Chapter Five

RECOMMENDED MASTER PLAN CONCEPT

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The planning process for the Lake Havasu City Municipal Airport Master Plan has included several technical efforts in the previous chapters intended to establish the role of the airport, project potential aviation demand, establish airside and landside facility needs, and evaluate options for improving the airport to meet those facility needs. The planning process, thus far, has included the presentation of two draft phase reports to the Planning Advisory Committee (PAC) and public information workshops. Lake Havasu City and airport administration have participated in each of these meetings and have been actively involved in the master planning process.

The PAC is comprised of several constituents with a stake in the Lake Havasu City Municipal Airport. Groups represented on the PAC include the Federal Aviation Administration (FAA), the Arizona Department of Transportation (ADOT) — Aeronautics Division, Lake Havasu City Council, airport administration, airport advisory board, various city departments, airport tenants, Arizona Military Airspace Working Group, Aircraft Owners and Pilots Association, Arizona Pilots Association, Lake Havasu Area Chamber of Commerce, Lake Havasu Economic Development, and a citizen representative. This diverse group has provided valuable input into the Master Plan Concept.

In the previous chapter, several development alternatives were analyzed to explore different options for the future growth and development of Lake Ha-

vasu City Municipal Airport. The development alternatives have been refined into a single recommended concept for the Master Plan. The purpose of this chapter is to describe, in narrative and graphic form, the plan for the future use and development of Lake Havasu City Municipal Airport. Environmental conditions that need to be considered during development are also examined within this chapter.

MASTER PLAN CONCEPT

The Master Plan Concept represents the development direction for the Lake Havasu City Municipal Airport through the planning period of this Master Plan. The Master Plan Concept is the consolidation and refinement of the airside and landside alternatives, presented in Chapter Four, into a single development concept collectively representing input received from the PAC, Lake Havasu City, and the general public. It presents an ultimate configuration for the airport that meets FAA design standards and provides a variety of landside development options to meet the increasing demands on the airport by different aviation activities. It is important to note that the finalized concept provides for anticipated facility needs over the next 20 years, as well as establishing a vision and direction for meeting facility needs beyond the planning period of this Master Plan.

AIRSIDE DEVELOPMENT PLAN

Airside components include the runways, parallel and connecting taxiways, lighting aids, navigational aids, and imaginary surfaces which help to provide a safe operating environment for aircraft. The major airside issues addressed in the Master Plan Concept include the following:

- The upgrade of Runway 14-32 to Airport Reference Code (ARC) C/D-II design standards.
- A straight-in instrument approach procedure to Runway 32.
- The installation of an approach lighting system on Runway 32.
- Land acquisition for approach protection.
- The construction of an additional exit taxiway on the west side of Runway 14-32 to provide a more efficient taxiing network from the runway system.
- The extension of Taxiway C south to provide access for future aviation development on the airport.
- The installation of taxiway lighting on all active taxiways.
- The relocation of the segmented circle and wind cone to conform to future airport safety design standards.
- The construction of a partial-parallel taxiway on the east side of Runway 14-32 to allow for future aviation development.

Airfield Design Standards

As a federally obligated airport (the result of accepting federal grant funding), Lake Havasu City Municipal Airport must comply with FAA design and safety standards. The FAA has established these design criteria to define the physical dimensions of runways and taxiways and the imaginary surfaces surrounding them that ensure the safe operation of aircraft at the airport. FAA design standards also define the separation criteria for the placement of landside facilities. As discussed previously in Chapter Three, FAA design criterion is a function of the critical design aircraft's approach speed, wingspan, and/or tail height, and in some cases, the runway approach visibility minimums. The critical design aircraft is defined as the most demanding aircraft or "family" of aircraft which will conduct 500 or more operations (take-offs and landings) per year at the airport.

According to FAA Advisory Circular (AC) 150/5300-13, Change 13, *Airport Design*, an aircraft's approach category is based upon 1.3 times its stall speed in landing configuration at that aircraft's maximum certificated weight. The five approach categories used in airport planning are as follows:

Category A: Speed less than 91 knots.

Category B: Speed 91 knots or more, but less than 121 knots.

Category C: Speed 121 knots or more, but less than 141 knots.

Category D: Speed 141 knots or more, but less than 166 knots.

Category E: Speed greater than 166 knots.

The airplane design group (ADG) is based upon either the aircraft's wingspan or tail height, whichever is greater. The six ADGs used in airport planning are as follows:

Airplane Design Group	Tail Height (feet)	Wingspan (feet)
I	Less than 20	Less than 49
II	Greater than 20, but less than30	Greater than 49 but less than 79
III	Greater than 30 but less than 45	Greater than 79 but less than 118
IV	Greater than 45 but less than 60	Greater than 118 but less than 171
V	Greater than 60 but less than 66	Greater than 171 but less than 214
VI	Greater than 66 but less than 80	Greater than 214 but less than 262

Source: AC 150/5300-13, Change 13

Lake Havasu City Municipal Airport is used by a wide range of general aviation aircraft. General aviation aircraft include single and multi-engine piston aircraft within ARCs A-I and B-I, turboprop aircraft within ARCs B-I and B-II, and business jet aircraft within ARCs B-I, B-II, C-I, C-II, and occasionally ARCs D-I and D-II. Future aircraft mix can expect to include

a larger percentage of corporate aircraft and, as a result, future facility planning should include the potential for the airport to be utilized by the majority of business jets on the market.

In the past, Lake Havasu City Municipal Airport has also supported scheduled airline service. The Beech 1900 turboprop aircraft was the primary aircraft used prior to commercial service being suspended in May 2007. This aircraft falls within ARC B-II. Analysis in Chapter Two indicated the potential to shift to larger turboprop and regional jet aircraft in the future should air service return to the airport. Taking into consideration the potential changes in scheduled airline service in the future, the critical commercial aircraft could fall within ARC C-II over the long term.

The Master Plan anticipates that jet aircraft activity will continue to be strong and define the critical aircraft parameters for Lake Havasu City Municipal Airport through the planning period. In addition, Runway 14-32 provides adequate length to support a large majority of jet aircraft in operation today. For this reason, Runway 14-32 is planned for the most demanding ARC C/D-II design standards.

The design of taxiways considers the wingspan requirements of the most demanding aircraft to operate within the specific area. All taxiways on the west side of Runway 14-32 are planned to accommodate aircraft within ADG II. Taxilanes serving existing and proposed T-hangar areas are planned to accommodate aircraft in ADG I. **Table 5A** summarizes the planned airfield safety and facility requirements for Lake Havasu City Municipal Airport. The following sections summarize the airside development recommendations as depicted on **Exhibit 5A**.

- **The upgrade of Runway 14-32 to ARC C/D-II design standards**

Forecast operations at Lake Havasu City Municipal Airport include an increase in business turboprop and jet aircraft utilizing the airport. This follows the national trend of increased business and corporate use of turboprop and jet aircraft, strong sales and deliveries of turboprop and jet aircraft, and expanded fractional ownership programs for these aircraft.

Some of the larger jet aircraft that are forecast to utilize the airport on a more frequent basis in the future have higher approach speeds than the current critical aircraft operating at the airport. The higher approach speeds of these aircraft are expected to have the potential of changing the critical aircraft designation for the airport. Currently, the critical design aircraft using the airport fall within ARC B-II. Ultimately, it is expected to accommodate aircraft within ARC C/D-II.

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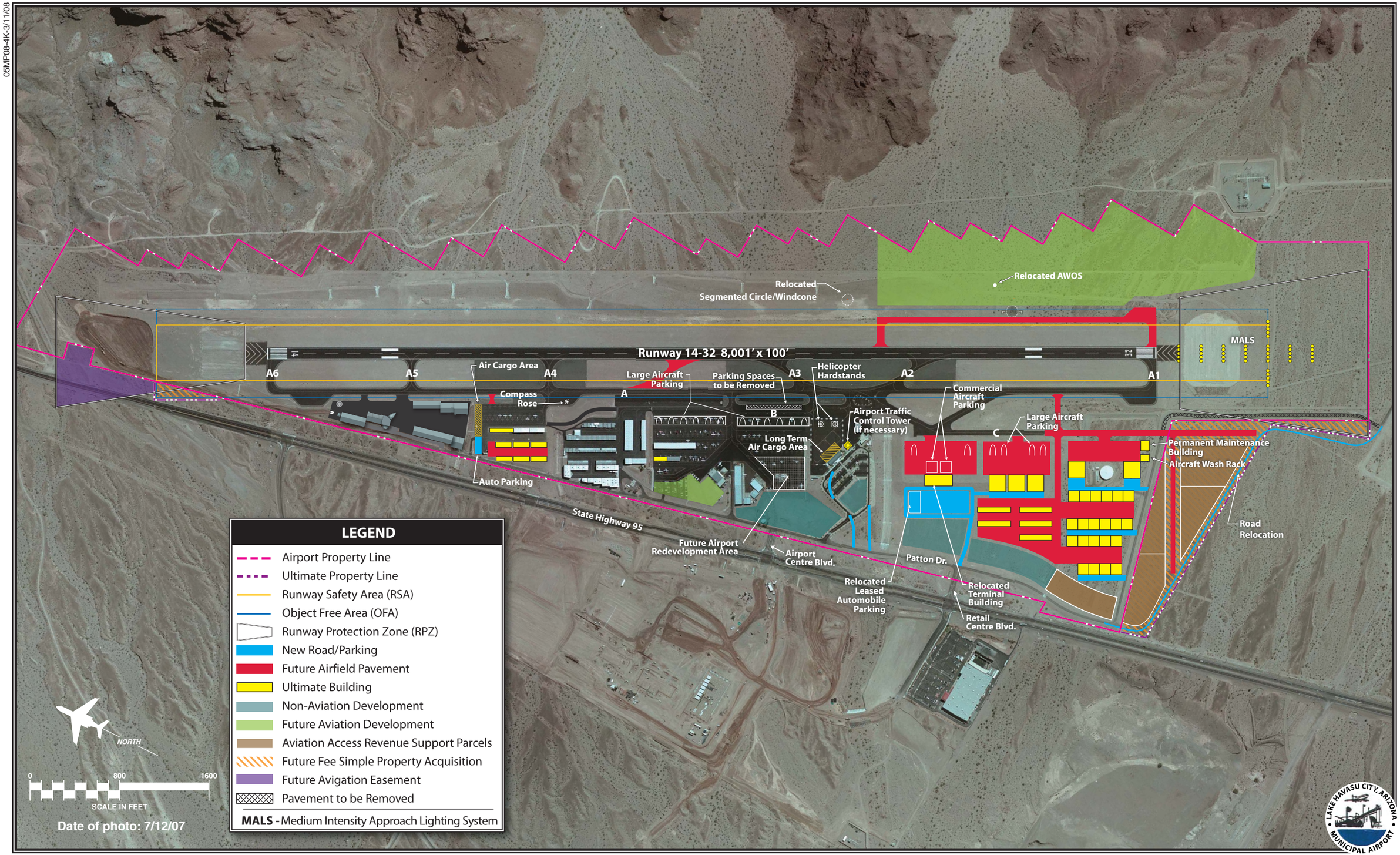


Exhibit 5A
MASTER PLAN CONCEPT

TABLE 5A
Airfield Safety and Facility Dimensions (in feet)
Lake Havasu City Municipal Airport

	Existing Runway 14-32	Ultimate Runway 14-32	
Airport Reference Code (ARC)	B-II	C/D-II	
Approach Visibility Minimums	1.25 miles – circling only	3/4 mile - Runway 32	
Runways			
Length	8,001	8,001	
Width	100	100	
Runway Safety Area (RSA)			
Width	150	500	
Length Beyond Runway End	300	1,000	
Object Free Area (OFA)			
Width	500	800	
Length Beyond Runway End	300	1,000	
Obstacle Free Zone (OFZ)			
Width	400	400	
Length Beyond Runway End	200	200	
Runway Centerline to:			
Parallel Taxiway Centerline	340	300*	
Edge of Aircraft Parking Apron	500	400*	
Runway Protection Zone (RPZ)	Both Ends	14	32
Inner Width	500	500	1,000
Outer Width	700	1,010	1,510
Length	1,000	1,700	1,700
Taxiways			
Width	35	35	
Safety Area Width	79	79	
Object Free Area Width	131	131	
Taxiway Centerline to:			
Parallel Taxiway/Taxilane Centerline	105	105	
Fixed or Moveable Object	65.5	65.5	
Taxilanes			
Object Free Area Width	115	115	
Taxilane Centerline to:			
Parallel Taxilane Centerline	97	97	
Fixed or Moveable Object	57.5	57.5	

*Denotes ultimate C/D-II design standards.
Source: FAA Advisory Circular (AC) 150/5300-13, Change 13, *Airport Design*; 14 CFR Part 77, *Objects Affecting Navigable Airspace*

Should aircraft in ARC C/D-II conduct more than 500 operations annually at the airport, Runway 14-32 will be required to conform to ARC C/D-II design standards. As shown in **Table 5A**, this will require the expansion of the runway safety area (RSA) and object free area (OFA). The airport is in good position for this transition as the ARC C/D-II RSA and OFA are currently unobstructed. It should be mentioned, however, that a portion of the proposed OFA would extend beyond the current airport property boundary on the northwest side of the airport. The total area of land outside

the property line but within the OFA is approximately 1.2 acres. At a minimum, the airport would need to acquire the OFA areas outside the property line. Due to the nature and location of the property adjacent to State Highway 95, it may not be prudent or feasible to purchase this property. In the event that this property cannot be acquired, an easement should be pursued giving the airport control over what can be done in this area. Methods of gaining control could include an avigation easement, letter of agreement, or memorandum of understanding.

- **A straight-in instrument approach procedure to Runway 32**

Lake Havasu City Municipal Airport currently has a circling instrument approach to Runway 14-32 that allows for visibility minimums as low as one and one-quarter miles. Where possible, approach minimums should be as low as practical considering safety and financial constraints. Lower approach minimums and/or a straight-in instrument approach procedure could prevent aircraft from having to divert to another airport, which can cause financial hardships for the operator, on-airport businesses, and the City.

A large majority of new instrument approach procedures in the United States are being developed with global positioning system (GPS). With the development of the Wide Area Augmentation System (WAAS) as previously detailed in Chapter Three, a GPS WAAS approach provides for both course and vertical navigation, just like an instrument landing system (ILS) precision approach. As WAAS is upgraded in the future, precision approaches similar in capability to an ILS should become available for Lake Havasu City Municipal Airport.

The Master Plan Concept depicts the installation of a straight-in instrument approach to Runway 32. This approach is planned for visibility minimums as low as three-quarters of a mile and cloud ceilings as low as 200 feet above ground level (AGL). The installation of a medium intensity approach lighting system (MALS) to Runway 32 is required to achieve these visibility minimums and cloud ceiling requirements.

The prevailing winds are most commonly out of the northwest at Lake Havasu City Municipal Airport, favoring the use of Runway 32. Also, during times when poor weather conditions exist that may warrant the use of a straight-in instrument approach, wind conditions would favor the use of Runway 32. A preliminary obstruction analysis completed in the previous chapter concluded that there are no identified obstructions to Runway 32 that would prohibit or restrict a straight-in instrument approach procedure. As proposed on the Master Plan Concept, Runway 14 could support a non-precision instrument approach with visibility minimums not lower than one mile.

It should be mentioned that Lake Havasu City Municipal Airport recently obtained notification from the FAA that it plans to develop a GPS localizer performance with vertical guidance

(LPV) instrument approach procedure to Runway 32. The FAA is currently reviewing potential environmental and safety impacts related to a proposed instrument approach to the runway.

- **The installation of an approach lighting system on Runway 32**

The Master Plan Concept depicts the installation of a MALS on Runway 32 in order for the runway to provide for visibility minimums as low as three-quarters of a mile. The MALS lights begin approximately 200 feet beyond the runway threshold and extend to a maximum distance of 1,400 feet. Further engineering analysis, separate from this Master Plan, would determine the exact location of the approach lighting system.

It should be noted that a runway served by an instrument approach procedure with visibility minimums as low as three-quarters of a mile will have an expanded primary surface per Title 14 of the Code of Federal Regulation (CFR) Part 77, *Objects Affecting Navigable Airspace*. The hangar infrastructure currently being developed on the northwest side of the airport would penetrate the proposed primary surface associated with this type of approach. Future analysis completed by the FAA separate from this study will determine future instrument approach procedure minimums. Building infrastructure and other objects on the airport and within the runway approach paths will be evaluated by the FAA in determining the approach minimums. In the event that it is determined by the FAA that approach minimums as low as three-quarters of a mile cannot be obtained due to objects on the airport or within the runway approach paths, the proposed MALS would not be needed.

- **Land acquisition for approach protection**

With the onset of improved instrument approach procedures to Runway 14-32 in addition to the airport transitioning to ARC C/D-II design standards, the proposed runway protection zones (RPZs) will further expand to include areas outside existing airport property. The Master Plan Concept depicts two types of land acquisition. The first type of land acquisition is related to securing the proposed RPZ associated with Runway 32. Approximately 1.5 acres of land to include a portion of the perimeter road on the southwest side of the airport are included in the proposed RPZ. Due to the nature of the property and proposed development farther south of the airport in the future, the plan proposes realigning the perimeter road outside the RPZ and acquiring the 1.5 acres through fee-simple property acquisition in order to maintain total control over the area.

A second type of land acquisition is shown to provide protection to the proposed RPZ associated with Runway 14. Approximately six acres of land just to the northwest of airport property would fall within the RPZ. This area would need to be controlled by at least an avigation easement in order to provide approach protection from

any future development. Although the FAA typically recommends fee simple property acquisition for areas within the RPZ, avigation easements can be obtained. An avigation easement is typically structured to provide the airport with control of the airspace above the property. Given that State Highway 95 traverses this area, it is not possible to purchase this property through fee simple acquisition; thus, making an avigation easement more reasonable.

- **The construction of an additional exit taxiway on the west side of Runway 14-32 to provide a more efficient taxiing network from the runway system**

The Master Plan Concept includes the construction of an additional high-speed exit taxiway extending west of Runway 14-32 farther to the north. The existing high-speed exit taxiways were constructed to accommodate Runway 14-32 when it was initially built at 5,500 feet. Since the runway has been extended to 8,001 feet, analysis shows that an additional high-speed exit taxiway located farther north would better serve larger jet aircraft. As a result, the high-speed exit taxiway is proposed approximately 4,200 feet from the Runway 32 threshold.

As demand warrants, providing for an additional high-speed exit taxiway will increase the capacity of Runway 14-32 and will enhance and improve aircraft operational flow on the airport.

- **The extension of Taxiway C south to provide access for future aviation development on the airport**

The extension of Taxiway C approximately 1,900 feet to the south is proposed to satisfy potential landside development in the southwest area of the airport. This taxiway could provide access to aviation-related development in the form of aircraft storage hangars and commercial aviation businesses and would be designed to meet ADG II aircraft design standards.

It should be noted that the proposed extension of Taxiway C does traverse areas of land currently outside the existing airport property line. Prior to constructing the entire length of the proposed taxiway, property adjacent to the southwest side of the airport would need to be acquired by Lake Havasu City Municipal Airport. This is further discussed in the landside development plan to follow.

- **The installation of taxiway lighting on all active taxiways**

Currently, only parallel Taxiway A and the entrance/exit taxiways are equipped with medium intensity taxiway lighting (MITL). In an effort to increase safety and provide enhanced guidance for aircraft taxiing during nighttime and/or poor weather conditions, MITL should be applied to all active taxiways on the airport. This includes Taxiway B, Taxiway C, and any future taxiways constructed at the airport.

- **The relocation of the segmented circle and wind cone to conform to future airport design standards**

It has been determined that once the ARC design standards are upgraded to C/D-II, the existing location of the segmented circle and wind cone will penetrate the proposed OFA. FAA AC 150/5300-13, *Airport Design*, indicates that the OFA should be cleared of objects protruding above the runway safety area edge elevation.

The Master Plan Concept depicts the relocation of the segmented circle and wind cone approximately 1,500 feet northeast of their current location. In doing so, the facility will be located outside the ultimate OFA and also provide a more desired midfield location.

- **The construction of a partial-parallel taxiway on the east side of Runway 14-32 to allow for future aviation development**

A partial-parallel taxiway on the east side of Runway 14-32 is depicted on the Master Plan Concept. This taxiway would allow for certain areas in the southeast area of the airport to be afforded aircraft access which could lead to aviation-related development. This taxiway measures approximately 2,500 feet in length and is located 300 feet from the runway centerline. This distance complies with runway-to-parallel taxiway separation requirements for an ARC C/D-II runway providing an instrument approach procedure with not lower than three-quarters of a mile visibility minimum.

A study is currently being conducted that calls for the potential realignment of State Highway 95 on the east side of the airport. If this were to occur, automobile access and utility infrastructure would better accommodate future aviation development on the east side of the airport. It should be mentioned, however, that forecast aviation demand through the long term planning horizon of this Master Plan can be accommodated on the west side of Runway 14-32. It is likely that any development in the southeast area of the airport including a partial-parallel taxiway will occur outside the planning period of this study.

LANDSIDE DEVELOPMENT PLAN

Examples of landside facilities include aircraft storage hangars, terminal buildings, aircraft parking aprons, hangar and apron access taxilanes, fuel storage facilities, and vehicle parking lots. The landside plan for Lake Havasu City Municipal Airport has been devised to efficiently accommodate potential aviation demand and provide revenue enhancement possibilities by designating the use of certain portions of airport property for aviation-related and non-aviation-related commercial and industrial uses. Future construction of landside facilities is anticipated to be accomplished through a combination of private and public investments. This is more clearly illustrated in Chapter Six.

All existing landside facilities at Lake Havasu City Municipal Airport are located on the west side of the runway. Parallel Taxiway A connects the terminal apron and main aircraft parking aprons to either end of the runway. The current terminal building is located at approximately midfield, with hangar development located to the north. Conventional, executive, shade, and Port-A-Port hangar storage space is provided, and the airport maintains a waiting list for additional hangar space.

The primary goal of landside facility planning is to provide adequate aircraft storage space while also maximizing operational efficiencies and land uses. Achieving this goal yields a development scheme which segregates aircraft users (large vs. small aircraft) while maximizing the airport's revenue potential.

The development of landside facilities will be demand-based. In this manner, the facilities will only be constructed if required by verifiable demand. For example, additional aircraft storage hangars will be constructed only if new based aircraft owners desire enclosed aircraft storage. The landside plan is based on projected needs that can change over time. The landside plan is developed with flexibility in mind to ensure the orderly development of the airport should this demand materialize. **Exhibit 5A** depicts the recommended landside development plan for the airport.

West Side Development Area

As previously mentioned, all aviation-related facilities are located on the west side of the airport. This includes the passenger terminal building, fixed base operators (FBOs), aircraft storage hangars, aircraft parking aprons, and other support facilities.

The current terminal building was constructed in 1991 and provides for approximately 5,700 square feet of space that is occupied by airport administrative offices, two rental car agencies, and amenities for commercial airline service to include passenger waiting areas, a baggage claim area, a vending area, and a ticket counter. Analysis in Chapter Three indicated the need for additional terminal building space to accommodate the future demands of airport users. Lake Havasu City Municipal Airport can expect an increase in passenger enplanements through the planning period in the event that it regains commercial service. It was indicated that the terminal building will need to provide approximately 10,000 square feet in order to accommodate the functions associated with commercial airline service by the long term planning period.

In an effort to better accommodate future airport users and maximize the amount of available space in the terminal area, the recommended plan proposes construction of a new passenger terminal building site approximately 900 feet south of the current

location. Proposed automobile parking associated with the new terminal building location will be provided directly west of the facility with access being provided by a new roadway extending east from Retail Centre Boulevard.

An added benefit of the new terminal building location will be the amount of space made available for additional aviation-related development. The Master Plan Concept proposes air cargo activity to be relocated to the existing terminal area once a new terminal building is constructed farther south. Currently, a designated air cargo area is located in the northwest portion of the main aircraft parking apron adjacent to the leased automobile parking lot. This requires larger turboprop aircraft associated with the transfer of air cargo to taxi through areas designated for aircraft parking and FBO activities. The air cargo area would be better served in a location that provides more convenient access to the taxiway system. As a result, a short term air cargo area is proposed on the north aircraft parking apron that will provide improved segregation of air cargo operations. As previously discussed, once a new passenger terminal building is constructed, air cargo activity could be transferred to the existing terminal area. This would be desirable as the facility would provide a more secure location for the screening of cargo and vehicles as they enter the airfield environment.

In order to accommodate larger vehicles associated with the ground movement of cargo, the roadway leading to this area is depicted as being realigned to eliminate the near 90 degree turns that may disable large transport trucks from accessing the facility. A one-way entrance and exit road connecting to Patton Drive will provide automobile access to the ultimate air cargo area. It should be noted that the existing terminal facility could also support other commercial business operations.

Other areas adjacent to the existing terminal building were closely studied for future development. Marked helicopter parking areas are located on the terminal apron to the east, providing improved separation from fixed-wing aircraft activities on the main aircraft parking apron.

Facility planning in Chapter Three suggested that a location should be reserved for the development of an airport traffic control tower (ATCT), should future justification support one. As a result, the Master Plan Concept reserves an area of land immediately south of the existing terminal building for the potential construction of an ATCT. This is a desirable midfield location providing good visibility to the runway and taxiways on the airport. It should be noted that current and future aircraft operations projections will not fully fund the construction and operation of an ATCT; thus, future justification of the facility may not be warranted during the planning period of this Master Plan. The recommended plan only reserves an area for the future development of an ATCT should justification ever support one.

Farther to the north, two rows of large aircraft parking are proposed on the main aircraft parking apron. In addi-

tion, an area designated for future redevelopment is depicted that could accommodate aircraft hangars used for commercial aviation activities and/or aircraft storage. An aircraft storage hangar in the form of a T-hangar or shade hangar is proposed on the north side of the main aircraft parking apron. Future aviation development is called for in areas on the northwest side of the main parking apron. Currently, a portion of this area is dedicated for a leased automobile parking lot. Upon completion of the relocated terminal building and automobile parking lot on the south side of the airport, the existing leased automobile parking lot can be relocated to the dedicated automobile parking area. This is desired as it will better segregate aircraft and automobiles while also providing additional space for aviation development.

Adjacent to the aircraft parking area on the north side of the airport are seven proposed aircraft storage hangars. Single engine and smaller multi-engine aircraft could utilize these hangar facilities. An additional taxiway connecting the north aircraft parking apron and parallel Taxiway A is planned to improve the flow of aircraft in this area.

As previously discussed, the Master Plan Concept also proposes future development of the southwest side of the airport. As a large majority of this area is currently vacant, significant improvements will be needed, including roadway access and utility extensions, before infrastructure development can begin. Careful consideration should be given regarding the implementation of staging projects in this area. While the recommended plan shows total build-out in this area, actual demand will dictate the timeline for future development.

The orderly development of the southwest side of the airport will be important and should provide for the proper separation of high, medium, and low activity levels at the airport. The high activity area should be planned and developed to provide aviation services on the airport. Examples would include the relocated terminal building and adjoining aircraft parking areas, which provide tiedown locations and circulation for aircraft. Large conventional style hangars used for FBOs, corporate aviation departments, and the storage of large numbers of aircraft should also be considered in this area. The best locations for these types of activities are near the flight line. In the case at Lake Havasu City Municipal Airport, these proposed high activity functions are located adjacent to Taxiway C.

An aircraft wash rack and airport maintenance building are also proposed toward the south end of the high activity development area. Currently, airport maintenance personnel utilize an existing hangar and other outside locations for equipment storage. A dedicated airport maintenance staging area would provide for vehicle access without the need to traverse aircraft operational areas and allow for aircraft storage in the hangar currently being utilized for equipment storage. This location will be provided access via the perimeter road that currently lies next to the property line on the southwest side of the airport.

To the west of the proposed conventional hangar development includes smaller executive and T-hangars that would fit the medium and low activity levels. The best location for these types of facilities are off the immediate flight line, but still readily accessible to aircraft, including corporate jets. A taxiway extending west from Taxiway C separates the executive and T-hangar development, which is preferred.

The Master Plan Concept also proposes the acquisition of approximately 23 acres of land south of the existing perimeter road to be utilized for future aviation-related development. Four aviation access revenue support parcels are depicted ranging in size from approximately two to five acres and are provided access via a taxiway extending west of the proposed extension to Taxiway C. These parcels could support aviation businesses and/or aircraft storage.

Portions of the west side of the airport are not provided airfield access. Automobile access routes and physical land constraints limit the areas from airfield access. As such, the utility of these areas is limited to non-aviation development in the form of commercial and industrial parcels. These uses are allowable by the FAA as long as they are not minimizing the availability of aviation-related property. Commercial and industrial uses provide the airport with an opportunity to improve revenue streams, increasing the airport's financial resources. These uses should be promoted as a means to bolster the airport's financial position and ability to become and remain financially self-sufficient.

East Side Development Area

In order to fully utilize all areas on the airport, the recommended plan highlights portions of the southeast area of the airport for future aviation development. As previously discussed, preliminary plans calling for the relocation of State Highway 95 on the east side of the airport could make this area much more attractive for future development. As is the case with the southwest side of the airport, before infrastructure development can begin, utility extensions and roadways will be needed. The timeline for development in this area will likely extend beyond the long term planning period associated with this Master Plan.

Landside Summary

The following list includes the major considerations for landside improvements at Lake Havasu City Municipal Airport throughout the planning period.

- Improve utilities, aircraft access, and automobile access to the southwest area of the airport for future aviation-related development.
- Construct a new terminal building south of the current location on the airport.
- Consider proper implementation of infrastructure development on the southwest side of the airport to in-

clude a terminal facility area, hangars, and aircraft apron space.

- Construct additional aircraft storage hangars adjacent to the north aircraft parking apron.

- Construct aviation support facilities to include an aircraft wash rack and airport maintenance building.

- Designate additional marked parking spaces for large aircraft on the main aircraft parking apron.

- Identify approximately 23 acres of land adjacent to the southwest side of the airport for future fee simple property acquisition to be utilized for aviation-related development.

- Identify areas of land on airport property that are not provided airfield access for non-aviation development to further enhance airport revenue support.

- Identify land on the southeast side of the airport for future aviation-related development to fully maximize all areas of airport property.

ENVIRONMENTAL EVALUATION

A review of the potential environmental impacts associated with proposed airport projects is an essential consideration in the Airport Master Plan process. The primary purpose of this section is to review the proposed improvement program at Lake Havasu City Municipal Airport to determine whether the proposed actions could, individually or collectively, have the potential to significantly affect the quality of the environment. The information contained in this section was obtained from previous studies, various internet websites, and analysis by the consultant.

Construction of the improvements depicted on the Airport Layout Plan (ALP) will require compliance with the *National Environmental Policy Act* (NEPA) *of 1969*, as amended to receive federal financial assistance. For projects not "categorically excluded" under FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, compliance with NEPA is generally satisfied through the preparation of an Environmental Assessment (EA). Instances in which significant environmental impacts are expected, an Environmental Impact Statement (EIS) may be required.

While this portion of the Master Plan is not designed to satisfy the NEPA requirements for a categorical exclusion, EA, or EIS, it is intended to supply a preliminary review of environmental issues that would need to be analyzed in more detail within the NEPA process. This evaluation considers all environmental categories required for the NEPA process as outlined in FAA Order 1050.1E and Order 5050.4B, *National Environmental Policy Act Implementation Instructions for Airport Actions.*

FAA Orders 1050.1E and 5050.4B contain a list of the environmental categories to be evaluated for airport projects. Of the 23 environmental categories described in the FAA's *Envi-*

ronmental Desk Reference (2007), the following resources are not found within the airport environs:

- Coastal Resources (Coastal Barriers and Coastal Zones)
- Farmland
- Wild and Scenic Rivers

Since these are not found within the airport environs, they are not addressed in this analysis. The following sections describe potential impacts to resources present within the airport environs. These resources were described in detail within Chapter One of this study.

AIR QUALITY

The U.S. Environmental Protection Agency (EPA) has adopted air quality standards that specify the maximum permissible short-term and long-term concentrations of various air contaminants. The National Ambient Air Quality Standards (NAAQS) consist of primary and secondary standards for six criteria pollutants which include: Ozone (O_3), Carbon Monoxide (CO), Sulfur Dioxide (SO_2), Nitrogen Dioxide (NO_2), Particulate Matter (PM_{10} and $PM_{2.5}$), and Lead (Pb). Potentially significant air quality impacts, associated with an FAA project or action, would be demonstrated by the project or action exceeding one or more of the NAAQS for any of the time periods analyzed. Various levels of review apply within both NEPA and permit requirements. According to the most recent update contained on the EPA's Greenbook website, Mohave County is currently in attainment for all criteria pollutants.

A number of projects planned at the airport could have temporary air quality impacts during construction, especially those which require a large amount of land disturbance such as the construction of apron areas or taxiways. Emissions from the operation of construction vehicles and fugitive dust from pavement removal are common air pollutants during construction. However, with the use of best management practices (BMPs) during construction, these air quality impacts can be significantly lessened.

BIOTIC (FISH, WILDLIFE AND PLANTS) RESOURCES

The United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) determines that a significant impact to biotic resources will result when the proposed action would likely jeopardize the continued existence of a species in question or would result in the destruction or adverse modification of federally designated critical habitat in the area. Lesser impacts, as outlined by agencies and organizations having jurisdiction, may also result in a significant impact.

Table 5B lists the federally threatened, endangered, and candidate species with the potential to occur in Mohave County. Arizona does not have an endangered species law, although through their Comprehensive Wildlife

Conservation Strategy, Arizona does identify "Wildlife of Special Concern" (WSC). These species are also shown in **Table 5B**.

TABLE 5B
Federal and State Listed Species
Mohave County, Arizona

Common Name	Scientific Name	Federal Status	State Status
Amphibians			
Relict leopard frog	*Lithobates [Rana] onca*	C	WSC
Birds			
American peregrine falcon	*Falco perinigrus anatum*		WSC
Bald eagle	*Haliaeetus leucocephalus*	T (Desert Nesting)	WSC
Clark's Grebe	*Aechmophorus clarkia*		WSC
California Brown pelican	*Pelecanus occidentalis californicus*	E	
California condor	*Gymnogyps californianus*	E	
Least bittern	*Ixobrychus exilis*		WSC
Mexican spotted owl	*Strix occidentalis lucida*	T	
Northern goshawk	*Accipter gentilis*		WSC
Southwestern willow flycatcher	*Empidonax traillii extimus*	E	WSC
Yuma clapper rail	*Rallus longirostris yumanensis*	E	WSC
Yellow-billed cuckoo	*Coccyzus americanus*	C	
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*		WSC
Flowering Plants			
Arizona cliffrose	*Purshia subintegra*	E	
Fickeisen plains cactus	*Pediocactus peeblesianus var. fickeideniae*	C	
Holmgren (Paradox) milk vetch	*Astragulus homgreniorum*	E	
Jones cycladenia	*Cycladenia humilis var. jonesii*	T	
Siler pincushion cactus	*Pediocactus sileri*	T	
Fish			
Bonytail chub	*Gila elegans*	E	WSC
Desert pupfish	*Cyprinodon macularius*	E	WSC
Gila chub	*Gila intermedia*	E	
Humpback chub	*Gila cypha*	E	WSC
Razorback sucker	*Xyrauchen texanus*	E	WSC
Virgin River chub	*Gila seminude*	E	WSC
Woundfin	*Plagopterus argentissimus*	E	WSC

TABLE 5B (Continued)
Federal and State Listed Species
Mohave County, Arizona

Common Name	Scientific Name	Federal Status	State Status
Mammals			
California leaf-nosed bat	*Macrotus californicus*		WSC
Hualapai Mexican vole	*Microtus mexicanus hualpaiensis*	E	WSC
Reptiles			
Desert tortoise	*Gopherus agassizii (Xerobates)*	T	
Sonoran desert tortoise	*Gopherus agassizii (Sonoran population)*		WSC

Threatened (T), Endangered (E), Candidate (C), Wildlife of Special Concern (WSC)
Source: U.S. Fish and Wildlife Service, Mohave County Species List (http://www.fws.gov/southwest/es/arizona/Documents/CountyLists/Mohave.pdf) and Arizona Game and Fish Species List by Watershed, (http://www.azgfd.gov/w_c/edits/documents/ssspecies_bywatershed_001.pdf), accessed August 2008.

The amphibian, bird, and fish species listed in the table above are not present within the airport environs due to the habitat requirements of the species. Each of the listed species requires open water or riparian habitats, neither of which is present on airport property.

According to the Arizona Game and Fish Department's *On-Line Environmental Review Tool*, (accessed August 2008), the Southwestern willow flycatcher, Sonoran desert tortoise, Yuma clapper rail, and Razorback sucker have been documented to occur within three miles of Lake Havasu City Municipal Airport. In addition, there is critical habitat for the Bonytail chub within three miles of the airport. The Bonytail chub and Razorback sucker are both fish, however, due to the lack of water resources within the immediate airport environs, it is not anticipated these species will be impacted by future development at the airport. Additionally, the two birds' habitats, the southwestern willow flycatcher and Yuma clapper rail, consist of riparian areas. Again, due to the lack of water resources within the airport environs, it is not likely this species will be impacted by planned future airport development. Habitat for the Sonoran desert tortoise and other remaining listed species such as the desert tortoise, the Jones cycladenia, or the Siler pincushion cactus, may be present in the areas proposed for development, especially in the southern portions of airport property; therefore, prior to development in areas that are not regularly maintained, additional studies should be undertaken to ensure that none of the listed species are present. If any of these species are found, further coordination with the USFWS and the Arizona Fish and Game Department would be required.

CONSTRUCTION IMPACTS

Construction impacts typically relate to the effects on specific impact categories, such as air quality or noise, during construction. The use of BMPs during construction is typically a requirement of construction-related permits such as an Arizona Pollution Discharge Elimination System (AZPDES) permit. Use of these measures typically alleviates potential resource impacts.

Construction-related noise impacts are not anticipated as the area immediately surrounding the airport is either undeveloped or utilized for industrial purposes. Any possible impacts would be short-term in nature.

Construction-related air quality impacts would be expected as described in the Air Quality section above. Air emissions related to construction activities would be short-term in nature and will be included in the air emissions inventory, if one is requested.

DEPARTMENT OF TRANSPORTATION ACT SECTION 4(f) PROPERTIES

A significant impact would occur when a proposed action involves more than a minimal physical use of a Section 4(f) property, (publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or any land from a historic site of national, state, or local significance) or is deemed a "constructive use" substantially impairing the Section 4(f) property where mitigation measures do not reduce or eliminate the impacts. Substantial impairment would occur when impacts to Section 4(f) lands are sufficiently serious to the value of the site in terms of its prior significance and enjoyment being substantially reduced or lost.

A number of potential Section 4(f) properties are located in the vicinity of the airport including the Havasu National Wildlife Refuge and Lake Havasu State Park. It is not anticipated that future airport development will impact these resources as the types of development planned at the airport will not necessarily change the types or manner in which aircraft operate at the airport. For example, flight tracks over the potential Section 4(f) resources will likely not change significantly with implementation of any of the proposed airport improvements.

FLOODPLAINS

Executive Order 11988 directs federal agencies to take action to reduce the risk of flood loss, minimize the impact of floods on human safety, health, and welfare, and restore and preserve the natural and beneficial values served by the floodplains. Floodplain impacts resulting from airport development would be considered significant if the encroachment would result in either: (1) a high probability of loss of human life; or (2) substantial encroachment-associated costs or damage, including interrupting aircraft service or loss of a vital transportation facility; or (3) adverse impacts on natural and beneficial floodplain values.

The City of Lake Havasu is in the process of seeking a revision to the Federal Emergency Management Agency (FEMA) maps for the airport environs. In 2005, the city submitted a request for a Conditional Letter of Map Revision (CLOMR) to FEMA to reflect anticipated floodplain boundaries resulting from proposed development west of the airport along Highway 95. This proposed development was located within 100-year floodplains, thereby resulting in a detailed hydraulic analysis of the area. The hydraulic analysis resulted in a need for additional floodwater storage; therefore, to ensure flood protection, a floodwater detention system was constructed east of the airport. This system results in portions of airport property being removed from the designated 100-year floodplain along with the development which has since been constructed west of Highway 95.

The anticipated limits of the 100-year floodplain in the vicinity of the airport are depicted on **Exhibit 5B.** As indicated on the exhibit, the central portions of the airport are anticipated to not be located within a designated 100-year floodplain. Development undertaken in the northern or southern portions of airport property will require consultation with the public, and appropriate state and local agencies, to ensure the development will not result in significant floodplain impacts. This coordination will be undertaken in accordance with Executive Order 11988, *Floodplain Management*.

HAZARDOUS MATERIALS, POLLUTION PREVENTION, AND SOLID WASTE

According to the EPA *Enviromapper*, there are no known contaminated sites at the airport. The *Enviromapper* does indicate that Sunwestern Flyers (now known as Desert Skies Executive Air Terminal), an FBO at the airport, is a hazardous waste generator. The actions in this plan should not have any immediate effect on hazardous waste. Prior to the acquisition of land, an Environmental Due Diligence Audit (EDDA) will likely be required by the FAA to establish an environmental baseline for the property and for the identification of any known hazardous materials or environmental contamination.

The airport must comply with applicable pollution control statutes and requirements. The airport will need to comply with the AZPDES operations permit requirements. With regard to construction activities, the airport and all applicable contractors will need to comply with the requirements and procedures of the construction-related AZPDES General Permit, including the preparation of a *Notice of Intent* and a *Stormwater Pollution Prevention Plan* prior to the initiation of project construction activities.

As a result of increased operations at the airport, solid waste may slightly increase; however, these increases are not anticipated to be significant.

HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Determination of a project's environmental impact to historic and cultural resources is made under guidance in the *National Historic Preservation Act* (NHPA) *of 1966*, as amended, the *Archaeological and Historic Preservation Act* (AHPA) *of 1974*, the *Archaeological Resources Protection Act* (ARPA), and the *Native American Graves Protection and Repatriation Act* (NAGPRA) *of 1990*. In addition, the *Antiquities Act of 1906*, the *Historic Sites Act of 1935*, and the *American Indian Religious Freedom Act of 1978* also protect historical, architectural, archaeological, and cultural resources. Impacts may occur when a proposed project causes an adverse effect on a property which has been identified (or is unearthed during construction) as having historical, architectural, archaeological, or cultural significance.

As previously stated in Chapter One, there are no known or previously recorded significant archaeological sites in the airport environs. However, prior to development in previously undisturbed areas, field surveys will likely be required to confirm the lack of resources in the development area. This would pertain, for the most part, to the areas proposed for development in the southern portions of airport property (development of hangar facilities, aprons, access road extensions, etc.).

LIGHT EMISSIONS AND VISUAL IMPACTS

Airport lighting is characterized as either airfield lighting (i.e., runway, taxiway, approach and landing lights) or landside lighting (i.e., security lights, building interior lighting, parking lights, and signage). Generally, airport lighting does not result in significant impacts unless a high intensity strobe light, such as a Runway End Identifier Light (REIL), would produce glare on any adjoining site, particularly residential uses.

Visual impacts relate to the extent that the proposed development contrasts with the existing environment and whether a jurisdictional agency considers this contrast objectionable. The visual sight of aircraft, aircraft contrails, or aircraft lights at night, particularly at a distance that is not normally intrusive, should not be assumed to constitute an adverse impact.

Landside development at the airport will create several new hangar complexes as well as privately leased aviation development parcels. These new facilities are not anticipated to create an annoyance among people or interfere with normal activities as the areas planned for development are surrounded by open space and industrial land uses.

05MP08-5B-9/11/08

LIMIT OF
DETAILED STUDY

Relocated AWOS

Relocated
Segmented Circle/Windcone

Wash

Runway 14-32 8,001' x 100'

14

32

MALS

A6

A5

Short Term
Air Cargo Area

A4

Large Aircraft
Parking

A

Parking Spaces
to be Removed

A3

Helicopter
Hardstands

A2

A1

Compass
Rose

B

Airport Traffic
Control Tower
(if necessary)

Commercial
Aircraft
Parking

C

Large Aircraft
Parking

Long Term
Air Cargo Area

Permanent Maintenance
Building

Aircraft Wash Rack

Private Aviation Development
Under Construction

Auto Parking

Short Term
Maintenance
Building

LIMIT OF
DETAILED STUDY

State Highway 95

Road
Relocation

Future Airport
Redevelopment Area

Airport
Centre Blvd.

Patton Dr.

Relocated
Leased
Automobile
Parking

Relocated
Terminal
Building

Retail
Centre Blvd.

LEGEND

- Airport Property Line
- Ultimate Property Line
- Runway Safety Area (RSA)
- Object Free Area (OFA)
- Runway Protection Zone (RPZ)
- New Road/Parking
- Future Airfield Pavement
- Ultimate Building
- Non-Aviation Development
- Future Aviation Development
- Aviation Access Revenue Support Parcels
- Future Fee Simple Property Acquisition
- Future Avigation Easement
- Pavement to be Removed
- 100 Year Flood Plain
- Area Anticipated to be Removed from 100 Year Flood Plain
- Wash

MALS - Medium Intensity Approach Lighting System

NORTH

0 800 1600

SCALE IN FEET

Date of photo: 7/12/07

LAKE HAVASU CITY, ARIZONA • MUNICIPAL AIRPORT •

Exhibit 5B
MASTER PLAN CONCEPT
WITH FLOOD PLAINS

ENERGY SUPPLIES, NATURAL RESOURCES, AND SUSTAINABLE DESIGN

In instances of major proposed actions, power companies or other suppliers of energy will need to be contacted to determine if the proposed project demands can be met by existing or planned facilities.

Increased use of energy and natural resources are anticipated as the operations at the airport grow. None of the planned development projects are anticipated to result in significant increases in energy consumption.

In accordance with Executive Order 13213, *Greening the Government Through Efficient Energy Management* (1999), any projects using federal funding should undergo a life-cycle energy-efficiency analysis. This analysis should result in using the most energy efficient construction, appliances, and energy sources.

NOISE AND COMPATIBLE LAND USE

The standard methodology for analyzing noise conditions at airports involves the use of a computer simulation model. The Federal Aviation Administration (FAA) has approved the Integrated Noise Model (INM) for use in modeling noise for airports.

The INM describes aircraft noise in the *Yearly Day-Night Average Sound Level* (DNL). DNL accounts for the increased sensitivity to noise at night (10:00 p.m. to 7:00 a.m.) and is the metric preferred by the FAA, EPA, and Department of Housing and Urban Development (HUD), among others, as an appropriate measure of cumulative noise exposure.

The INM works by defining a network of grid points at ground level around the airport. It then selects the shortest distance from each grid point to each flight track and computes the noise exposure for each aircraft operation by aircraft type and engine thrust level, along each flight track. Corrections are applied for air-to-ground acoustical attenuation, acoustical shielding of the aircraft engines by the aircraft itself, and aircraft speed variations. The noise exposure levels for each aircraft are summed at each grid location. The DNL at all grid points is used to develop noise exposure contours for selected values (e.g., 65, 70, and 75 DNL). Noise contours are then plotted on a base map of the airport environs using the DNL metrics.

In addition to the mathematical procedures defined in the model, the INM has another very important element. This is a database containing tables correlating noise, thrust settings, and flight profiles for most of the civilian aircraft and many common military aircraft operating in the United States. This database, often referred to as the noise curve data, has been developed under FAA guidance based on rigorous noise monitoring in controlled settings. In fact, the INM database was developed through more than a decade of research, including extensive field measurements of more than 10,000 aircraft operations. The database also includes performance data for each aircraft to allow for the computation of airport-specific flight

profiles (rates of climb and descent). The most recent version of the INM, Version 7.0, was used for modeling the noise condition for this Master Plan.

INM Input

A variety of user-supplied input data is required to use the INM. This includes the airport elevation, average annual temperature, airport area terrain, a mathematical definition of the airport runways, the mathematical description of ground tracks above which aircraft fly, and the assignment of specific take-off weights to individual flight tracks. In addition, aircraft not included in the model's database may be defined for modeling, subject to FAA approval.

- **Activity Data**

Airport activity is defined as the take-offs and landings by aircraft operating at the facility; this is also referred to as aircraft operations. Activity is further described as either *local*, indicating aircraft practicing take-offs and landings (i.e., performing touch-and-go's), or *itinerant*, referring to the initial departure from or final arrival at the airport.

Existing airport activity (i.e., take-offs and landings, or operations by aircraft) was estimated using data prepared during the development of this Master Plan. **Table 5C** provides a breakdown of operations for the existing condition as well as the ultimate forecast year.

TABLE 5C
Operations Summary and Fleet Mix Data
Lake Havasu Municipal Airport, Lake Havasu, Arizona

Aircraft Type	Existing	Ultimate
Fixed Propeller	21,187	38,825
Variable Propeller	21,187	38,825
Multi-engine Piston	2,500	6,000
Turboprop	1,850	3,750
Light Fanjet	850	1,700
Medium Fanjet	250	500
Large Fanjet	100	300
Helicopter	1,250	2,500
Total	49,174	92,400

- **Runway Use**

Runway usage data is another essential input to the INM. For modeling purposes, wind data analysis usually determines runway use percentages. Aircraft will normally land and take-off into the wind. However, wind analysis provides only the directional availability of a runway and does not consider pilot selection, primary runway operations, or local operating conventions.

The runway usage at the airport was established through conversations with airport staff as well as an analysis of wind conditions. For the purposes of this noise modeling effort, it was assumed that Runway 14 was used 35 percent of the time and Runway 32 was used 65 percent of the time.

- **Time-of-Day**

The time-of-day at which operations occur is important as input to the INM due to the 10 decibel weighting of nighttime (10:00 p.m. to 7:00 a.m.) flights. In calculating airport noise exposure, one operation at night has the same noise emission value as 10 operations during the day by the same aircraft. For noise modeling purposes, it was assumed that 97 percent of the operations occurred during the daytime and evening hours and three percent occurred during the nighttime hours.

INM Output

Output data selected for calculation by the INM are annual average noise contours in DNL. The DNL is a measure of the 24-hour noise level of a community to allow for comparison between the no action and proposed action alternatives. DNL is the metric currently accepted by the FAA, EPA, and HUD, as an appropriate measure of cumulative noise exposure.

Impact Assessment

To standardize the assessment of airport land use compatibility and noise, the FAA has established guidelines, codified within 14 CFR Part 150, that identify suitable land uses for development near airport facilities. These guidelines state that residential development, including standard construction (residential construction without acoustic treatment), mobile homes, and transient lodging are all incompatible with noise above 65 DNL. Homes of standard construction and transient lodging may be considered compatible where local communities have determined these uses are permissible; however, sound insulation methods are recommended. Schools and other public use facilities are also generally considered to be incompatible with noise exposure above 65 DNL.

The results of the noise analysis are depicted on **Exhibit 5C**. The existing noise contours are entirely contained within existing airport property. The future noise contours would extend slightly off the property to the northwest and southeast of Runway 14-32. No residences or other noise-sensitive development are located within the 65 DNL noise contour; therefore, existing and anticipated future operations at the airport will not likely result in significant noise or compatible land use impacts.

SECONDARY (INDUCED) IMPACTS

These impacts address those secondary impacts to surrounding communities resulting from the proposed development, including shifts in patterns of population growth, public service demands, and changes in business and economic activity to the extent influenced by airport development.

Significant shifts in patterns of population movement, growth, or public service demands are not anticipated as a result of the proposed development. It could be expected, however, that the proposed development would potentially induce positive socioeconomic impacts for the community over a period of years. The airport, with expanded facilities and services, would be expected to attract additional users. It is also expected to encourage tourism, industry, and trade, and to enhance the future growth and expansion of the community's economic base. Any future socioeconomic impacts resulting from the proposed development are anticipated to be primarily positive in nature.

SOCIOECONOMIC IMPACTS, ENVIRONMENTAL JUSTICE, AND CHILDRENS RISK AND SAFETY

The proposed development plan calls for the acquisition of property through either fee simple acquisition or the acquisition of easements. All the property proposed for acquisition is currently owned by the State of Arizona and is classified as State Trust properties. Further coordination with the Arizona State Land Department will be needed to assess the potential impact of the property acquisition.

The EPA's *Environmental Justice Geographic Assessment Tool* was consulted regarding the presence of environmental justice areas within the airport environs. According to the tool, areas southwest of the airport are classified as environmental justice areas; however, planned airport development will not likely impact these areas as they are located outside the 65 DNL noise contour and the presence or lack of flight patterns over the area will not likely change due to the planned airport development projects.

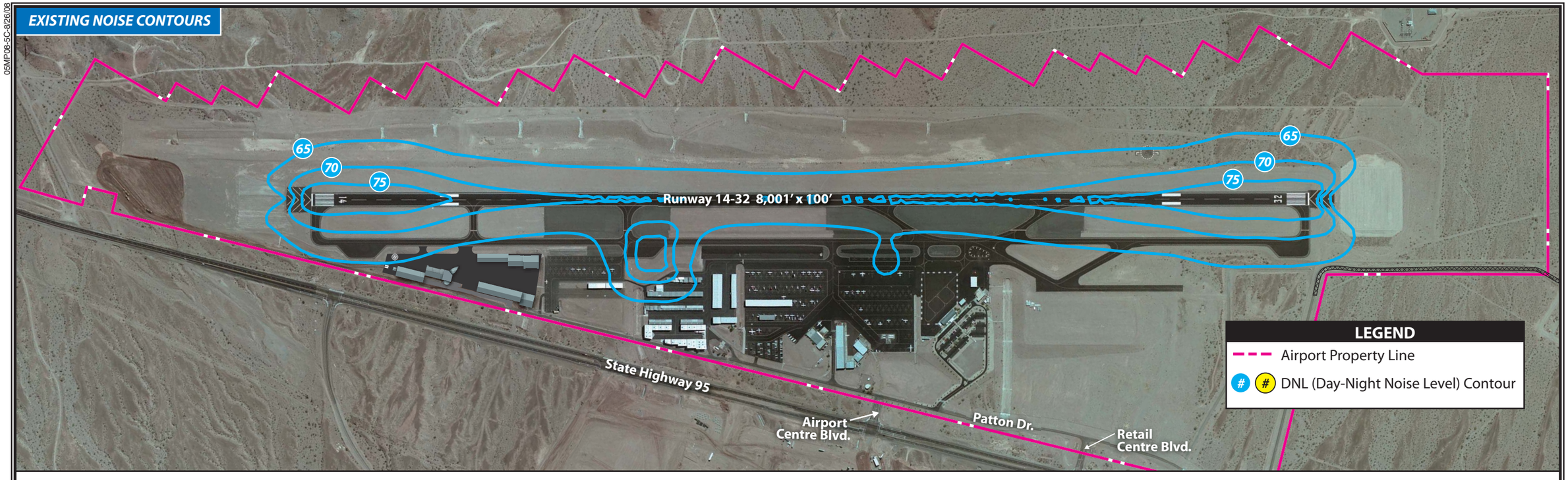
Planned development will, for the most part, occur entirely on existing airport property which is not easily accessible by children; therefore, impacts to children's health and welfare are not anticipated.

WATER QUALITY

The airport will need to continue to comply with an AZPDES operations permit. With regard to construction activities, the airport and all applicable contractors will need to obtain and comply with the requirements and procedures of the construction-related AZPDES General Permit number AZG2003-001, including the preparation of a *Notice of Intent* and a *Stormwater Pollution Prevention Plan,* prior to the initiation of project construction activities.

05MP08-5C-8/26/08

EXISTING NOISE CONTOURS



ULTIMATE NOISE CONTOURS

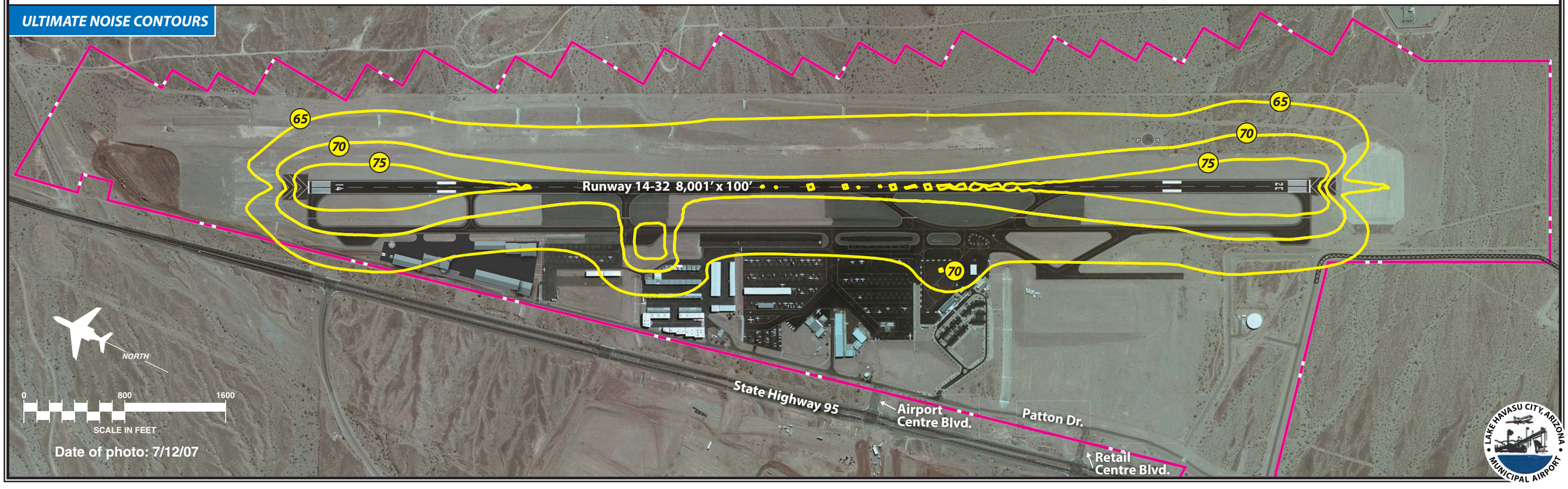


Exhibit 5C
NOISE CONTOURS

As development occurs at the airport, the AZPDES permit would possibly need to be modified to reflect the additional impervious surfaces and requirements for any stormwater retention facilities. The addition and removal of impervious surfaces may require modifications to this permit should drainage patterns be modified.

WETLANDS AND WATERS OF THE UNITED STATES

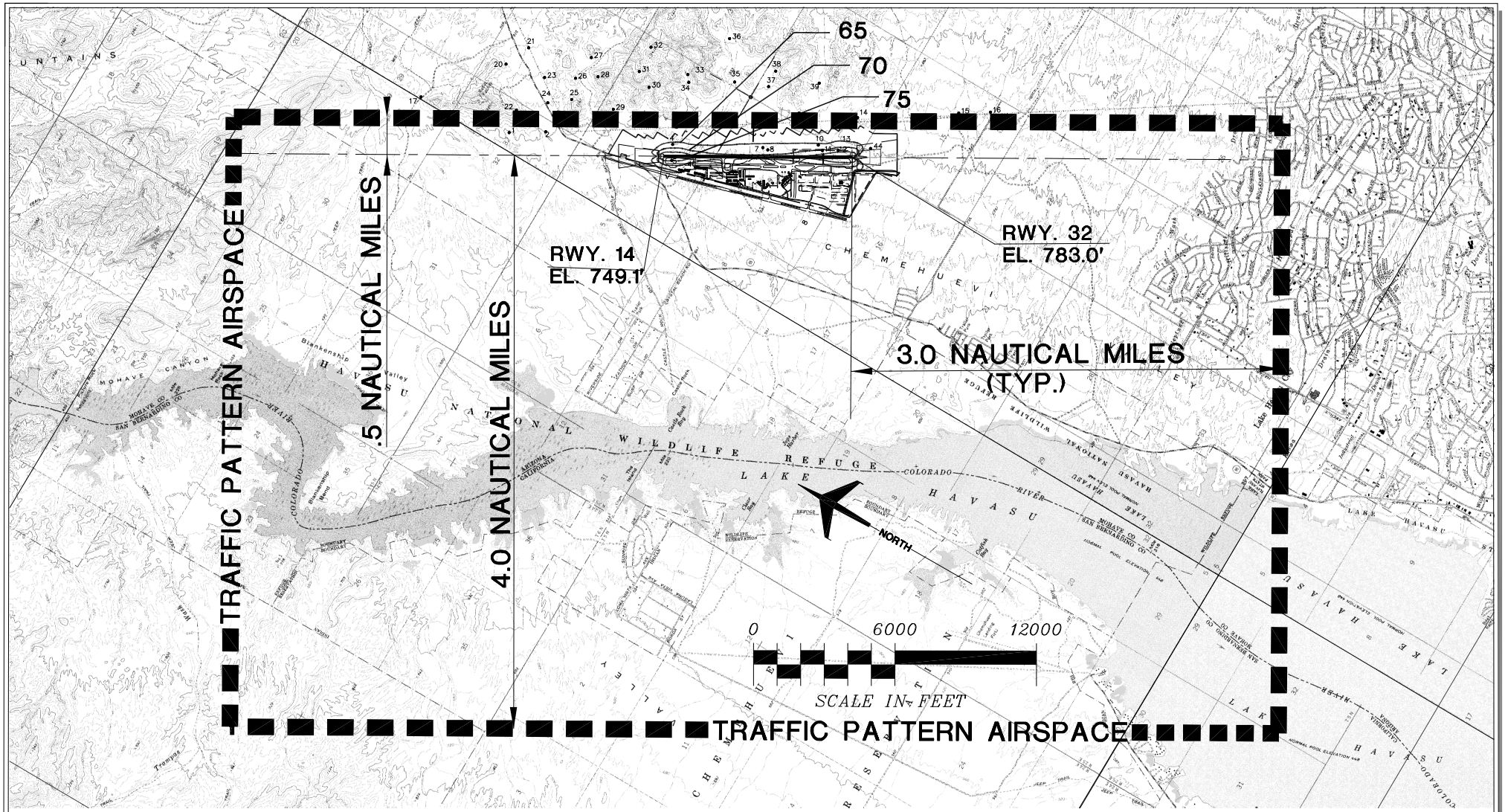
According to the online USFWS *Wetland Mapper*, there are no known wetlands on the airport property. This source provides a general overview, and before any development, this should be backed up by a "ground truth" survey to ensure that this information is accurate. If any wetlands are found and impacted, there would be a requirement to acquire appropriate permits and possibly provide mitigation.

As described in Chapter One, the only present potential Waters of the U.S. are ephemeral washes that flow southwest to the Colorado River and Lake Havasu. The approximate location of the washes is depicted on **Exhibit 5B**. Before any development activities that could impact these washes is undertaken, the limits of the major washes should be defined in the field, and a determination should be requested from the U.S. Army Corps of Engineers regarding jurisdiction. Planned developments that could occur within these areas include the expansion of taxiways on the south end of the airport, and possibly, the planned airside development in the southern portion of airport property.

PUBLIC AIRPORT DISCLOSURE MAP

As previously discussed in Chapter One, Arizona Revised Statutes (ARS) 28-8486, *Public Airport Disclosure*, provides for a public airport owner to publish a map depicting the "territory in the vicinity of the airport." The territory in the vicinity of the airport is defined as the traffic pattern airspace and the property that experiences 60 DNL or higher in counties with a population of more than 500,000 and 65 DNL or higher in counties with less than 500,000 residents. ARS 28-8486 provides for the State Real Estate Office to prepare a disclosure map in conjunction with the airport owner. The Disclosure Map is recorded with the County Recorder

Exhibit 5D depicts the Disclosure Map for Lake Havasu City Municipal Airport. Traffic pattern airspace is a function of the approach category for the runway.



NOTES:

1. This map has been prepared inaccordance with the Arizona Revised Statutes, Section 28-8486, relating to Public Airport Disclosure.
2. Traffic Pattern Airspace Boundaries have been established in accordance with the guidelines provided in the FAA Order JO 7400.2G
3. The Airport Noise Contours have been developed with the Integrated Noise Model (Version 7.0a) and are based on the Total Annual Operations (Take-offs and Landings) of 92,400.
4. 1 Nautical mile = 6,080 feet or 1, 516 statute miles.
5. Base map derived from electronic USGS quadrangles Topock, Lake Havasu City South, Lake Havasu City North, Havasu Lake, Castle Rock.

LEGEND:

- TRAFFIC PATTERN AIRSPACE
- 65 — NOISE CONTOURS DAY NIGHT LEVEL (DNL)
- EXISTING AIRPORT PROPERTY LINE
- EXTENDED RUNWAY CENTERLINE

LAKE HAVASU CITY AIRPORT

PUBLIC AIRPORT DISCLOSURE MAP

LAKE HAVASU CITY, ARIZONA

PLANNED BY:	Matt Quick
DETAILED BY:	Maggie Beaver
APPROVED BY:	James M. Harris, P.E.
March 9, 2010	SHEET 1 OF 1

Coffman Associates
Airport Consultants
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Exhibit 5D
Public Airport Disclosure Map