaluations of development activities and their compatibility with the Joint Land Use Plan and the respective General Plans.
4. The City and County should consider adopting a Transfer of Development Rights (TDR) program securing or transferring property development rights from one location for use in another at a higher density.

Appendix D

Seismicity Assessment

Introduction

The purpose of this appendix is to characterize the seismicity of the Yuma area by presenting a discussion of seismic source zones, information on earthquakes and faults, identification of some potential ground-failure hazards, and some general conclusions and recommendations for seismic design considerations.

Typically the State of Arizona is generally considered to be seismically inactive. However, Yuma is in a region of moderate to high seismicity (Uniform Building Code Zone 4) because of its close proximity to the highly active San Andreas Fault system of California and Mexico. Seismic risk is an important factor in the continued urban development of the Yuma area.

Earthquakes and Faults

An earthquake is a sudden motion or trembling in the Earth caused by the abrupt release of seismic waves radiating from a source of energy created by the release of slowly accumulated strain (by faulting or volcanic activity). Most earthquakes occur near plate margins of the Earth, in areas of active global geologic forces that make mountains, rift valleys, mid-oceanic ridges, and ocean trenches.

The most common are tectonic earthquakes. These are produced when rocks break suddenly in response to various geologic forces. Faulting or rupture at the surface is often associated with earthquakes, although faulting may occur at depths with no obvious surface rupturing and minor or smaller earthquakes rarely result in surface rupture.

The epicenter of an earthquake is the location on the earth's surface of the initial rupture. The faults seen at the earth's surface may extend to considerable depths within the Earth's crust. These faults are structural offsets, either vertical or horizontal, in rock. Faults may range in length from a few feet to many miles. Fault displacements are defined as either horizontal (transform or strike-slip) or vertical (normal, reverse, or thrust). The presence of a fault indicates that movement in the geologic structure of the area has occurred either recently (within tens of thousands of years) or many millions or hundreds of millions of years ago. Of primary interest are active faults. A fault is considered active if movement has occurred during historic, Holocene (less than 10,000 years ago) or Quaternary (less than 2,500,000 years ago) time (Bolt 1993). Recent earthquakes in California resulted in the appearance of several "new" faults, which had not been detected until surface rupture occurred.

The power released during an earthquake may be described in terms of magnitude and intensity. Two scales have been developed to gauge the force of earthquakes, the Richter magnitude scale and the Mercalli intensity scale. Richter magnitude is based on a logarithmic scale with each whole number representing a tenfold increase in seismic wave trace amplitude. The Mercalli intensity scale is based on observations of an earthquake's effects on manmade structures and natural surroundings. Table 1 is a comparison of the two scales, energy equivalents, and witnessed observations.

TABLE 1
Earthquake Rating Scales Compared in Terms of Energy Released and Damage Observed

| Richter Magnitude | Mercalli Intensity | Equivalent Energy in Weights of TNT | Witnessed Observations |
|--------------------------|---------------------------|--|--|
| Up to 3 | I-II | less than 400 lbs | barely noticeable |
| 3-4 | II-III | up to 6 tons | feels like vibration of nearby truck |
| >4-5 | IV-V | up to 200 tons | small objects upset, sleepers awoken |
| >5-6 | VI-VII | up to 6,270 tons | difficult to stand; damage to masonry |
| >6-7 | VII-VIII | up to 100,000 tons | general panic; some walls fall |
| >7-8 | IX-XI | up to 6,270,000 tons | wholesale destruction, large landslides |
| 8-9 | XI-XII | up to 200,000,000 tons | total damage; waves seen on ground surface |

Source: AIPG 1993, Citizens' Guide to Geologic Hazards

Earthquakes may also be measured in terms of acceleration due to gravity (expressed as cm/sec or g). Each Portion of the earthquake seismic waves may be associated with a certain acceleration of the ground. In general the higher the seismic intensity the higher the average velocity of shaking. However, earthquake intensity and acceleration is greatly affected by bedrock type, amount and type of alluvium, and topography. The 1989 Loma Prieta earthquake in the San Francisco area of California had high intensities and greatest damage in the alluvial-filled lands of the marina compared to the harder bedrock areas in the hills.

Regional Tectonics and Setting

Yuma is located at the eastern edge of the Salton Trough seismic source zone and is adjacent to the Southern Basin and Range seismic source zone (Figure A-1; the appendix figures are at the end of the appendix text). The Salton Trough includes the Salton Sea-Cecilia and Imperial Valleys Area in California and extends southward through the Gulf of California. The Salton Trough is a broad structural depression, the northward extension of the Gulf of California. Its northeastern boundary is formed by the San Andreas Fault. The Algodones Fault, part of the San Andreas Fault zone, trends northwest to southeast and is located within a few miles to the south and southwest of Yuma.

Seismic source zones are zones of regions that have been determined by seismologists to have similar active geologic structures, physiography, stratigraphy, and various geophysical data such as gravity, magnetics, and heat flow. These boundaries are only approximate since emphasis is on historic seismicity and potentially active faults in establishing these zones. Regions with little earthquake activity or surface rupture expression typically are harder to define than those with more seismic activity. The seismic source zones used in this discussion have been determined by recent studies of the Arizona Earthquake Information Center (1994) at Northern Arizona University by Bausch and Brumbaugh as part of the Earthquake Preparedness Program.

The Salton Trough seismic source zone is characterized by a high level of seismicity due to active northwest-trending faults and an oceanic-type spreading center located in the source zone. Seismicity in the Salton Trough is concentrated between the offsets of three major transform faults – San Andreas, Imperial, and Cerro Prieto. Geodetic measurements, as well as historic and geomorphic evidence of recent fault movements, show a high rate of tectonic activity in the area.

The Southern Basin and Range seismic source zone also has an influence on the City of Yuma since its western boundary is adjacent to the city. The Southern Basin and Range seismic source zone extends from southern Nevada into Mexico and includes a portion of southeastern California as well as southwestern and south-central Arizona. The Southern Basin and Range is tectonically stable with low levels of seismicity and few active faults.

Figures A-2 and A-3 are ground acceleration contour maps for 50- and 100-year time frame periods. These maps represent the predicted peak horizontal acceleration of the ground at bedrock and are based on several factors including the frequency of occurrence of earthquakes in that region, data on attenuation of ground shaking with distance, and various aspects of the typical faults which generate earthquakes in that region. These are historical records that can be used to estimate both the frequency and intensity of future seismic events.

Although no epicenters of earthquakes with Richter magnitude 6.0 or greater have been recorded in Arizona during historic time, major earthquake epicenters associated with the San Andreas fault zone have been recorded near Yuma. Figure A-4 shows the location and intensities of earthquake occurrences in and around Arizona.

Several historic earthquakes in the Yuma area occurred in the Imperial Valley of southeastern California/northern Mexico. The May 19, 1940 event (Figure A-5) had a Modified Mercalli intensity of XII (VII in Yuma) and a Richter magnitude of 7.1. This event resulted in serious damage in the Yuma area. Eight people were killed, 20 people seriously injured, and there were many more minor injuries. A 40-mile-long fault scarp with a maximum horizontal displacement of about 15 feet developed near the U.S. – Mexico border. Portions of the Yuma Valley in the Yuma-Somerton-Gadsden area were subject to liquefaction, the formation of craters, cracking and upheaval of the ground surface (DuBois and others 1982).

The October 15, 1979 Imperial Valley event had a Modified Mercalli intensity of IX (VI in Yuma) and a Richter magnitude of 7.0 but resulted in generally minor structural damage in Yuma (DuBois and others 1982; DuBois and Smith 1980). The June 28, 1992 Landers earthquake, originating from the Mohave Desert of southern California, had a magnitude of 7.4 and was felt throughout most of the western United States. The Landers earthquake ruptured a 37-mile-long-segment. Another earthquake occurred near this same area on July 5, 1992 along the Big Bear Fault with a magnitude of 5.1. There were numerous strong foreshocks and aftershocks in this region for several months. These earthquakes were felt in Yuma although damage to structures was minimal (Wallace 1992).

Seismologists continue to study earthquakes and try to determine ways to predict an earthquake event. So far, most have been unsuccessful. Although methods to determine the time of occurrence and exact location have been unsuccessful so far, seismologists have been able to

estimate the probability of an earthquake and a maximum magnitude based on historic observations and geologic parameters. These offer an estimate of earthquake risk for an area. Studies completed by the Arizona Earthquake Information Center (1994) determined a maximum magnitude earthquake of 7.6 for the Salton Trough seismic source zone and a maximum intensity of VII to VIII from a period of record of 1887 to 1987 for the City of Yuma. The 50-year and 100-year ground acceleration contour maps, Figures A-2 and A-3, based on historic records that can be used to indicate the likelihood of future damaging ground accelerations for the Yuma region. This study concluded an average peak ground acceleration at bedrock of 50 percent (0.5 g) and 64 percent (0.6 g) for the 50-year and 100-year time frame, respectively, and a 90 percent chance of not exceeding the predicted value for the time frame.

These estimates of ground shaking intensity for the Yuma area will vary by location as a factor of the underlying geology. Analysis of historic intensities indicates that greater intensities will occur in alluvial deposits compared to bedrock. Also higher intensities occur in sedimentary and volcanic rocks compared to intrusive rocks. Thickness of alluvium overlying bedrock and the type of that underlying bedrock are also important factors in determining seismic risk at a specific location. The information available from the Arizona Earthquake Information Center needs to be supplemented by geological studies of specific areas to be able to assess this risk.

Earthquake Hazards

Earthquakes typically pose little direct hazard to individuals (AIPG 1993). Contrary to the depiction of earthquakes in movies, people are not “shaken” to death and swallowed by the ground. The greatest damage and threat to human life from earthquakes is derived from the damage or failure of man-made structures resulting from ground failure hazards caused by earthquakes.

Ground failure hazards resulting from earthquakes, which could impact the Yuma area generally include: ground shaking; liquefaction and seismically induced settlement; surface rupture; and slope failures. Other hazards which do not apply to the Yuma area include tsunamis and volcanic activities.

Ground Shaking

Ground shaking (vibrations) during an earthquake is considered the greatest source of damage to structures. The degree of damage will depend on the intensity and duration of the shaking, type of structure, and subsurface soil conditions.

Liquefaction and Seismically Induced Settlement

Liquefaction is a phenomenon where sandy, saturated soils (beneath a groundwater table) behave similarly to a liquid during an earthquake. As the ground shakes, the pore water pressure in the soil will increase, resulting in a significant loss in the strength of the soil. This causes the soil particles to disperse and behave as a liquid. As the ground shaking subsides, the soils will compress and settle. As a result of ground shaking and soil liquefaction, there would also likely be deformation (distortion) of the ground surface and surface manifestations of liquefied soils (e.g. sand boils). In the absence of groundwater table, soils may also densify and settle in response to ground shaking. Resulting settlements can vary from a few inches to several feet. However, buildings will not completely sink (submerge) into the ground.

Soil liquefaction typically occurs in sandy soils with a shallow ground-water table. These topics have been identified in the discussions of constraints to development in the text of the land use plan with a general indication of the locations of high groundwater and sandy soils. The potential for liquefaction will depend on the following factors: (1) the level and duration of earthquake shaking; (2) the subsurface soil conditions including soil grain size distribution and density; and (3) groundwater level location.

Surface Rupture

Surface rupture is a ground surface failure, which occurs along fault zones. The ground surface failure is in the form of vertical and horizontal displacements and offsets. This type of earthquake hazard is typically confined within the fault zone and can cause severe damage to structures within this zone.

Slope Failures

Ground shaking during an earthquake will result in additional dynamic loads on soil and rock slopes. These loads may cause slopes, which are stable under “normal” (static) conditions, to fail. In the Yuma area, the slopes along the edge of the mesa may be particularly affected by this condition.

Minimizing Earthquake Damage

Several proactive measures can be undertaken, in order to minimize the adverse impacts (risk) of earthquake hazards on the community. These measures can be categorized as follows: education; seismic evaluation and retrofit; planning; and building codes.

- Education - An earthquake public awareness program can be implemented to educate the public on what to expect and how to protect themselves in the event of an earthquake. Public panic and lack of preparedness in the even of an earthquake can lead to increased risk. The City and County are currently preparing such an awareness program.
- Seismic Evaluation and Retrofit - The studies of seismic risk that have been undertaken thus far have broadly identified the conditions in the Yuma area. They must be supplemented by specific investigation if they are to provide practical guidelines. Seismic evaluations can be performed to assess the liquefaction potential and the potential for other ground failure hazards for specific areas in Yuma. A rating system can then be adopted for use as a planning tool by providing practical guidance for land use siting. The study should continue the seismic evaluation of existing critical structures being completed by the City. Assigned area ratings can then be matched to particular land uses and building requirements. Such structures should be retrofitted if found unstable in the event of an earthquake.
- Planning - Based on the results of the seismic evaluation study, land use siting and planning guidelines can be developed to address future development and reduce seismic risk. Such guidelines may include (for example) limiting land use in area with a high potential for ground failure hazards and requiring structures to be located at a certain distance from fault zones.
- Building Codes - Building codes can be developed (or adopted) which specifically address design and construction for seismic loads. Present building codes and standards provide for the use of seismic risk factors in determining construction and design, but

should require the necessary site evaluation to ensure that these are uniformly applied. Minimum standards can be developed for geotechnical investigations and soil mitigation activities (ground improvement) for sites prior to development at the site. A key factor to proper implementation of these codes will be the design review and construction inspection on the part of the responsible governing agency (building department).

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Appendix E

Policy C – Runway Approach Departure Safety Area/Airport Industrial Overlay District

PURPOSE: The purpose of the Runway Approach Departure Safety Area/Airport Industrial Overlay District (RADSA/AIOD) is the protection and safety of the general public who enter, work, or reside within the RADSA/AIOD boundaries by identifying appropriate land uses and development standards that are compatible with established aircraft over flight conditions.

Runway Approach Departure Safety Area – (RADSA): Least Intensive Use/Most Restrictive Area

– Directly under regular, straight-in approaches and departures to Runway 8-26 and/or directly under other regular flight paths.

Location: West Area – All property located within 1/8 of a mile (nominal) north and south of the extended centerline of Runway 8 – 26 following existing property lines between the west property line of the airport and the west right-of-way line of 4th Avenue (See Figure 1). East Area – All property located in the area bounded by, the west right-of-way line of Avenue 3E on the west, east-west lines 1/8 of a mile (nominal) north and south of the extended centerline of Runway 8-26 following existing property lines and the east right-of-way line of Avenue 4E on the east. (See Figure 2).

Land Uses: Land uses permitted are those shown in the RADSA/AIOD-1 column of the land use compatibility matrix. Allowable occupant density to be lowest permitted and to be determined in next phase of Plan implementation. Recommend that the City’s current APZ-1 occupant density standard (maximum of 1 person per 5000 square feet, i.e. about 8.6 persons per acre) be considered for this area.

Airport Industrial Overlay District 1 (AIOD-1): Area of intermediate intensity use – directly under some regular flight paths but NOT under straight-in approaches and departures to Runway 8-26.

Location: Property located within an area bounded by the north right-of-way line of 32nd Street on the north, the west right-of-way line of Avenue 3E on the west, the east right-of-way line of Avenue 4E on the east, and that area which is more than 1/8 of a mile (nominal) north of the extended centerline of runway 8-26 following existing property lines. Additionally, this overlay district shall apply to property located within an area bounded by the future alignment of 36th Street (the east-west mid-section line) on the south, the west right-of-way line of Avenue 3E on the west, the east right-of-way line of Avenue 4E on the east, and a northern boundary that is 1/8 of a mile (nominal) south of the extended centerline of Runway 8-26 following existing property lines (See Figure 2).

Land Uses: Land uses permitted are those shown in the RADSA/AIOD-1 column of the land use compatibility matrix. Allowable Occupant Density is to be somewhat less restrictive than the RADSA and is to be determined in the implementation phase of the JLUP. The County’s current APZ-1 occupant density standard (maximum of 25 persons per acre) might be considered appropriate for this area.

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Policy C – Runway Approach Departure Safety Area/Airport Industrial Overlay District

Airport Industrial Overlay District 2 AIOD-2): Most Intensive Use/Least Restrictive Area – AIOD areas which are NOT directly under either the regular straight-in approaches and departures to Runway 8-26 or other regular flight paths but whose proximity to flight paths demonstrates a need for enhanced public safety measures.

Location:

Property located within an area bounded by the future alignment of 36th Street (east-west mid-section line) on the south, the west right-of-way line of 4th Avenue on the west, the west airport property line on the east, and that area which is more than 1/8 of a mile (nominal) south of the extended centerline of Runway 8-26 following existing property lines (See Figure 1).

Land Uses:

Land uses permitted are those shown in the AIOD-2 column of the land use compatibility matrix. Retail sales are permitted in this area. Allowable Occupant Density is to be somewhat less restrictive than the AIOD-1 and is to be determined in the implementation phase of the JLUP. The County's current APZ-2 occupant density standard (maximum of 50 persons per acre) might be considered appropriate for this area.

Grandfathered Rights: Fully grandfather ALL current uses in the entire AIOD/RADSA area. By fully grandfathering it is meant that all current uses shall be allowed to continue the current category of use, i.e. property with a current retail sales use (such as a car dealership) can continue to be used for any use within that category (such as retail clothing sales) and shall be allowed to develop or redevelop to the fullest extent allowed under present Building Code, Fire Code, Development Standards, and Lot Coverage Standards. Vacated facilities may be reestablished within three (3) years if of the same category of land use. The grandfathering specifically does NOT apply to zoning on property that is not currently being used for that purpose, i.e. if the property is presently being used to raise alfalfa but is currently zoned Light Industrial, a light industrial use would NOT be grandfathered. A light industrial use could be built on that parcel if, however, it was one of the uses in the list of approved uses for the underlying AIOD or RADSA area and conformed with the occupant load limitations for that AIOD or RADSA area. The occupant load for grandfathered uses would NOT be restricted other than is presently provided for in Building and Fire Code restrictions.

REASON FOR DIFFERENCE IN TREATMENT OF THE SAFETY AREAS AT THE EAST AND WEST ENDS OF RUNWAY 8-26: There is a clear, distinct, difference in aircraft operations at the different ends of runway 8-26 which produces different areas and levels of exposure to risk.

East End of Runway: - Aircraft flight operations at the east end of Runway 8-26 are characterized by published flight patterns, which allow departing aircraft to turn north of the extended runway centerline. Additionally, established military jet flight paths (tower patterns) to the main jet runways over-fly this area with marked frequency. These two flight pattern characteristics permit greater frequencies of aircraft exposure to ground activities and uses at the east end of Runway 8-26.

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Policy C – Runway Approach Departure Safety Area/Airport Industrial Overlay District

Additionally, the simultaneous use of Runway 8-26 and the main jet runways - a normal airport operational procedure – also introduces the possibility of mid-air collisions between the aircraft simultaneously using runways near this location.

The higher potential for mishap at the east end of Runway 8-26 clearly demonstrates a need for a larger area of safety concern and policy guidance for ground activities than would be the case if only straight-in flight operations on a single runway were occurring in this area.

West End of Runway: Aircraft flight operations at the west end of Runway 8-26 are characterized by direct, straight-in approaches and departures, with some approaches from the south under easterly wind conditions. Aircraft using this runway normally stay aligned with the runway centerline between the runway and a prominent landmark, the City water tower, located well outside the area being considered for safety policy. Aircraft-turns away from the direct, straight runway alignment, though legally possible, tend to be the exception rather than the rule inside the west RADSA.

There are no regular, conflicting flight patterns from other runways that go above the proposed runway safety areas on the west end of Runway 8-26. Therefore, the public exposure to frequent and potentially conflicting over-flights by aircraft using other runways at this location does NOT exist.

The lack of regular flight patterns for other runways over the proposed safety area on the west end of Runway 8-26 also reduces public safety exposure from possible mid-air collisions by aircraft using the airspace west of Runway 8-26.

ADDITIONAL RECOMMENDATION #1: Consideration should be given to requiring the construction of a quarter-section line east-west street along the extended centerline of Runway 8-26 during the development of property between Fortuna Avenue and 4th Avenue on the west and between Avenue 4E and about Avenue 3 1/8E on the east. Construction of these streets should be to at least the standard design for a four (4) lane arterial roadway with a continuous center left turn lane, all underground utilities, pedestrian scale (4 foot or less) street lighting and appropriate building setbacks. Enhanced public safety opportunities can be provided with the construction of these streets and consideration should be given to government participation in funding these roads when these areas develop.

JUSTIFICATION: The construction of a paved street along the extended center line of Runway 8-26, with appropriate building setback regulations, pedestrian scale street lighting and all utilities placed underground will minimize the danger to public safety from aircraft accidents while maximizing the utilization of adjacent property.

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Policy C - Runway Approach Departure Safety Area/Airport Industrial Overlay District

ADDITIONAL RECOMMENDATION #2: Adopt a 40:1 Approach/Departure Clearance Surface for Runway 8-26.

JUSTIFICATION: Recommended by RASA Working Group. The adoption of a 40:1 Approach/Departure Clearance Slope is necessary to reduce the potential for ground obstructions to and encroachments on aircraft flight paths on this runway.

ADDITIONAL RECOMMENDATION #3: Recommend to appropriate authorities the modification of the approach and departure flight paths for aircraft landing on Runway 8 or taking off from Runway 26 under Visual Flight Rules (VFR) and Instrument Flight Rules with VFR conditions to require all such aircraft to fly the Runway heading until clear of the City water tower located at the James Deyo Community Complex.

JUSTIFICATION: Recommended by RASA Working Group. The adoption of this change in airport flight paths will significantly change the public safety exposure to aircraft over-flights in the urban area. The elimination of aircraft flights from Runway 8-26 from over flying such sensitive areas as KOFA High School, Palmcroft School and heavily used shopping centers will greatly reduce the chance of large scale loss of life from aircraft accidents.

ADDITIONAL RECOMMENDATION #4: Recognizing the increasing volumes of air traffic over the RADSA and the resulting exposure to people and improvements that will occur, it appears that the long term interests of the community would be best served by public ownership of the land within the RADSA. It is therefore recommended that consideration be given to acquisition of that land by the City, County and/or a RADSA development district or other authority. It is further recommended the method used to acquire that land take into consideration the wishes of those property owners with respect to purchase versus condemnation.

JUSTIFICATION: Recommended by some property owners. The public acquisition of lands in this area would: (1) significantly reduce the exposure of life and property to aircraft over-flights; (2) would enhance future commercial and industrial development opportunities in the vicinity of the airport; and (3) would provide current land owners opportunities to reinvest their resources into other areas of the community.

The following is a list of the permitted land uses within the RADSA/AIOD boundaries. Development standards addressing building location and intensity as well as population density (building occupant loads) are to be developed as part of the implementation program of the Joint Land Use Plan following a comprehensive public participation program of proposed ordinance changes. All uses listed will be subject to development standards produced through the implementation program.

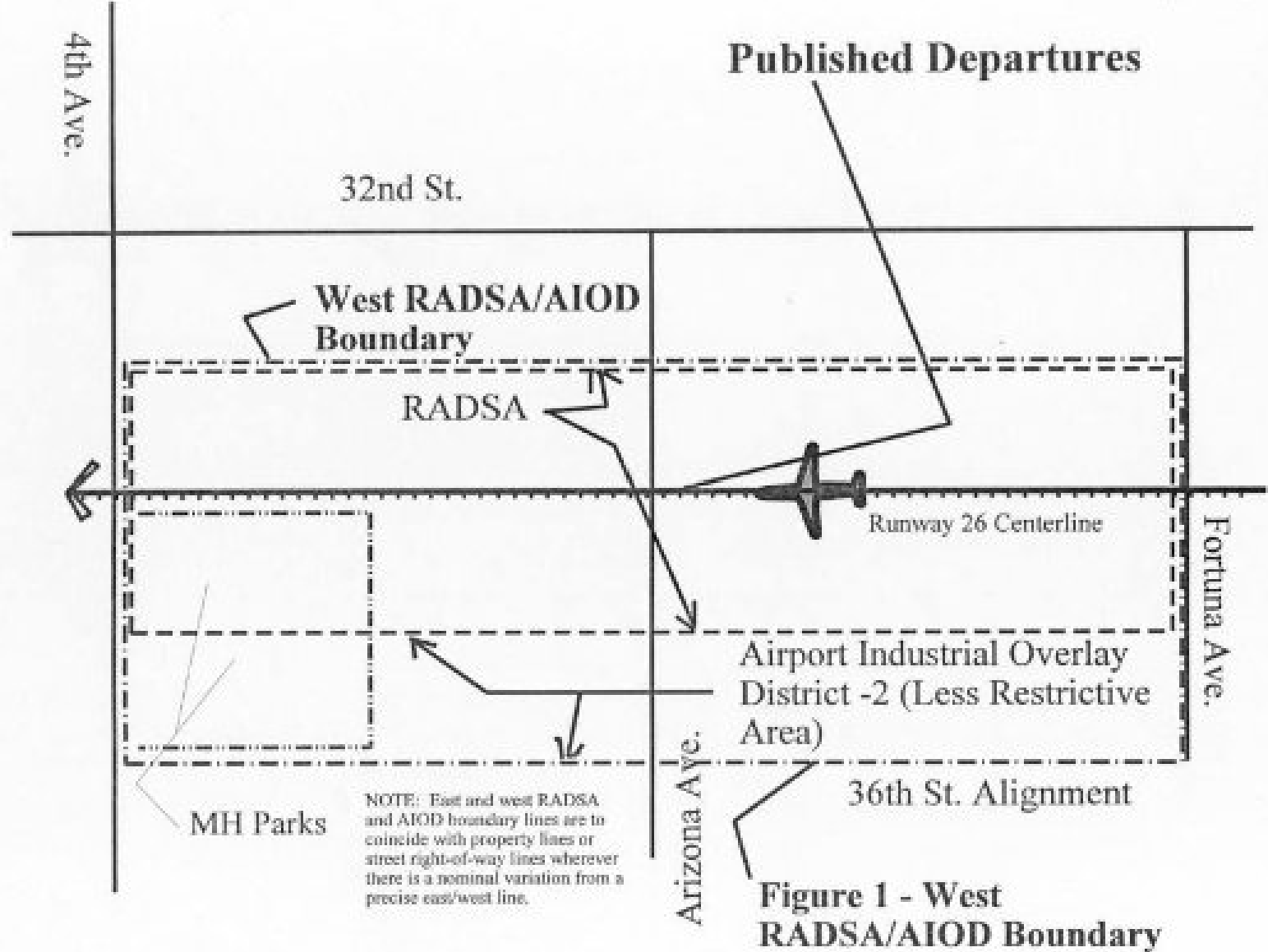
| Land Use Category/Activity | RADSA/AIOD – 1 (Footnotes 1a, 1b, & 2a) | AIOD – 2 (Footnotes 1c, 2b) |
|--|--|------------------------------------|
| Manufacturing of: | | |
| Food & kindred products | Y | Y |
| Textile mill products | Y | Y |
| Lumber & wood products | Y | Y |
| Furniture & fixture | Y | Y |
| Paper & allied products | Y | Y |
| Printing & publishing industries | Y | Y |
| Stone, clay & glass products | Y | Y |
| Primary metal industries | Y | Y |
| Fabricated metal products | Y | Y |
| Miscellaneous manufacturing | Y | Y |
| Caretakers Residence | Y | Y |
| Transportation, Communications & Utilities | | |
| Railroad, rapid rail transit & street railway uses or ancillary office/maintenance facilities but not terminals, stations or transit centers | Y | Y |
| Truck terminals | Y | Y |
| Airports | Y | Y |
| Highway & street right-of-way | Y | Y |
| Vehicle storage/parking lots | Y | Y |
| Utilities (below ground okay; above ground requires review as to placement) | Y | Y |
| Other transportation, communication & utility facilities | Y | Y |
| Caretakers Residence | Y | Y |
| Trade/Commercial | | |
| Wholesale trade exclusive of membership-based businesses | Y | Y |
| Storage | Y | Y |
| Retail trade – building materials, hardware & farm equipment | N | Y |

| Land Use Category/Activity | RADSA/AIOD-1 (Footnotes 1a, 1b, 2a) | AIOD-2 (Footnotes 1c, 2b) |
|--|--|--|
| Retail trade – general merchandise | N | Y |
| Retail trade – food | N | Y |
| Retail trade – automotive, marine craft, aircraft & accessories | N | Y |
| Retail trade – furniture, home furnishings & equipment | N | Y |
| Retail trade – restaurants & eating & drinking establishments | N | Y |
| Caretakers Residence | Y | Y |
| Services | | |
| Finance, insurance & real estate services | Y | Y |
| Personal services | Y | Y |
| Cemeteries | Y | Y |
| Business services | Y | Y |
| Professional services | Y | Y |
| Repair services | Y | Y |
| Contract construction services | Y | Y |
| Governmental services excluding libraries or facilities with auditoriums, meeting halls, etc. | Y | Y |
| Miscellaneous | Y | Y |
| Caretakers Residence | Y | Y |
| Cultural, Entertainment & Recreational | | |
| Nature exhibits | Y | Y |
| Parks with passive open space areas, not with active recreation space facilities that concentrate people | Y | Y |
| Caretakers Residence | Y | Y |
| Resource Production & Extraction | | |
| Agricultural | Y | Y |
| Livestock farming & animal breeding | Y | Y |
| Agriculturally-related activities | Y | Y |
| Forestry activities & related services | Y | Y |
| Fishing activities & related services | Y | Y |
| Mining activities & related services | Y | Y |
| Caretakers Residence | Y | Y |
| Other resource production & extraction | Y | Y |
| Miscellaneous | Y | Y |
| Existing Uses (as of...(effective date after adoption) | Y | Y |

Footnotes: Within each land use category listed, land uses and activities may require further evaluation during the code implementation process due to the variation of densities of people and structures. Such standards for code language should include, but not necessarily be limited to,

the following:

- 1a A maximum of one (1) person per _____ square feet of net lot area shall be allowed (applies to Runway Approach-Departure Safety Area).
- 1b A maximum of one (1) person per _____square feet of net lot area shall be allowed (applies to Airport Industrial Overlay District-1)
- 1c A maximum of one (1) person per _____square feet of net lot area shall be allowed (applies to Airport Industrial Overlay District-2).
- 2a A maximum of one (1) person per _____square feet of building area shall be allowed (applies to RADSA and Airport Industrial Overlay District-1).
- 2b A maximum of one (1) person per _____square feet of building area shall be allowed (applies to Airport Industrial Overlay District-2).
- 3 A building or structure setback of _____ feet from the extended centerline of Runway 8-26 shall be maintained in the development or construction of new or remodeled facilities.
- 4 Factors to be considered in land use or site development include labor intensity, occupancy loads, building configuration and location, parking and vehicular circulation, structural coverage, flashing light or other exterior light sources, the extent of storage or use of explosive materials or flammables, release of airborne particulates or pollutants which may obscure vision or pose potential explosive hazards; generation of electromagnetic fields or transmission of electrical signals or impulses that would interfere with aircraft operations or radio transmissions or other processes or uses of similar character or origin.
- 5 Above ground electrical transmission lines exceeding _____kV capacity are not allowed
- 6 All existing uses (as of ...(effective date after adoption) are grand fathered and permitted to lawfully operate within the limits of the existing zoning at the effective date of the Plan's adoption subject to:
 - a. Facility/use expansion allowed to maximum permitted under current zoning
 - b. Compliance with nonconforming use regulations where/if applicable
 - c. Approach/departure clearance surface slope criteria and other airport surfaces where applicable.
- 7 West AID Clear Zone owned by Yuma County and maintained by the Yuma County Airport Authority for runway protection is limited to those uses established by Federal Aviation Regulations (FAR) and approved by the Federal Aviation Administration.
- 8 Land use categories and/or activities not listed in this land use compatibility matrix are not permitted.



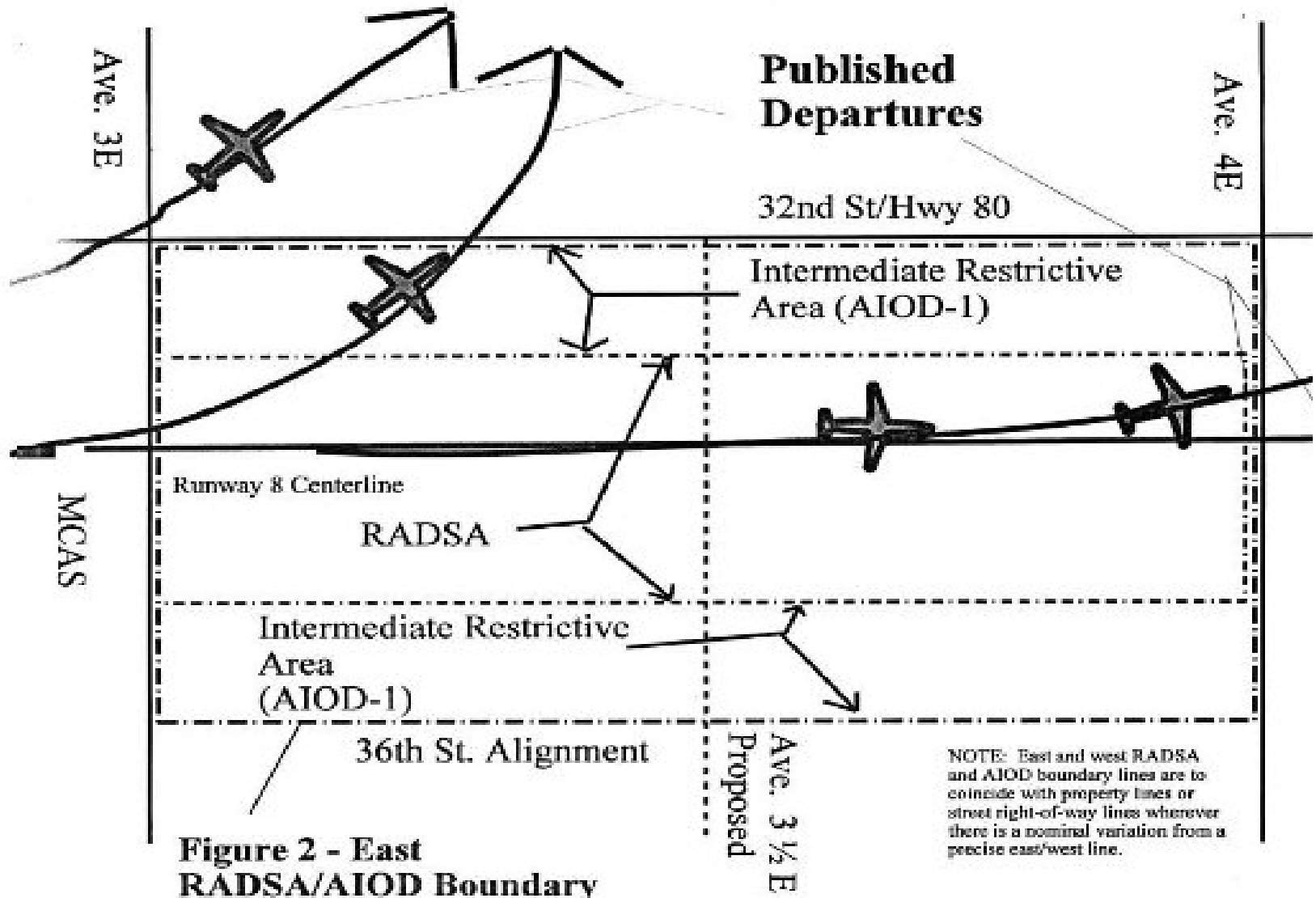


Figure 2 - East RADSA/AIOD Boundary