2.14 LAND USE

In a typical master planning process, an inventory is completed showing how on- and off-airport land areas are used and zoned taking into consideration the interests of those who reside, work, or visit those land areas. Interests may include protecting the airspace to minimize or eliminate conflicts with approaching or departing aircraft, or minimizing noisy aircraft operations during the night hours. A thorough understanding of land use during the planning process ensures existing and future land uses are compatible with each other.

This master planning process includes a unique in-depth assessment of on-airport and off-airport land use that goes beyond compatibility concerns that are typically addressed. The intent of this increased land use effort, in association with the overall master plan update is to:

- Identify the potential for airport land development to provide additional, sustainable revenue while accommodating the airport's aeronautical development requirements,
- Support economic development efforts of the airport area as a whole,
- To provide a development investment framework which can coordinate the actions of public and private interests,
- Determine the long-range transportation, utility and facilities, and land use and urban design framework that will enable and encourage private investment on airport property, and
- Provide a framework for coordinated capital investment among key agencies including TAA, the City of Tucson, Pima County, the Arizona Department of Transportation (ADOT), utilities providers, and other agencies.

Preceding sections included a detailed inventory of the aeronautical on-airport land areas (functional land use areas). In the section that follows, the non-aeronautical, vacant, or undeveloped on-airport land areas as well as off-airport land areas that may impact or be impacted by airport operations are described. For purposes of the in-depth land use assessment, the following inventory pertains to existing conditions and, where data was provided, future or planned development. Following this section, an inventory of the existing and planned airport access system, environmental conditions, and economic and market conditions are presented. The final section is an assessment of the land use and development potential of studied land areas.

For clarity purposes, Airport Land refers to all land owned by TAA (also known generally as Airport Property). Airport Land is comprised of a Primary Land area and a Reserve Land area. The Primary Land consists of all land used for aeronautical purposes. Of the 8,343 acres of land owned by TAA, 2,076 acres have been developed and are currently used or designated for aeronautical use. The preceding sections focused on this Primary Land.

Reserve Land consists of all land that is currently used for non-aeronautical purposes, is undeveloped or vacant. The Reserve Land also consists of land currently set aside for planned aeronautical purposes, such as the area reserved for a future far parallel runway and associated aeronautical facilities. Because the far parallel runway concept is not expected to be needed until beyond the planning horizon, opportunities now exist for interim non-aeronautical development of this area. The Airport Land area is summarized in **Table 2-21** and **Figure 2-12** by functional land use.

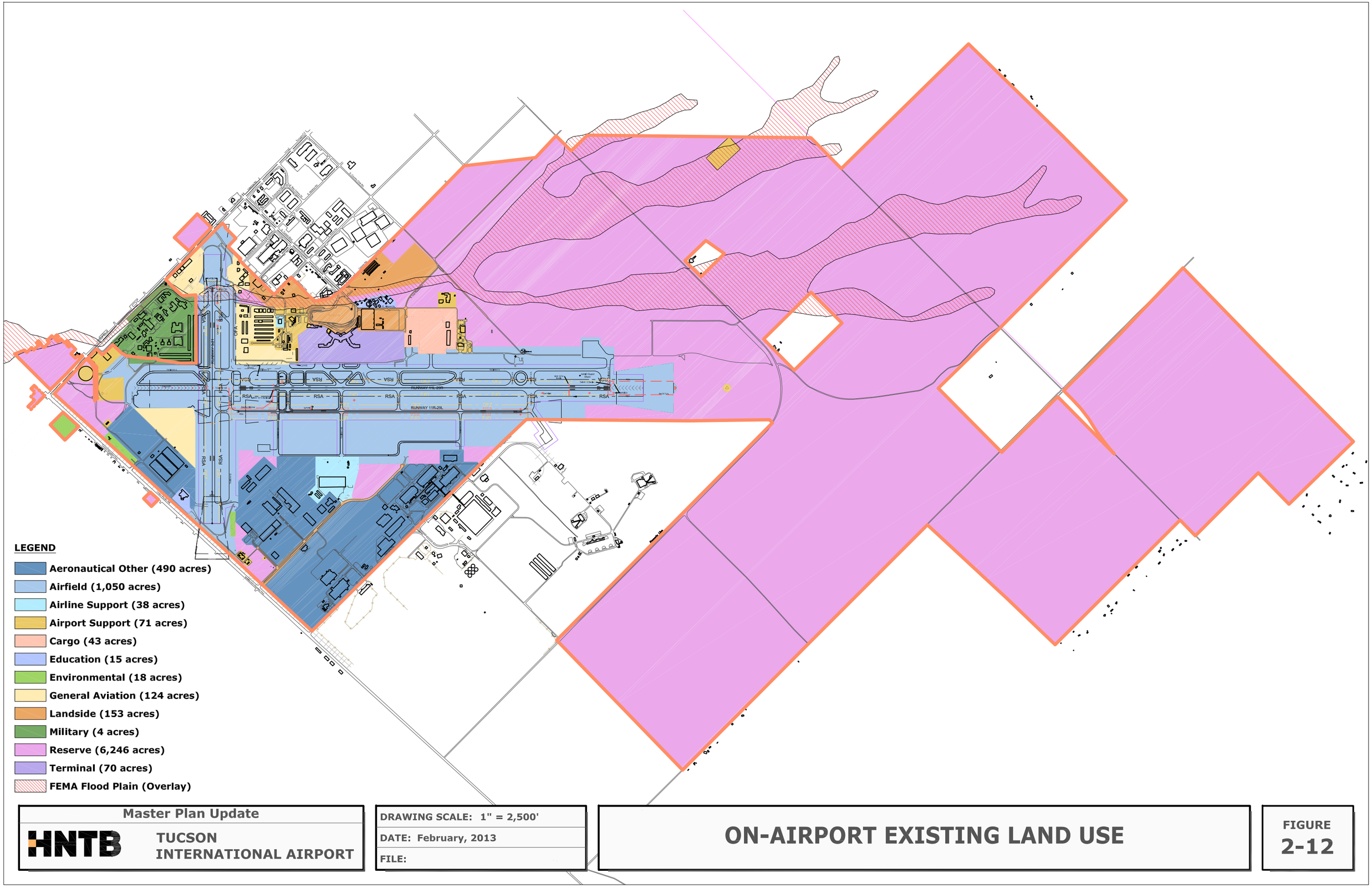
TAA maintains an Extended Clear Zone (ECZ) Policy that restricts development immediately beyond the Runway Protection Zone. The ECZ Policy requires that the extended clear zone be kept clear of development not critical to airfield operations and that vehicles, aircraft and other objects or buildings may not be permanently parked or otherwise located or placed in this area. **Figure 2-13** delineates the generalized extents of the RPZs and ECZs.

Table 2-21: Airport Land Acreages by Functional Use

	Functional Land Use	Total Acres
Primary Land	Airfield	1,050
	Airline Support	38
	Airport Support	71
	Cargo	43
	Education	15
	Environmental	18
	General Aviation	124
	Landside	153
	Military (on-airport property portion only)	4
	Other Aeronautical	490
	Terminal	70
Reserve Land		6,267
	Total	**8,343**

Source: HNTB Analysis

Off-airport land areas that may impact or be impacted by airport operations are referred to as the Urban Land Context. The majority of the following sections pertain to the Urban Land Context. The three land areas (Primary Land, Reserve Land, and Urban Land Context) are shown in **Figure 2-14**.



Master Plan Update

HNTB

TUCSON INTERNATIONAL AIRPORT

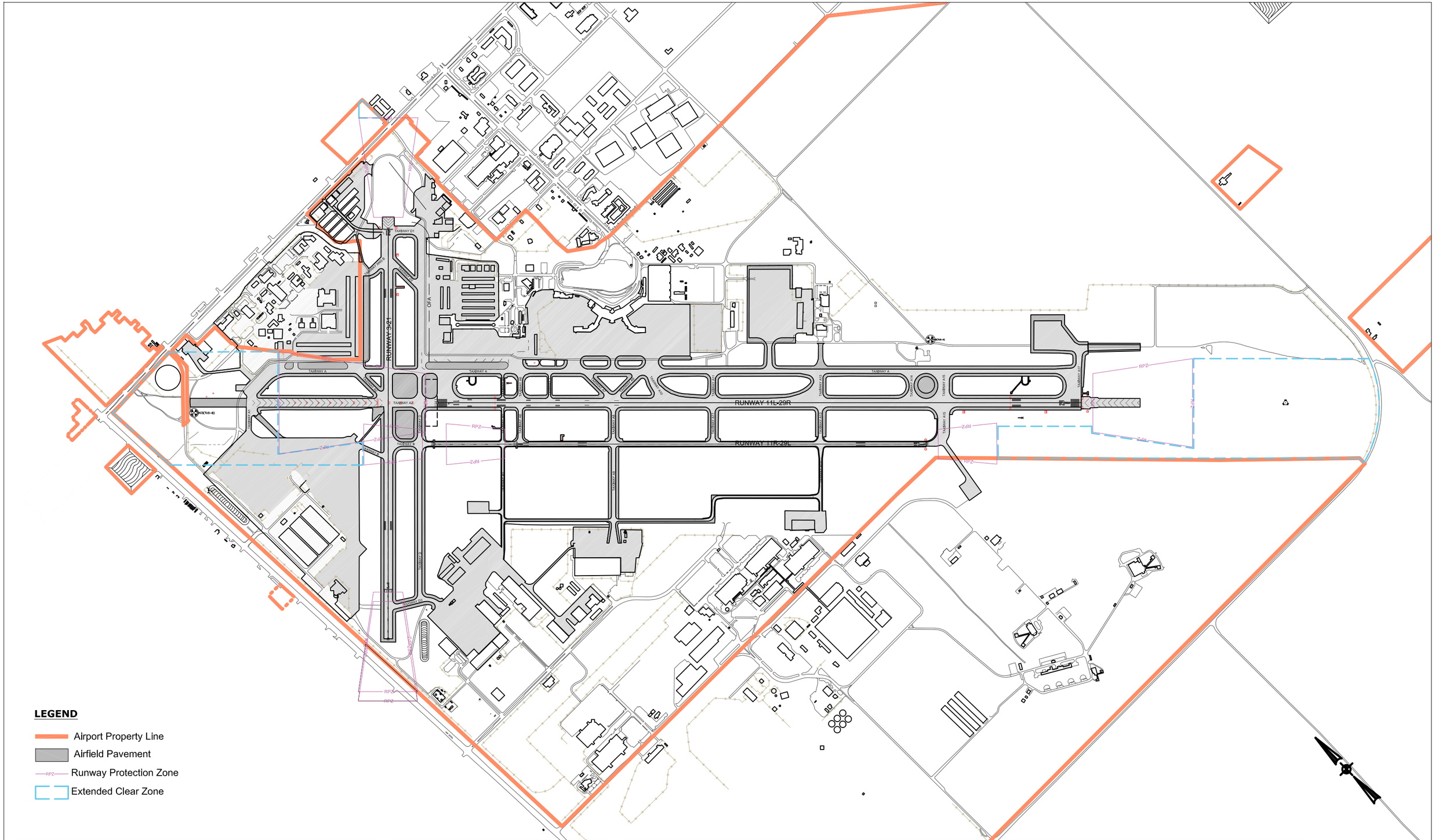
DRAWING SCALE: 1" = 2,500'

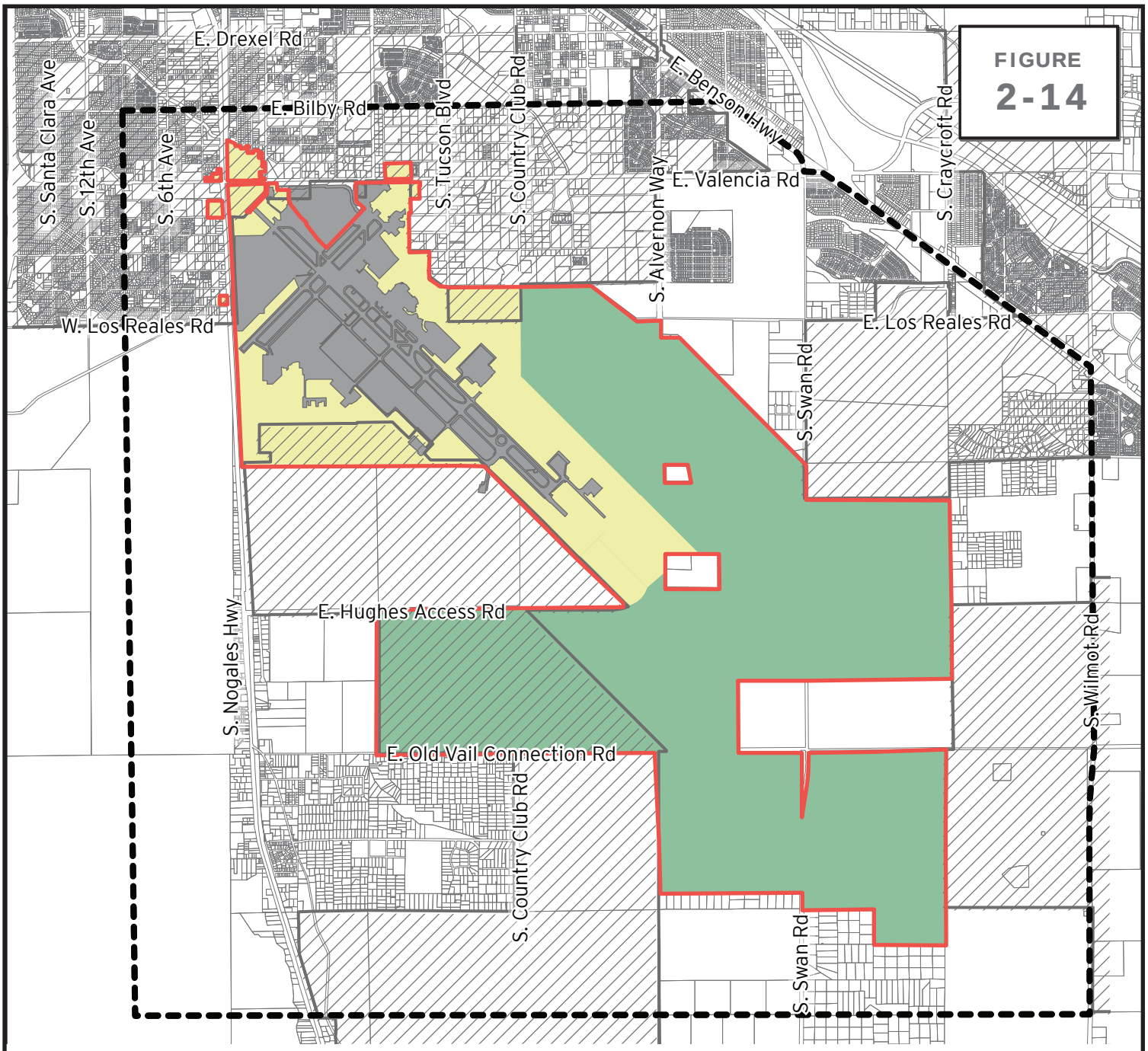
DATE: February, 2013

FILE:

ON-AIRPORT EXISTING LAND USE

FIGURE 2-12


RUNWAY 3-21
RUNWAY 11L-29R
RUNWAY 11R-29L
OFA
TAXIWAY A
TAXIWAY A1
TAXIWAY A2
TAXIWAY A3
TAXIWAY A4
TAXIWAY A5
TAXIWAY A6
TAXIWAY A7
TAXIWAY A8
TAXIWAY A9
TAXIWAY A10
TAXIWAY A11
TAXIWAY A12
TAXIWAY A13
TAXIWAY A14
TAXIWAY A15
TAXIWAY B
TAXIWAY B1
TAXIWAY B2
TAXIWAY C
TAXIWAY D
TAXIWAY D1
TAXIWAY E
TAXIWAY F
TAXIWAY G
TAXIWAY H
RPZ
RPZ
RPZ



Source: HNTB Corporation

Master Plan Update

HNTB TUCSON INTERNATIONAL AIRPORT

MASTER PLAN
LAND AREAS

2.15 RESERVE LAND

2.15.1 Existing and Planned Land Uses

The Reserve Land area is shown in **Figure 2-14**. The northeastern part of the Reserve Land is currently vacant, but is where future aeronautical development is planned. The southeastern part of the Reserve Land is mostly undeveloped or vacant but there are some areas where active / inactive mining operations are located.

The areas where mining operations are located are under the control of TAA and, pending definition of aeronautical needs could be available for non-aeronautical use. Using aerial photography as a basis for measurement, roughly 1,270 acres of land are currently used for mining activity and 740 acres represent inactive mined locations.

2.15.2 Airport Land Use Compatibility

The 2001 General Plan for the City of Tucson has a land use policy "to encourage local governments to promote compatible land uses adjacent to public preserves and airports, based on consultation with natural resource and airport personnel.[1]" Land use compatibility concerns between the Airport and surrounding community have focused primarily on airport approach and departure path and high noise areas.

2.16 URBAN LAND CONTEXT

The land uses within the Urban Land Context are shown in **Figure 2-15**. The functional land uses within the Urban Land Context are shown in **Figure 2-16**. These functional land uses depict the major concentrations of land use by general type within the Reserve Land. It is intended to illustrate clusters of significant activity that may have a bearing on future land use and development preferences.

2.16.1 Existing Land Use and Development

In general, the City of Tucson's street grid extends to the north and northwest sides of TIA and establishes a more urban land use pattern. Within these areas, there are a mix of residential, commercial and employment land uses. Non-residential uses are clustered in proximity to Valencia Road and Nogales Highway as major entry corridors to the Airport area. The area roughly south of Los Reales Road takes on a different physical form and land use character from lands to the north. The development pattern is more fractured with large parcel employment development separated by large tracts of vacant land, and lands which include active or inactive excavation / mining activity. This pattern is in part driven by TAA, state and federal land ownership which is more prominent in this area than lands to the north. The western boundary of the Urban Land Context is framed by the San Xavier Indian Reservation and Desert Diamond Casino. An overview of existing major land use categories is briefly discussed below.

[1] City of Tucson General Plan, December 6, 2001, Policy 9.7 on page 2-26.

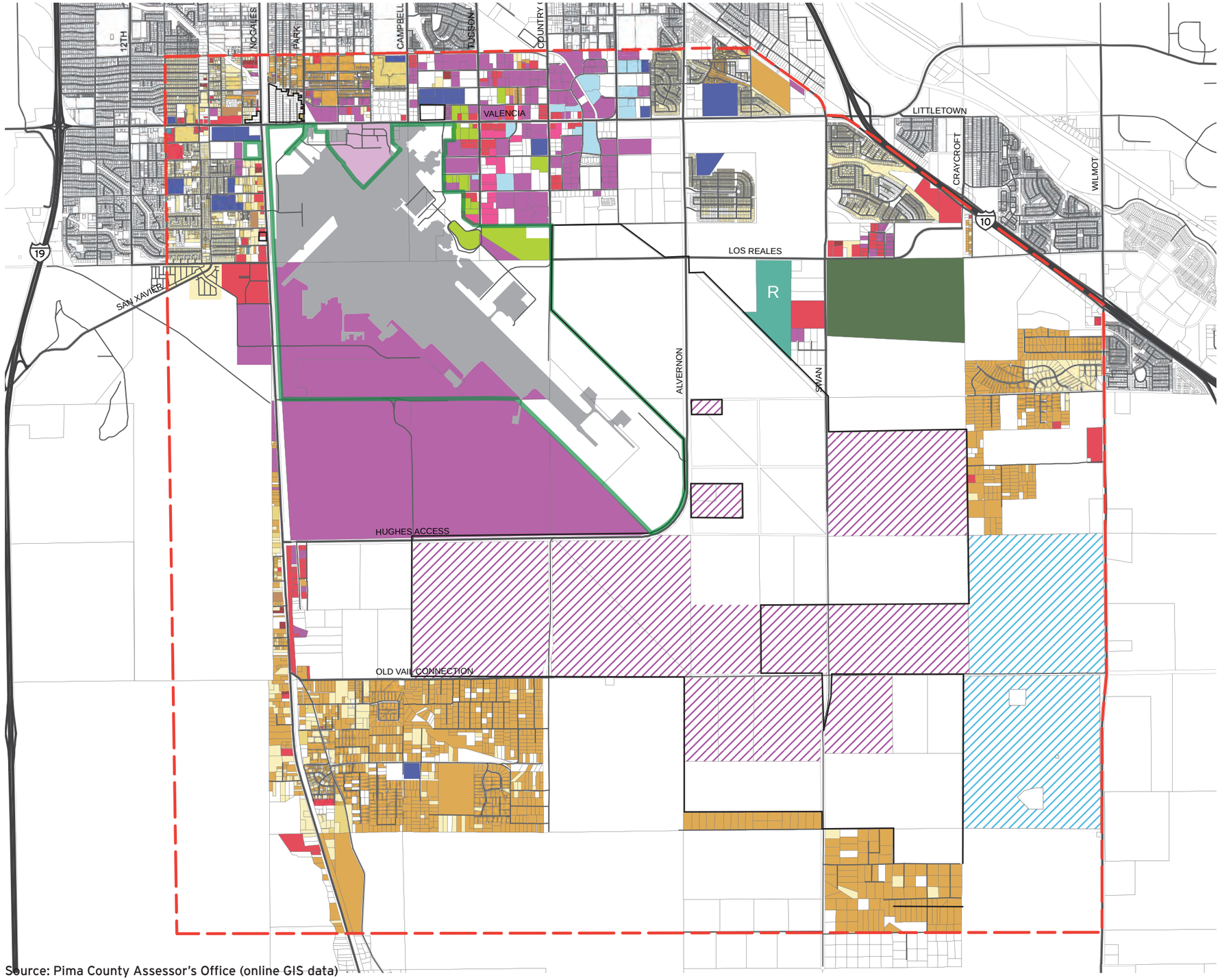
Residential Uses: Single family uses predominate the pattern, reflecting a broad mix of manufactured and site built homes. Condominiums occupy a portion of the area. Organized neighborhoods in the Urban Land Context include Sunnyside and Elvira. In general, residential uses south of Hughes Access Road rely on on-site water and wastewater facilities.

Commercial Uses: Commercial uses are generally aligned with major corridors in the study area, but take on a different role and function. The western portion of Valencia Road focuses on service and neighborhood commercial uses whereas the eastern part of the corridor includes more airport related uses, particularly along Tucson Boulevard where hotel, parking and restaurant services support air traveler business needs. Nogales Highway is primarily service commercial in orientation. As discussed elsewhere in this inventory, the condition and appearance of commercial corridor approach routes to the airport could be improved to better reflect the community's image to Airport users.

Employment Uses: Employment uses generally include manufacturing and industrial businesses, planned business parks, and aerospace and defense contractors. Employment uses are generally concentrated in two locations – along the Valencia Road corridor, at TIA, or in areas to the south of TIA. Older industrial and manufacturing uses are located north of the Valencia Road corridor. Newer planned business parks, such as the Tucson International Business Center and Airport Commerce Center, are located along Valencia Road east of Tucson Boulevard and include a range of office, research, warehouse, distribution and technology land uses. Aerospace and defense uses such as Bombardier and Raytheon Corporation are located west of the parallel runways.

2.16.2 Existing Zoning

Both the City of Tucson and Pima County have established zoning within the Urban Land Context area. Current zoning for both the City of Tucson and Pima County is illustrated in **Figure 2-17**. Existing land use patterns are generally consistent with current zoning. The majority of the Airport property and the Urban Land Context area is in unincorporated Pima County and is subject to County zoning. TAA property within the jurisdiction of Pima County is zoned general industrial and at its southern extents, rural homestead. Northeast of TIA, Pima County lands are zoned as residential, while east and south of the airport property is largely suburban, rural residential and rural homestead.
Incorporated lands within the Urban Land Context include residential districts northeast and south of the Airport, light industrial immediately north, heavy industrial north and south of Hughes Access Road and planned area development east of the Airport.



LEGEND

- Primary Land
- Reserve Land
- Urban Land Context
- Vacant (within Urban Land Context)

RESIDENTIAL

- Single Family Residential
- Multi-Family Residential
- Manufactured Home
- Mixed Use RV/ Manufactured Home

COMMERCIAL

- Commercial
- Health Care
- Race Track
- Hotel/ Motel
- Parking
- Mixed Use Commercial
- Military
- TIA Airfield

EMPLOYMENT

- Industrial/ Manufacturing/ Planned Business Park
- Office
- Extraction

PUBLIC/ QUASI PUBLIC

- Schools
- Corrections
- Landfill

Source: Pima County Assessor's Office (online GIS data)

Master Plan Update

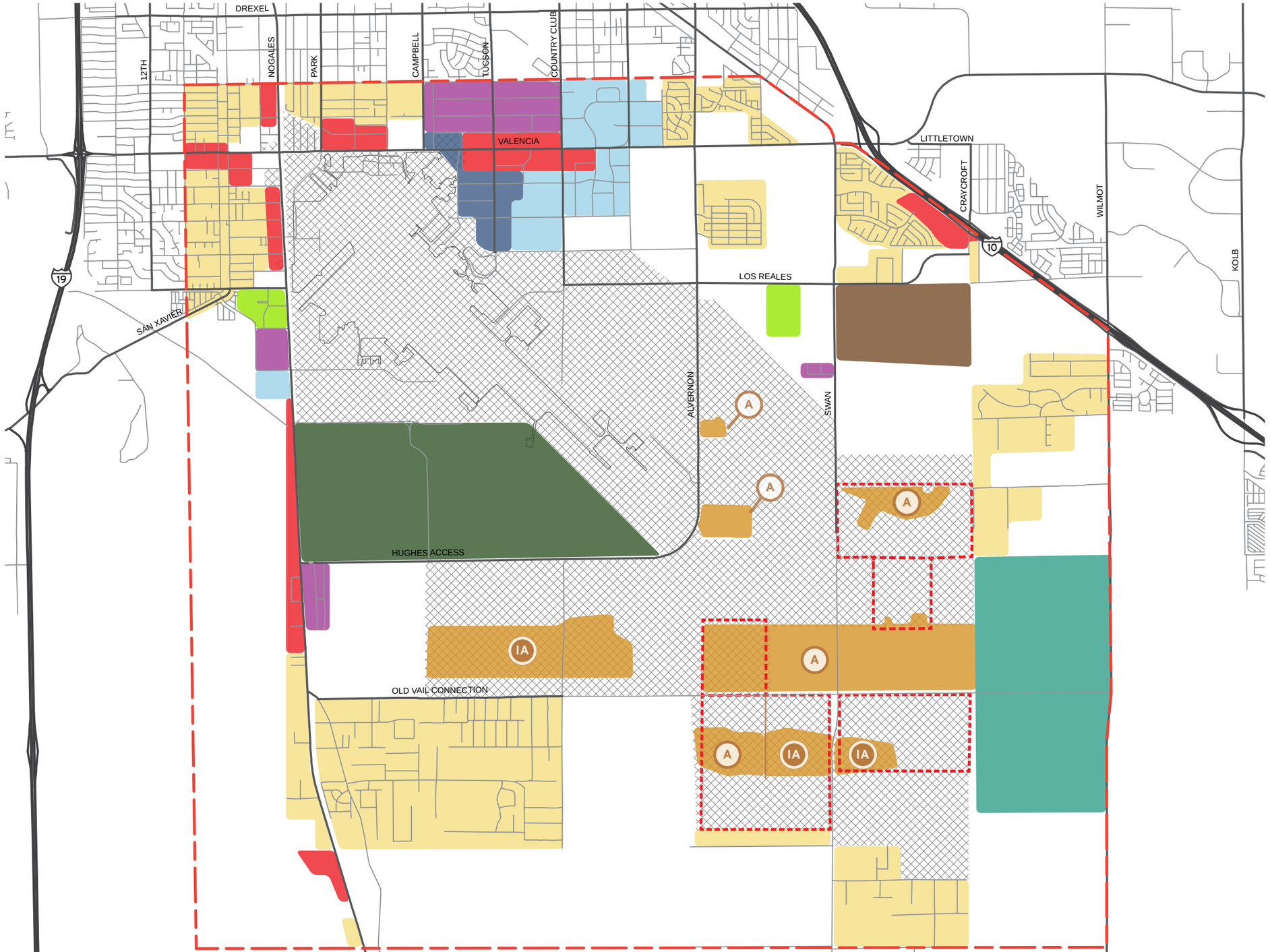
HNTB TUCSON INTERNATIONAL AIRPORT

DRAWING SCALE: Not to Scale

DATE: February, 2013

URBAN LAND CONTEXT EXISTING LAND USE

FIGURE 2-15



LEGEND

- RESIDENTIAL
- COMMERCIAL SERVICE
- AIRPORT SERVICE
- ENTERTAINMENT
- EMPLOYMENT - PLANNED BUSINESS PARK
- MANUFACTURING / INDUSTRIAL
- EXTRACTION
  - A ACTIVE
  - IA INACTIVE
- AERO/ DEFENSE
- CORRECTIONS
- LANDFILL
- TIA OWNERSHIP
- MINING LEASEHOLD

Master Plan Update

HNTB

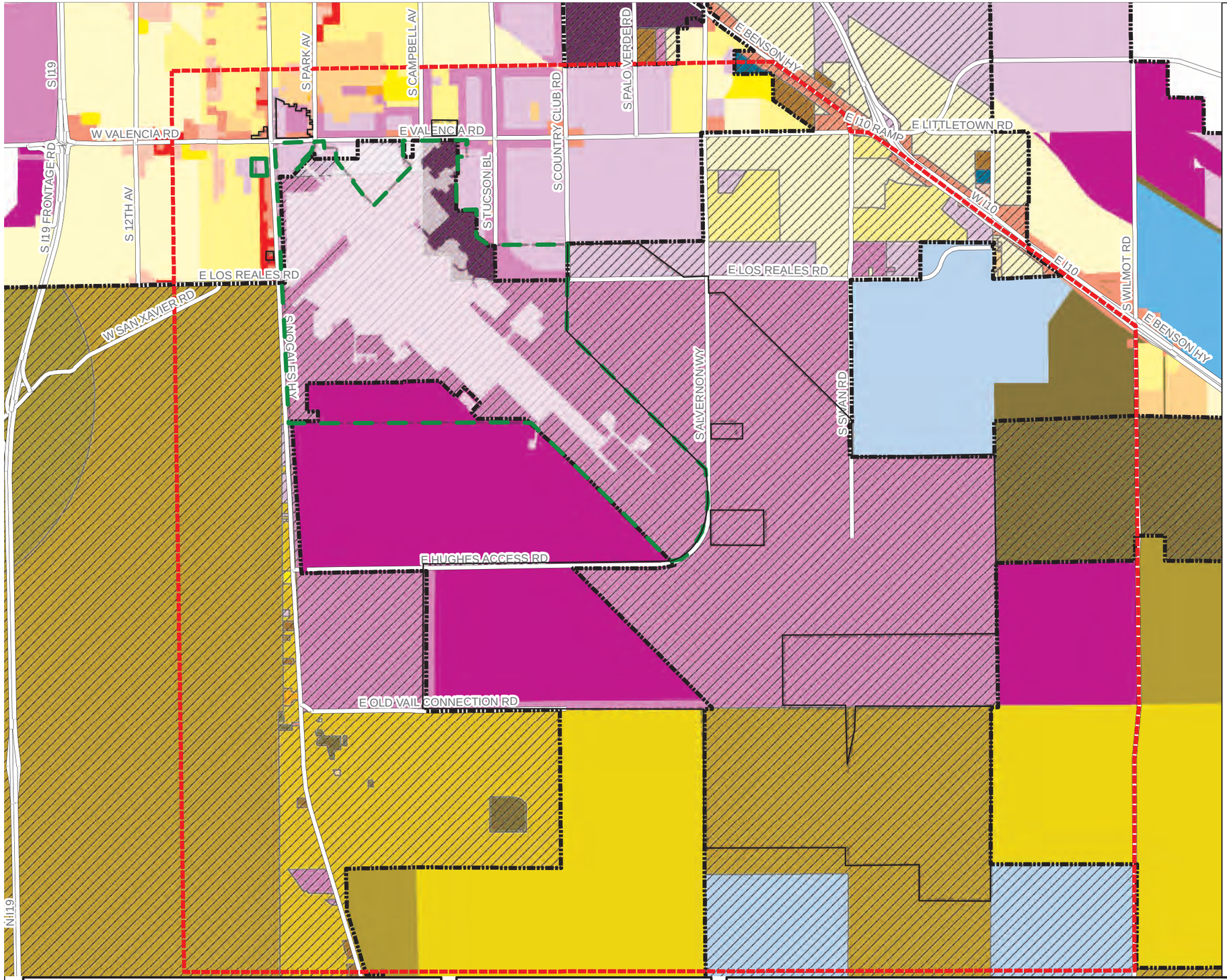
TUCSON INTERNATIONAL AIRPORT

DRAWING SCALE: 1" = 4,000'

DATE: February, 2013

URBAN LAND CONTEXT EXISTING FUNCTIONAL LAND USE

FIGURE 2-16



LEGEND

City of Tucson

- C-1: Commercial
- C-2: Commercial
- O-3: Office
- I-1: Light Industrial
- P-I: Light Industrial
- I-2: Heavy Industrial
- MH-1: Mobile Home
- MH-2: Mobile Home
- RV: Recreational Vehicle
- R-1: Residence
- R-2: Residence
- R-3: Residence
- RH: Rural Homestead
- RX-1: Residence
- SH: Suburban Homestead
- MU: Multiple Use
- PAD-14: Planned Area Development
- PAD-7: Planned Area Development

Pima County

- CB-1: Local Business
- CB-2: General Business
- CI-1: Light Industrial/Warehousing
- CI-2: General Industrial
- CMH-1: County Manufactured and Mobile Home-1
- CMH-2: County Manufactured and Mobile Home-2
- TH: Trailer Homesite
- CR-3: Single Residence
- CR-4: Mixed-Dwelling Type
- CR-5: Multiple Residence
- GR-1: Rural Residential
- RH: Rural Homestead
- RH(H): Rural Homestead Historic
- SH: Suburban Homestead
- MU: Multiple Use
- SP: Specific Plan
- TR: Transitional

- City of Tucson
- Airfield
- Primary Land
- Reserve Land
- Urban Land Context
- Major Streets

0 0.2 0.4 0.8 Mil

Source: City of Tucson Zoning, 2007; Pima County Zoning, 2010

Master Plan Update

HNTB TUCSON INTERNATIONAL AIRPORT

DRAWING SCALE: Not to Scale

DATE: February, 2013

EXISTING ZONING

FIGURE 2-17

2.16.3 Future Development Plans

The entirety of the Urban Land Context is within the City of Tucson's planning area. The City's General Plan (2001) identifies several future growth and development areas, as illustrated in **Figure 2-18**. Two of these, the "Evolving Edge" and the "Future City" influence the Urban Land Context. While the plan establishes a strong policy framework for growth and development guidance in each of these areas, it emphasizes the following:

- Both of these areas offer economic development opportunities subject to plan protocols for infrastructure and land use
- Both areas include a significant amount of state owned lands which require approved master planning in association with the Arizona State Land Department pre-requisite release of lands for development. A portion of these lands are within the Urban Land Context.

In addition, the City of Tucson General Plan provides overall guidance on the type and locations of future development. Tucson's Generalized Distribution of Land Use Patterns, shown in **Figure 2-19**, illustrates the community's official intent for development and conservation in the area. The Plan recognizes established residential neighborhoods and commercial corridors in the north and western portions of the study area. It also recognizes the employment and commercial area development opportunities for the areas immediately north and northeast of TIA. Consistent with the "Future City" subarea, it also recognizes the need for State Land Department properties to be master planned in the southern portion of the study area. Overall, the City's comprehensive plan supports continued business development in the Urban Land Context. The City of Tucson's General Plan is currently undergoing a comprehensive update, and is anticipated to be adopted sometime in early 2013.

The Pima County Comprehensive Plan was adopted in 2001 and includes policies for land use, circulation, water resources, open space, growth areas, the environment, development costs and concurrency, military airport facilities, rezoning and special area plans. Land Uses within the Pima County Comprehensive Plan are classified into four major land use intensity categories – urban intensity, rural intensity, urban and rural intensity, and major resort community. These intensity categories, shown in **Figure 2-20**, contain a number of land use plan designations each linked to compatible zoning districts and densities.

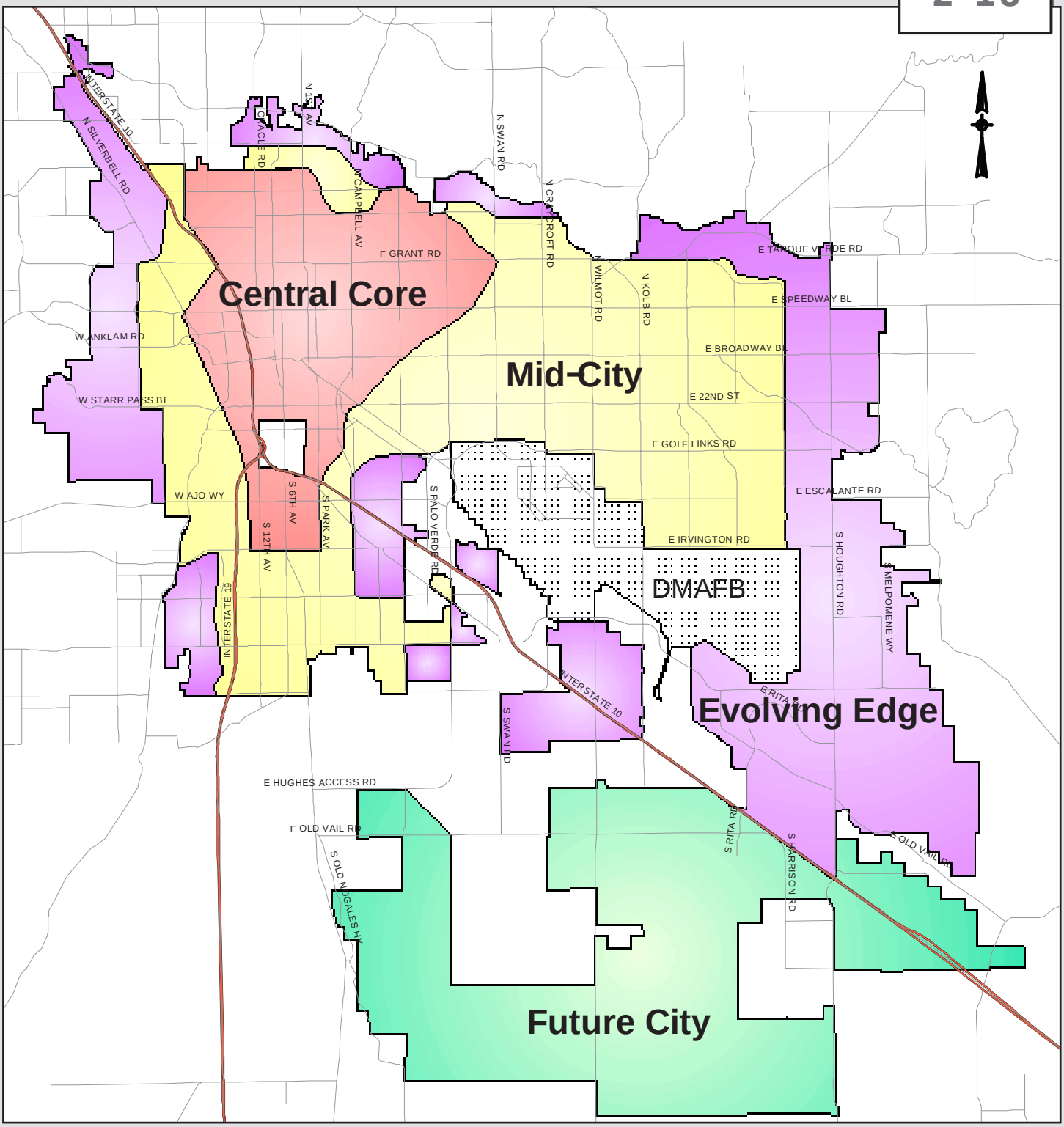
The Airport's unincorporated properties are largely designated for urban and industrial uses. Parcels along and nearby Nogales Highway and Interstate 10 are classified as "multi-function" corridors, promoting planned and integrated development. The remaining unincorporated parcels in the study area largely consist of medium to high intensity urban uses with some low and medium intensity urban and rural uses in the southern portion of the study area, south of Old Vail Connection Road. Several small linear corridors designated for Resource Transition are also threaded through the areas south of Old Vail Connection Road. Resource Transition lands are lands characterized by environmentally sensitive areas that could be developed provided the approach will sustain the areas ecological linkages.

The Pima County Comprehensive Plan also identifies growth areas. The Airport Growth Area is located northeast of TIA. Growth area policies encourage a mix of uses that will establish a commercial base and create a demand for residential densities that will both foster and support multimodal transportation

opportunities. Residential projects in the growth area should provide a density of not less than eight units per acre within a mixed-use setting, including provisions for a range of housing types, costs and ownership. Commercial projects should support both a local and community-wide customer base. In addition to the Airport Growth Area, the entire City of Tucson is designated as a growth area within Pima County's Comprehensive Plan.

Concurrent with the City of Tucson General Plan update that is nearing completion, a regional planning process called "Imagine Greater Tucson" is also underway, seeking to coordinate the planning policies and strategies of Pima County, the City of Tucson and surrounding municipalities to achieve a common vision for future growth. While the plan will have no authority with respect to development policy, it will document the shared desires and intentions of the citizenry at a regional scale, and ideally will be reflected in the future plan for each respective jurisdiction.

FIGURE
2-18



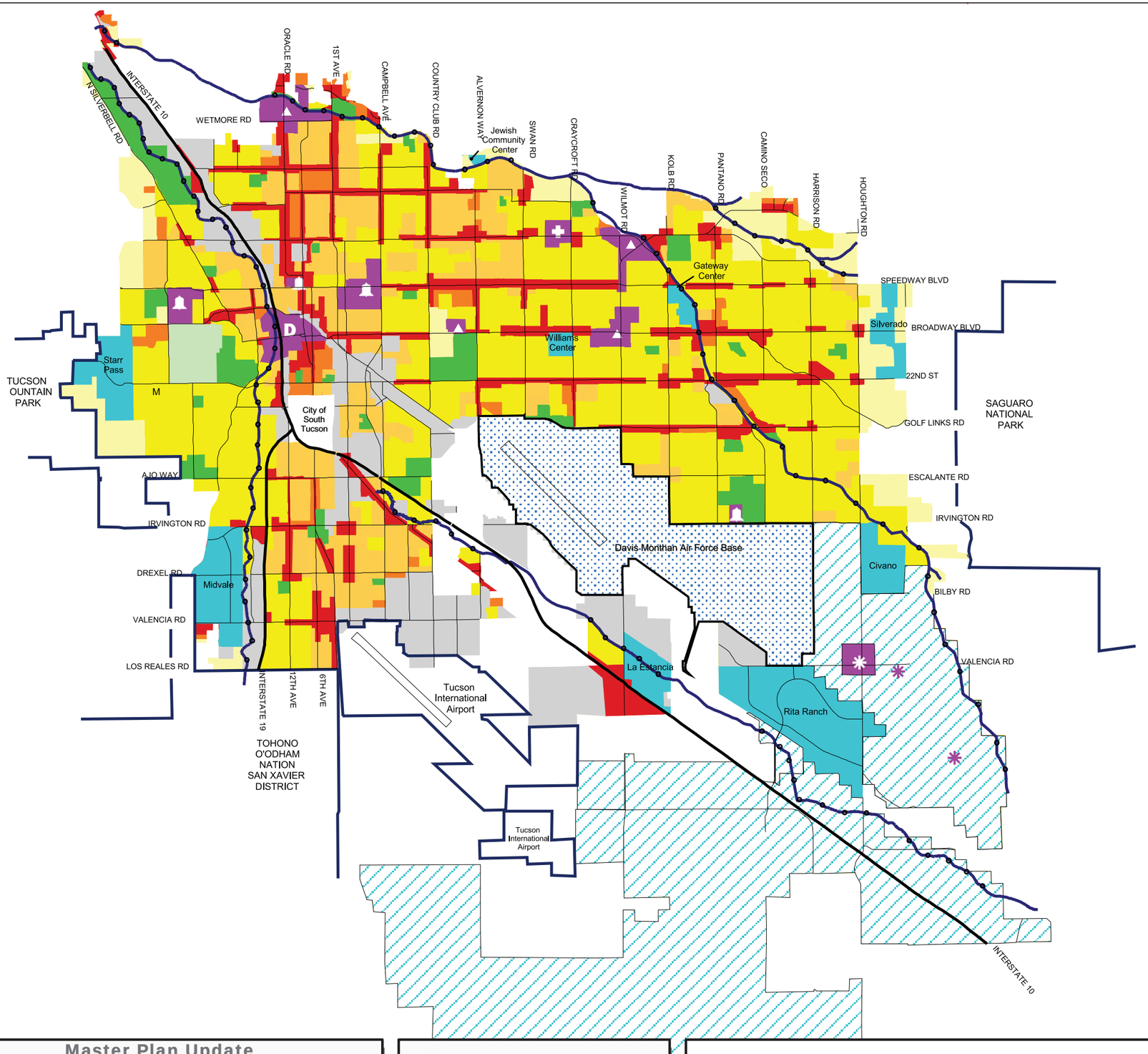
Source: City of Tucson General Plan, 2001

FOR GRAPHICAL DISPLAY PURPOSES ONLY

Master Plan Update

HNTB TUCSON INTERNATIONAL AIRPORT

CITY OF TUCSON 2001 GENERAL PLAN GROWTH AREAS



LEGEND

- Rural Character
- Suburban Character
- Mid-Urban Character
- Urban Character
- Mixed Use Character
- Activity Centers
- Industrial
- Existing Master Planned Communities
- Master Planning Areas
- Park
- Future River Park System
- Tumamoc Hill Environmental Study Area
- Davis Montham Air Force Base

1 0 1 2 Miles

Source: City of Tucson General Plan, 2001

Master Plan Update

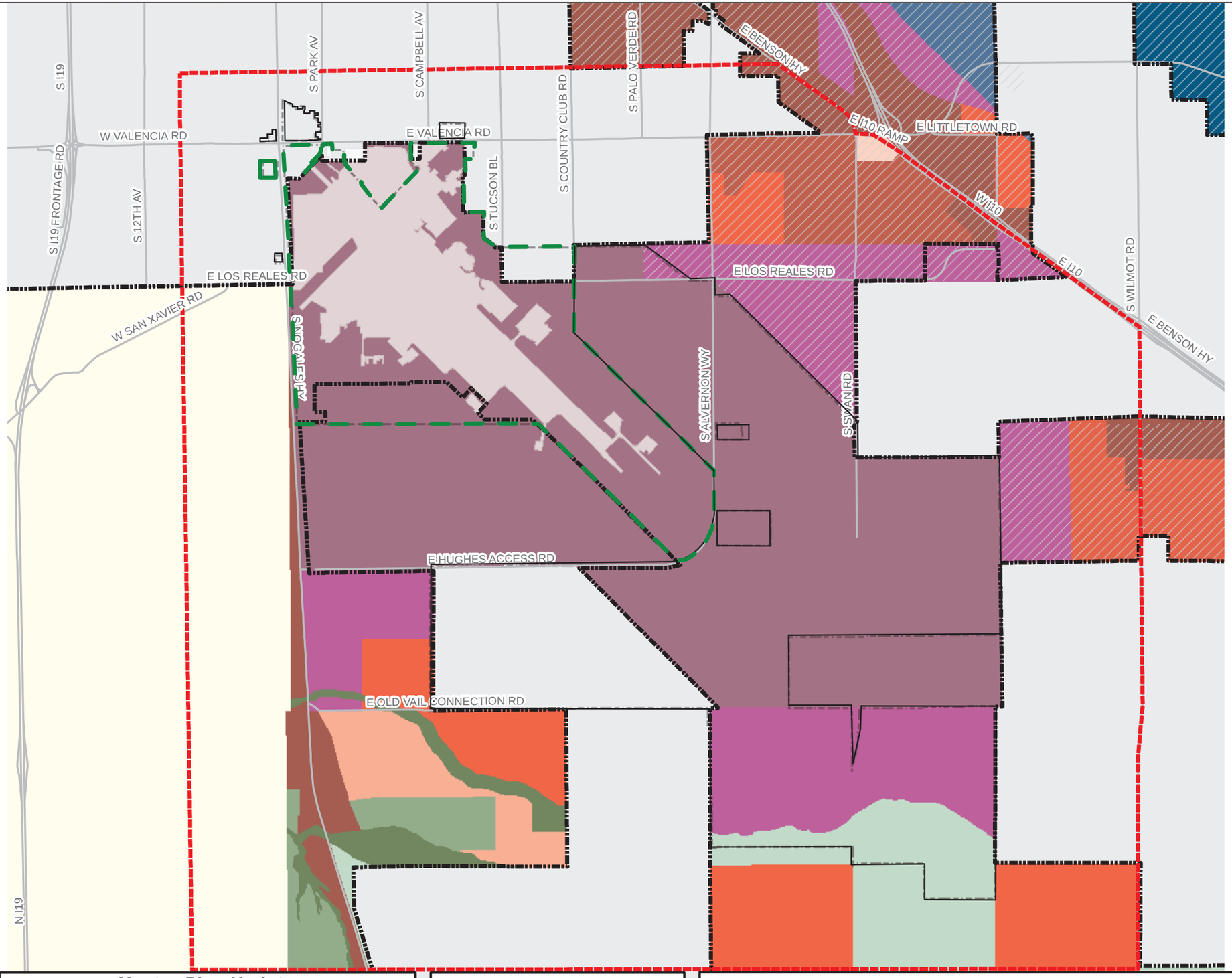
HNTB

TUCSON INTERNATIONAL AIRPORT

DATE: February, 2013

CITY OF TUCSON GENERALIZED DISTRIBUTION OF LAND USE PATTERNS

FIGURE 2-19



LEGEND

- City of Tucson
- Major Streets
- Primary Land
- Reserve Land
- Urban Land Context
- Airfield

Pima County Comprehensive Plan Growth Areas

- Airport Growth Area

Pima County Comprehensive Plan Land Use Intensities

- NEIGHBORHOOD ACTIVITY CENTER
- LOW INTENSITY URBAN 3.0
- MEDIUM INTENSITY URBAN
- MEDIUM HIGH INTENSITY URBAN
- HIGH INTENSITY URBAN
- MULTIFUNCTIONAL CORRIDOR
- LOW INTENSITY RURAL
- MEDIUM INTENSITY RURAL
- RESOURCE TRANSITION
- MILITARY AIRPORT
- URBAN INDUSTRIAL
- HEAVY INDUSTRIAL
- SAN XAVIER DIST-TOHONO O'ODHAM
- CITY OF TUCSON

0 0.5 1 Miles

Source: Pima County Comprehensive Plan, 2001

Master Plan Update

HNTB

TUCSON INTERNATIONAL AIRPORT

DATE: February, 2013

PIMA COUNTY COMPREHENSIVE LAND USE PLAN

FIGURE 2-20

2.17 EXISTING AND PLANNED AIRPORT ACCESS SYSTEM

The existing off-Airport transportation network and future transportation improvement initiatives will serve as a strong influence on opportunities for development at TIA and in the Urban Land Context. This section summarizes key information regarding the current transportation network and pending or proposed mobility improvements. It is intended to provide a general understanding of transportation considerations that are most relevant to the development of alternative scenarios.

2.17.1 Existing Off-Airport Airport Access and Roadway System

Vehicular Access / Roadways

TIA is located in the southern portion of the Tucson metropolitan area, as shown in **Figure 2-21,** south of downtown Tucson and between Interstate 10 (I-10) and Interstate 19 (I-19). The majority of the passengers who utilize TIA today originate their vehicular trips from the Tucson metropolitan area north of TIA. Currently, the most direct access to TIA from the metropolitan area is achieved via surface streets. Valencia Road and Tucson Boulevard are six-lane collectors that provide the most direct public surface street access to the TIA passenger terminal complex. Tucson Boulevard, with its access to the passenger terminal, is designated a National Highway System intermodal connector. Plumer Avenue provides access to the TAA administrative offices and remaining general aviation areas. Other public access routes include Country Club Road and Craycroft Road from Interstate 10 (I-10).

The main public entrance to TIA is on Tucson Boulevard. From downtown Tucson, located approximately 8 miles north / northwest of TIA, access is provided along a route comprising Campbell Avenue, Kino Parkway, Benson Highway, and Tucson Boulevard. From the midtown area, access is provided along a route comprising Alvernon Way, Palo Verde Road, Valencia Road, and Tucson Boulevard. From the east, access is provided along a route comprising Kolb Road, located to the east of Davis Monthan Air Force Base, Valencia Road, and Tucson Boulevard. From the southeast and Eastern Arizona, access is provided along a route comprising Interstate 10 (I-10), E Valencia Road, and Tucson Boulevard. From the northwest, access is provided along a route comprising I-10, Kino Parkway, and Tucson Boulevard. Finally, although not part of the Tucson metropolitan area, access from the south is provided along a route comprising Interstate 19 (I-19), Valencia Road, and Tucson Boulevard. All access routes to TIA are shown in **Figure 2-21**.

Today, the transportation network is more developed and complete north of TIA. Improvements to roads that link the region to the Airport are planned and in various stages of development.

Freight Access / Rail

As described in the *2009 Tucson Regional Inland Port Strategic Implementation Plan*[2], freight-related infrastructure in the region encompasses highways and railways, as well as air cargo transport:

Highways: The east-west Interstate 10 corridor has the heaviest truck volumes in Tucson, peaking at 19,000 trucks per day. For comparison, Interstate 19 averages approximately 4,000 trucks per day along the majority of its length. Current planning initiatives related to U.S.-Mexico trucking, however, seek to

[2] Tucson Regional Inland Port Strategic Implementation Plan: Appendix (pages 30-33). Transystems, March 2009.

support significantly higher truck volumes in the future between Nogales, Mexico and destinations in the Sun Corridor, including Tucson, utilizing Interstate 19 to Nogales.

Railways: Up to 45 trains per day travel along the Union Pacific (UP) Sunset Route, which includes UP's intermodal service between Long Beach, CA and El Paso, TX (source: Federal Railroad Administration). As many as 12 trains per day travel along the UP route through Nogales located at the U.S.-Mexico border, traversing the study area along the western edge of TIA directly adjacent to Nogales Highway on the east.

The Port of Tucson provides intermodal service for the region, and is located along the UP Sunset Route northwest of TIA, between Wilmot and Kolb. The Port of Tucson is a 264-acre rail facility with expansion capability. It provides a wide variety of rail oriented transportation options, including intermodal container handling, boxcar access, and team track. The UP currently has a classification yard in downtown Tucson, the Pacific Fruit Express yard.

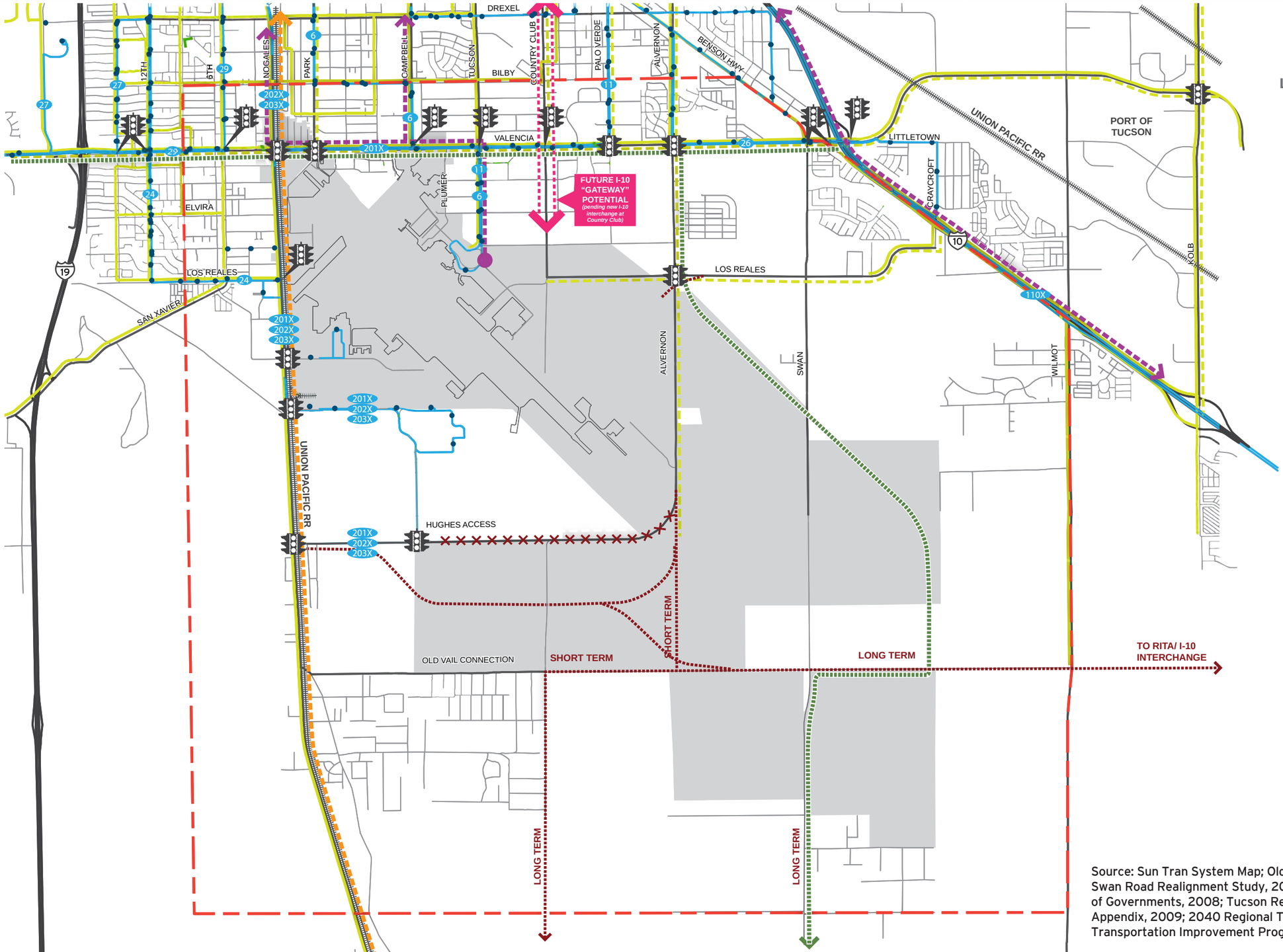
Air Cargo: Air cargo facilities include more than 56,000 gross square feet at TIA. Domestic freight service is provided by FedEx to Memphis. The main landside access road to the cargo facility is via Country Club Road. Tucson is not served by international cargo service.

Public Transportation Access / Transit

Transit service to TIA is provided by Sun Tran, a transit provider serving the Tucson metropolitan area providing bus and shuttle service. Sun Tran provides transit service via two routes (Routes 6 and 11) every half-hour on weekdays and every hour on weekends to and from TIA. These routes continue north toward downtown Tucson on either Campbell Avenue or Palo Verde Road. Valencia Road is a key east-west cross-town route, while other bus routes serve the Sunnyside and Elvira residential neighborhoods. The Sun Tran transit stop is located on the sidewalk directly west of the terminal just before the start of the curbside area on the upper level roadway. A total of two bus stalls are provided that use Tucson Blvd and Valencia Road.

Four additional routes provide access to industrial areas south of TIA, with a stop located at the Bombardier and Raytheon Missile Systems facilities via Aero Park Boulevard (Routes 421, 201X, 202X, and 203X). Service is provided primarily approximately every hour during morning and afternoons on weekdays with the exception of Route 421, which provides shuttle service to TIA on Saturdays. These routes connect the employment center to residential areas in the Tucson area. The three express routes utilize Hughes Access Road. Bus and express routes will require adjustment if Hughes Access Road is closed to the general public to facilitate Aerospace and Defense Corridor plans.

Amtrak provides intercity rail service on the UP Sunset Route, parallel to and east of Interstate 10. Tucson has a passenger train station located downtown where Tucson passengers originate and terminate their Amtrak rail trips.



LEGEND

- Study Area
- Airport Property
- Freeway
- Major Street
- Minor Street
- Existing Traffic Signal
- Existing Freight Rail
- Long-Term Parkway Improvements (per 2040 RTP)
- Proposed New Roadway Alignment
- Proposed Roadway Abandonment or Private Use
- Existing Bus Route
- Existing Bus Stop
- Proposed Fixed Route Transit Service (BRT, later upgraded to LRT, per 2040 RTP)
- Proposed Commuter/ Intercity Rail Service (CRT or HSR, per High Capacity Transit Plan)
- Existing On-Street Bike Route (Signed On-street)
- Proposed New/ Upgraded Bike Route (per 2040 RTP)

Source: Sun Tran System Map; Old Vail Road Connection Study, March 2011; Alvernon Way / Swan Road Realignment Study, 2008; Southeast Regional Arterial Study, Pima Association of Governments, 2008; Tucson Regional Inland Port Strategic Implementation Plan: Appendix, 2009; 2040 Regional Transportation Plan; 2011 - 2015 TIP: 5 Year Transportation Improvement Program, 2010

Master Plan Update

HNTB

TUCSON INTERNATIONAL AIRPORT

DATE: February, 2013

TRANSPORTATION FRAMEWORK

FIGURE 2-21

2.17.2 Pending and Planned Improvements

Transportation planning for the area surrounding TIA is undertaken by the City of Tucson, Pima County, and the Pima Association of Governments (PAG). PAG is the metropolitan planning organization (MPO) that coordinates development of a long-range regional transportation plan (RTP) which secures federal funding, and maintains a five-year transportation improvement plan (TIP) to allocate the funding.

As depicted in **Figure 2-21**, several transportation-related improvements that would impact the airport area are identified in the current 2040 RTP. Several of these have been allocated funding in the current 2011-2015 TIP[3], while others are considered long-term recommendations for which funding and an implementation timeframe have yet to be determined. In particular, extensions to the arterial roadway system are being planned for the short-term which would result in "leading" development on undeveloped lands south and east of the airport. North of TIA, plans to expand and enhance public transportation access to better link TIA to downtown Tucson and other metropolitan destinations are emerging.

Vehicular Access / Roadways

Key roadway improvements recommended in the TIP and/or RTP are summarized below (freight, transit and non-motorized improvements are discussed separately).

Valencia Road Improvements: "Parkway" improvements along Valencia Road from Interstate 19 to Interstate 10 are recommended in the 2040 RTP, along with similar improvements extending south on the realigned Alvernon Way / Swan Road, but funding for these improvements has not been secured. It will be equally important to consider aesthetic and urban design enhancements along a widened and upgraded Country Club Road alignment in the future, as both corridors will serve as gateway entrance routes into the Airport in the future.

Aerospace and Defense Corridor (ADC): This initiative is a coordinated effort of the City of Tucson, Pima County, TAA and Raytheon Missile Systems to protect existing aerospace and defense industries and foster future aerospace and defense expansion. The proposed ADC would require abandonment of Hughes Access Road and, minimally, replacement of three miles of Old Vail Connection Road between Nogales Highway and the (currently unimproved) Alvernon Way alignment, as well as improvements to the one-mile Alvernon Way alignment (1 mile) between Old Vail Connection Road and the current transition of Hughes Access Road and Alvernon Way. ADC planning builds upon the Alvernon/ Swan realignment and Old Vail Connection studies described below, and will directly affect large parcel planning in the Reserve Land Area.

Alvernon Way / South Swan Road Realignment Study[4]: The Alvernon Way / South Swan Road Realignment Study generally reflect the longstanding concept that was developed in 2008 in response to TIA's long-term airfield plan. This project would require improvements to five miles of the Old Vail Connection Road alignment between Nogales Highway and the (currently unimproved) Craycroft Road

[3] 2011-2015 TIP: 5-Year Transportation Improvement Program. Pima Association of Governments. Adopted May 27, 2010.

[4] Alvernon Way / Swan Road Realignment Study. Kimley-Horn and Associates, Inc. October 2008.

alignment, as well as a new parkway (4 miles in length) that would connect the Old Vail Connection Road improvement at Craycroft Road to the current intersection of Los Reales Road and Alvernon Way.

Old Vail Connection Road Study[5]: This Study examined in more detail the alternatives for upgrading Old Vail Connection Road and extending it further east, eventually connecting Nogales Highway to Interstate 10 at the Rita Road interchange (a nine-mile corridor). This more complete east-west connection would support broader economic development goals for a larger Aerospace and Defense Corridor, beyond the more immediate need to provide an alternative to Hughes Access Road due to the planned Raytheon facility expansion.

Southeast Regional Arterial Study[6]: Both the Old Vail Road and Alvernon Way studies build upon general recommendations contained in this 2006 report, which also proposed long term extensions of both Swan Road and the Country Club Road alignment further south from Old Vail Connection Road to facilitate anticipated growth demands extending south, including better connections to the Town of Sahuarita.

Freight Access / Rail

Building on the "Building a Quality Arizona" (bqAZ) initiative[7] involving statewide MPOs and Councils of Governments COGs, the *Statewide Rail Framework* developed by ADOT in 2010 highlights the importance of Tucson within the national freight rail network, and the opportunities to increase freight volume and associated intermodal business opportunities due to proximity to Mexico. Planning recommendations related to freight movement include the following:

Inland Port Strategic Implementation Plan[8]: One of Tucson's leading opportunities is its "prime location on major trade corridors including its rail and road connectivity to Mexico as well as its proximity to major markets. This gives Tucson a distinct opportunity to grow its international and domestic trade capacities. Balancing out the disproportionate inbound/outbound traffic is also a way that Tucson could capitalize on its prime location on major trade corridors."

Port of Tucson: In addition to intermodal container handling, the Port of Tucson plans to expand to provide the following services: Intermodal Team Track Services, Rail Spur to Truck Cross-docking, Transload / Reload services, Container-Yard Storage, Leased Warehouse Space, Frozen Storage, and Build to suit Warehousing. Constructing a rail spur across Kolb Road will allow the Port of Tucson to significantly increase in size in the future.

Freight Transportation Framework Study: A freight transportation framework study is being undertaken to develop a more detailed strategy for capturing additional intermodal business activity in the Sun Corridor. PAG and its two neighboring COGs (Maricopa Association of Governments [MAG] and Central Arizona Council of Governments [CAAG]) are seeking to identify and develop freight-

[5] Old Vail Connection Road Study. Kimley-Horn and Associates, Inc. June 2011.
[6] Southeast Regional Arterial Study. Pima Association of Governments. September 2006.
[7] www.bqaz.org
[8] Tucson Regional Inland Port Strategic Implementation Plan: Appendix (pages 30-33). Transystems. March 2009.

related economic development opportunities and increase mobility and access for freight movements throughout the Sun Corridor. In addition, the Southern Arizona Logistics Education Organization (SALEO) is conducting a U.S.-Mexico trucking pilot program providing support for Mexico-based truck traffic entering the U.S. at Nogales.

I-10 Bypass Study: In support of overall Sun Corridor economic development planning a bypass study was conducted which recommended that over the very long-term, a bypass route running west and south of Tucson be constructed to streamline truck freight movement around the metropolitan area.

Deep Port Activity in Mexico: Long-term initiatives to expand the capacity for deep port activity in Mexico, by improvements to the existing Port of Guaymas and/or creation of a new port at Punta Colonet, could increase the demand for intermodal activity and/or customs processing at and near TIA. Mexico has designated their segment of the CANAMEX rail corridor as the "Guaymas-Arizona Multimodal Corridor" and conducted a logistics study that reinforces the importance of increasing capacity at the Port of Guaymas and relying on additional customs processing capacity in Tucson to supplement existing capacity in Nogales.

Public Transportation Access / Transit

2040 RTP: 2040 RTP transit-related recommendations, as generally depicted in the Transportation Framework map, include expanding beyond the traditional fixed route bus service currently provided by Sun Tran in several ways:

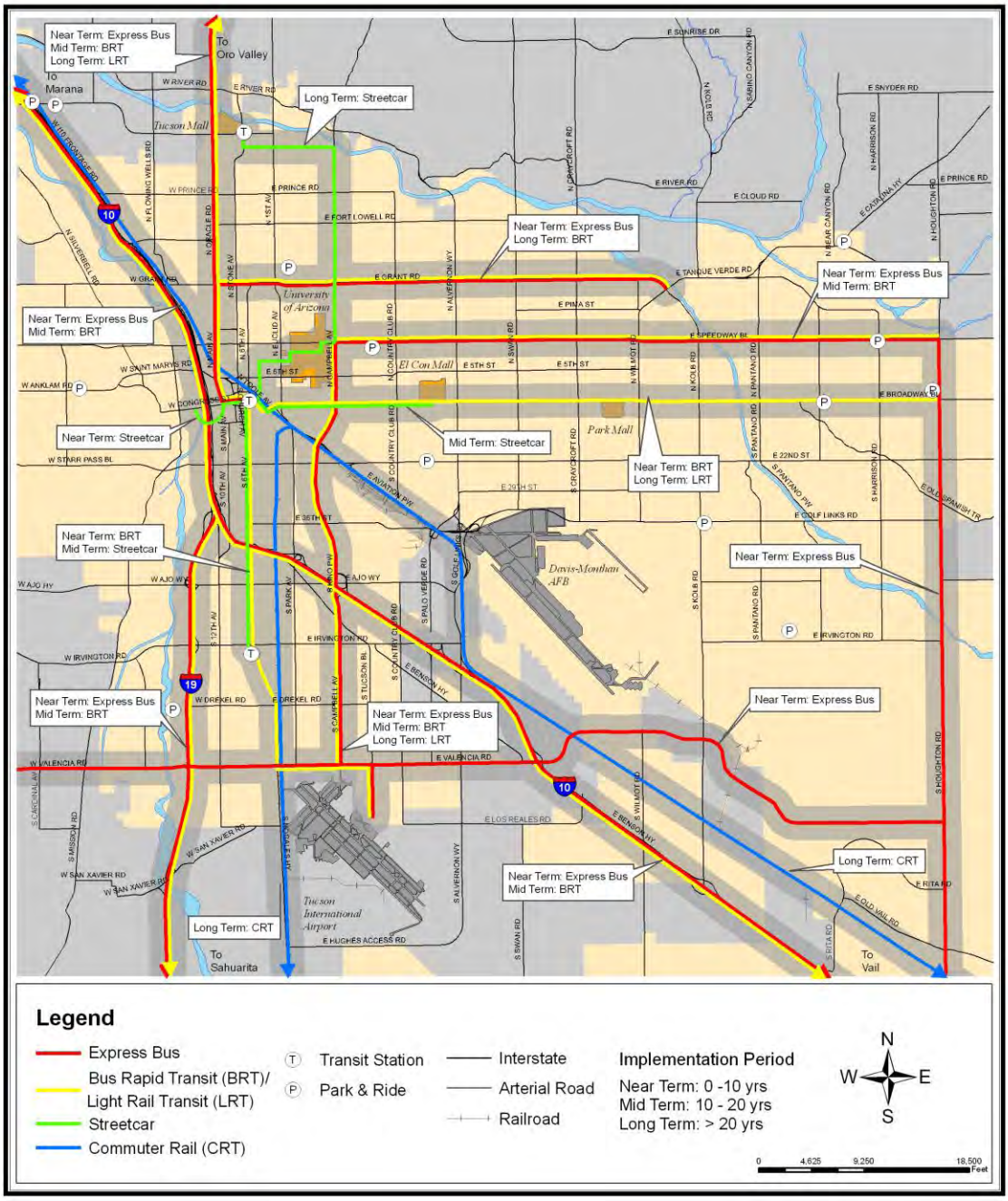
- Cross-town express bus service would be provided on Valencia Road during peak travel periods.

- Bus rapid transit (BRT) service would be provided on Valencia Road, 6th Avenue, Campbell Road, and Nogales Highway with an eventual upgrade of some portions to light rail transit (LRT), with a focus on improving mobility between the downtown area and the Airport. Additional BRT routes that would likely remain BRT are also being considered on existing bus alignments that would support additional ridership capacity. These recommendations were developed in more detail in the *High Capacity Transit System Plan* developed by PAG in 2009.

- The *2009 PAG High Capacity Transit Implementation Plan* transit-related recommendations, as depicted in **Figure 2-22**, include commuter rail transit (CRT) along the UP freight rail line adjacent to Nogales Highway, and LRT, BRT and/or express bus services along Valencia and connecting to the TIA terminal area from the north.

Intercity Rail Study: The Intercity Rail Study is currently underway by ADOT, is investigating alternatives for a CRT connection between Tucson and Phoenix, within the broader context of eventually connecting the entire Sun Corridor with high-speed intercity rail service (HSR). The *2010 Statewide Rail Framework Study*, also prepared by ADOT, identified this effort as incremental, with the highest priority being the connection between Tucson and Phoenix. The *High Capacity Transit Plan* recommended that CRT be provided to connect Tucson south to Vail, Sahuarita and Vail, with incremental implementation of BRT service prior to fixed guideway service. While the Intercity Rail Study is ongoing, all alternative routes being considered include a segment along Nogales Highway and a station stop to serve TIA.

Figure 2-22: High Capacity Transit Implementation Plan



Source: Pima County Association of Governments

Airport Gateway Corridors

Ideally, the arrival routes to the airport would present a vibrant, attractive and strong business investment presence. While portions of corridors in the Urban Land Context do, such as the eastern segment of Valencia Road and, and Tucson Boulevard south of Valencia Road, most other corridor entryways do not create a positive sense of arrival to the Airport. **Figure 2-23** shows the Tucson Airport Gateway Corridors, the main arrival approaches to TIA.

2.17.3 Summary of Off-Airport Transportation Planning Considerations

With respect to transportation issues, the key transportation planning considerations that will inform development of alternative scenarios in the next step include:

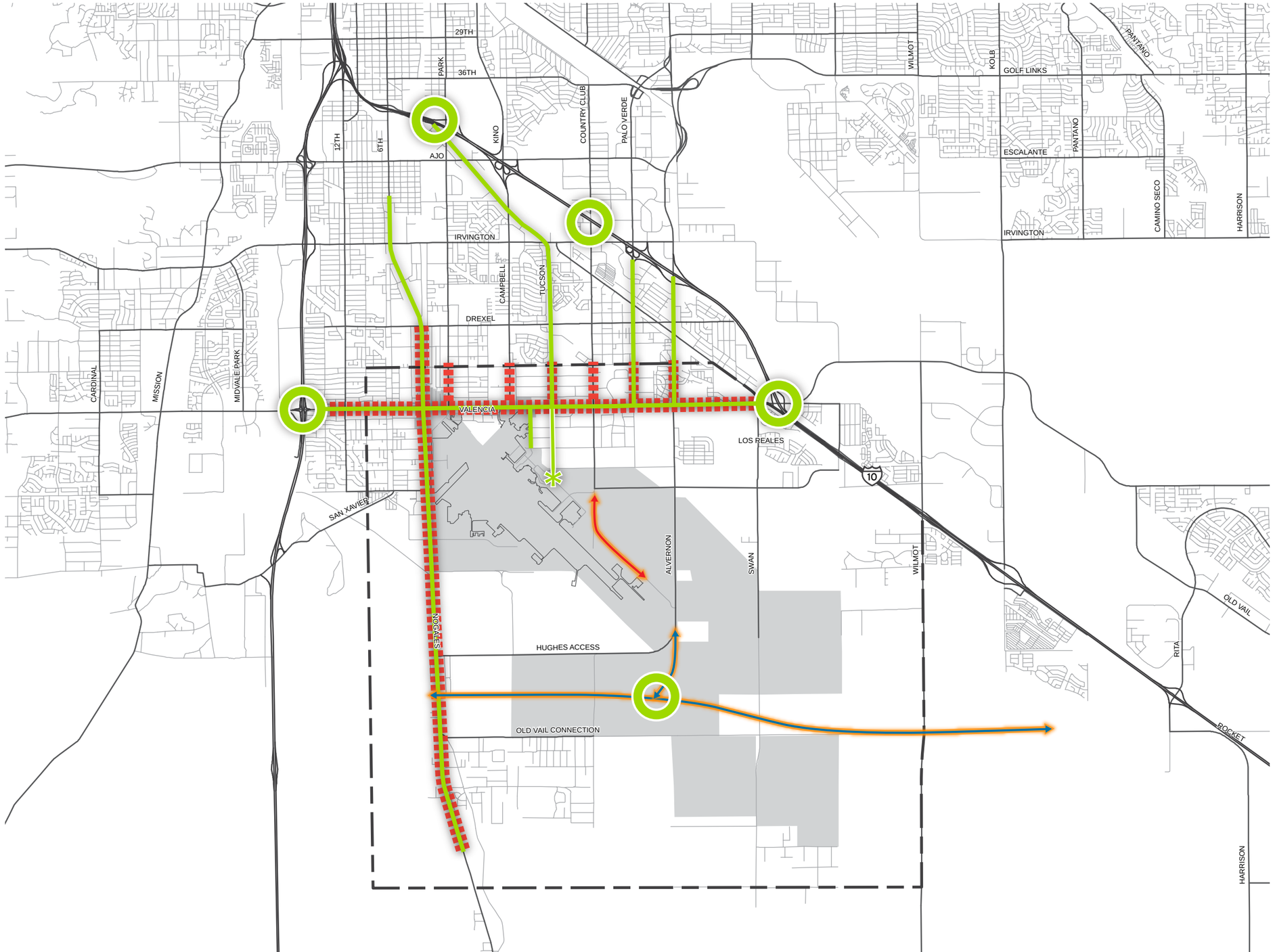
Vehicular Access: Improvements to airport approach routes will be critical to establishing a coordinated image, and for ease of wayfinding. Proposed "parkway" improvements along Valencia Road, and the implications of the planned interchange at Interstate 10 and Country Club Road, are important opportunities for coordinated improvements to public rights-of-way surrounding and leading to the Airport that will both improve airport access and support associated development.

Freight Access: Valencia Road, a "regional freight corridor of significance" must continue to provide access to industrial and office uses in the Airport area, in addition to supporting commercial uses and accommodating additional forms of public transportation in the future. While long-term regional planning related to the Interstate 10 Bypass and increased reliance on rail for freight movement have implications for future truck traffic levels on Valencia Road, it will continue to be a critical truck route. Access from the UP Railroad to the airfield and to development sites to the south of the Airport will also be critical considerations to support intermodal activity.

Public Transportation Access: Increasing public transportation options is a consideration not just for future terminal access, but for support of nearby business opportunities and the ability to provide a catalyst for increased and more accessible retail and services that can enhance the quality of life in nearby neighborhoods. Long-term planning for CRT or HSR on the UP Railroad also suggest that, in the future, connections between the terminal area and the Nogales Highway frontage will become important considerations, even though they are beyond the immediate planning time horizon.

Non-Motorized Transportation Access: Wherever feasible, in light of other considerations related to airport access and security, plans for regional trail network expansion should be supported and accommodated in the area surrounding the airport as additional development occurs.

In the next step of the planning process, opportunities and limitations with regard to connecting and accessing potential development sites in the Airport Land and Urban Land Context areas will be assessed in more detail, based on the current and proposed future transportation system.



LEGEND

- MAJOR AIRPORT APPROACH ROUTE
- KEY COMMERCIAL CORRIDOR IMPROVEMENT AREAS
- KEY INTERCHANGE ACCESS
- TIA TERMINAL
- PROPOSED COUNTY AEROSPACE / DEFENSE CORRIDOR ROADWAYS
- PROPOSED INDUSTRIAL AVIATION BYPASS

Master Plan Update

HNTB

TUCSON INTERNATIONAL AIRPORT

NOT TO SCALE

DATE: February, 2013

TIA GATEWAY CORRIDORS

FIGURE 2-23

2.18 ENVIRONMENTAL SETTING

This section summarizes the environmental factors that will be considered in determining airport requirements and evaluating alternative development options.

2.18.1 Air Quality

Federal ambient air quality standards are established under the 1990 Clean Air Act by the Environmental Protection Agency (EPA). The EPA has established National Ambient Air Quality Standards (NAAQS) for ambient (i.e., outdoor) concentrations of the following six criteria pollutants: Carbon Monoxide (CO), Nitrogen Dioxide (NO2), Ozone (ground-level O3), Sulfur Dioxide (SO2), Lead (Pb), particulate matter with a diameter of 10 microns or less (PM_{10}) and particulate matter with a diameter of 2.5 microns or less ($PM_{2.5}$).

Per the Clean Air Act, states are required to develop a State Implementation Plan (SIP) to achieve national ambient air quality standards. The Tucson Air Planning area is currently in attainment for all "criteria" pollutants except for particulate matter less than 10 microns in diameter (PM_{10}).

2.18.2 Noise

TIA has a Federal Aviation Regulation (FAR) Part 150 Airport Noise Compatibility Plan (Part 150 NCP) which was approved by the FAA in 1991 and updated in 2013.

The regulations contained in Part 150 NCP are voluntary. However, many airport operators pursue them as they are the primary vehicle for gaining approval of applications for Federal grants for noise abatement projects (e.g. for land acquisition and sound insulation aimed at reducing significant aircraft noise exposures to residential and noise-sensitive areas in the airport environment), and provide the required analyses for evaluating the impacts of any proposed constraints upon an airport's operations.

The Part 150 Study includes the development of existing and future noise exposure maps, noise mitigation strategies, and guidelines mitigate incompatible land uses. Sources of aircraft noise, or unwanted sound, include sound produced during take-offs, engine run-ups, landings, and overflights. At TIA the noise impact to the community are depicted graphically as noise contours and are determined based on the ambient noise generated from the total number of and types of aircraft operations.

Sound exposure is typically expressed in units of decibels (dB). However, because people perceive the "loudness" of sound levels or energy differently, based on their proximity to sound, duration they are exposed, and their overall sensitivity to sound, noise generated by aircraft or noise incompatibilities, are generally defined as residences or public use noise-sensitive facilities (libraries, churches, schools, nursing homes, and hospitals) within the 65 Day-Night Average Sound Level (DNL or Ldn) noise contour. In general, the noise contours have decreased in size over the past two decades primarily due to the transition to newer and quieter aircraft.

2.18.3 Biotic Resources

Wildlife and Habitat / Threatened and Endangered Species

TIA has a riparian corridor that crosses the property from the northwest to southeast. This riparian corridor is home to a variety of wildlife species, such as migratory birds that use the corridor as a nesting ground or movement corridor, and vegetation or plant species. Wildlife and plants, some of which are endangered or protected, found on TIA property are listed below.

The following vegetative species could occur on airport property:

- Pima pineapple cactus:
  - Endangered under US Endangered Species Act; highly safeguarded under Arizona Native Plant Law
- Tumamoc globeberry
  - Salvage restricted under the Arizona Native Plan Law

The following wildlife (non-bird species) could occur on airport property:

- Black-tailed jack rabbit
- Coyote
- Desert cottontail
- Javelina
- Mule deer
- Round-tailed ground squirrel
- White-throated wood rat
- Mirriam's mouse
- Tucson shovel-nosed snake

The following bird species (both game and non-game) could occur on airport property:

- American kestrel
- Burrowing owl
- Gambel's quail
- Rufous-winged sparrow
  - Protected by the Migratory Bird Treaty Act
- Great-horned owl
- Cactus ferrunginous pygmy owl
  - Protected by the Migratory Bird Treaty Act
- Western burrowing owl
  - Protected by the Migratory Bird Treaty Act
- Mourning dove
- Red-tailed hawk
- Turkey vulture
- Lesser long-nosed bat
  - Endangered under US Endangered Species Act
- Western red bat
- Western yellow bat

With regards to wildlife and habitat areas, while lands further south of the Study Area include significant concentrations of protected wildlife and habitat, there are no other conservation lands identified by the Sonoran Desert Conservation Plan (SDCP). **Figure 2-24**, illustrates Sonoran Desert Conservation zones for the Land Use Study Area. The SDCP Riparian areas have also been classified by the Pima County Regional Flood Control District (RFCD) as Important Riparian Areas, which are considered Regulated Riparian Habitat (RRH) subject to mitigation requirements detailed in the 2009 Regulated Riparian Habitat Mitigation Standards and Implementation Guidelines. Any disturbance to RRH triggers review by the RFCD and mitigation plans when the disturbance is greater than one-third of an acre. In addition to the IRA classified by the RFCD, other classes of RRH are present throughout the Land Use Study Area, the most significant of which is Hydroriparian and Mesoriparian Habitat H, which is vital to wildlife species and is one of the rarest riparian habitats in Pima County, existing on the airport property east of Alvernon Way and at the southern limit of Country Club Road, as well as along Franco Wash, south of Old Vail Connection Road. The RRH identified by the RFCD also coincides with critical wildlife habitat mapped by the University of Arizona and classified as major segments of riparian habitat not linked with protected areas.

Vegetation

The majority of the Study Area's vegetation consists of tropical-subtropical desert lands, with patches of tropical-subtropical swamp along wash corridors and pockets of warm temperate grasslands scattered throughout the gently sloping valley floor (See **Figure 2-25**). These desert lands coincide with more well-drained hydric soils (Group B), while the tropical-subtropical swamps and riparian corridors correlate to clay soils with low infiltration rates (Group D) and a permanent high water table and high runoff potential (See **Figure 2-26**). The general soil classification (see **Figure 2-27**) for Group A hydric soils include Mohave-Sahuarita-Cave soils, while the Group D soils along the washes consist of Tanque-Riverroad-Arizo-Riggs soils and Pinaleno-Nickel-Palos Verdes. In the development context, well-drained Group B soils are better suited for development and will require fewer modifications than clay-based Group D soils, although the vegetative cover associated with the Group A soils might also be associated with endangered species.

2.18.4 Floodplains / Drainage Basins / Wetlands

TIA property falls inside or is within close proximity to four watersheds, shown in **Figure 2-28**, and all part of the larger Santa Cruz watershed. The Airport Wash Watershed comprises the majority of TIA land and flows from southeast to northwest into the Santa Cruz River. The Airfield Wash Watershed comprises the West Ramp and aeronautical facilities in the southwest quadrant of TIA property. The Lee Moore and Franco Wash Watersheds are both located in the southern half of the Study Area while Hughes Wash and Airport Wash, including its north and south forks, traverse the northern half of the Study Area. Of primary concern at TIA is the Airport Wash Watershed as it includes a 100-year floodplain zone and riparian corridor with intermittent wetland areas.

In June of 2011, new digital Flood Insurance Rate Maps (FIRMs) went into effect for Pima County and are reflected in the Floodplains and Floodways map, as shown in **Figure 2-29**. The FIRMs show that many of the washes in the Study Area are in special flood hazard areas. In the southwest corner of the Study Area, sections of Franco Wash, Summit Wash and Lee Moore Wash are within Zone A. Much of Airport Wash

and its forks are also in Zone A, while northwest of Campbell Avenue the wash is within a floodway in Zone AE, which can be seen in more detail in **Figure 2-30**.

Both publicly and privately owned detention and retention basins are located in the northeast corner of the Study Area. In addition, TIA has on-site detention and retention basins that capture runoff for the airport property with plans for additional basins as facilities are developed as noted in the 2004 Airport Wide Drainage Basin Study.

W VALENCIA RD
E VALENCIA RD
S PARK AV
S CAMPBELL AV
S COUNTRY CLUB RD
S PALO VERDE RD
E LITTLETOWN RD
S 12TH AV
S TUCSON BL
W LOS REALES RD
E LOS REALES RD
S WILMOT RD
S NOGALES HY
S ALVERNON WY
S SWAN RD
E HUGHES ACCESS RD
E OLD VAIL CONNECTION RD
N 19 EXIT 87 ON RAMP
I 19 N
I 19 S

LEGEND

- Urban Land Context
- City of Tucson
- Airfield
- Airport Property / Land
- Major Streets

Wildlife Habitat

- Major Segments of Riparian Habitat Not Linked with Protected Areas
- Other

Sonoran Desert Conservation Plan - Conservation Lands System

- Multiple Use
- Riparian

Regulated Riparian Habitat Classes

- Important Riparian Area IRA
- Hydroriparian and Mesoripirian Habitat H
- Xeroriparian Habitat A
- Xeroriparian Habitat B
- Xeroriparian Habitat C
- Xeroriparian Habitat D

0 0.5 1 Miles

Source: University of Arizona, 1992; Sonoran Desert Conservation Plan, 2001; Pima County, 2005.

Master Plan Update

HNTB

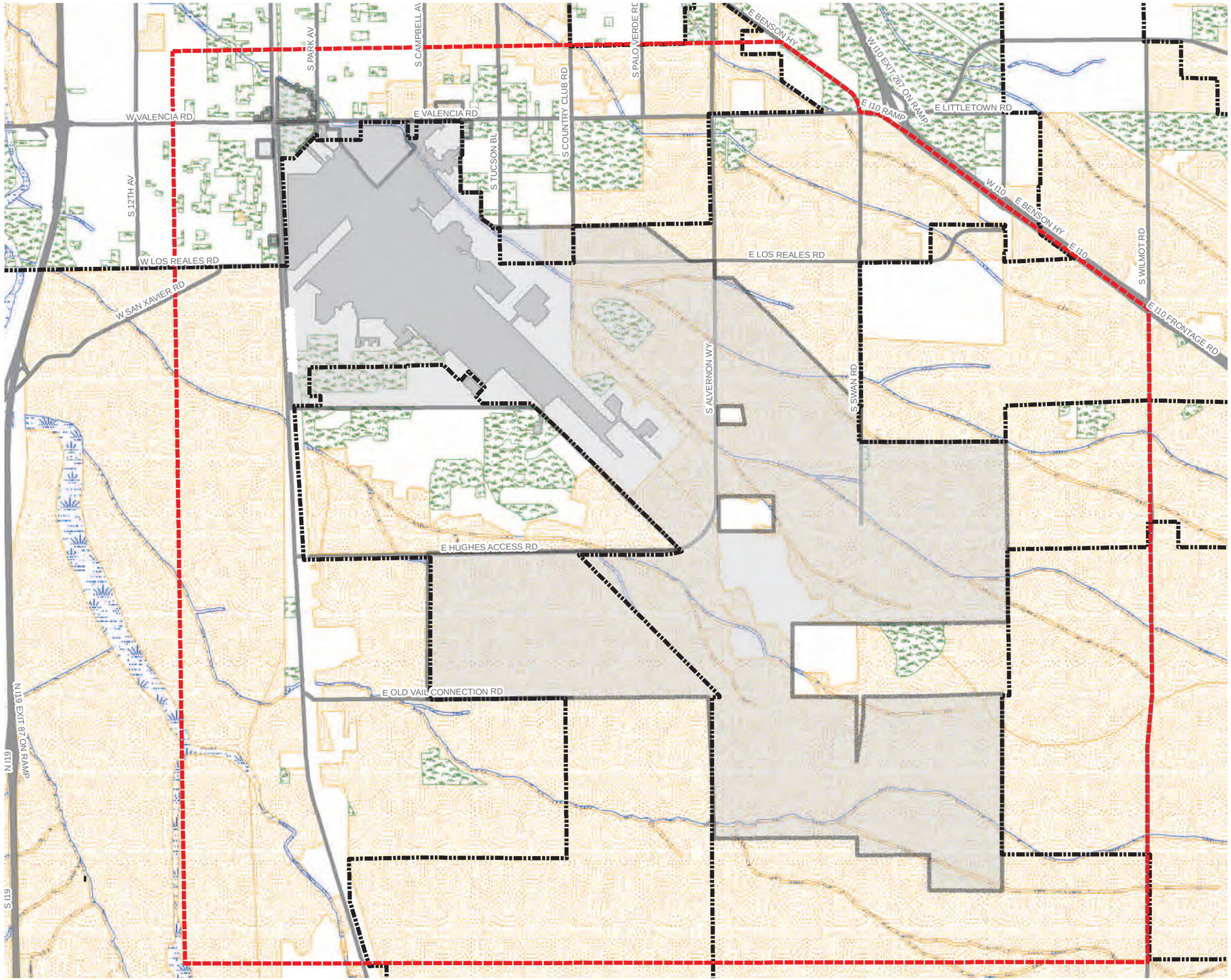
TUCSON INTERNATIONAL AIRPORT

NOT TO SCALE

DATE: February, 2013

CONSERVATION AND HABITAT

FIGURE 2-24



LEGEND

- Urban Land Context
- City of Tucson
- Airfield
- Airport Property / Land
- Major Streets

Vegetation

- Tropical-Subtropical Desertlands
- Tropical-Subtropical Swamp
- Warm Temperate Grasslands

0 0.5 1 Miles

Source: Pima County Wildlife Habitat Inventory, 1995

Master Plan Update

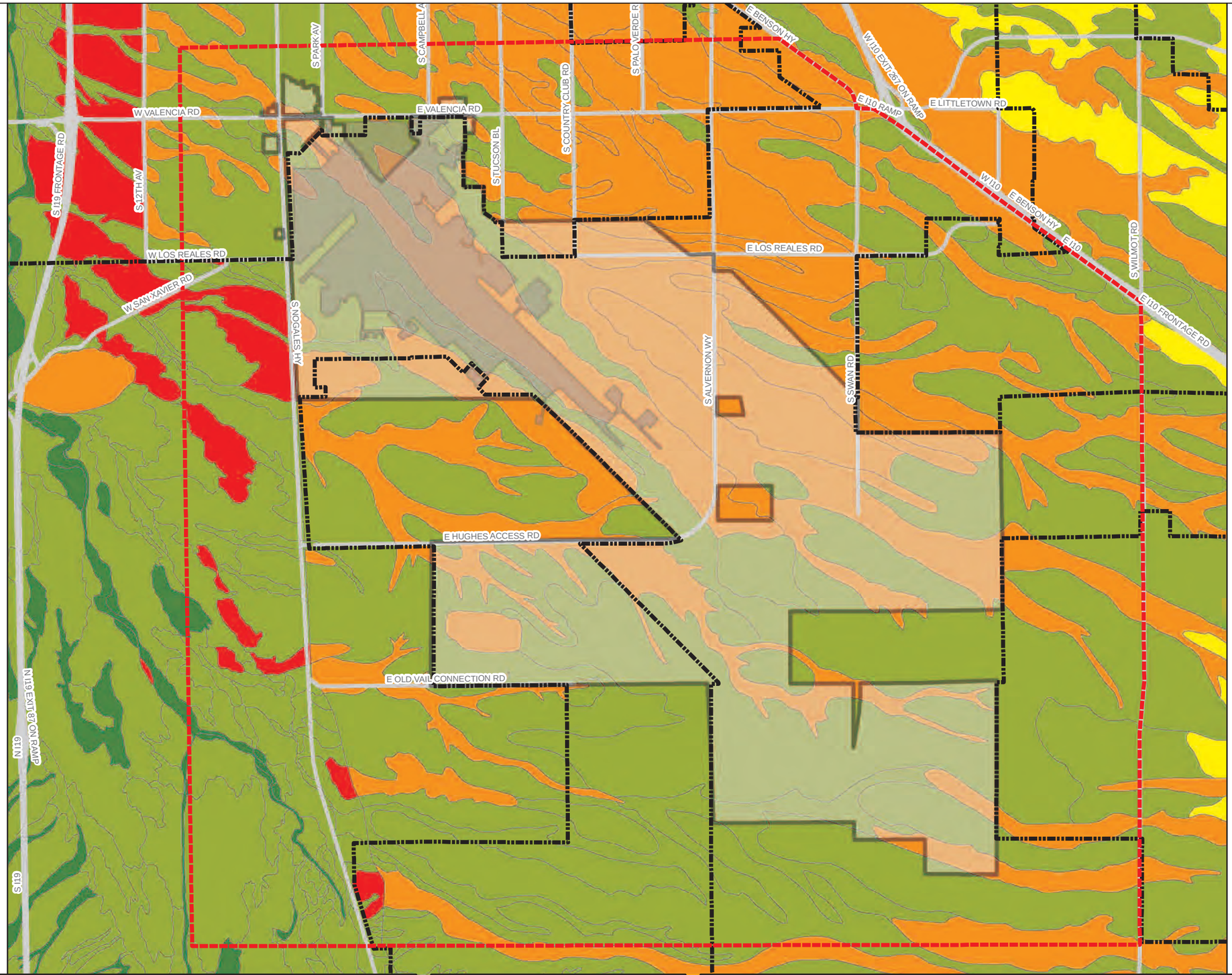
HNTB

TUCSON INTERNATIONAL AIRPORT

DATE: February, 2013

VEGETATION

FIGURE 2-25



LEGEND

- Urban Land Context
- City of Tucson
- Airfield
- Airport Property / Land
- Major Streets

Hydric Soils

- A
- B
- C
- D
- Mixed

0 0.5 1 Miles

Master Plan Update

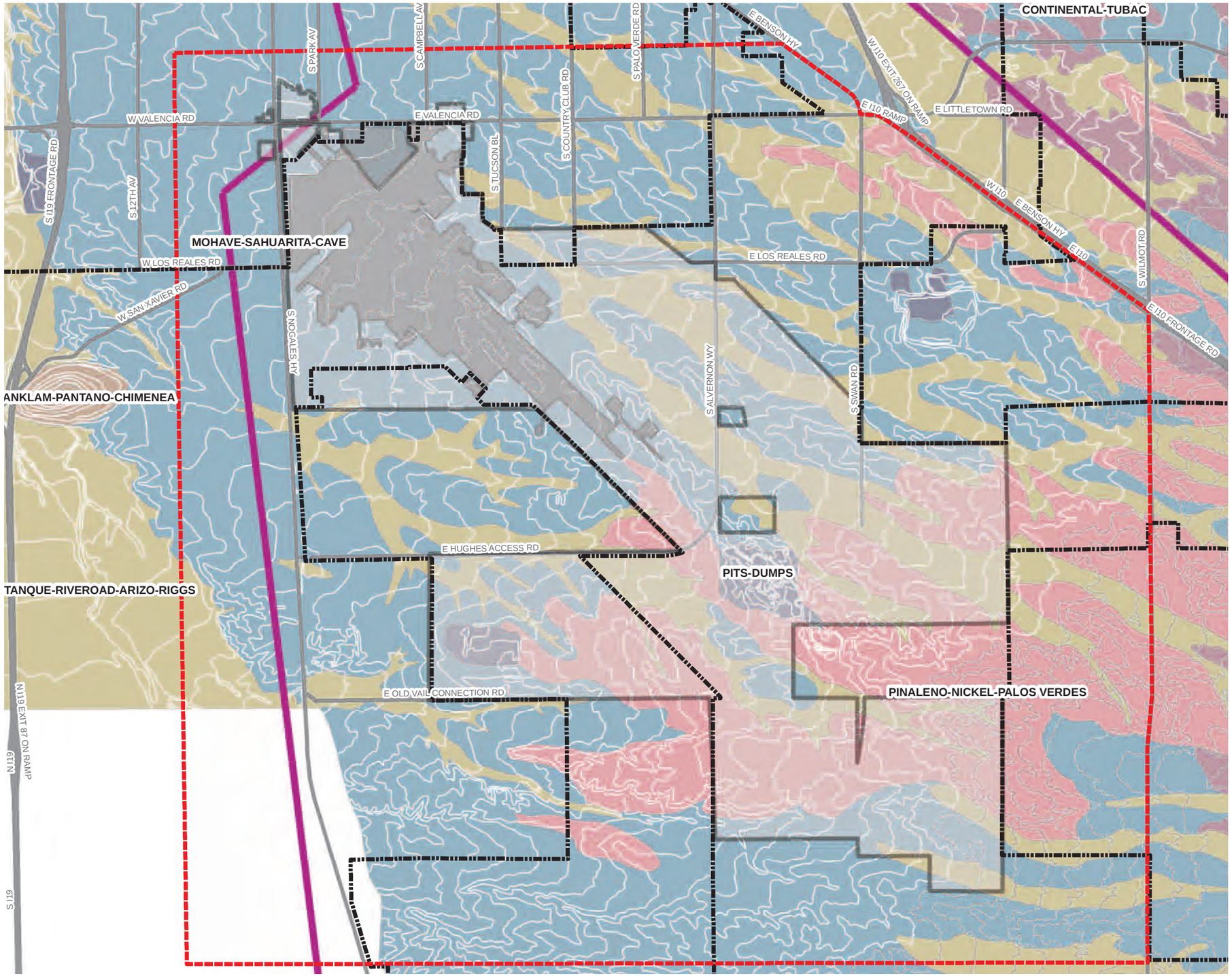
HNTB

TUCSON INTERNATIONAL AIRPORT

DATE: February, 2013

HYDRIC SOILS

FIGURE 2-26



LEGEND

- Urban Land Context
- City of Tucson
- Airfield
- Airport Property / Land
- Major Streets
- Geologic Faults

USGS Topography

- 0 - 2760
- 2761 - 3541
- 3542 - 4400
- 4401 - 5840
- 5841 - 9080

Soils

- ANKLAM-PANTANO-CHIMENEA
- CONTINENTAL-TUBAC
- MOHAVE-SAHUARITA-CAVE
- PINALENO-NICKEL-PALOS VERDES
- PITS-DUMPS
- TANQUE-RIVEROAD-ARIZO-RIGGS

0 0.5 1 Miles

Source: Pima County Soil Conservation Service, 1991; Pima County, 1992; USGS, 1997

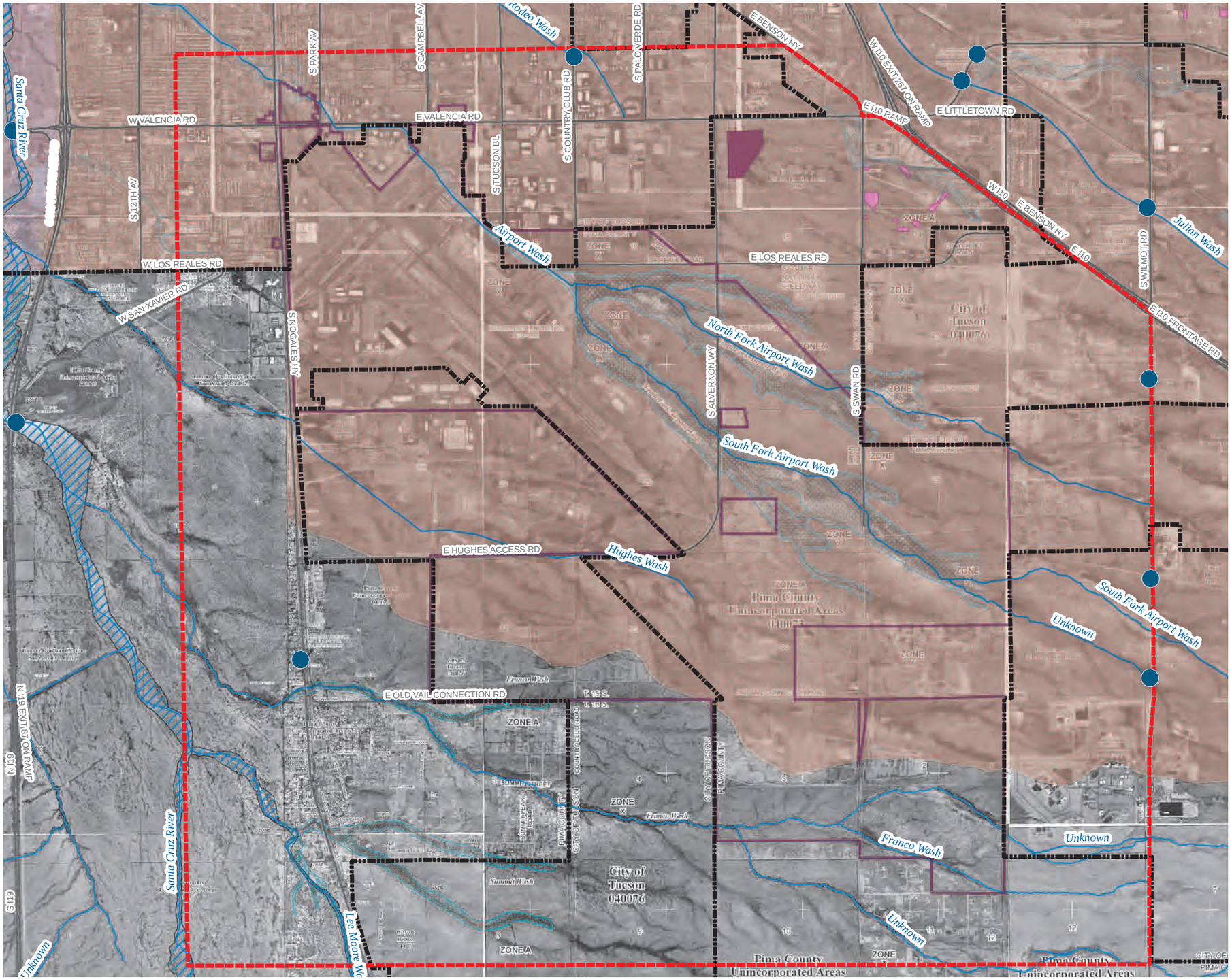
Master Plan Update

HNTB TUCSON INTERNATIONAL AIRPORT

DATE: February, 2013

SOILS TOPOGRAPHY AND FAULTS

FIGURE 2-27



LEGEND

- Urban Land Context
- City of Tucson
- Airport Property / Land
- Major Streets
- RFCD Flood Control Structures
- Major Washes Greater Than 2,000 cfs
- Major Washes Greater Than 10,000 cfs
- Detentionand Retention Basins Privately Owned
- Detention and Retention Basins Publicly Owned

NPDES Drainage Basins

- SANTA CRUZ RIVER CORRIDOR
- SOUTH SANTA CRUZ RIVER BASIN

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

Note: The NPDES Drainage Basin data files obtained from Pima County did not cover the southwest quadrant of the TIA study area. However, in looking at the wash and drainage patterns, it is apparent that the entire study area is in the Santa Cruz River Basin.

0 0.5 1 Miles

Source: Pima County Regional Flood Control District, 2008; NPDES, 1991; Pima County, 1998

Master Plan Update

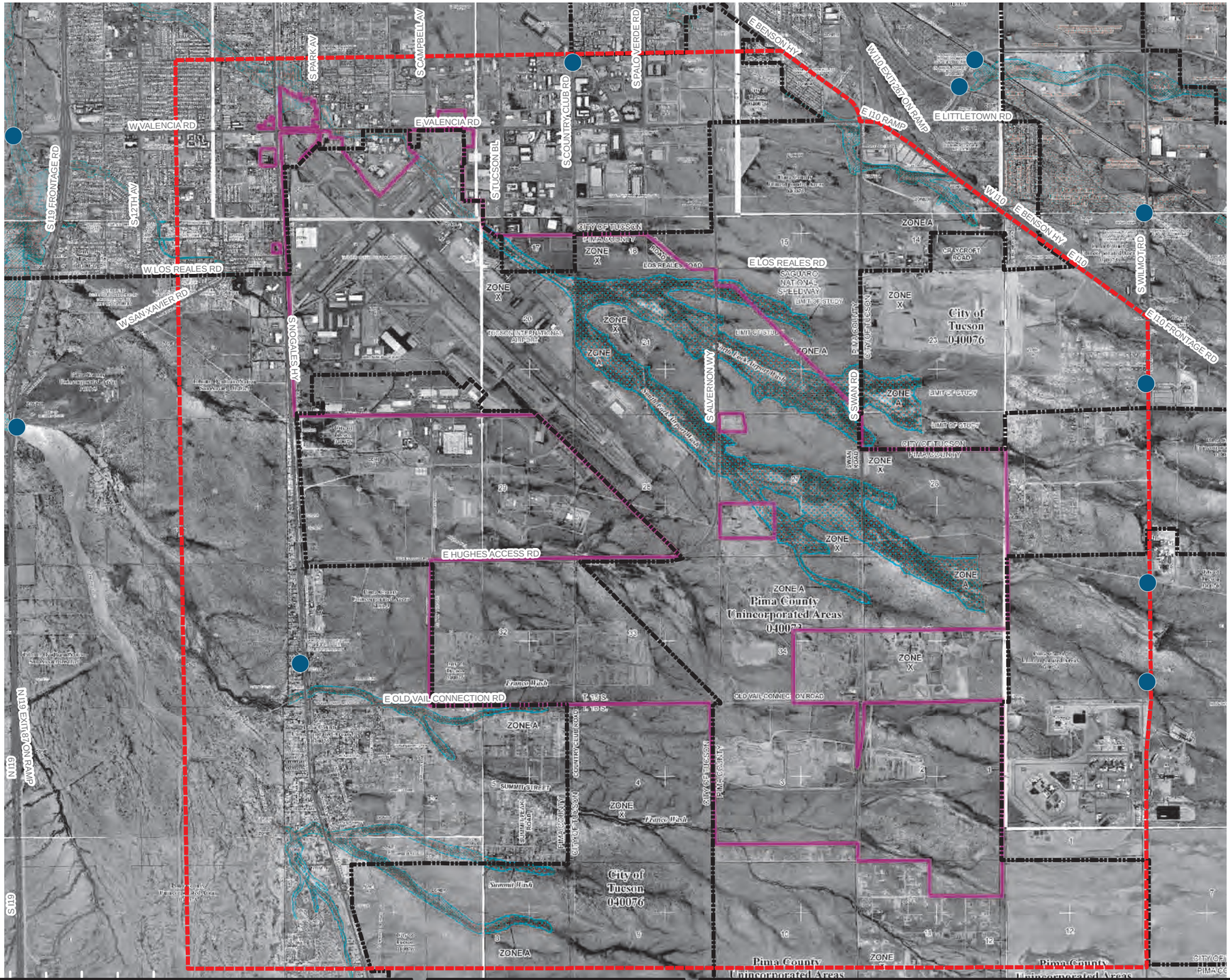
HNTB

TUCSON INTERNATIONAL AIRPORT

DATE: February, 2013

FLOOD AND DRAINAGE FEATURES

FIGURE 2-28



LEGEND

- Urban Land Context
- City of Tucson
- Airport Property / Land
- Major Streets
- RFCD Flood Control Structures

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

0 0.5 1 Miles

Source: FEMA FIRMS, 2011

Master Plan Update

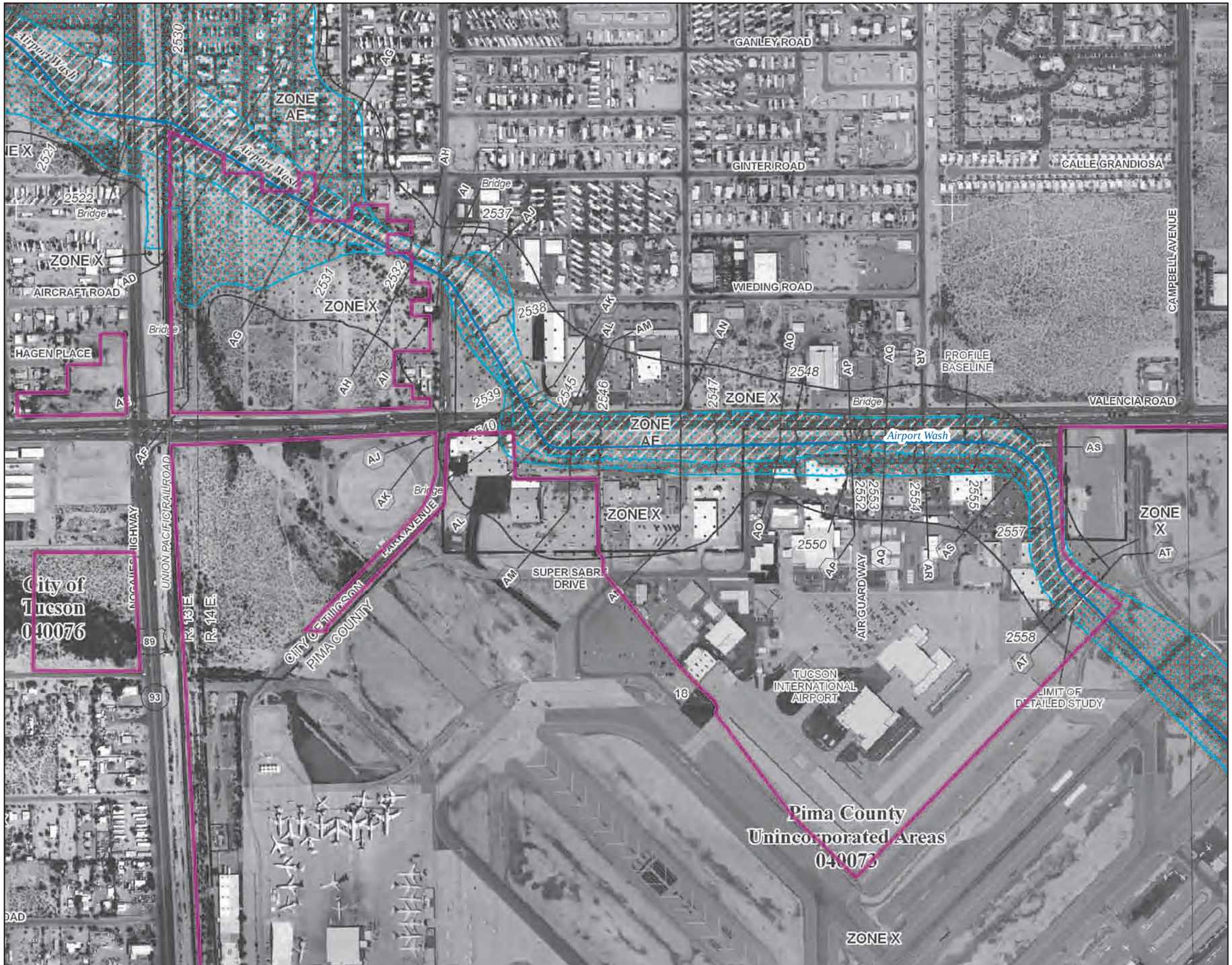
HNTB

TUCSON INTERNATIONAL AIRPORT

DATE: February, 2013

FLOODPLAN AND FLOODWAYS

FIGURE 2-29



LEGEND

Urban Land Context

Airport Property / Land

Major Washes Greater Than 2,000 cfs

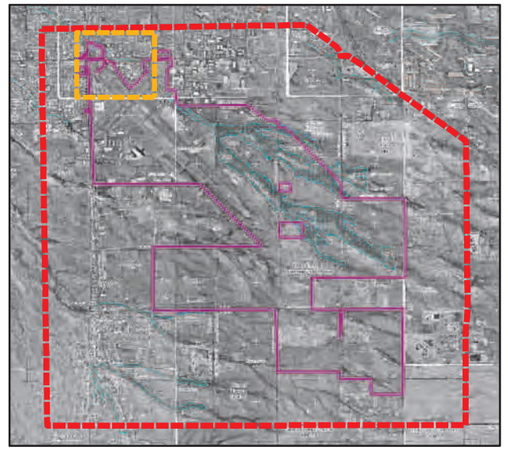
SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

Location Map



0 0.1 0 2 Miles

Source: FEMA FIRMS, 2011

Master Plan Update

HNTB

TUCSON INTERNATIONAL AIRPORT

DATE: February, 2013

FLOODPLAINS AND FLOODWAYS: AIRPORT DETAIL

FIGURE 2-30

2.18.5 Historical, Architectural, and Cultural Resources

There are several structures and sites that are potentially eligible to be included in the National Register of Historic Places (NRHP). These include the Triple Hangars, located on the West Ramp and originally constructed in 1942. These buildings are currently being rented.

In addition, some archaeological or artifact sites may also be added in the future. One site is the spur of the Twin Buttes Railroad Company track. The second site is the location of a restaurant within one of the original Airport hangar buildings near the Triple Hangars. Additionally, it should be noted that in the past, most of the TIA and surrounding land area was inhabited by Indian or other historic settlements.

2.18.6 Water Quality

Storm Water

To handle storm water, TIA has a detention basin located northeast of the airfield. No treatment problems or capacity problems have been documented or are anticipated. TAA has a Multi-Sector General Permit for Air Transportation covering storm water discharges.

Groundwater

The Arizona Department of Water Resources registration records indicate there may be two wells located within the northern area of the Airport that are owned by the Arizona State Land Department and registered as "exempt" for industrial water production. When considering development options, areas closest to the Santa Cruz River corridor to the west may not be suitable for certain uses such as landfills, gas stations (including underground storage tanks), industrial facilities handling hazardous materials, and high pesticide and fertilizer-dependent agricultural uses.

Waste Water

All wastewater and sanitary waste is treated by Pima County Wastewater Management. TAA holds several Industrial Wastewater Discharge permits for facilities such as vehicle wash racks for rental car and maintenance vehicles, and the Fire Station maintenance bays.

2.18.7 Summary of Key Environmental Considerations

Given the extent of natural resources and environmental constraints within the Urban Land Context areas, the key planning considerations for future development will include:

Water Resource Planning: The presence of floodways and floodplains within the Airport Land and Urban Land Context areas will require advance planning for long term impacts and improvements as well as coordination with the Pima County RFCD. Best management practices should be incorporated where possible to both reduce runoff and limit impacts to riparian corridors.

Habitat and Wildlife Conservation: The extensive network of Regulated Riparian Habitat, including Riparian corridors identified in the Sonoran Desert Conservation Plan, and the potential for endangered species, such as the Pima Pineapple Cactus and Cactus Ferruginous Pygmy Owl, within the study area

necessitates inventories of all lands planned for development. Development opportunities should prioritize avoidance of these habitats and, when necessary, mitigation of planned impacts.

2.19 ECONOMIC AND REAL ESTATE MARKET

2.19.1 Market and Economic Development Overview

The market and economic development overview identifies those market segments in the local economy with growth potential that could be captured and supported in the airport area. The studied areas are already the site of many of the region's major employers and offer the potential for substantial growth in the future. The City of Tucson, TAA, Pima County and other regional partners including Tucson Regional Economic Opportunities (TREO) collaborate in economic development activities for the benefit of the airport and the region.

2.19.2 Socioeconomic Conditions

The greater Tucson area represents a growing and dynamic economic market. The Tucson Metropolitan Area (Pima County) was ranked 52nd largest in 2007 compared to 58th largest in 2000. On a percentage of growth basis, only 10 regions grew more rapidly between 2000 and 2007. According to the PAG, the Tucson Metropolitan area is expected to grow from 1 million in 2010 to 1.8 million in the year 2040 for an 80% increase. Focusing in on the studied areas, PAG's 2040 estimated change, by employment sector[9] is summarized in **Table 2-22**, showing a 50% increase in employment for the area as a whole reflecting the importance of the TIA as an employment location.

Table 2-22: Projected Employment Growth by Sector

	Retail	Wholesale	Fire*	Industrial	Service	Public Service
2011	9,956	3,096	78,738	85,210	30,113	108,395
2040	19,471	6,192	157,383	170,289	60,213	216,066

Source: Pima County Association of Governments
Notes: * Finance, Insurance, and Real Estate

2.19.3 Economic Opportunity

The long term prospects for economic growth within the region are strong, the greatest opportunities area tied to four market major market segments. These growth segments have been identified by both TREO and the Chamber of Commerce. Each of these sectors and their relevance to TAA are briefly discussed below.

Aerospace and Defense

Tucson has long been the location of a strong aerospace and defense industry. With over 200 aerospace companies in southern Arizona, the economy benefits from 5-6 billion in revenue per year[10]. TIA is a central aerospace activity hub within the larger market. Major employers in the studied areas include Raytheon Missile Systems, Bombardier Aerospace and Paragon Space Development Corporation. The

[9] HNTB generate data excerpted from PAG transportation analysis zones within Study Area boundaries
[10] Tucson Regional Economic Opportunities, Inc., Spotlight on Aerospace and Defense, 7/2010, with permission.

industry currently employs roughly 20,000 to 30,000, which in 2010 represented nearly eight percent of total employment within the Metropolitan Statistical Area (MSA).

Work force education and development opportunities are strong. The University of Arizona, Department of Aerospace and Mechanical Engineering offers accredited programs in the aerospace industry. Pima Community College and Embry-Riddle Aeronautical University at Davis Monahan Air Force Base also offer technical degrees to industry workers.

In recognition of the strength of this economic base, the City of Tucson, TAA, Pima County, TREO and others have begun development of the Aerospace Defense Corridor Plan. The physical development corridor follows the Old Vail Connection Road corridor in the southern portion of the Study Area from Nogales Highway extending to the University of Arizona Science and Technology Park west of Interstate 10, which includes the Arizona Center for Innovation.

Biosciences

Over the last decade bioscience research and development has been a strong focus in Arizona. Beginning in 2002, working with the Flinn Foundation and Battelle Corporation, the Arizona Bioscience Roadmap was formed as a basis of development of the bioscience industry in the state of Arizona. A recent presentation by Battelle in February 2011[11] regarding a performance assessment of Arizona's progress, shown in **Table 2-23**, indicates significant progress. Tucson's bioscience strengths remain focused on research, testing, medical laboratories, and hospitals.

[11] Presentation by Walter H. Plosila, PhD, Senior Advisor, Technology Partnership Practice, Battelle, February 2011.

Table 2-23: Arizona Bioscience Roadmap Assessment

Arizona Metropolitan Area	Key Bioscience Subsector	Establishments, Employment Level & Concentration (2009)	Regional Strengths / Highlights
Flagstaff	Medical Devices & Equipment	Establishments: 7 Employed: 2,380 Empl. Growth ('02-'09): 145% Location Quotient: 14.52	• Flagstaff is highly specialized in medical devices, with 14 times the national employment concentration • The regional sector continues to grow at a rapid pace, up to 145% since 2002
	Hospitals	Establishments: 3 Employed: 2,820 Empl. Growth ('02-'09): 14% Location Quotient: 1.57	• Flagstaff has a specialized hospitals subsector with a 57 percent greater concentration of hospital jobs relative to the national average of more than 2,800 jobs
Phoenix-Mesa-Scottsdale	Research, Testing, & Medical Laboratories	Establishments: 269 Employed: 5,651 Empl. Growth ('02-'09): 31% Location Quotient: 0.80	• Phoenix metro area has a large number employed in research, testing, and medical labs – three-quarters of the State total • The region has added 31% to its job base since 2002, driving state growth in the sector
Tucson	Research, Testing, & Medical Laboratories	Establishments: 71 Employed: 1,248 Empl. Growth ('02-'09): 33% Location Quotient: 0.92	• Tucson's research, testing, & medical labs sector employment is well concentrated, nearly matching the national average • The region has added 28 establishments in the sector since 2002
	Hospitals	Establishments: 14 Employed: 14,882 Empl. Growth ('02-'09): 20% Location Quotient: 1.23	• Tucson has a large, growing, and specialized hospitals subsector with nearly 15,000 jobs • Hospital employment is 23 percent more concentrated in and around Tucson relative to the national average

Source: Battelle analysis of Bureau of Labor Statistics, QCEQ data from Minnesota IMPLAN Group.
Employment data have been revised for Research, Testing, & Medical Labs back to 2002 to incorporate updates to share of Bioscience-related R&D from newly released data from the U.S. Economic Census.

In the recent recession, bioscience jobs in Arizona grew by seven percent while Arizona's overall private sector lost eleven percent of its jobs. A backbone to Tucson's future in the advancement of biosciences in the region is the University of Arizona. Among its many programs, the University pursues state of the art research through its BIO5 program which is a collaborative research institute that coalesces the research efforts of scientists from the disciplines of agriculture, medicine, pharmacy, basic science and engineering. The University Bioscience Park at the intersection of Kino Parkway and Interstate 10 is now under development and will include education, research and bio-based business and industry. Yet Tucson is already host to over 100 bioscience firms.

In a presentation of a *Study of the Southern Arizona Bioscience Industry* by the Office of University Research Parks on January 5th, 2011, shown in **Table 2-24**, it was reported that the average income for workers in the bioscience industry in both hospital and non-hospital based industries is substantially higher, advancing regional economic development goals on providing opportunities to increase household income.

Table 2-24: Bioscience Industry Average Employee Incomes

Economic Impact of Non-Hospital Bioscience in Pima County CY 2008

	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Job	5,172	1,822	1,921	**8,915**
Income	$385,633,000	$91,093,000	$69,262,000	**$545,988,000**
Output	$1,373,570,000	$248,328,000	$219,999,000	**$1,841,897,000**

- Average Income per Worker in Non-Hospital Bioscience Industry = $74,600
- Average Income per Worker in All Industry = $40,000

Economic Impact of Hospital Bioscience in Pima County CY 2008

	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Job	31,903	4,630	8,311	**44,844**
Income	$1,890,576,000	$188,628,000	$300,299,000	**$2,379,503,000**
Output	$3,572,700,000	$563,171,000	$952,355,000	**$5,088,226,000**

- Average Income per Worker in Hospital Bioscience Industry = $59,300
- Average Income per Worker in All Industry = $40,000

Multipliers of Non-Hospital Bioscience in Pima County CY 2008

	Job	Wage	Output
Multiplier	1.72	1.42	1.52

Every 100 non-Hospital Bioscience Jobs generate additional 72 jobs in Pima County

Multipliers of Hospital Bioscience in Pima County CY 2008

	Job	Wage	Output
Multiplier	1.41	1.26	1.42

Every 100 Hospital Bioscience Jobs generate additional 41 jobs in Pima County

Pima County Share of Non-Hospital Bioscience in Arizona CY 2008
Direct Employment Share = 38.2%

Pima County Share of Hospital Bioscience in Arizona CY 2008
Direct Employment Share = 45.1%

Source: Study of the Southern Arizona Bioscience Industry, Office of University Research Parks, January 5th, 2011.

Transportation Logistics

Over the long term, a key business strategy the TIA can undertake is multi-modal transport integration with airport operations. The TIA has already enhanced freight access and distribution to the airport. Regarding freight and intermodal logistics, the UP Sunset Route is a major statewide business corridor. The strategic business opportunities identified by the statewide plan include:

- Construction of a new state-of-the-art rail switching yard north of Tucson along Interstate 10 near Red Rock and Picacho Peak State Park;
- Explore and prioritize options for moving freight around Tucson; and
- Make safety improvements along the route.

The plan also recommends improved connectivity and capacity to serve inland ports, such as Tucson, to serve rail and local industry.

The prospect of opening connections to ocean ports through Tucson has long been a discussion in the community. The volume, associated congestion, and cost of business at the Ports of Los Angeles and Long Beach have resulted in the exploration of alternative entry points including new sea port construction on the Pacific Coast of Northern Mexico in Punta Colonet, Baja California with rail connections to points east of California including Arizona and Texas. As noted in the transportation section, Tucson is well positioned with its inland port and plans to serve it with freight rail access in the near future. Long-term initiatives for sea port construction in Mexico, by improvements to the existing Port of Guaymas and/or creation of a new port at Punta Colonet, could increase the demand for intermodal activity and/or customs processing at and near Tucson and TIA. Mexico has designated their segment of the CANAMEX rail corridor as the "Guaymas-Arizona Multimodal Corridor" and conducted a logistics study that reinforces the importance of increasing capacity at the Port of Guaymas and relying on additional customs processing capacity in Tucson to supplement existing capacity in Nogales.

Pima Association of Governments and its two northern neighboring COGs, (CAAG and MAG) are seeking to identify and develop freight-related economic development opportunities and increase mobility and access for freight movements throughout the Sun Corridor in their efforts to develop a

freight transportation framework for the region. The study considers the logistics needs and opportunities at TIA. Air cargo facilities at the Airport occupy approximately 56,000 gross square feet. The only current domestic freight carrier service at TIA is provided by FedEx to its hub in Memphis.

There is potential for TIA to serve as the multimodal transportation hub for inter-regional and national passenger and freight movement.

Solar Energy

Arizona (generally) and Tucson (specifically) are becoming one of the nation's strongest regions for solar technology development, manufacture and use. TREO reports that according to a 2005 study on Solar Photo Voltaic (PV) Development by the Renewable Energy Policy Project, Arizona ranked 3rd among the states in total investment and jobs in the solar industry. This included both manufacturing jobs and construction/installation jobs. TREO offers the following statistics to describe the growth of the solar industry in the Tucson area as of late 2009 relative to future industry projections.

- The Solar PV industry experienced remarkable growth in the United States from 2001 to 2008. Although the ongoing financial crisis will have some impact on the growth of solar companies, the supportive incentive programs at the state and federal level will boost future development and drive additional investment to this sector.
- With a projected federal investment of $500 billion in clean energy over the next 10 years, it is expected that Arizona could capture about $9.4 billion, according to the Apollo Alliance. This would result in an estimated 75,100 new direct and indirect jobs created in the state over a 10 year period.

2.20 LAND USE AND DEVELOPMENT POTENTIAL

Existing land use and development conditions will be a strong influence on future development possibilities in the Urban Land Context as well as in the Reserve Land. This section and other sections that follow provide information regarding current land use and development conditions. It is intended to provide an overall understanding of growth, development and market and investment conditions to begin to identify market preferences for where development may be directed in the future. It also examines the relationships of natural and environmental features, and utilities and transportation infrastructure in relation to development potential.

A preliminary property matrix (**Table 2-25**) identifies the development suitability of key land parcels within the Reserve Land and Urban Land Context.

2.20.1 Economic Development Considerations

The City of Tucson, Pima County and State of Arizona offer economic incentives, a few of which will offer benefits to TAA's land development efforts. These are briefly described below.

Enterprise Zone: Much of Tucson, Pima County and surrounding counties benefit from a state-approved Enterprise Zone that is in effect through 2013. The entire Urban Land Context is within this Enterprise Zone. New and expanded qualifying businesses can take advantage of the following available tax credits:

- Employment Tax Credit
- Work Opportunity Tax Credit
- Business Investment Incentives
- Issuance of Tax Exempt Bonds
- Welfare to Work Tax Credit

Arizona Job Training Grants: Job training grants are available to qualified businesses with the following parameters:

- Reimbursement of up to 75 percent of the cost to train new employees and up to 50 percent of the cost to train incumbent employees, and
- Any qualified training provider including the business may provide training itself.

No portion of the airport area is currently part of the Tucson Foreign Trade Zone (FTZ). In general, the only economic incentive tool that has broad coverage of the study area is the City-County Enterprise Zone. Individual sites can be designated as part of the FTZ- geographic contiguity is not required.

The City of Tucson also offers several citywide economic development incentives which include:

- Deferral of impact fee for roads, parks, and public facilities until certificate of occupancy,
- Solar Incentive: $10,000 for subdivisions. $1,000 for single permit,
- Formation of Community Facilities District to finance public infrastructure,
- Grant funded Phase I Environmental Assessment Study ($3K – 6K benefit), and
- Grant funded Phase II Environmental Assessment Study ($5k - $100K benefit).

2.20.2 Summary of Land Use and Development Considerations

With respect to land use and development considerations, the key planning considerations that will inform development of alternative scenarios in the next step include:

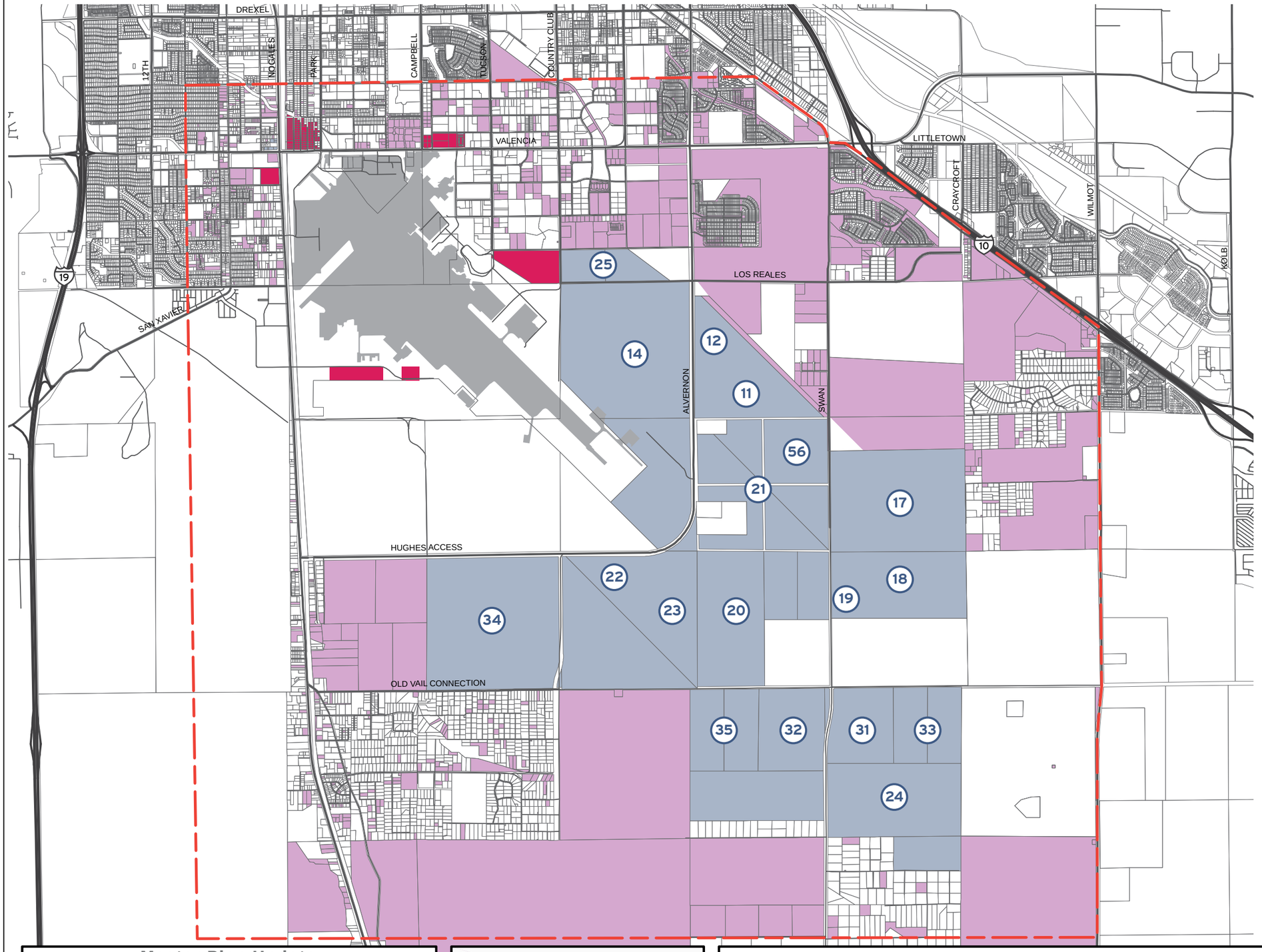
Overall Development Considerations: The airport and surrounding area continue to be a logical choice for employment development investment. A substantial inventory of vacant and underutilized land exists with strong potential for employment uses which support the interests of the airport and economic development plans for the Tucson community as a whole.

Extraction Properties: There are a number of sites in the studied areas which have been mined for gravel extraction. Several are active and a number are inactive. Among all features inventoried, the constraints to development and re-use of these sites may prove to be the most limiting of any.

Current Land Use Plans and Controls: In general, current City of Tucson and Pima County plans and development regulation controls encourage non-residential employment generally within the Urban Land Context. Use patterns in the southern portion of Urban Land Context area may be better utilized for non-residential than residential in the long term.

Transportation and Facilities Influences: As noted in the transportation and utility sections of the report, realizing the full development potential of many vacant or underutilized properties will require several improvements.

Based on field reconnaissance and existing conditions analysis, an inventory of vacant and underutilized land within the studied areas have been prepared, as depicted in **Figure 2-31**. Along with this inventory a preliminary Development Suitability Matrix, shown in **Table 2-25**, has also been prepared which identifies a variety of site, infrastructure and regulatory conditions associated with each parcel to help establish the "readiness" of sites within the Reserve Land Area for development.



LEGEND

- Urban Land Context
- TIA Vacant Property
- Other Vacant Property
- 57 Parcel Number / Large Parcel Sites
- Infill Sites

Master Plan Update

HNTB

TUCSON INTERNATIONAL AIRPORT

DATE: February, 2013

VACANT AND UNDERUTILIZED PROPERTY

FIGURE 2-31

Table 2-25: Development Suitability Matrix

Parcel Code	TIA Ownership	Parcel			Frontage	Visibility	Access	Utilities	Natural Features		Excavation		Incorporated	Current Use	Current Plan Designation		Current Zoning	
		Acres	*Size*	*Shape*	*Feet*	*Existing*	*Current Type(s)*	*Current Type(s)*	*Type(s)*	*General Extent*	*Active*	*Inactive*			*City*	*County*	*City*	*County*
11	Yes	120.00	Sufficient	Marginal	1,725	Y	R	-	W, FP, H, WL	Medium	N	N	N	Vacant	-	Heavy Industrial	-	General Industrial
12	Yes	138.00	Sufficient	Marginal	3,100	Y	R	-	W, FP, H, WL	Medium	N	N	N	Vacant	-	Heavy Industrial	-	General Industrial
14	Yes	944.00	Sufficient	Efficient	22,600	Y	R	W, S	W, FP,V, H, WL	Medium	N	N	N	Commercial	-	Heavy Industrial	-	Light Industrial/Warehousing
17	Yes	480.00	Sufficient	Efficient	5,485	Y	R	W	W, FP, V, H, WL	Low	Y	N	N	Vacant	-	Heavy Industrial	-	Light Industrial/Warehousing
18	Yes	239.00	Sufficient	Marginal	-	N	-	-	W, FP, V, H, WL	Medium	N	N	N	Vacant	-	Heavy Industrial	-	Light Industrial/Warehousing
19	Yes	80.00	Sufficient	Marginal	2,568	N	R	-	W, V, H, WL	Low	N	N	N	Vacant	-	Heavy Industrial	-	Light Industrial/Warehousing
20	Yes	480.00	Sufficient	Efficient	5,348	N	R	-	W, FP, V, H, WL	Low	Y	N	N	Vacant	-	Heavy Industrial	-	Light Industrial/Warehousing
21	Yes	255.00	Sufficient	Marginal	2,660	Y	R	-	W, FP, V, H, WL	High	N	N	N	Vacant	-	Heavy Industrial	-	Light Industrial/Warehousing
22	Yes	160.00	Sufficient	Marginal	4,000	Y	R	-	W, V, H, WL	High	N	Y	N	Vacant	-	Heavy Industrial	-	Light Industrial/Warehousing
23	Yes	160.00	Sufficient	Marginal	-	Y	-	-	W, V, H, WL	Medium	N	Y	N	Vacant	-	Heavy Industrial	-	Light Industrial/Warehousing
24	Yes	635.00	Sufficient	Efficient	2,906	N	R	-	W, V, H, WL	Medium	N	N	N	Agriculture	-	Low Intensity Rural	-	Rural Homestead
25	Yes	98.20	Sufficient	Marginal	8,160	Y	R	W, S	V, H	Medium	N	N	N	Vacant	-	Heavy Industrial	-	Light Industrial/Warehousing
31	Yes	181.00	Sufficient	Efficient	5,690	N	R	-	V, H	Low	N	Y	N	Miscellaneous	-	Urban Industrial	-	Rural Homestead
32	Yes	192.87	Sufficient	Efficient	3,852	N	R	-	V, H	Low	N	Y	N	Vacant	-	Urban Industrial	-	Rural Homestead
33	Yes	195.62	Sufficient	Efficient	2,730	N	R	-	V, H	Low	N	N	N	Miscellaneous	-	Urban Industrial	-	Rural Homestead
34	Yes	918.80	Sufficient	Efficient	15,631	Y	R, BT	W	V, H	Medium	N	Y	Y	Vacant	-	-	Heavy Industrial	-
35	Yes	196.40	Sufficient	Efficient	2,775	N	R	-	V, H	Low	Y	N	N	Vacant	-	Urban Industrial	-	Rural Homestead
41	Pending	3.11	Marginal	Marginal	265	Y	R, BT, B	S	V	Low	N	N	Y	Parking Facility	Industrial	-	Light Industrial	-
56	Yes	308.40	Sufficient	Marginal	5,175	Y	R	W	W, FP, V, H, WL	Medium	N	N	N	Vacant	-	Heavy Industrial	-	General Industrial

NOTES:

Parcel Code Parcel code corresponds with the current TIA Property Map (dated August 2010).

Parcel
- *Size:* Sufficient – Parcel size is larger than one acre and suitable for development;
  Marginal – Parcel is smaller than one acre and may be suitable for commercial or retail uses, but is marginal for large parcel employment development. It may be desirable to combine the parcel with other parcels.
- *Configuration:* Sufficient – Parcel is reasonably configured and roughly rectangular to optimize site holding capacity;
  Marginal = Parcel shape includes acute angle(s) which make optimization of site challenging, especially if site is also small in size.

Frontage Approximate linear feet of frontage along a dedicated public street or approved access way.

Visibility Parcel is or is not visible from a major street corridor.

Access Site currently has access to the following transportation modes: R – Road/Auto/Truck, FR – Freight Rail, PR – Passenger Rail, BT– Bus Transit, S–Sidealk/Ped, B–Bike. Future access is shown in Existing and Planned Transportation Framework diagram.

Utilities Site is adjacent to or is currently being served by sewer or water: W – Water; S – Sewer.

Natural Features
- *Type:* The type of natural features present on the site: W – Major Wash greater than 2,000 cfs, FP – Flood Plain, V – Vegetation, H – habitat, WL – Wildlife.
- *General Extent:* The extent of the site covered by major washes, floodplain, habitats and wildlife corridors.
  Note: When present, vegetation tends to cover significant portions of the site. The presence of other natural features pose more significant development hurdles and so only their extent is considered here.

Excavation Parcel includes either an active or inactive mining / excavation site: Y = Active/inactive excavation site present; N = No active/inactive excavation on the site.

Incorporated Site was incorporated into the City of Tucson as of December 2010.

Current Use Current use of the parcel as identified in the 2011 Assessor's data.

Current Plan Designation Current land use plan designation as specified by the City of Tucson or Pima County.

Current Zoning Current City of Tucson or Pima County zoning designation of the parcel.

Source: HNTB research and analysis