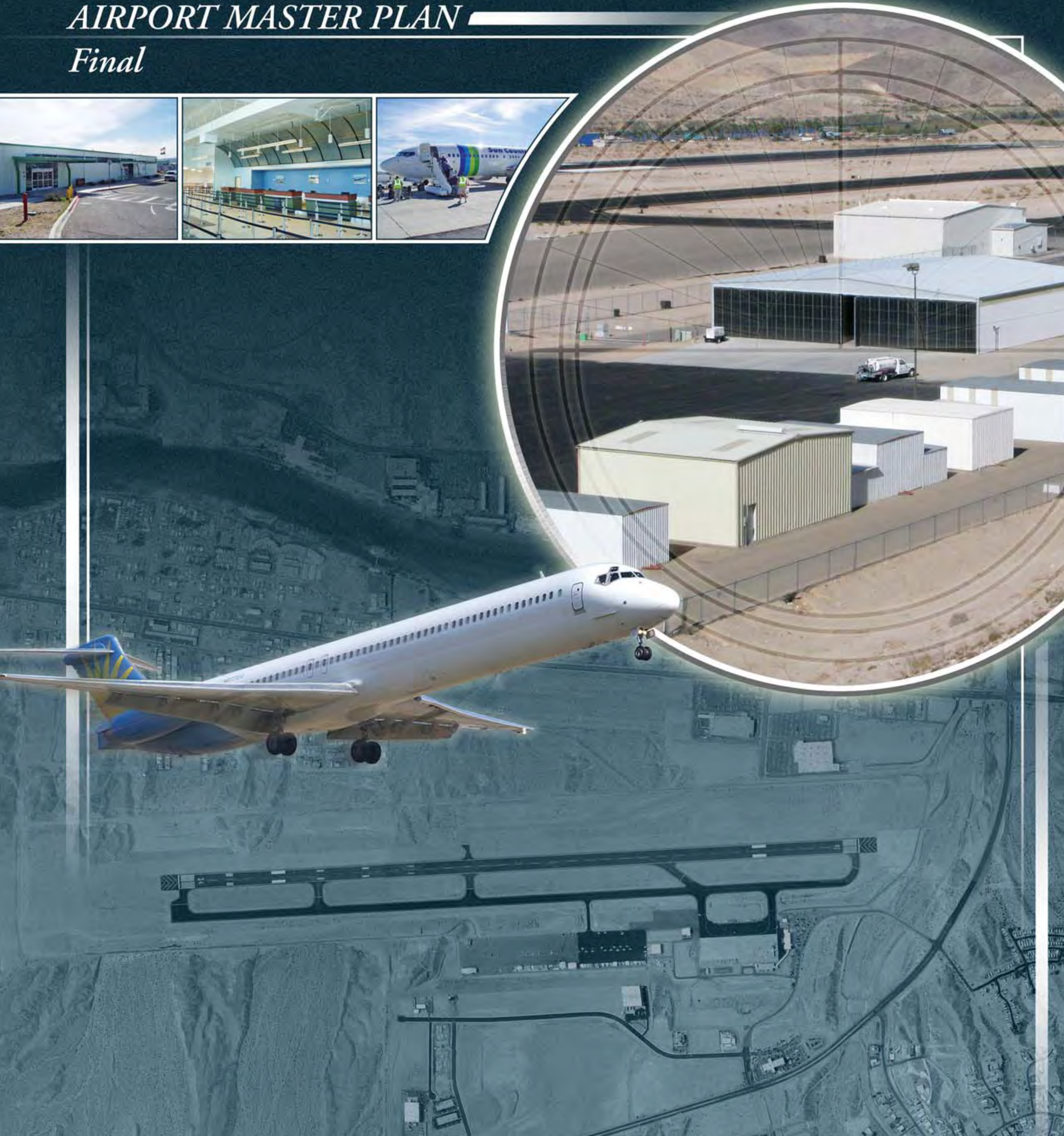
LAUGHLIN BULLHEAD INTERNATIONAL AIRPORT

AIRPORT MASTER PLAN

Final



FINAL
AIRPORT MASTER PLAN

for

LAUGHLIN/BULLHEAD
INTERNATIONAL AIRPORT
Bullhead City, Arizona

Prepared for the
MOHAVE COUNTY AIRPORT AUTHORITY

by

Coffman Associates, Inc.

Approved January 20, 2009

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LAUGHLIN BULLHEAD INTERNATIONAL Airport

INTRODUCTION

The Laughlin/Bullhead International Airport Master Plan Update has been undertaken to evaluate the airport's capabilities and role, to forecast future aviation demand, and to plan for the timely development of new or expanded facilities that may be required to meet that demand. The ultimate goal of the Master Plan is to provide systematic guidelines for the airport's overall maintenance, development, and operation.

The Master Plan is intended to be a proactive document which identifies and then plans for future facility needs well in advance of the actual need. This is done to ensure that the Mohave County Airport Authority (MCAA) can coordinate project approvals, design, financing, and construction in a timely manner, prior to experiencing the detrimental effects of inadequate facilities.

An important result of the Master Plan is reserving sufficient areas for future facility needs. This protects development areas and ensures they will be readily available when required to meet future needs. The intended result is a detailed land use concept which outlines specific uses for all areas of airport property.

The preparation of this Master Plan is evidence that the MCAA recognizes the importance of air transportation to the community and the associated challenges inherent in providing for its unique operating and improvement needs. The cost of maintaining an airport is an investment which yields impressive benefits to the community. With a sound and realistic Master Plan, Laughlin/Bullhead International Airport can maintain its role as an important link to the national air transportation system for the community and maintain the existing public and private investments in its facilities.

The MCAA initiated this Master Plan in 2007 to re-evaluate and adjust as necessary the future development plan for the Laughlin/Bullhead International Airport. The last Master Plan for Laughlin/Bullhead International Airport was completed in October 2000. Since that time, the MCAA has invested considerable funds into the rehabilitation of airfield pavements, most recently in 2007 with the complete reconstruction of Runway 16-34. All general aviation facilities have now been moved to the existing airport site east of Runway 16-34. General aviation facilities were formally located along State Route 95 west of Runway 16-34 - the original airport site. This area along State Route 95 has been redeveloped for commercial uses. Revenues from land leases in this area support the operation and development of the airport. The new departure building has been added since 2000 and the main terminal building was rehabilitated in 2007.

MASTER PLAN GOALS AND OBJECTIVES

The primary objective of the Laughlin/Bullhead International Airport Master Plan is to develop and maintain a financially feasible, long term development program which will satisfy aviation demand and be compatible with community development, other transportation modes, and the environment. The accomplishment of this objective requires the evaluation of the existing airport and a determination of what actions should be taken to maintain an adequate, safe, and reliable airport facility to meet the air transportation needs of the area. The completed Master Plan will provide an outline of the necessary development and give responsible officials advance notice of future needs to aid in planning, scheduling, and budgeting.

Specific goals and objectives of the Laughlin/Bullhead International Airport Master Plan are:

- **Preserve Public and Private Investments**

The MCAA, the United States Government (through the Federal Aviation Administration [FAA]), and the Arizona Department of Transportation (ADOT) have made considerable investments in the airport's infrastructure. Private individuals and businesses have made investments in buildings and other facilities. The Master Plan will provide for continued maintenance and necessary improvements to the airport's infrastructure to ensure maximum utility of the private facilities at Laughlin/Bullhead International Airport and ensure the continued use of publicly-funded facilities.

- **Be Reflective of Community Goals and Objectives**

The Laughlin/Bullhead International Airport is a public facility serving the needs of the local residents and businesses. The Master Plan needs to be reflective of the desires and visions the local communities have for quality of life, business and development, and land use. The Master Plan will consider existing community planning documents for surrounding communities in the ultimate design and use of the airport.

- **Maintain Safety**

Safety is an essential consideration in the planning and development at the airport. The Master Plan will focus on maintaining the highest levels of safety for airport users, visitors, employees, and surrounding communities.

- **Preserve the Environment**

Protection and preservation of the local environment are essential concerns in the Master Plan. Any improvements called for in the Master Plan will be mindful of environmental requirements.

- **Attract Public Participation**

To ensure that the Master Plan reflects the concerns of the public, the local communities, airport tenants, airport users, and businesses throughout the region, the Master Plan process will include an active public outreach program to solicit comments and suggestions and include them in the final Master Plan, to the extent possible.

- **Strengthen the Economy**

In continuing support of the area's growing economy, the Master Plan is aimed at retaining and increasing jobs and revenue for the region and its businesses.

MASTER PLAN TASKS

The Master Plan will accomplish these objectives by carrying out the following:

- Determining projected needs of airport users through the year 2027.

- Reviewing the potential for enhanced air service as well as expanded cargo activities.

- Examining the need for, and location of, a new passenger terminal building and cargo facilities.

- Identifying existing and future facility needs.

- Evaluating if portions of airport property might be considered "excess" by the FAA and, therefore, may be suitable for non-aviation development.

- Developing a realistic, common-sense plan for the use and/or expansion of the airport.

- Developing land use strategies for the use of airport property.

- Evaluating the land acquisition requirements (if any) for future airport facility development and/or safety requirements.

- Establishing a schedule of development priorities and a program for improvements.

- Analyzing the airport's financial requirements for capital improvement needs and grant options.

- Coordinating this Master Plan with local, regional, state, and federal agencies.

- Conducting active and productive public involvement through the planning process.

MASTER PLAN ELEMENTS AND PROCESS

The Laughlin/Bullhead International Airport Master Plan Update was prepared in a systematic fashion following FAA guidelines and industry-accepted principles and practices. The Master Plan Update for Laughlin/Bullhead International Airport has six general elements that are intended to assist in the discovery of future facility needs and provide the supporting rationale for their implementation.

Exhibit IA provides a graphical depiction of the process and elements involved in the Laughlin/Bullhead International Airport Master Plan Update.

Element One encompasses the inventory efforts. The inventory efforts are focused on collecting and assembling relevant data pertaining to the airport and the area it serves. Information is collected on existing airport facilities and operations. Local economic and demographic data is collected to define the local growth trends. Planning studies which may have relevance to the Master Plan are also collected. Information collected during the inventory efforts is summarized in Chapter One, Inventory.

Element Two examines the potential aviation demand for aviation activity at the airport. This analysis utilizes local socioeconomic information, as well as national air transportation trends to quantify the levels of aviation activity which can reasonably be expected to occur at Laughlin/Bullhead International Airport though the year 2027. This includes commercial airline enplanements, air cargo, general aviation based aircraft, and annual aircraft operations by type. The results of this effort are used to determine the types and sizes of facilities which will be required to meet the projected aviation demands for the airport through the planning period. The results of this analysis are presented in Chapter Two, Aviation Demand Forecasts.

Element Three comprises the facility requirements analysis. The intent of this analysis is to compare the existing facility capacities to forecast aviation demand and determine where deficiencies in capacities (as well as excess capacities) may exist. Where deficiencies are identified, the size and type of new facilities to accommodate the demand are identified. The airfield analysis focuses on improvements needed to serve the type of aircraft expected to operate at the airport in the future, as well as navigational aids to increase the safety and efficiency of operations. This element also examines aircraft storage hangars and apron needs. The findings of this analysis are presented in Chapter Three, Facility Requirements.

Element Four considers a variety of solutions to accommodate the projected facility needs. This element proposes various facility and site plan configurations to efficiently and effectively use the available airport property. A thorough analysis is completed to identify the strengths and weaknesses of each proposed development alternative, with the intention of determining a single direction for development. These results are presented in Chapter Four, Airport Development Alternatives.

Element Five comprises two independent, yet interrelated work efforts: a recommended development plan and an environmental overview. Chapter Five, Airport Plans, presents a graphic and narrative description of the recommended plan for the use, development, and operation of the airport, and a review of federal environmental requirements applicable to Laughlin/Bullhead International Airport. The official Airport Layout Plan (ALP) drawings used by the FAA in determining grant eligibility and funding will be included as an appendix to the Master Plan.

Element Six focuses on the capital needs program. This program defines the schedules, costs, and funding sources for the recommended development projects. The Capital Improvement Program (CIP) will be included in Chapter Six.

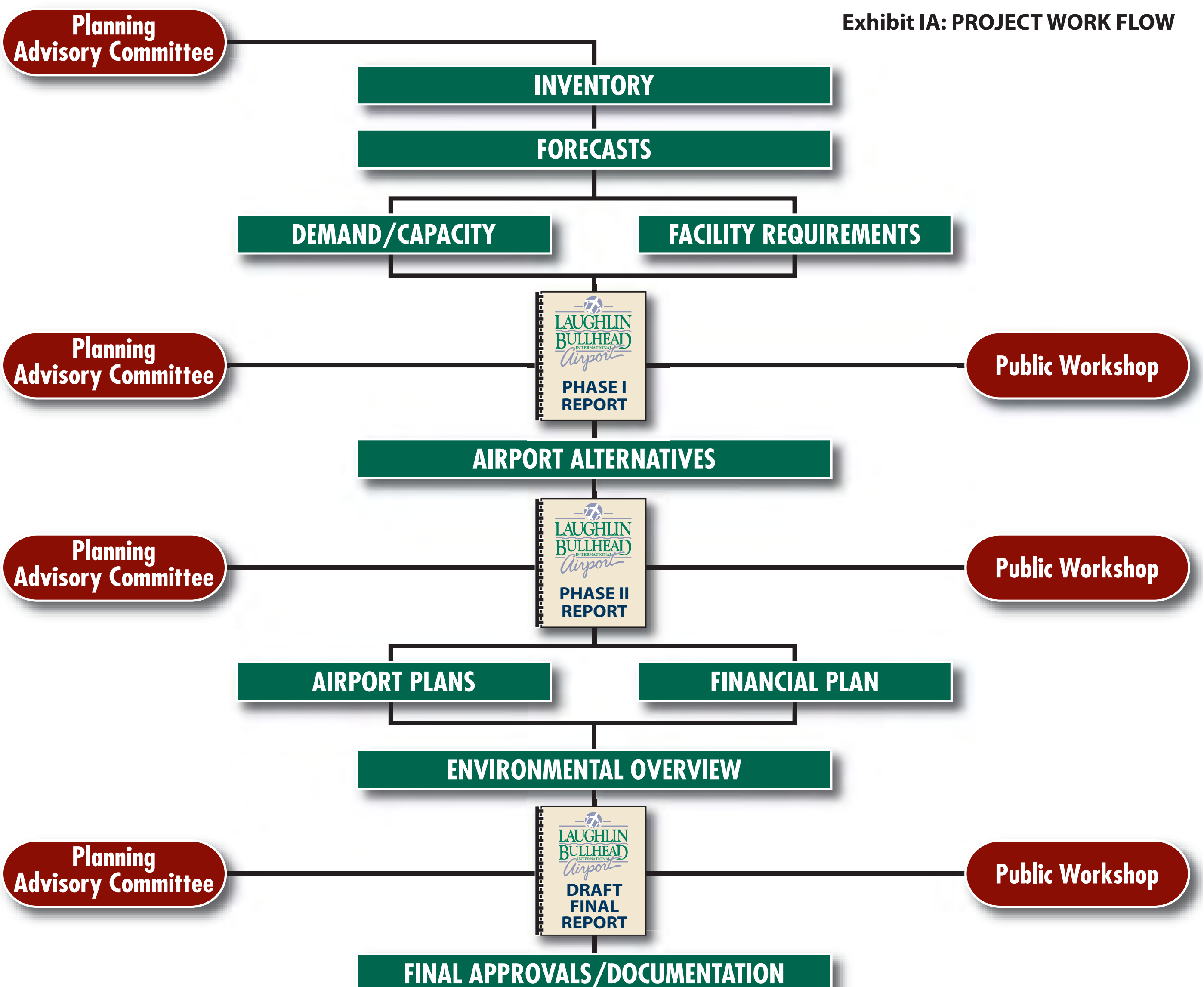


Exhibit IA: PROJECT WORK FLOW

COORDINATION

The Laughlin/Bullhead International Airport Master Plan Update is of interest to many within the local community. This includes local citizens, community organizations, airport users, airport tenants, area-wide planning agencies, and aviation organizations. As an important component of the regional, state, and national aviation systems, the Master Plan Update is of importance to both state and federal agencies responsible for overseeing air transportation.

To assist in the development of the Laughlin/Bullhead International Airport Master Plan Update, the MCAA identified a cross-section of community members and interested persons to act in an advisory role in the development of the Master Plan. As members of the Planning Advisory Committee (PAC), the committee members reviewed phase reports and provided comments throughout the study to help ensure that a realistic, viable plan was developed.

To assist in the review process, a series of draft phase reports were prepared at three milestones in the planning process as shown on **Exhibit IA**. The draft phase reports allowed for input and review during each step of the Master Plan process to ensure that all Master Plan issues were fully addressed, as the recommended program developed.

Three public information workshops are also included as part of the plan coordination. The public information workshops allowed the public to provide input and learn about general information concerning the Master Plan. The Master Plan report was also available on the internet via the consultant's web page: www.ifp.airportstudy.com.

BASELINE ASSUMPTIONS

A study such as this typically requires some baseline assumptions that will be used throughout the analysis. The baseline assumptions for the Laughlin/Bullhead International Airport Master Plan Update are listed below:

- Laughlin/Bullhead International Airport will continue to operate as a commercial service airport serving Bullhead City in Arizona and the Town of Laughlin and related gaming industry in Nevada.
- Laughlin/Bullhead International Airport will continue to pursue commercial service opportunities.
- Laughlin/Bullhead International Airport will continue to pursue air cargo opportunities.
- The airport will operate under the direction of the MCAA throughout the planning period.
- Laughlin/Bullhead International Airport intends to seek general aviation and corporate business aviation based tenants and transient operations.
- The aviation industry on the national level will grow as forecast by the FAA in its annual Aerospace Forecasts.
- Population and employment in the Laughlin/Bullhead International Airport service area will continue to grow as forecast by the State of Arizona.
- The gaming industry in Laughlin, Nevada will continue to grow.

CHAPTER ONE: INVENTORY

Chapter One
INVENTORY

The initial step in the preparation of the Airport Master Plan for Laughlin/Bullhead International Airport is the collection of information that will provide a basis for the analysis to be completed in subsequent chapters. For the Master Plan, information is gathered regarding not only the airport but also the region it serves. This chapter will begin with an overview of the existing conditions at Laughlin/Bullhead International Airport consisting of descriptions of the airport facilities, airspace, and the airport's role in state and national aviation systems. This will be followed by background information regarding the City of Bullhead City, Arizona and Town of Laughlin, Nevada, including information regarding surface transportation and the historic socioeconomic profile.

AIRPORT OWNERSHIP AND ROLE

The Laughlin/Bullhead International Airport is owned by Mohave County. The airport is managed and operated by the Mohave County Airport Authority, Inc. (MCAA), a non-profit corporation. It is a volunteer organization composed of residents of Mohave County, Arizona and Clark County, Nevada. Membership requires two-thirds approval by the existing voting membership at the annual meeting.

The Authority membership also elects its Board of Directors. The eleven-member Board of Directors serve staggered three-year terms. The majority of the membership (six members) rotates annually between the two counties. During odd-numbered years, six members must be from Mohave County, and during even-numbered years, six members must be from Clark County. The Authority's Executive Director and Chief Operating Officer oversee the day-to-day business operations of the Airport Authority.

Laughlin/Bullhead International Airport is a commercial service airport serving all aspects of civil aviation and military activity. The airport is certificated under Title 14 of the Code of Federal Regulations (CFR) Part 139, *Certification of Airports*, to accommodate scheduled airline operations. While the airport does not have regularly scheduled airline service, the airport accommodates large aircraft (more than 30 passenger seats) charters by Sun Country Airlines, Allegiant Airlines, and Canadian North Airlines serving the gaming industry in Laughlin, Nevada. The airport accommodates both

private recreational and business general aviation activity. Military aircraft occasionally use the airport as a refueling stop and for training.

AIRPORT FACILITIES

This section presents a description of the existing facilities at Laughlin/Bullhead International Airport. These facilities can be divided into two distinct categories: airside facilities and landside facilities. Airside facilities include those directly associated with aircraft operation. Landside facilities include those necessary to provide a safe transition from surface to air transportation and support aircraft servicing, storage, maintenance, and operational safety.

AIRSIDE FACILITIES

Airside facilities are depicted on **Exhibit 1A**. Airside facilities include runways, taxiways, airport lighting, and navigational aids. Airside facility data is discussed in detail below.

Runway

Laughlin/Bullhead International Airport is served by a single runway. Runway 16-34 is 7,500 feet long and 150 feet wide and is constructed of asphalt. The runway was reconstructed in December 2007.

Runway Safety Area (RSA) improvements were completed concurrently with the reconstruction. Federal Aviation Administration (FAA) design standards require the RSA to extend 250 feet on each side of the runway centerline and 1,000 feet beyond the runway end. Prior to reconstructing the runway, the RSA beyond the Runway 16 end (north of the runway) did not meet these standards. The RSA only extended approximately 500 feet beyond the end of the runway where it was intersected by a perimeter service road. The Highland Wash is located beyond the perimeter service road. To provide the RSA beyond the Runway 16 end, the existing Runway 16 end was relocated 500 feet south. To maintain the existing runway length, the Runway 34 end was shifted 500 feet south, as well. The Runway 34 landing threshold will remain in its existing location until such time that the FAA can republish the instrument approach procedures to Runway 34. Therefore, the pavement that comprises the 500-foot shift will only be used for departures to the north.

The relocation of runway ends and displacement of landing thresholds has resulted in different takeoff and landing distances for each runway. To notify pilots of the different runway lengths available for landing and departure, declared distances have been implemented at the airport. Declared distances incorporate the following concepts:

Takeoff Runway Available (TORA) - The runway length declared available and suitable for the ground run of an airplane taking off;

Takeoff Distance Available (TODA) - The TORA plus the length of any remaining runway and/or clearway beyond the far end of the TORA;

Accelerate-Stop Distance Available (ASDA) - The runway plus stopway length declared available for the acceleration and deceleration of an aircraft aborting a takeoff; and

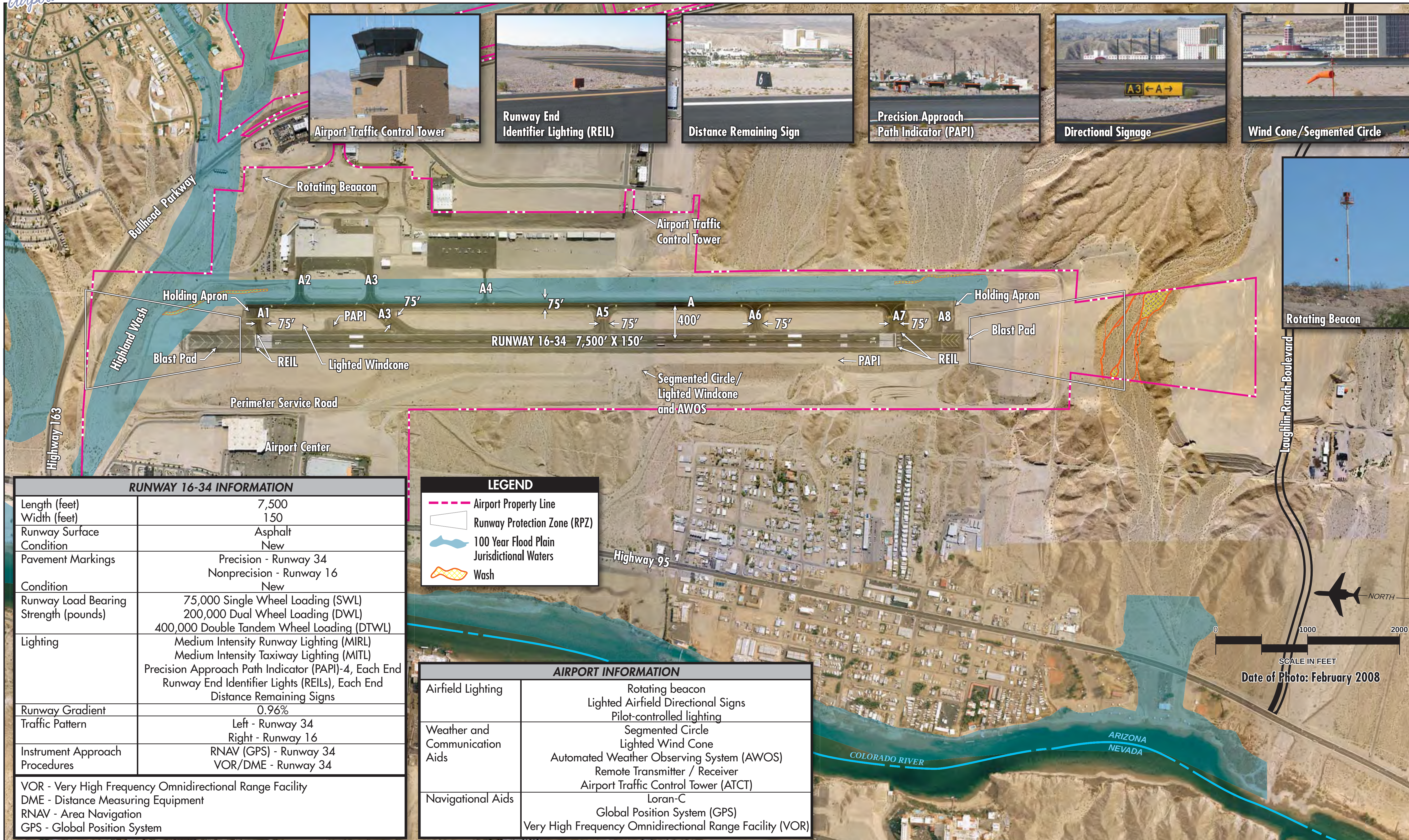
Landing Distance Available (LDA) - The runway length declared available and suitable for landing.

The declared distances at the airport are as follows:

Runway 16	
TORA	7,000 feet
TODA	7,000 feet
ASDA	7,000 feet
LDA	7,500 feet

Runway 34	
TORA	7,500 feet
TODA	7,500 feet
ASDA	7,500 feet
LDA	7,000 feet

LAUGHLIN BULLHEAD INTERNATIONAL Airport



LEGEND

- Airport Property Line
- Runway Protection Zone (RPZ)
- 100 Year Flood Plain Jurisdictional Waters
- Wash

RUNWAY 16-34 INFORMATION	
Length (feet)	7,500
Width (feet)	150
Runway Surface	Asphalt
Condition	New
Pavement Markings	Precision - Runway 34 Nonprecision - Runway 16
Condition	New
Runway Load Bearing Strength (pounds)	75,000 Single Wheel Loading (SWL) 200,000 Dual Wheel Loading (DWL) 400,000 Double Tandem Wheel Loading (DTWL)
Lighting	Medium Intensity Runway Lighting (MIRL) Medium Intensity Taxiway Lighting (MITL) Precision Approach Path Indicator (PAPI)-4, Each End Runway End Identifier Lights (REILs), Each End Distance Remaining Signs
Runway Gradient	0.96%
Traffic Pattern	Left - Runway 34 Right - Runway 16
Instrument Approach Procedures	RNAV (GPS) - Runway 34 VOR/DME - Runway 34

VOR - Very High Frequency Omnidirectional Range Facility
DME - Distance Measuring Equipment
RNAV - Area Navigation
GPS - Global Position System

AIRPORT INFORMATION	
Airfield Lighting	Rotating beacon Lighted Airfield Directional Signs Pilot-controlled lighting
Weather and Communication Aids	Segmented Circle Lighted Wind Cone Automated Weather Observing System (AWOS) Remote Transmitter / Receiver Airport Traffic Control Tower (ATCT)
Navigational Aids	Loran-C Global Position System (GPS) Very High Frequency Omnidirectional Range Facility (VOR)

Exhibit 1A
AIRFIELD FACILITIES

A paved blast pad is available beyond each runway end. These pavement areas reduce the chances of soil erosion caused by breakaway take-off thrust and propeller wash.

The runway has a pavement strength rating of 75,000 pounds single wheel loading (SWL), 200,000 pounds dual wheel loading (DWL), and 400,000 pounds double tandem wheel loading (DTWL). SWL refers to the design of certain aircraft landing gear that has a single wheel on each main landing gear strut. DWL refers to certain aircraft landing gear which has two wheels on each main landing gear strut. DTWL refers to certain aircraft landing gear which has two sets of dual wheels on each main landing gear strut in a tandem configuration.

A 1,000-foot extension of Runway 16-34 to the south is being considered. This runway extension was proposed in the previous airport master plan. An on-going Environmental Assessment (EA) is being conducted to evaluate any potential environmental impacts and for compliance with the *National Environmental Policy Act* (NEPA).

Taxiways

The taxiway system at Laughlin/Bullhead International Airport includes a full-length parallel taxiway and six connecting taxiways. Taxiway A is 75 feet wide and located 400 feet east of the Runway 16-34 centerline. Taxiways A1, A3, A5, A6, A7 and A8 connect Runway 16-34 to Taxiway A. All taxiways are 75 feet wide. Taxiway A3 is constructed at an acute angle to allow a direct connection to the terminal apron taxilane.

Holding aprons are available at each runway end. The holding aprons allow an area off the taxiway for aircraft to complete pre-departure procedures or hold awaiting clearance. This allows aircraft ready for departure to by-pass the holding aircraft and depart without delay.

Airfield Lighting

Airfield lighting systems extend an airport's usefulness into periods of darkness and/or poor visibility. A variety of lighting systems are installed at Laughlin/Bullhead International Airport for this purpose. An emergency generator is located near the terminal to power the airfield lighting systems in case of electrical supply disruptions. The lighting systems at the airport, categorized by function, are summarized as follows.

• IDENTIFICATION LIGHTING

The location of an airport at night is universally indicated by a rotating beacon which projects two beams of light, one white and one green, 180 degrees apart. The rotating beacon at Laughlin/Bullhead International Airport is located atop a metal tower northeast of the Runway 16 end.

• RUNWAY AND TAXIWAY LIGHTING

Runway and taxiway lighting utilizes light fixtures placed near the pavement edge to define the lateral limits of the pavement. This lighting is essential for maintaining safe operations at night and/or during times of poor visibility in order to maintain safe and efficient access from the runway and aircraft parking areas. Runway 16-34 is equipped with medium intensity runway lighting (MIRL). Medium intensity taxiway lighting (MITL) has been installed on all taxiways.

The Runway 16 and 34 ends are equipped with threshold lighting to identify the landing threshold. Threshold lighting consists of specially designed light fixtures that are red on one half of the lens and green on the other half of the lens. The green portion of the lights are turned towards the approach surface and intended to be seen from landing aircraft, while the red portion is visible to aircraft on the runway surface.

• VISUAL APPROACH LIGHTING

A four-box precision approach path indicator (PAPI-4) system has been installed at the Runway 16 and Runway 34 ends. The Runway 16 PAPI-4s are located on the east side of the runway approximately 700 feet south of the runway end. The Runway 34 PAPI-4s are located on the west side of the runway approximately 700 feet from the runway end. The PAPI consists of a series of lights that, when interpreted by the pilot, give him or her an indication of being above, below, or on the designed descent path to the runway.

• RUNWAY END IDENTIFICATION LIGHTING

Runway end identification lights (REILs) provide rapid and positive identification of the approach ends of a runway. A REIL system has been installed at each runway end. A REIL consists of two synchronized flashing lights, located laterally on each side of the runway threshold, facing the approaching aircraft. REILs are installed to each runway end.

• AIRFIELD SIGNS

Airfield identification signs assist pilots in identifying their location on the airfield and directing them to their desired location. Lighted airfield signs at Laughlin/Bullhead International Airport are located at aircraft hold positions, taxiway intersections, and at the intersection of the connecting taxiways and runways.

Mandatory hold signs are also installed at the airport. These signs alert the pilot to the location to stop and hold prior to taxiing to the runway. These hold signs are located 250 feet from the runway centerline on all taxiways which connect to the runway and coincide with painted hold markings on the taxiway surface.

• PILOT-CONTROLLED LIGHTING

The MIRL system on Runway 16-34 is connected to the pilot-controlled lighting system (PCL). This system allows pilots to turn on or increase the intensity of the MIRL from the aircraft with the use of the aircraft's radio transmitter. The MIRL operates from dusk to dawn.

Pavement Markings

Pavement markings aid in the movement of aircraft along airport surfaces and identify closed or hazardous areas on the airport. Runway 16 has non-precision markings which identify the runway designation, centerline, threshold, and aiming point. Runway 34 has precision markings which identify the runway designation, edges, centerline, threshold, touchdown zone, and aiming point.

Taxiway and taxilane centerline markings are provided to assist pilots in maintaining proper clearance from pavement edges and objects near the taxiway/taxilane edges. Taxiway markings also include aircraft holding positions located on the connecting taxiways. For Runway 16-34, the holdlines are marked 250 feet from the runway centerline. Aircraft movement areas on the apron are also identified with centerline markings. Aircraft tie-down positions are identified on the various apron surfaces, and pavement edge markings.

Weather Facilities

The airport has a lighted wind cone and segmented circle located approximately 4,200 feet south of the Runway 16 end and 250 feet west of the runway centerline as shown on **Exhibit 1A**. A lighted wind cone provides information to pilots regarding wind conditions. The segmented circle surrounds the lighted wind cone and provides traffic pattern information to pilots. A lighted wind sock is also available between the runway and Taxiway A adjacent to Taxiway A2, while another is located approximately 1,000 feet north of the Runway 34 threshold.

An Automated Weather Observation System III (AWOS-III) was installed at the airport in 2007. The AWOS automatically records weather conditions such as wind speed, wind gusts, wind direction, variable wind direction, temperature, dew point, altimeter setting, density altitude, visibility, variable visibility, precipitation, sky condition, and cloud height. This information is then transmitted at regular intervals. The AWOS is located adjacent the segmented circle.

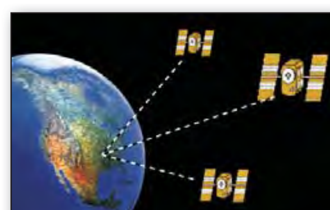
Navigational Aids

Navigational aids are electronic devices that transmit radio frequencies which pilots of properly equipped aircraft translate into point-to-point guidance and position information. The types of electronic navigational aids available for aircraft flying to or from Laughlin/Bullhead International Airport include the very high frequency omnidirectional range (VOR) facility, Loran-C, and the global positioning system (GPS).

The VOR, in general, provides azimuth readings to pilots of properly equipped aircraft by transmitting a radio signal at every degree to provide 360 individual navigational courses. Frequently, distance measuring equipment (DME) is combined with a VOR facility (VOR/DME) to provide distance as well as direction information to the pilot. Military tactical air navigation aids (TACANs) and civil VORs are commonly combined to form a VORTAC. A VORTAC provides distance and direction information to civil and military pilots.

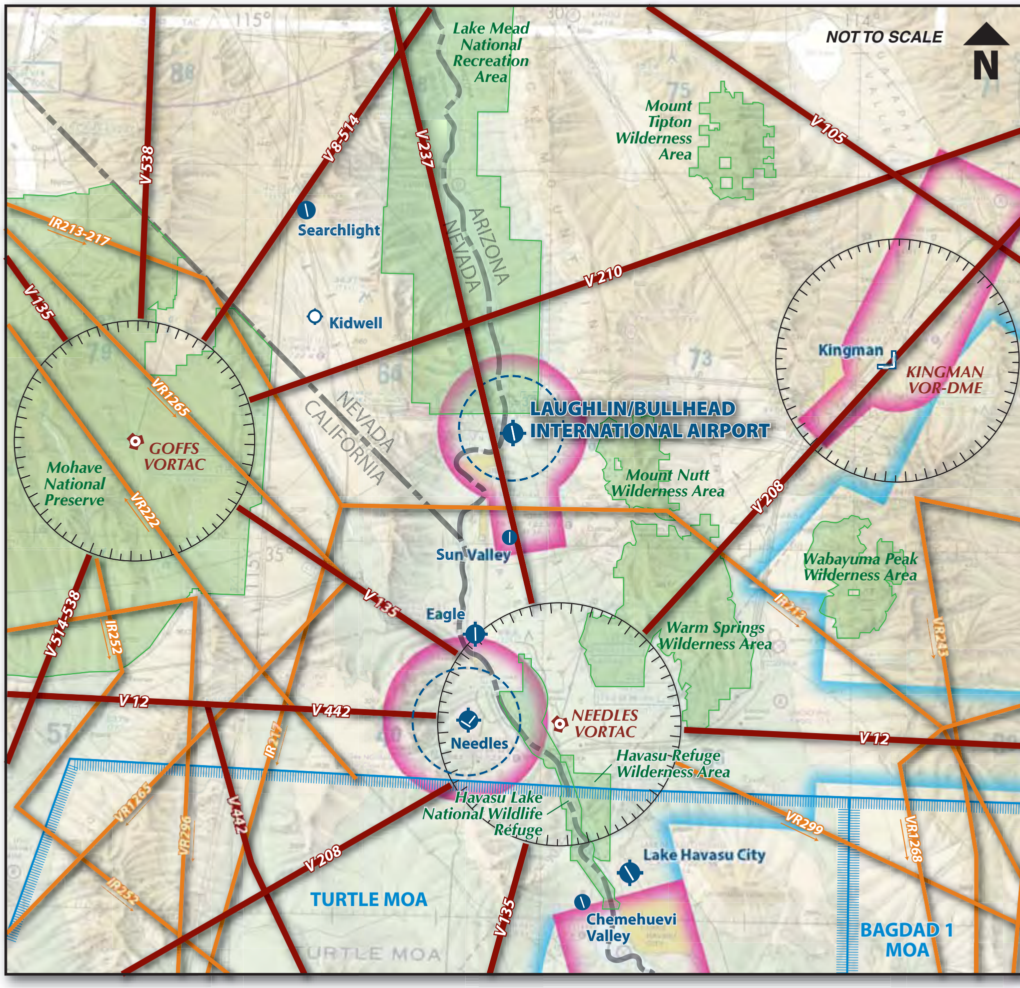
The Kingman VOR/DME, located approximately 31.3 nautical miles northeast of the airport, Needles VORTAC, located approximately 23.9 nautical miles southeast, and the Goffs VORTAC, located approximately 30.3 nautical miles west/northwest, can be utilized by pilots flying to or from the airport. The locations of these navigational facilities are shown on **Exhibit 1B**.

GPS was initially developed by the United States Department of Defense for military navigation around the world and is currently being utilized more and more in civilian aircraft. GPS varies from the VOR in that pilots are not required to navigate using a specific facility. GPS uses satellites placed in orbit around the earth to transmit electronic signals, which properly equipped aircraft use to determine altitude, speed, and navigational information. With GPS, pilots can directly navigate to any airport in the country and are not required to navigate using a specific navigational facility. The FAA is proceeding with a program to gradually replace all traditional enroute navigational aids with GPS over the next 20 years.



Loran-C is a ground-based enroute navigational aid which utilizes a system of transmitters located in various locations across the continental United States. Loran-C is similar to GPS as pilots are not required to navigate using a specific facility. With a properly equipped aircraft, pilots can navigate to any airport in the United States using Loran-C.

Exhibit 1B: VICINITY AIRSPACE



L E G E N D

- Airport with other than hard-surfaced runways
- Airport with hard-surfaced runways 1,500' to 8,069' in length
- Airports with hard-surfaced runways greater than 8,069' or some multiple runways less than 8,069'
- VORTAC
- Compass Rose
- Wilderness Area
- Class D Airspace
- Class E Airspace with floor 700 ft. above surface
- Class E Airspace with floor 1,200 ft. or greater above surface that abuts Class G Airspace
- Victor Airways
- Military Training Routes
- Military Operations Area (MOA)

Source: Phoenix Sectional Charts, US Department of Commerce, National Oceanic and Atmospheric Administration 02/15/07

Instrument Approach Procedures

Instrument approach procedures are a series of predetermined maneuvers established by the FAA which utilize electronic navigational aids (such as those discussed in the previous section) to assist pilots in locating and landing at an airport during low visibility and cloud ceiling conditions. The capability of an instrument approach is defined by the visibility and cloud ceiling minimums associated with the approach. Visibility minimums define the horizontal distance that the pilot must be able to see to complete the approach. Cloud ceilings define the lowest level a cloud layer (defined in feet above the ground) can be situated for a pilot to complete the approach. If the observed visibility or cloud ceilings are below the minimums prescribed for the approach, the pilot cannot complete the instrument approach.

There are two operational instrument approach procedures for Laughlin/Bullhead International Airport, both to Runway 34. An instrument approach procedure was previously available to Runway 16; however, this approach procedure was decommissioned in December 2007 when the Runway 16 end was relocated to the south.

The two approaches available to Runway 34 utilize GPS and the Needles VORTAC. The localizer performance with vertical guidance (LPV) GPS approach minimums provides both vertical guidance and course guidance to a pilot. The lateral navigation (LNAV) GPS approach minimums provide only for course guidance to a pilot. The VOR/DME approach only provides course guidance to a pilot.

Each approach also has circling minimums. Circling minimums allow pilots to land on Runway 16 even though there is not a specific approach defined to that runway end any longer. While providing flexibility for the pilot to land on Runway 16 when the winds support this runway's use, the circling approach has higher visibility and cloud ceiling minimums. This is done to provide pilots with sufficient visibility and ground clearance to navigate visually from the approach to the desired runway end for landing. **Table 1A** summarizes the approach capabilities at Laughlin/Bullhead International Airport.

Local Operating Procedures

Laughlin/Bullhead International Airport is situated at 695 feet above mean sea level (MSL). The traffic pattern altitude for light aircraft at the airport is 1,005 feet above the airfield elevation (1,700 feet MSL). The traffic pattern altitude for high performance aircraft is 1,505 feet above ground level (AGL) (2,200 feet MSL). Runway 16 utilizes a right traffic pattern. In doing so, the approach to landing is made using a series of right turns. Runway 34 utilizes a left traffic pattern. In doing so, the approach to landing is made using a series of left turns. The use of a right traffic pattern on Runway 16 and left traffic pattern on Runway 34 maintains the traffic pattern west of the runway.

During the environmental approval process for the construction of Runway 16-34 (referred to as Runway 16R-34L in the agreement), the Department of the Interior, the National Park Service, and the FAA adopted the following agreement with regards to overflights of the Lake Mead Recreation Area that is located immediately north of the airport:

"For mitigation on Lake Mead National Recreation Area: Aircraft departures to the north from Runway 16R-34L under visual flight rule (VFR) conditions will

Table 1A
INSTRUMENT APPROACH DATA

	Weather Minimums by Aircraft Type					
	Categories A & B		Category C		Category D	
	Cloud Height (feet AGL)	Visibility (miles)	Cloud Height (feet AGL)	Visibility (miles)	Cloud Height (feet AGL)	Visibility (miles)
RNAV (GPS) Runway 34						
LPV	700	2	700	2	700	2
LNAV	1,000	1.25/1.5	1,000	3	1,000	3
Circling	1,000	2	1,000	3	1,100	3
VOR/DME Runway 34						
Straight	1,800	1.25/1.5	1,800	3	1,800	3
Circling	1,800	1.25/1.5	1,800	3	1,800	3

Aircraft Categories are established based on 1.3 times the stall speed in landing configuration as follows:
Category A/B: 0-120 knots
Category C: 121-140 knots
Category D: 141-166 knots
LPV - localizer performance with vertical guidance
LNAV - lateral navigation

Source: U.S. Terminal Procedures

climb straight out for 2 nautical miles and then turn to the west and south, exiting the recreation area. Airport departures to the north from Runway 16R-34L under instrument meteorological conditions (IMC) will climb straight out for 2 nautical miles and then turn to the east, exiting the park. Aircraft landing from the north to the south on Runway 16R-34L will approach the airport generally from the east and will turn on to the final straight-in segment at a point ranging from 1 to 2 nautical miles north of Runway 16R-34L. When wind and weather conditions do not require approach and departure procedures north of the airport, a preferential runway use program will provide for departures to the south and arrivals from the south. Notice to airmen will publicize this preferential runway use procedure. Pilots operating VFR over parkland will be advised to fly not less than 2,000 feet above the surface, in accordance with the Interagency Agreement between the FAA and the National Park Service and with FAA Advisory Circular 91-36C."

Air Traffic Control

Laughlin/Bullhead International Airport has an operational airport traffic control tower (ATCT). The ATCT is operated daily from 8:00 am to 6:00 pm local time. Outside these times, there are no formal ATC services available at the airport for takeoff and landing clearances. When the ATCT is closed, air traffic advisories are made using the Common Traffic Advisory Frequency (CTAF). Approach/Departure

Control services for arriving and departing aircraft on an instrument flight plan are provided by the Los Angeles Air Route Traffic Control Facility (ARTCC), which controls aircraft in a large multi-state area. Remote transmitter/receiver equipment at the airport provides for contacting the Los Angeles ARTCC after the ATCT is closed.

The ATCT is located east of the airport approximately at midfield. Serco provides ATCT services at the airport under contract with the FAA. The MCAA owns and maintains the ATCT.

Vicinity Airspace

To ensure a safe and efficient airspace environment for all aspects of aviation, the FAA has established an airspace structure that regulates and establishes procedures for aircraft using the national airspace system. The U.S. airspace structure provides for two basic categories of airspace, controlled and uncontrolled, and identifies them as Classes A, B, C, D, E, and G as described below.

- Class A airspace is controlled airspace and includes all airspace from 18,000 feet MSL to Flight Level 600 (approximately 60,000 feet MSL).
- Class B airspace is controlled airspace surrounding high capacity commercial service airports (i.e., McCarran International Airport).
- Class C airspace is controlled airspace surrounding lower activity commercial service and some military airports.
- Class D airspace is controlled airspace surrounding airports with an airport traffic control tower (ATCT).

All aircraft operating within Classes A, B, C, and D airspace must be in contact with the air traffic control facility responsible for that particular airspace.

- Class E is controlled airspace that encompasses all instrument approach procedures and low altitude federal airways. Only aircraft conducting instrument flights are required to be in contact with air traffic control when operating within Class E airspace. While aircraft conducting visual flights in Class E airspace are not required to be in radio communications with air traffic control facilities, visual flights can only be conducted if minimum visibility and cloud ceilings exist.

- Class G airspace is uncontrolled airspace that does not require contact with an air traffic control facility.

Airspace within the vicinity of Laughlin/Bullhead International Airport is depicted on **Exhibit 1B**. Due to the presence of the ATCT, the airspace for an approximately five nautical mile radius around the airport is Class D. The Class D airspace extends from the ground to 3,200 feet MSL. Surrounding this Class D airspace is Class E airspace with a floor 700 feet above ground level (AGL) and extending to 18,000 feet MSL. The airspace outside the immediate Class E airspace surrounding Laughlin/Bullhead International Airport is Class E airspace with a floor 1,200 feet above the ground. When the ATCT is closed, Class D airspace reverts to Class E.

A number of Victor Airways are present near Laughlin/Bullhead International Airport. Victor Airways are corridors of airspace eight miles wide that extend upward from 1,200 feet AGL to 18,000 feet MSL, and extend between VOR navigational facilities.

There are two military operations areas (MOAs) located south of Laughlin/Bullhead International Airport. MOAs define airspace where a high level of military activity is conducted and are intended to segregate military and civilian aircraft. While civilian aircraft operations are not restricted in the MOA, civilian aircraft are cautioned to be alert for military aircraft during periods the MOA is active and at the specified altitudes. These MOAs include the Turtle and Baghdad 1 MOAs.

The military training routes are located near Laughlin/Bullhead International Airport. The routes are used by military aircraft for training activity and commonly operate at speeds in excess of 250 knots and at altitudes above 10,000 feet MSL. While civilian aircraft are not restricted in the vicinity of these routes, civilian aircraft are cautioned to remain alert for high speed military jet aircraft. These routes are designated alpha-numerically and start either with an IR or VR. IR routes are instrument training routes, whereas VR routes are visual training routes.

While not considered part of the U.S. airspace structure, the boundaries of the National Park Service areas, U.S. Wildlife Service areas, and U.S. Forest Wilderness and Primitive areas are noted on aeronautical charts. While aircraft operations are not specifically restricted over these areas, aircraft are requested to maintain a minimum altitude of 2,000 feet AGL. As shown on **Exhibit 1B**, the Lake Mead National Recreational Area is located directly north of the airport.

AREA AIRPORTS

As indicated on **Exhibit 1B**, there are several other airfields in the tri-state area. There are seven other airports in the vicinity that are open to the public and approximately two private, restricted-use airports. The two private, restricted-use airports include Willow Springs Ranch Airport to the northeast and Camino Airstrip Airport to the southwest. **Table 1B** summarizes the seven public use airports.

Table1B
REGIONAL AIRPORT SUMMARY

	Sun Valley Airport	Eagle Airpark	Kidwell Airport	Needles Airport	Searchlight Airport	Kingman Airport	Lake Havasu City Airport	Chemehuevi Valley Airport
Distance from IFP	9.1 nm South	16.4 nm South	18.2 nm West/SW	23.7 nm South	24.3 nm NW	31.1 nm East/NE	36.5 nm South/SE	38.2 nm South
Ownership	Private	Private	Private	Public	Public	Public	Public	Public
Number of Runways	1	1	1	2	1	2	1	1
Longest Runway	3,700' x 42'	4,800' x 50'	4,140' x 65'	5,005' x 100'	5,040' x 70'	6,827' x 150'	8,001' x 100'	5,000' x 75'
Runway Surface	Asphalt	Asphalt	Dirt	Asphalt	Asphalt	Asphalt	Asphalt	Asphalt
Instrument Approach	None	None	None	Yes	None	Yes	Yes	None
Automated Weather	No	No	No	Yes	No	Yes	Yes	Yes
ATCT	No	No	No	No	No	No	No	No
Based Aircraft	22	58	19	24	0	273	302	2
Operations	14,235	16,060	3,484	10,585	300	60,955	51,100	4,004
Fuel	100LL	100LL/ Jet-A	None	100LL/ Jet-A	None	100LL/ Jet-A	100LL/ Jet-A	None
Airframe Service	Minor	Minor	None	Minor	None	Major	Major	None
Power Plant Service	Minor	Minor	None	Minor	None	Major	Major	None

nm – nautical miles SW – Southwest NW – Northwest NE - Northeast

Source: FAA Records

Kingman Airport is the only other commercial service airport near Laughlin/Bullhead International Airport. Starting April 17, 2009 Great Lakes will provide daily service to Phoenix from Kingman Airport. Lake Havasu City Airport has had intermittent periods of scheduled service in the past. However, in 2008 the Lake Havasu City Airport did not have scheduled airline service. All other airports are general aviation airports exclusively.

LANDSIDE FACILITIES

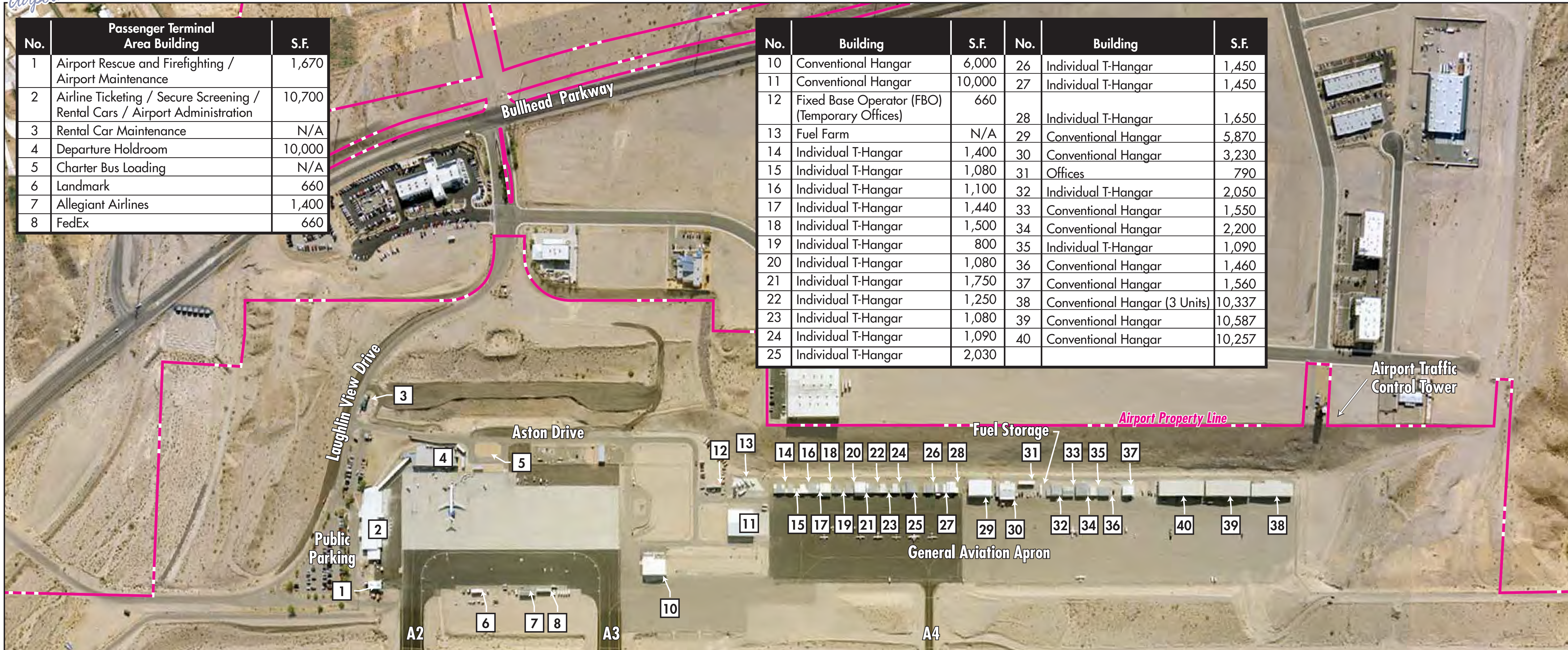
Landside facilities are the ground-based facilities that support the aircraft and pilot/passenger handling functions. These facilities typically include the passenger terminal building, aircraft storage/ maintenance hangars, aircraft parking apron and support facilities, such as fuel storage, automobile parking, and roadway access. Landside facilities at Laughlin/Bullhead International Airport are identified on **Exhibit 1C**.

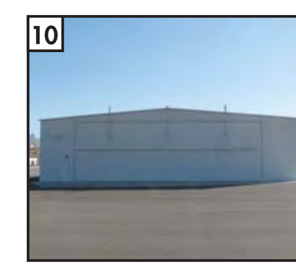
Passenger Terminal Building

Commercial airline terminal functions are provided in two separate single-level buildings located in the northeast portion of the airport. As shown on **Exhibit 1D**, the main terminal building provides space for ticketing, airline operations, checked baggage screening and make-up, secure screening, rental cars, airport administration, and Transportation Security Administration (TSA) offices. Constructed in 1992, the building was completely renovated in 2007 and expanded. This building currently encompasses approximately 15,000 square feet. Baggage claim is located at the far western end of

No.	Passenger Terminal Area Building	S.F.
1	Airport Rescue and Firefighting / Airport Maintenance	1,670
2	Airline Ticketing / Secure Screening / Rental Cars / Airport Administration	10,700
3	Rental Car Maintenance	N/A
4	Departure Holdroom	10,000
5	Charter Bus Loading	N/A
6	Landmark	660
7	Allegiant Airlines	1,400
8	FedEx	660

No.	Building	S.F.	No.	Building	S.F.
10	Conventional Hangar	6,000	26	Individual T-Hangar	1,450
11	Conventional Hangar	10,000	27	Individual T-Hangar	1,450
12	Fixed Base Operator (FBO) (Temporary Offices)	660	28	Individual T-Hangar	1,650
13	Fuel Farm	N/A	29	Conventional Hangar	5,870
14	Individual T-Hangar	1,400	30	Conventional Hangar	3,230
15	Individual T-Hangar	1,080	31	Offices	790
16	Individual T-Hangar	1,100	32	Individual T-Hangar	2,050
17	Individual T-Hangar	1,440	33	Conventional Hangar	1,550
18	Individual T-Hangar	1,500	34	Conventional Hangar	2,200
19	Individual T-Hangar	800	35	Individual T-Hangar	1,090
20	Individual T-Hangar	1,080	36	Conventional Hangar	1,460
21	Individual T-Hangar	1,750	37	Conventional Hangar	1,560
22	Individual T-Hangar	1,250	38	Conventional Hangar (3 Units)	10,337
23	Individual T-Hangar	1,080	39	Conventional Hangar	10,587
24	Individual T-Hangar	1,090	40	Conventional Hangar	10,257
25	Individual T-Hangar	2,030			





NORTH

0 400 800

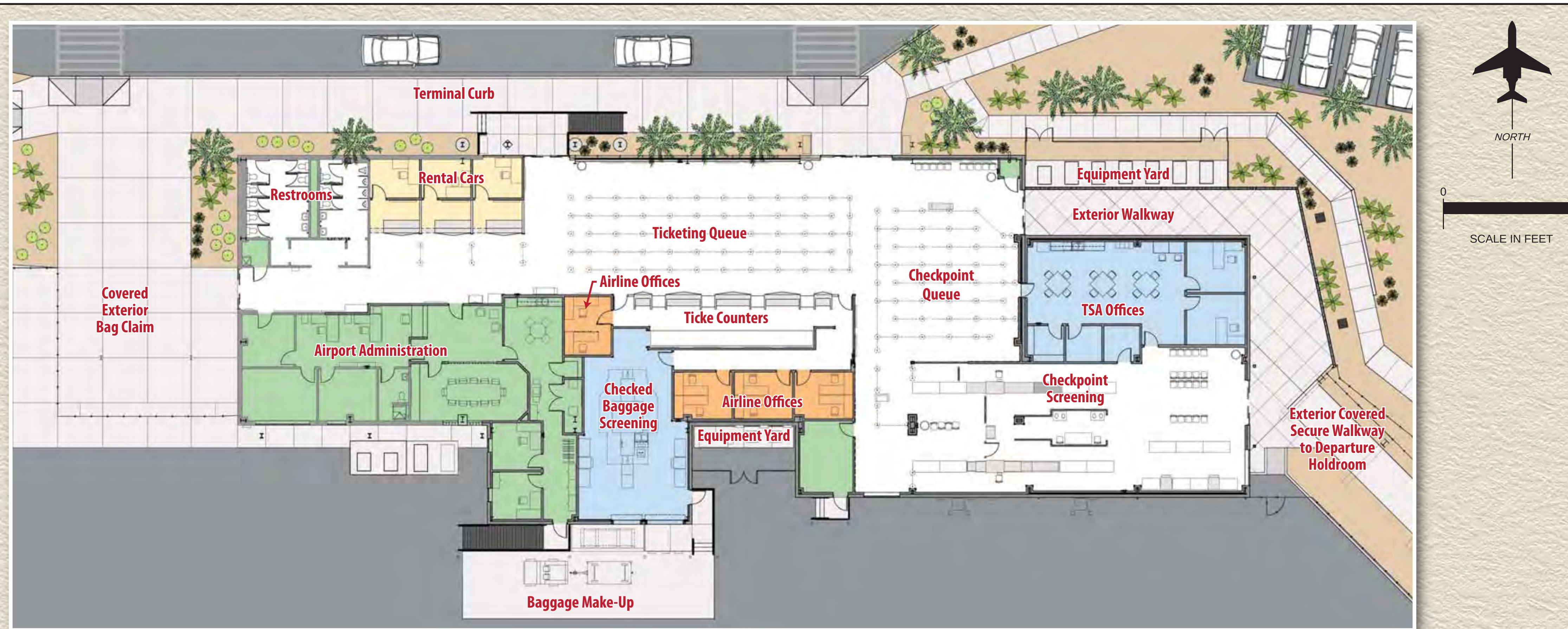
SCALE IN FEET

Date of Photo: February 2008

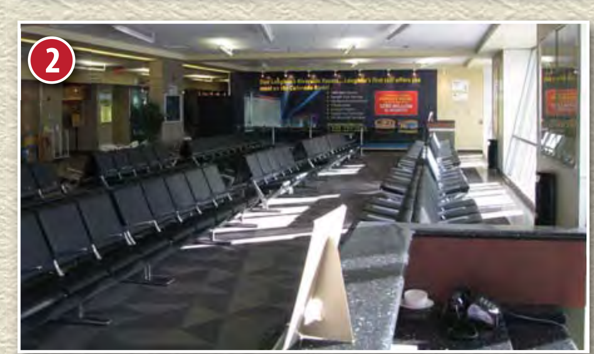
Exhibit 1C
LANDSIDE FACILITIES

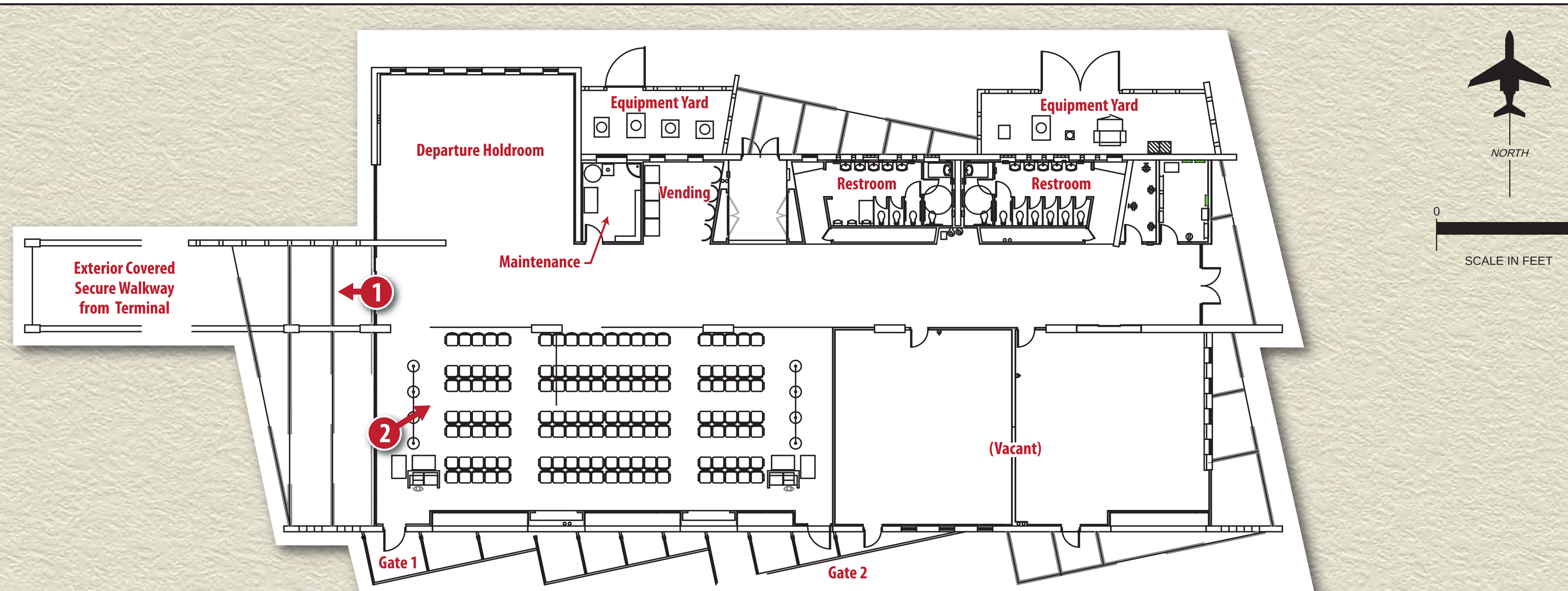
Main Terminal

Terminal Building Specifications	
Main Terminal Building (s.f.)	15,000
Departure Holdroom Building (s.f.)	9,950
Total Area (s.f.)	**24,950**
Functional Area Specifications	
Main Terminal Building	
Ticket Counter Length (l.f.)	49
Ticket Lobby (s.f.)	1,400
Airline Operations Area (s.f.)	1,400
Checked Baggage Screening (s.f.)	900
Bag Claim Display (ft.)	30
Bag Claim Lobby (s.f.)	1,200
Rental Car Counter Length (ft.)	24
Rental Car Offices (s.f.)	600
Rental Car Queuing (s.f.)	300
Checkpoint Screening (s.f.)	2,900
Security Queuing Area (s.f.)	1,000
TSA (s.f.)	1,300
Restrooms (s.f.)	700
Circulation (s.f.)	2,200
Airport Administration (s.f.)	2,300
Departure Holdroom Building	
Holdrooom (s.f.)	3,800
Vending/Snack Counter (s.f.)	400
Circulation (s.f.)	2,200
Restrooms (s.f.)	900
Vacant Offices(s.f.)	2,500
Maintenance (s.f.)	150
Terminal Curb and Automobile Parking	
Enplane/Deplane Curb Length (l.f.)	330
Public Parking Spaces	141
Rental Car Parking Spaces	42
Total Parking Spaces	183



Departure Holdroom





the building. The baggage claim shelf and lobby are located outside in a covered area.

Departure functions are contained in a second separate building located southeast of the main terminal building. Access to this building is via a covered secure walkway. This building was constructed in 2005. The walkway is enclosed by chain-link fencing and/or steel bar fencing on both sides. This building provides the departure gates, hold rooms, and vending/snack bar. While the main terminal building was under construction in 2007, this building also provided ticketing and secure screening. All aircraft boarding is ground level through aircraft stairs.

Combined, the two buildings encompass nearly 25,000 square feet. **Exhibit 1D** depicts the terminal building floor plan and summarizes the functional areas of the terminal building.

As shown on **Exhibit 1D**, an enplaning/deplaning curb extends the full-length of the terminal building. There are four vehicle traffic lanes provided in front of the terminal building. This allows for parking at the curb with two through lanes. A separate lane is also available for loading and unloading opposite the terminal curb and across the two through lanes.

Two distinct automobile parking areas are provided near the passenger terminal building. The public parking area is located just north of the main passenger terminal building and provides approximately 310 parking spaces for public and terminal employee parking and was reconstructed and expanded in early 2009. The rental car ready/return lot is located northeast of the terminal and provides approximately 90 parking spaces. This area was expanded in 2009.

Aircraft Parking Aprons

There is approximately 138,500 square yards of apron area for commercial airline, air cargo, and general aviation use at the airport. The apron in the northeast portion of the airport between Taxiways A2 and A3 encompasses approximately 43,100 square yards. This apron serves both commercial airline and air cargo aircraft. The apron is bisected by an apron taxilane. The northeastern corner of this apron provides three parking areas adjacent to the departure holdroom building for commercial airline aircraft. Presently, air cargo is handled from a temporary building located on the west end of the apron near Taxiway A3. Future plans would move air cargo to the southeastern edge of this apron where vehicle access would be from Aston Drive. Presently, air cargo vehicles must cross the apron and Taxiway A2 to load and unload freight from aircraft.

Aircraft Hangar Facilities

There are 34 separate and multiple hangar facilities located at the airport totaling approximately 87,100 square feet. Hangar space is comprised of conventional hangars and individual T-hangars. Conventional hangars provide a large enclosed space, typically accommodating more than one aircraft. T-hangars provide for separate, single aircraft storage areas. All hangars at the airport are privately owned.

As shown in **Exhibit 1C**, conventional hangar space at the airport totals approximately 67,700 square feet in 14 separate hangars. There are 15 individual T-hangars totaling approximately 19,400 square feet.

Fuel Facilities

All fuel storage and dispensing facilities at the airport are privately owned and operated. Landmark fuel storage is in above ground tanks located at the terminus of Aston Drive as shown on **Exhibit 1C**. Jet fuel storage totals 40,000 gallons. 100LL fuel storage totals 12,000 gallons. All fuel is dispensed via mobile fueling trucks. Tri-State Care Flight maintains a 12,000 gallon above ground fuel storage tank for self-fueling. This tank is located between hangars 31 and 32.

Aircraft Rescue and Firefighting

The airport rescue and firefighting (ARFF) facility is located west of the terminal building along the terminal entrance road. Access to the runway is via Taxiway A2. ARFF services are provided by the MCAA. The ARFF building contains two bays for vehicle storage. Adjacent office space for ARFF training and management are located in the building.

The airport meets ARFF Index B requirements. This means the airport can accommodate operations by aircraft up to 126 feet in length. The ARFF vehicle is a 1992 Oshkosh 1500, which holds 1500 gallons of water, 300 gallons of aqueous film forming foam (AFFF), and 750 pounds of dry chemical.

Utilities

Water, sanitary sewer, natural gas, and electrical utilities are available at the airport. Water service is provided by the North Mohave Valley Water Company. Sanitary sewer services are provided by the Bullhead Sanitation District. Mohave Electric Cooperative provides electrical service at the airport. Southwest Gas Corporation provides natural gas service.

Fencing

The airport is equipped with six-foot chain-link fencing with three-strands of barbed-wire on top. Automated gates control access to portions of the airport.

Air Cargo Services

FedEx operates weekday service to Laughlin/ Bullhead International Airport. Service is provided by a single Cessna Caravan turboprop aircraft. FedEx is located in a temporary building on the west side of the apron near Taxiway A3.

General Aviation Services and Terminal

Landmark Aviation provides all fueling and line services at the airport. These services include aircraft fueling, aircraft tiedowns, aircraft storage, ground power, and aircraft towing. Landmark Aviation operates from a temporary facility located at the terminus of Aston Drive. Landmark Aviation plans the construction of a new 3,000 square-foot general aviation terminal in January 2009. Landmark Aviation also provides all ground handling services for the commercial charter airlines operating at the airport.

Airport Center

Airport Center is an approximately 75-acre non-aviation commercial development area on airport property boundary. As shown previously on **Exhibit 1A**, Airport Center is located along the airport's western property boundary along Highway 95. Airport Center tenants include Home Depot, Sam's Club, Carl's Jr., Chili's, McDonalds, IHOP, Panda Express, Taco Bell, and Long John Silver's.

PAVEMENT MANAGEMENT PROGRAM

The Arizona Department of Transportation – Aeronautics Division (ADOT) has implemented the Arizona Pavement Preservation Program (APPP) to assist in the preservation of the Arizona airport system infrastructure. Public Law 103-305 requires that airports requesting Federal Airport Improvement Program (AIP) funding for pavement rehabilitation or reconstruction have an effective pavement maintenance management system. To this end, ADOT has completed and is maintaining an Airport Pavement Management System (APMS) which, coupled with monthly pavement evaluations by the airport sponsor, fulfills this requirement.

The APMS uses the Army Corps of Engineers' "Micropaver" program as a basis for generating a five-year APPP. The APMS consists of visual inspections of all airport pavements. Evaluations are made of the types and severities observed and entered into a computer program database. Pavement Condition Index (PCI) values are determined through the visual assessment of pavement conditions in accordance with the most recent FAA Advisory Circular 150/5380-6 and range from 0 (failed) to 100 (excellent). Every three years, a complete database update with new visual observations is conducted. Individual airport reports from the update are shared with all participating system airports. ADOT ensures that the APMS database is kept current, in compliance with FAA requirements.

Every year ADOT, utilizing the APMS, will identify airport pavement maintenance projects eligible for funding for the upcoming five years. These projects will appear in the State's Five-Year Airport Development Program. Once a project has been identified and approved for funding by the State Transportation Board, the airport sponsor may elect to accept a state grant for the project and not participate in the APPP, or the airport sponsor may sign an Inter-Government Agreement (IGA) with ADOT to participate in the APPP.

Laughlin/Bullhead International Airport participates in the state's pavement maintenance program for AIP eligible pavement rehabilitation projects. On a daily basis, airport personnel complete an operations log for the airport, a portion of which includes visual observations of the pavement conditions. The MCAA performs routine pavement maintenance such as crack sealing and repair on an as-needed basis.

Pavement conditions are ranked according to the Pavement Condition Index (PCI). The PCI is a numerical index between 0 and 100 and is used to indicate the condition of pavement. The 2006 ***Pavement Condition Survey*** revealed several areas of distressed pavement at the airport. Runway 16-34 and associated taxiways were rated a 57 on the PCI scale. As mentioned earlier, Runway 16-34 was reconstructed in 2007. The concrete portion of the northeast apron (commercial airline apron) was rated a 99. The northern portion of the general aviation apron had a rating of 64. The southern portion of the apron had a rating of 91. Ratings over 85 are considered in good condition. Failed pavements have a rating below 55.

ENVIRONMENTAL INVENTORY

Available information about the existing environmental conditions at Laughlin/Bullhead International Airport has been derived from previous environmental studies, internet resources, agency maps, and existing literature. Studies and analyses completed for the on-going Environmental Assessment (EA) for the southerly extension of Runway 16-34 were also referenced for this inventory effort.

The intent of this task is to inventory potential environmental sensitivities that might affect future improvements at the airport. These resources are discussed further within the following sections.

AIR QUALITY

The 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_x), Nitrogen Oxide (NO_x), Particulate Matter (PM_{10}), and Lead (Pb).

Primary air quality standards are established at levels to protect the public health and welfare from any known or anticipated adverse effects of a pollutant. All areas of the country are required to demonstrate attainment with NAAQS.

Air contaminants increase the aggravation and the production of respiratory and cardiopulmonary diseases. The standards also establish the level of air quality which is necessary to protect the public health and welfare, including among other things, effects on crops, vegetation, wildlife, visibility, and climate, as well as effects on materials, economic values, and on personal comfort and well-being. According to the Environmental Protection Agency's "Green Book," Mohave County is in nonattainment for particulate matter.

COASTAL RESOURCES

Federal activities involving or affecting coastal resources are governed by the ***Coastal Barriers Resources Act*** (CBRA), the ***Coastal Zone Management Act*** (CZMA), and Executive Order 13089, ***Coral Reef Protection***. Laughlin/Bullhead International Airport is located in an inland area not subject to coastal laws or regulations.

DEPARTMENT OF TRANSPORTATION ACT: SECTION 4(f)

Section 4(f) properties include publicly owned land from a public park, recreational 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. The Lake Mead National Recreation Area is located less than one-half mile north of the airport.

During the environmental approval process for the construction of Runway 16-34 (referred to as Runway 16R-34L in the agreement), the Department of the Interior, the National Park Service, and the FAA adopted the following agreement with regards to overflights of the Lake Mead Recreation Area:

> "*For mitigation on Lake Mead National Recreation Area: Aircraft departures to the north from Runway 16R-34L under visual flight rule (VFR) conditions will climb straight out for 2 nautical miles and then turn to the west and south, exiting the recreation area. Airport departures to the north from Runway 16R-34L under instrument meteorological conditions (IMC) will climb straight out for 2 nautical miles and then turn to the east, exiting the park. Aircraft landing from the north to the south on Runway 16R-34L will approach the airport generally from the east and will turn on to the final straight-in segment at a point ranging from 1 to 2 nautical miles north of Runway 16R-34L. When wind and weather conditions do not require approach and departure procedures north of the airport, a preferential runway use program will provide for departures to the south and arrivals from the south. Notice to airmen will publicize this preferential runway use procedure. Pilots operating VFR over parkland will be advised to fly not less than 2,000 feet above the surface, in accordance with the Interagency Agreement between the FAA and the National Park Service and with FAA Advisory Circular 91-36C*."

ENVIRONMENTAL JUSTICE

Executive Order 12898, ***Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations***, and the accompanying Presidential Memorandum, and Order DOT 5610.2, *Environmental Justice*, require FAA to provide meaningful public involvement by minority and low-income populations and analysis, including demographic analysis that identifies and addresses potential impacts on these populations that may be disproportionately high and adverse. A review of the EPA "Enviromapper" website does not indicate a disproportionately low income population near the airport. Therefore, actions at the Airport may not result in disproportionately high or adverse impacts to minority or low-income populations.

FARMLANDS

Under the *Farmland Protection Policy Act* (FPPA), federal agencies are directed to identify and take into account the adverse effects of federal programs on the preservation of farmland, to consider appropriate alternative actions which could lessen adverse effects, and to assure that such federal programs are, to the extent practicable, compatible with state or local government programs and policies to protect farmland. The FPPA guidelines developed by the Department of Agriculture apply to farmland classified as prime or unique, or of state or local importance as determined by the appropriate government agency with concurrence by the Secretary of Agriculture.

In the State of Arizona, prime and unique farmland is characterized as any farmland which is currently being irrigated. Irrigated farmland does not exist on Airport property. Therefore, the *Farmland Protection Policy Act* does not apply.

FISH, WILDLIFE, AND PLANTS

A number of regulations have been established to ensure that projects do not negatively impact protected plants, animals, or their designated habitat. Section 7 of the *Endangered Species Act* (ESA), as amended, applies to federal agency actions and sets forth requirements for consultation to determine if the proposed action "may affect" a federally endangered or threatened species. The *Sikes Act* and various amendments authorize states to prepare statewide wildlife conservation plans for resources under their jurisdiction.

Field surveys were conducted in April 2007 to identify potential habitat for state or federally protected species at the Airport. According to the survey, vegetation in the project area consists of undisturbed, heavily disturbed, and denuded native desertscrub. Past disturbance within the project area boundary was evident from blading on the existing airport, the presence of unpaved roads, and trash dumping in the unnamed wash. The upland vegetation in the project area consisted of species typically found in the Mohave Desert of the Desertscrub Formation biotic community. Although not abundant, the dominant species in the upland portion of the project area are burrobrush (***Hymenoclea salsola***) and brittlebush (***Encelia farinosa***). Only one honey mesquite (***Prosopis glandulosa*** var. ***torreyana***) was observed in the project area.

Ephemeral washes or drainage areas were observed in the project area. Storm runoff flows primarily south-north or east-west. The vegetation type observed in these portions of the project area is associated with an ephemeral water supply (ephemeral washes typically flow only briefly, usually in direct response to significant precipitation in the immediate vicinity). Vegetation in and adjacent to ephemeral washes did not differ significantly from upland portions of the project area; however, creosote bush (***Larrea tridentata*** var. ***tridentata***) was more abundant in the unnamed wash bisecting the southern parcel of the project area. This is most likely due to the fact that this area had not been previously bladed. Burrobrush was also associated with these areas. Cacti were uncommon, and only a few branched pencil cholla (***Cylindropuntia ramosissima***) were observed near braids of the unnamed wash. There were no permanent existing surface waters in the project area, and no wetland vegetation or stands of deciduous broadleaf riparian trees were present.

Seventeen federally listed species, three candidate species, and one species under conservation agreement occur in Mohave County. All 17 federally listed species, the three candidate species, and the one species under conservation agreement are not impacted by the operation or development at Laughlin/Bullhead International Airport because their known geographic ranges are distant from the project area or because the project area does not contain conditions similar to those known to be necessary to support these species, or both. The project area does occur within three miles of designated Critical Habitat for two federally listed species: 1) bonytail chub; and 2) razorback sucker. However, the project area does not contain the primary constituent elements or conditions (i.e., aquatic habitat) similar to those known to be necessary to support these species.

FLOODPLAINS

A review of Flood Insurance Rate Maps (FIRM) for the area indicates that the project is located outside a 100-year floodplain. One-hundred-year floodplains near the airport are shown on **Exhibit 1A**.

HAZARDOUS MATERIALS

The two statutes of most importance to the FAA in proposing actions to construct and operate facilities and navigational aids are the ***Resource Conservation and Recovery Act*** (RCRA) (as amended by the ***Federal Facilities Compliance Act of 1992***) and the ***Comprehensive Environmental Response, Compensation, and Liability Act*** (CERCLA), as amended by the ***Superfund Amendments and Reauthorization Act of 1986*** (SARA or Superfund), and the ***Community Environmental Response Facilitation Act of 1992***. RCRA governs the generation, treatment, storage, and disposal of hazardous wastes. CERCLA provides for consultation with natural resources trustees and cleanup of any release of a hazardous substance (excluding petroleum) into the environment. E.O. 12088, as amended, directs federal agencies to: comply with "applicable pollution control standards," in the prevention, control, and abatement of environmental pollution; and consult with the EPA, state, interstate, and local agencies concerning the best techniques and methods available for the prevention, control, and abatement of environmental pollution. According to the EPA National Priorities List, the Airport is not listed as an active SUPERFUND site nor is there is any ***Clean Water Act***, Section 303(d) listed impaired waters near the project area.

HISTORICAL, 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 the 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.

A cultural resources survey was conducted at Laughlin/Bullhead International Airport in April 2007 in compliance with NEPA and Section 106 of the ***National Historic Preservation Act*** (NHPA). This survey encompassed approximately 130 acres of airport property, split into two areas. The northern area extended beyond the Runway 16 end to the wash. The southern area included all existing airport property south of the existing Runway 34 end.

The survey revealed that there are no National Register of Historic Places (NHRP)-Eligible Sites or NHRP-Ineligible Sites located in the APE. Two archaeological sites were previously recorded in the project area: AZ F:14:126 and AZ F:14:170. During a site survey, it was noted that the modern surface of the Airport has been extensively disturbed from airport construction and improvement activities. As such, both sites could not be identified and appear to have been destroyed. The site survey recorded five isolated occurrences (IOs) in the project area. The IOs consists of Historical period, or modern, artifacts and features. The IOs are not considered significant cultural resources.

WATER QUALITY

The Airport operates in conformance with Section 402(p) of the ***Clean Water Act***. The MCAA holds an AZ-PDES permit for stormwater drainages. As an industrial facility, the Airport is covered under this permit.

According to a water quality inventory completed in April 2007, the Arizona Department of Environmental Quality (ADEQ) has identified nitrogen as a potential problem in the area; however, based on water quality data, nitrate does not appear to be a widespread water quality issue. There are two known leaking underground storage tanks (LUST) sites with contaminated groundwater on the airport. While the water quality inventory found 29 monitoring wells associated with the airport, these wells have been removed. They were replaced with 14 monitoring wells associated with one of the LUST sites. There are 96 wells within one mile of the airport, and most are small diameter domestic or monitoring wells.

WETLANDS/WATERS OF THE U.S.

The U.S. Army Corps of Engineers regulates the discharge of dredged and/or fill material into waters of the United States, including adjacent wetlands, under Section 404 of the ***Clean Water Act***. Wetlands are defined in Executive Order 11990, Protection of Wetlands, as "those areas that are inundated by surface or groundwater with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetation or aquatic life that requires saturated or seasonably saturated soil conditions for growth and reproduction." Categories of wetlands include swamps, marshes, bogs, sloughs, potholes, wet meadows, river overflows, mud flats, natural ponds, estuarine areas, tidal overflows, and shallow lakes and ponds with emergent vegetation. Wetlands exhibit three characteristics: hydrology, hydrophytes (plants able to tolerate various degrees of flooding or frequent saturation), and poorly drained soils.

A field survey was conducted in April 2007 to assist in the preparation of a Jurisdictional Waters Determination (JWD). The field survey concluded that "There were no permanent existing surface waters in the project area, and no wetland vegetation or stands of deciduous broadleaf riparian trees were present." Therefore, there were no wetlands present in the project area. The field survey did indicate the potential for Waters of the U.S. As shown on **Exhibit 1A**, one ephemeral drainage area, braided ephemeral washes, and associated tributaries are located on the airport.

WILD AND SCENIC RIVERS

The Verde River is the only wild and scenic river in Arizona. This river is not in proximity to the airport.

COMMUNITY PROFILE

The purpose of this section is to summarize various studies and data to provide an understanding of the characteristics of the local area. Within this section is a description of ground access systems near the airport, a description of existing and future land use around the airport, local climate data, and a historical summary of the local economy and demographics.

REGIONAL SETTING, ACCESS, AND TRANSPORTATION

The City of Bullhead City is located in west-central Mohave County, Arizona. Located on the east side of the Colorado River, the City is near the juncture of Arizona, California, and Nevada. Bullhead City is located directly across the river from Laughlin, Nevada which has 11 major casino/resort hotels. In addition to the gaming industry in Laughlin, Nevada, area attractions include the Davis Dam and Lake Mohave.

As shown on **Exhibit 1E**, the City of Bullhead City is located at the juncture of Highways 163 and 95. Las Vegas is less than 90 minutes from Bullhead City. Phoenix is more than 220 miles southeast of the City.

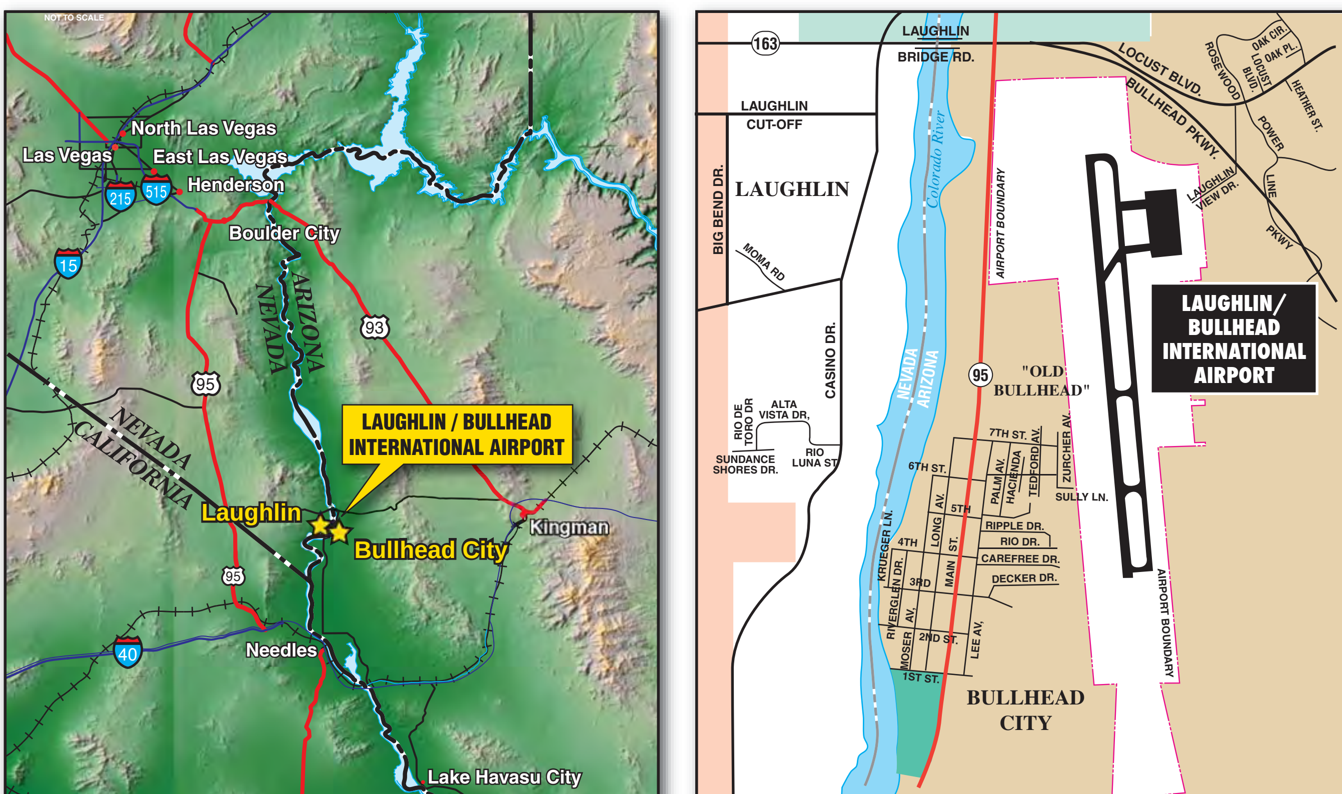
Amtrak service is provided in nearby Kingman and Needles. Greyhound bus service is available from Kingman. Within the township of Laughlin, Citizen's Area Transit, known as CAT, provides affordable transportation up and down Casino Drive and through the residential areas. The Bullhead Area Transit System (BATS) provides public transportation services in Bullhead City. Freight rail service is available in Needles and Kingman.

AREA LAND USE AND CONTROL

Exhibit 1F depicts the existing land use within the airport environs. The Lake Mead Recreation Area is located to the north. Residential development is located to the northeast, east, and west/southwest. Commercial development is located along Bullhead Parkway to the east and along Highway 95 to the south. Casino/resort areas are located to the west in Laughlin, Nevada, along with some residential and commercial uses. **Exhibit 1F** also depicts existing schools and churches.

Exhibit 1G depicts the General Plan for Bullhead City and Laughlin North planned land use. Commercial

Exhibit 1E: VICINITY MAP



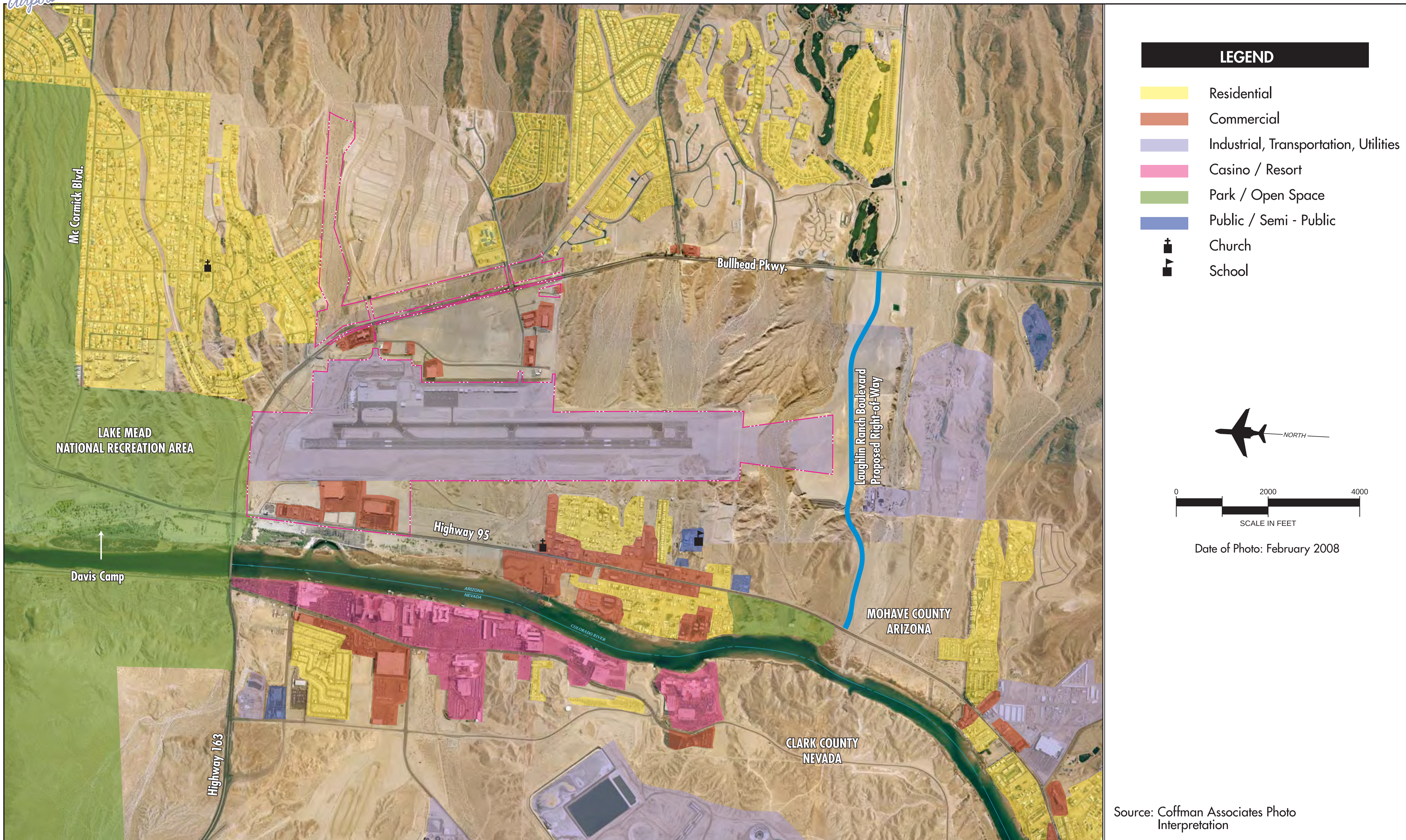
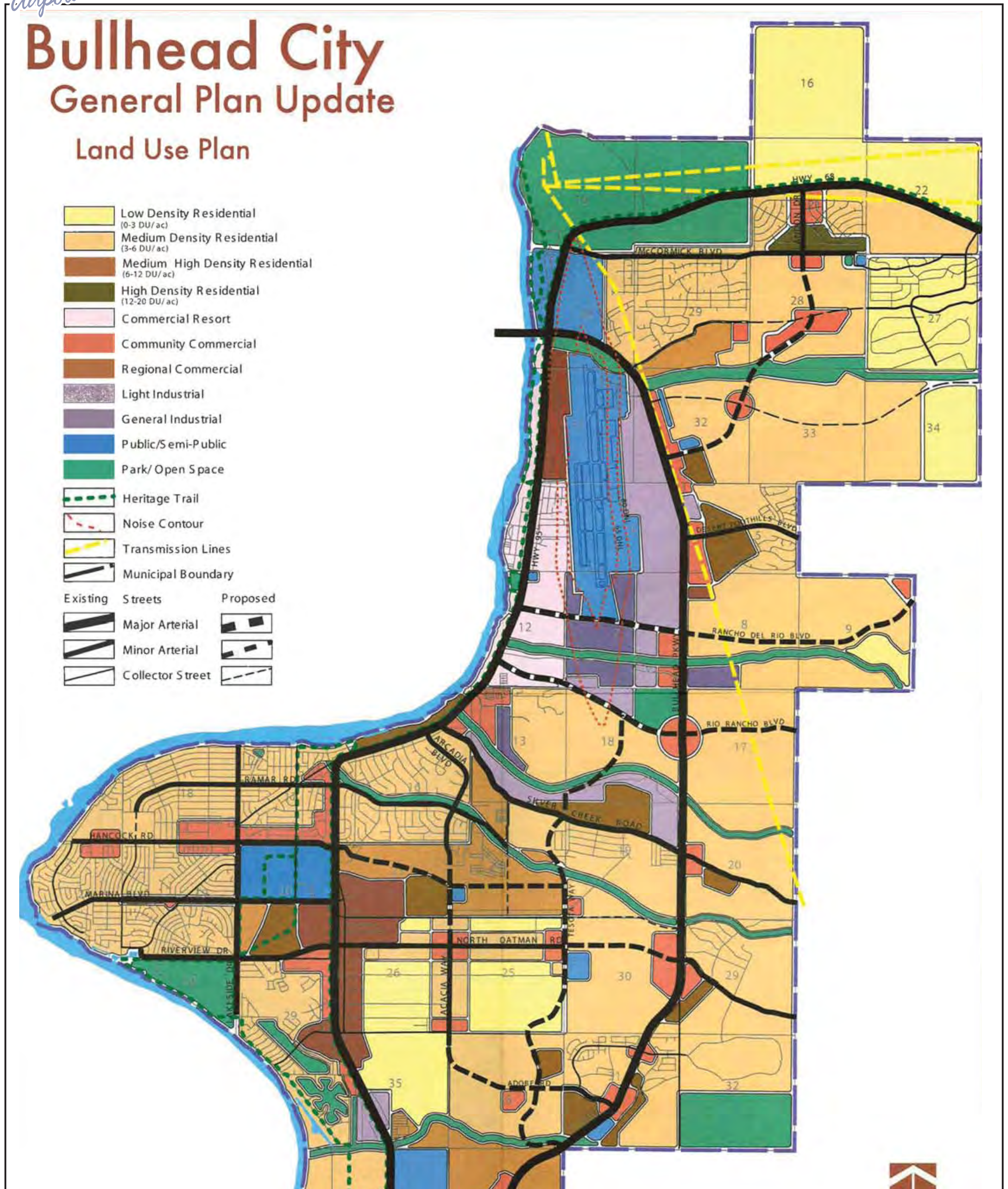


Exhibit 1F
GENERALIZED EXISTING LAND USE



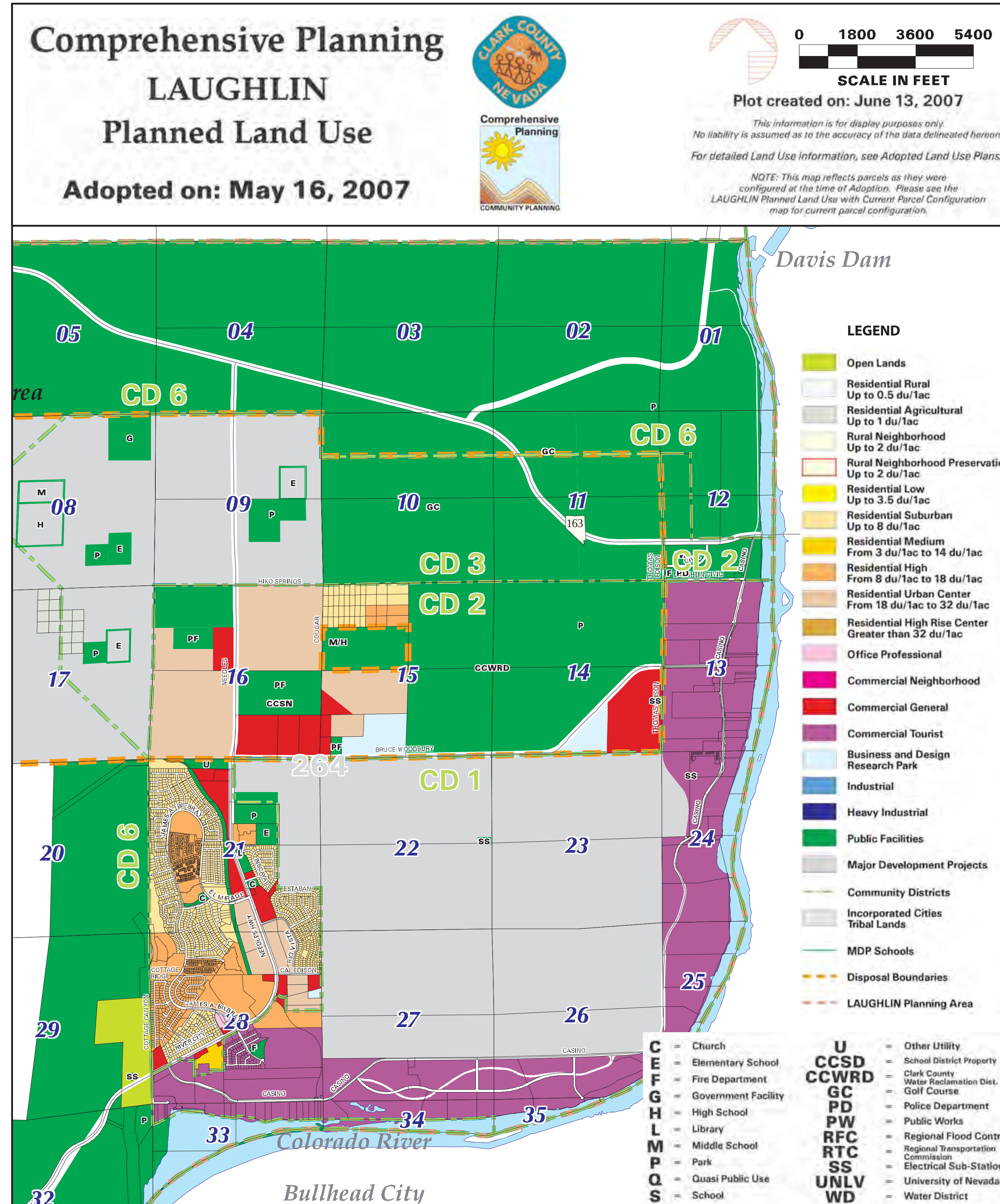


Exhibit 1G
LAND USE PLANS

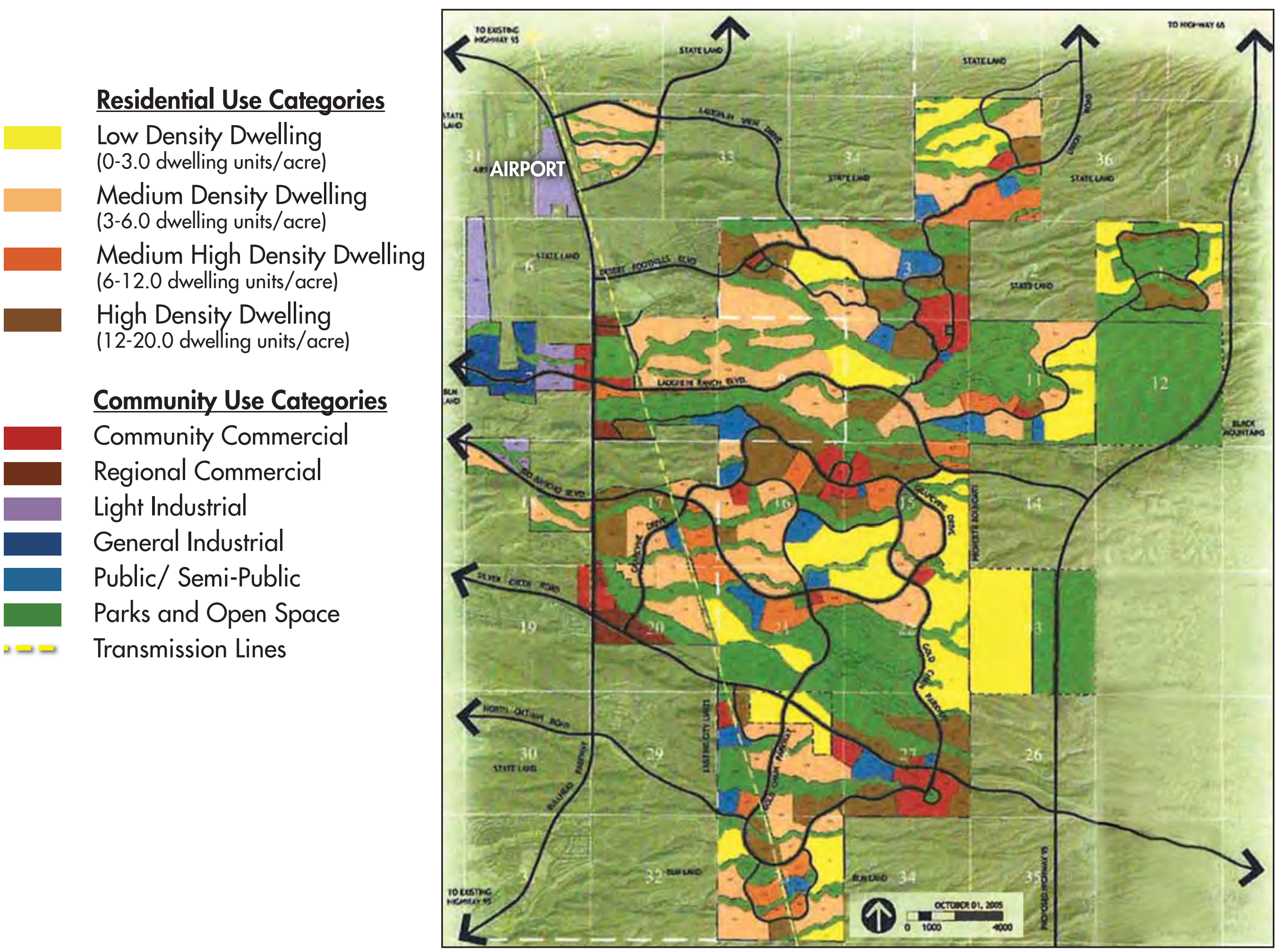
resort and regional commercial and industrial uses are planned along the airport property boundary in Bullhead City. Planned land uses are similar to existing land uses in Laughlin, Nevada.

Exhibit 1H depicts the Land Ranch General Plan Amendment. This plan amendment adds a total of 9,204 acres of additional development area to the existing Bullhead City General Plan. Land Ranch is a mixed-use planned development with residential, open space, public lands, and commercial and industrial uses. Laughlin Ranch Boulevard is planned to connect to Highway 95 to the south.

Chapter 17.34, ***Airport Noise and Height Overlay District***, of the City of Bullhead City municipal code provides for land use controls to promote the compatibility of the airport with the community. The principal purpose of the district is to promote and protect the public health, safety, and general welfare in the vicinity of the Laughlin/Bullhead International Airport by minimizing exposure to high noise levels and accident hazards generated by airport operations and to encourage future development which is compatible with the continued operation of the airports. In addition, it is the purpose of the district to minimize future conflicts between land uses and excessive noise generated by aircraft.

To achieve these goals, the ordinance sets forth geographical districts based upon noise exposure, clear zone standards, and heights of objects. The

Exhibit 1H: LAUGHLIN RANCH LAND USE PLAN



code establishes permitted uses within each of these districts. Within the Height Overlay District, height restrictions are based upon 14 CFR Part 77, ***Objects Affecting Navigable Airspace***, which establishes imaginary surfaces emanating from the runway and specify the acceptable height of objects near the airport. The Noise Overlay District is based upon computer-modeled noise exposure from the operation of aircraft at the airport. The Clear Zone Overlay District relates to areas off the end of the runway with a potential for accidents.

THE AIRPORT'S SYSTEM ROLE

Airport planning exists on many levels: local, state, and national. Each level has a different emphasis and purpose. Locally, this Master Plan is the primary airport planning document.

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

At the national level, the airport is included in the ***National Plan of Integrated Airport Systems*** (NPIAS). The NPIAS includes a total of 3,660 airports (both existing and proposed) which are important to national air transportation. Laughlin/Bullhead International Airport is classified as a commercial service airport within the NPIAS.

CLIMATE

Weather conditions are important to the planning and development of an airport. Temperature is an important factor in determining runway length requirements, while wind direction and speed are used to determine optimum runway orientation. The need for navigational aids and lighting is determined by the percentage of time that visibility is impaired due to cloud coverage or other conditions.

July is the hottest month with an average daily maximum temperature of 111 degrees Fahrenheit (F), and December is the coldest month with an average daily minimum temperature of 42 degrees F. The average precipitation in Bullhead City is only 5.95 inches per year. Average temperature and precipitation totals by month are summarized in **Table 1C**.

Table 1C
WEATHER SUMMARY - BULLHEAD CITY, ARIZONA

Month	Daily Minimum (degrees F)	Daily Maximum (degrees F)	Average Total Precipitation (inches)
January	43	65	0.98
February	46	71	1.05
March	50	78	0.91
April	56	88	0.16
May	65	97	0.08
June	73	107	0.01
July	79	111	0.30
August	79	109	0.73
September	71	103	0.35
October	59	90	0.46
November	49	74	0.42
December	42	65	0.49
Yearly Average	**59**	**88**	**5.95**

Source: Western Regional Climatic Center

SOCIOECONOMIC CHARACTERISTICS

A variety of historical and forecast socioeconomic data, related to the regional area, has been collected for use in various elements of this Master Plan. This information provides essential background for use in determining aviation service level requirements. Aviation forecasts are often related to the population base, economic strength of a region, and the ability of a region to sustain a strong economic base over an extended period of time.

Population

Population is one of the most important elements to consider when planning for future needs of the airport. Historical population data for the City of Bullhead City, Mohave County, and the Town of Laughlin, Nevada are presented in **Table 1D**. As shown in the table, the population of the City of Bullhead City has grown at an average annual growth rate of 3.9 percent since 1980, doubling in population. In contrast, Mohave County as a whole has grown at an average annual rate of 4.5 percent. The Town of Laughlin has grown at a slower rate of only 2.7 percent.

Table 1D
HISTORICAL POPULATION

Year	Bullhead City	Mohave County	Town of Laughlin, NV
1988	19,950	87,900	NA
1989	21,009	92,800	NA
1990	22,228	95,400	5,577
1991	23,615	102,375	7,454
1992	24,665	105,725	7,429
1993	25,825	114,000	7,550
1994	26,535	120,325	7,955
1995	26,940	124,500	7,945
1996	27,370	127,700	7,988
1997	27,800	133,550	6,988
1998	28,535	138,625	7,985
1999	29,315	142,925	7,903
2000	33,769	155,032	8,100
2001	34,615	161,580	6,271
2002	35,410	166,465	6,468
2003	35,760	170,805	7,041
2004	36,960	180,150	8,258
2005	38,210	188,035	8,315
2006	39,930	198,320	8,629
2007	41,000	204,122	8,998
Avg. Annual	**3.9%**	**4.5%**	**2.7%**

Source: Arizona Department of Economic Security, Clark County Department of Comprehensive Planning

Employment

Analysis of a community's employment base can be valuable in determining the overall well-being of that community. In most cases, the community's make-up and health is significantly determined by the availability of jobs, the variety of employment opportunities, and the types of wages provided by local employers. Locally, employment is driven by the robust gaming/resort activities in Laughlin, Nevada. In 2006, the 11 major casinos/resorts in Laughlin employed more than 14,000. On the Arizona side, more than 2,000 businesses employed approximately 6,800.

Table 1E summarizes historical unemployment statistics for the City of Bullhead City. This data shows that while the labor force is growing, the number of jobs has also grown consistently. With the exception of 2002 when unemployment exceeded 5.2 percent, total unemployment has been slightly above 4.0 percent since 2000.

Table 1F summarizes total labor force and nonfarm employment for Mohave County. As shown in the table, total employment has grown nearly at the same rate as the labor force. Within the county, there is more employment in goods production (mining, manufacturing) than in the private service sectors. The services sector has grown faster than the goods producing sector.

Growth Indicators

The State of Arizona and City of Bullhead City track several indicators which assist in characterizing the

Table 1E
UNEMPLOYMENT STATISTICS - BULLHEAD CITY, ARIZONA

	2000	2001	2002	2003	2004	2005	2006	2007
Labor Force	16,182	17, 090	18,004	19,272	19,917	20,861	21,790	21,679
Employment	15,511	16,336	17,075	18,376	19,097	20,023	20,918	20,716
Unemployment	671	754	929	896	820	838	872	963
Unemployment Rate	4.1%	4.4%	5.2%	4.6%	4.1%	4.0%	4.0%	4.4%

Source: State of Arizona, Department of Commerce, Research Administration, CES/LAUS Unit

Table 1F
MOHAVE COUNTY LABOR FORCE AND NONFARM EMPLOYMENT

	2003	2005	2007	Change	% Change
Total Civilian Labor Force	81,700	88,400	91,900	10,200	12.5%
Total Employment	77,700	84,675	87,600	9,900	12.7%
Total Nonfarm	47,425	52,800	54,850	7,425	15.7%
Total Private	39,825	45,000	46,175	6,350	15.9%
Goods Producing	9,275	11,325	10,400	1,125	12.1%
Mining and Construction	5,950	7,350	6,725	775	13.0%
Manufacturing	3,325	3,975	3,675	350	10.5%
Service-Providing	38,150	41,475	44,450	6,300	16.5%
Private Service-Providing	30,550	33,675	35,800	5,250	17.2%
Trade, Transportation, and Utilities	10,575	11,325	11,425	850	8.0%
Information	875	950	1,000	125	14.3%
Financial Activities	1,875	2,225	2,775	900	48.0%
Professional and Business Services	3,475	3,825	3,675	200	5.8%
Educational and Health Services	5,825	6,575	7,450	1,625	27.9%
Leisure and Hospitality	5,750	6,450	6,775	1,025	17.8%
Other Services	2,200	2,350	2,700	500	22.7%
Government	7,600	7,800	8,650	1,050	13.8%
Federal Government	525	525	500	-	-4.8%
State and Local Government	7,050	7,275	8,150	1,100	15.6%

Source: Arizona Department of Economic Security

growth in the community. **Table 1G** summarizes these growth indicators. Taxable Sales and Per Capita Tax Collection are descriptors of the retail economy in the City. School enrollment and building permits assist in describing population growth. Net assessed value describes the appreciation of assets in the community as well as investments made in the City.

HISTORICAL AIRPORT DEVELOPMENT

Table 1H summarizes the historical development at the airport funded with federal grants. Since 1988, nearly $149 million has been invested in the airport with federal and state grant assistance.

Table 1G
GROWTH INDICATORS

Indicator	1985	1990	2000	2005	2006
Taxable Sales (Mil$)	54.20	212.74	367.15	698.33	742.82
Per Capita Tax Collection (000$)	50.42	193.83	217.45	349.17	371.41
School Enrollment	3,793	4,119	4,960	7,279	6,396
Net Assessed Value (Mil$)	168.5	190.6	204.0	398.0	444.2
Building Permits					
Dwelling Unit	**2002**	**2003**	**2004**	**2005**	**2006**
Single Family	371	508	845	805	551
Mobile/Mfg	41	77	202	254	228
Commercial	105	74	12	17	57
Multifamily	3	3	16	2	54

Source: City of Bullhead City

Table 1H
AIRPORT DEVELOPMENT GRANTS

Year	Improvement	Grant Amount
FAA AIP Grants		
1988	Site prep/grading, relocation of powerline	$2,800,000
1989	Land acquisition (68.84 acres) for terminal site	2,800,000
1990	Site prep/grading	2,800,000
1991	Construct runway, lighting, fencing, ARFF vehicle and building	3,913,171
1992	Runway overlay, rotating beacon	2,396,100
1993	Air carrier apron extension, security fencing	400,000
1993	Airport Master Plan Update	111,080
1993	Runway widening to 150'	2,196,354
1995	Noise Compatibility Study	150,000
1995	East FBO site property acquisition, site prep, apron construction	947,149
1996	East FBO site property acquisition, site prep, apron construction	383,697
1997	Eastside apron construction	561,621
1997	Acquire 47.7 acres (south)	2,000,000
1998	Eastside Apron Construction and Master Plan Update	689,364
1999	Land Acquisition and Construction (Eastside)	363,664
1999	Phase III - Eastside General Aviation Development (Site Preparation, Drainage, Utilities, Apron Construction, Taxilanes, Access Road, and Security Lighting)	136,336
2000 & 2001	Phase IV - Eastside General Aviation Development (Taxilanes, Apron, and Access Road)	1,300,000
2001	Phase IV - Eastside General Aviation Development (Taxilanes, Apron, and Access Road); RIAT Projects (Perimeter Road, Hold Lines,and Relocation of Wind Cones)	842,000
2002	Reimbursement of Operational Security Costs, Acquire Hadicap Boarding Device, Expand Terminal Building (Remote Hold Room)	1,149,726
2002	Rehabilitate/Construct Apron	1,822,704

Table 1H (continued)
AIRPORT DEVELOPMENT GRANTS

Year	Improvement	Grant Amount
FAA AIP Grants		
2003	Remote Holdroom/Terminal Expansion (Phase II); Construct/Rehabilitate Parking Apron (Phase II); Install Automated Weather Observing System (AWOS-3)	1,196,228
2004	Construct Remote Holdroom for Terminal Building (Phase III); Rehabilitate Parallel Taxiway A (Design Only)	1,196,228
2004	Conduct Environmental Assessment (EA) associated with a 1,500 foot extension to the south end of Runway 16-34.	255,000
2006	Terminal Building Rehabilitation (Design Only); Runway 16-34 Rehabilitation (Design Only); Pavement Rehabilitation for Acess Road, GA Apron, and Parking Lot (Design Only)	457,373
2006	Update Airport Master Plan Study including an Environmental Evaluation/Environmental Overview (Phase I).	145,000
2007	Rehabilitate Terminal Building	2,977,848
2007	Update Airport Master Plan Study including an Environmental Evaluation/Environmental Overview (Phase II).	45,000
2007	Improve Runway 16-34 Safety Area (Shift Runway 16-34 500 feet to the South); Rehabilitate Runway 16-34.	7,205,995
Total		**$41,241,638**
ADOT Grants		
1989	Relocate coal slurry line, power line	$423,000
1989	Coal slurry line engineering	$315,000
1990	Financial feasibility study, old taxiway design and overlay, terminal design	$432,000
1991	Terminal site prep	$475,000
1994	Waterline extension, emergency generator, aerial photogrammetry	$500,000
1996	Acquisition of property, grading & paving	$500,000
1996	Acquisition of property, grading & paving	$650,000
1997	Planning and Land Acquisition (Eastside)	$940,950
1998	Land Acquisition (South)	$98,177
1998	Land Acquisition (Eastside)	$940,950
1998	Control Tower Construction	$750,000
1998	Consultation, Purchase, Transport, and Reconstruct Tower Cab	$250,000
1999	Design and Construction (Eastside)	$338,400
1999	Runway Pavement Preservation	$432,000
2002	FAA Grant Match	$6,692
2001	FAA Grant Match	$63,815
2001	FAA Grant Match	$41,333
2004	FAA Grant Match	$54,411
2003	FAA Grant Match	$89,474
2005	FAA Grant Match	$58,721
2005	FAA Grant Match	$29,069
2005	FAA Grant Match	$6,710

Table 1H (continued)
AIRPORT DEVELOPMENT GRANTS

Year	Improvement	Grant Amount
ADOT Grants		
2007	FAA Grant Match	$12,037
2007	FAA Grant Match	$3,816
2008	FAA Grant Match	$78,367
2008	FAA Grant Match	$1,184
2008	FAA Grant Match	$189,632
Total		**$7,680,738**

Source: Airport Records

DOCUMENT SOURCES

As mentioned earlier, a variety of different sources were utilized in the inventory process. The following listing reflects a partial compilation of these sources. This does not include data provided by airport management as part of their records, nor does it include airport drawings and photographs which were referenced for information. On-site inventory and interviews with staff and tenants contributed to the inventory effort.

Airport/Facility Directory, Southwest, U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office.

Phoenix Sectional Aeronautical Chart, U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office.

National Plan of Integrated Airport Systems (NPIAS), U.S. Department of Transportation, Federal Aviation Administration, 2007-2011.

U.S. Terminal Procedures, Southwest U.S., U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office.

A Cultural Resources Survey for the Proposed Laughlin/Bullhead International Airport Expansion Project, Mohave County, Arizona, SWCA Environmental Consultants, April 2007

Biological Evaluation of 131 Acres for the Laughlin Airport Expansion Project in Mohave County, Arizona, SWCA Environmental Consultants, April 2007

Laughlin Airport Expansion – Water Quality Inventory, Technical Memorandum SWCA Environmental Consultants, April 2007

Preliminary Jurisdictional Delineation of 131 Acres for the Laughlin Airport Expansion Project in Mohave County, Arizona, SWCA Environmental Consultants, April 2007

Airport Certification Manual for Laughlin/Bullhead International Airport, MCAA, January 2008.

FAA Form 5010-1, Laughlin/Bullhead International Airport

U.S. Environmental Protection Agency, ***EnviroMapper***, http://www.epa.gov/enviro/ej/

United States Census Bureau, ***U.S. Census 2000***, http://www.census.gov/main/www/cen2000.html

U.S. Environmental Protection Agency, Green Book Nonattainment Areas for Criteria Pollutants, http://www.epa.gov/oar/oaqps/greenbk/

U.S. Environmental Protection Agency, National Priorities List, http://www.epa.gov/superfund/sites/npl/sd.htm

Bullhead City Economic Development Authority www.bullheadeconomicdevelopment.com

Air Nav, www.airnav.com

Arizona Department of Commerce, www.azcommerce.com

Western Regional Climatic Center, www.wrcc.dro.edu

Clark County Comprehensive Planning, http://www.co.clark.nv.us/Comprehensive_planning/LUP/Laughlin.htm

Flood Insurance Rate Maps, Federal Emergency Management Agency

2006 Airport Pavement Management System Update, Arizona Department of Transportation, Aeronautics Division.

Chapter Two: Aviation Forecasts

Chapter Two

AVIATION FORECASTS

An important factor in facility planning involves a definition of demand that may reasonably be expected to occur during the useful life of the facility's key components. For Laughlin/Bullhead International Airport (IFP), this involves projecting potential aviation demand for a 20-year timeframe. In this Master Plan, forecasts of passenger enplanements, enplaned air cargo, based aircraft, and operations (takeoffs and landings) will be considered and serve as the basis for facility planning.

The aviation demand forecasts presented in this chapter have been prepared using airport-specific data provided by airport management, as well as data compiled by the Federal Aviation Administration (FAA). In addition, updated national forecasts in the publication FAA *Aerospace Forecasts – Fiscal Years 2007-2020* were referenced for industry trends.

The FAA has oversight responsibility to review and approve aviation forecasts developed in conjunction with airport planning studies. The FAA reviews such forecasts with the objective of comparing them to its *Terminal Area Forecasts* (TAF) and the *National Plan of Integrated Airport Systems* (NPIAS). In addition, aviation activity forecasts are an important input to the benefit-cost analyses associated with airport development, and the FAA reviews these analyses when federal funding requests are submitted.

As stated in FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems*, dated December 4, 2004, forecasts should:

- Be realistic
- Be based on the latest available data
- Reflect current conditions at the airport
- Be supported by information in the study
- Provide adequate justification for airport planning and development.

Recognizing this, it is intended to develop a Master Plan for Laughlin/Bullhead International Airport that will be demand-based rather than time-based. As a result, the reasonable levels of activity potential that are derived from this forecasting effort will be related to the planning horizon levels rather than dates in time. These planning levels will be established as levels of activity from which specific actions for the airport to consider will be presented.

The demand-based manner in which this Master Plan is being prepared is intended to accommodate variations in demand at the airport. Demand-based planning relates capital improvements to demand factors such as based aircraft operations, instead of points in time. This allows the airport to address capital improvement needs according to actual demand occurring at the airport. Therefore, should growth in aircraft operations or based aircraft slow or decline, it may not be necessary to implement some improvement projects. However, should the airport experience accelerated growth, the plan will have accounted for that growth and will be flexible enough to respond accordingly.

In order to fully assess current and future aviation demand for Laughlin/Bullhead International Airport, an examination of several key factors is needed. These include national and regional aviation trends, historical and forecast socioeconomic and demographic information of the area, and competing transportation modes and facilities. Consideration and analysis of these factors will ensure a comprehensive outlook for future aviation demand at Laughlin/Bullhead International Airport.

REGIONAL SOCIOECONOMIC CHARACTERISTICS

The socioeconomic profile provides a general look at the socioeconomic makeup of the City of Bullhead and the region. It also provides an understanding of the dynamics for growth and the potential changes in the community that may influence current and future aviation demand at Laughlin/Bullhead International Airport. Some of these characteristics would include population base, employment, and income. While Laughlin, Nevada is certainly part of the Laughlin/Bullhead International Airport service area, projections of population, income, and employment specific to Laughlin, Nevada are not available. Laughlin demographic profiles are typically combined with those of Clark County, Nevada.

POPULATION

Population is a basic demographic element to consider when planning for future aviation demand. This characteristic is important as highly concentrated population centers generally form around stable, strong, and diverse economic areas. **Table 2A** presents population information for the region.

Over the past 20 years, the City of Bullhead's population has grown at an average annual rate of 3.9 percent, while Mohave County has grown at 4.5 percent annually. The Arizona Department of Economic Security projects population growth for both the City and County to slow over the next 20 years. The City of Bullhead City is projected to grow at 1.5 percent annually, while the County is projected to grow at 2.2 percent annually.

Table 2A
HISTORICAL AND FORECAST POPULATION

Year	City of Bullhead City	Mohave County
Historical		
1988	19,950	87,900
1989	21,009	92,800
1990	22,228	95,400
1991	23,615	102,375
1992	24,665	105,725
1993	25,825	114,000
1994	26,535	120,325
1995	26,940	124,500
1996	27,370	127,700
1997	27,800	133,550
1998	28,535	138,625
1999	29,315	142,925
2000	33,769	155,032
2001	34,615	161,580
2002	35,410	166,465
2003	35,760	170,805
2004	36,960	180,150
2005	38,210	188,035
2006	39,930	198,320
2007	41,000	204,122
AAGR	3.9%	4.5%
Forecasts		
2012	44,422	234,196
2017	48,513	264,600
2022	52,262	292,462
2027	55,596	317,239
AAGR	1.5%	2.2%

Source: Arizona Department of Economic Security
AAGR: Average Annual Growth Rate

EMPLOYMENT

Employment characteristics for Mohave County as a whole are shown in **Table 2B**. Employment within the County is centered on retail trade, services, and the finance/insurance/real estate sectors. These three sectors represent over half of all employment. Collectively, the local, state, and federal governments are the next largest employment sectors. In the future, the retail trade, services, and the finance/insurance/real estate sectors will continue to employ the largest numbers of people, followed by the government sectors. The services and retail trade industries will add the greatest number of employees. For the services sectors, over 15,000 new positions will be created. Nearly 11,000 new positions will be added in retail trade.

INCOME

Table 2B summarizes per capita personal income (PCPI) for Mohave County. PCPI is expected to grow by over $7,000 annually by 2027, or by 33 percent. PCPI in Mohave County trails the State of Arizona PCPI by approximately $10,000 annually.

Table 2B
EMPLOYMENT AND INCOME - MOHAVE COUNTY

Sector	2007	2012	2017	2027
Total Employment (Thousands)	74.4	85.4	96.4	118.4
Farm	0.5	0.5	0.5	0.5
Agricultural Services	0.9	1.0	1.1	1.3
Mining	0.1	0.1	0.1	0.2
Construction	8.0	8.4	8.7	9.4
Manufacturing	4.6	4.6	4.6	4.6
Transportation, Commercial, & Public Utilities	3.4	4.1	4.9	6.3
Wholesale Trade	1.7	2.2	2.7	3.6
Retail Trade	16.9	19.6	22.3	27.8
Finance, Insurance, & Real Estate	6.8	7.6	8.4	10.1
Services	22.5	26.5	30.4	38.4
Federal Civilian	0.6	0.6	0.7	0.8
Federal Military	0.4	0.4	0.4	0.4
State and Local Government	7.9	9.7	11.5	15.2
Per Capita Personal Income (PCPI) $2004	$21,597	$23,066	$24,711	$28,708

Source: The Complete Economic and Demographic Data Source, 2007, Woods & Poole, Economics

FORECASTING APPROACH

The development of aviation forecasts proceeds through both analytical and judgmental processes. A series of mathematical relationships is tested to establish statistical logic and rationale for projected growth. However, the judgment of the forecast analyst, based upon professional experience, knowledge of the aviation industry, and assessment of the local situation, is important in the final determination of the preferred forecast. The most reliable approach to estimating aviation demand is through the utilization of more than one analytical technique. Methodologies frequently considered include trend line/time-series projections, correlation/regression analysis, and market share analysis.

Trend line/time-series projections are probably the simplest and most familiar of the forecasting techniques. By fitting growth curves to historical data and then extending them into the future, a basic trend line projection is produced. A basic assumption of this technique is that outside factors will continue to affect aviation demand in much the same manner as in the past. As broad as this assumption may be, the trend line projection does serve as a reliable benchmark for comparing other projections.

Correlation analysis provides a measure of direct relationship between two separate sets of historic data. Should there be a reasonable correlation between the data sets, further evaluation using regression analysis may be employed.

Regression analysis measures statistical relationships between dependent and independent variables, yielding a "correlation coefficient." The correlation coefficient (Pearson's "r") measures association between the changes in the dependent variable and the independent variable(s). If the "r^2" value (coefficient determination) is greater than 0.95, it indicates good predictive reliability. A value less than 0.95 may be used, but with the understanding that the predictive reliability is lower.

Market share analysis involves a historical review of the airport activity as a percentage, or share, of a larger regional, state, or national aviation market. A historical market share trend is determined, providing an expected market share for the future. These shares are then multiplied by the forecasts of the larger geographical area to produce a market share projection. This method has the same limitations as trend line projections, but can provide a useful check on the validity of other forecasting techniques.

It is important to note that one should not assume a high level of confidence in forecasts that extend beyond five years. Facility and financial planning usually require at least a 10-year preview, since it often takes more than five years to complete a major facility development program. However, it is important to use forecasts which do not overestimate revenue-generating capabilities or understate demand for facilities needed to meet public (user) needs.

COMMERCIAL SERVICE

To determine the types and sizes of facilities necessary to properly accommodate present and future airline activity at any airport, two basic elements must be forecast: annual enplaned passengers and annual aircraft operations. The number of annual enplaned passengers is the most basic indicator of demand for commercial service activity. From a forecast of annual enplanements, operations and other activity descriptors can be projected based upon behavioral factors characteristic of Laughlin/Bullhead International Airport or the airline industry as a whole.

The term "enplanement" refers to a passenger boarding an airline flight. Enplaning passengers are then described in terms of "originating" or "transfer." Originating passengers are those who board and depart in a commercial service aircraft from an airport. Transfer passengers are all others, including those who have departed from another location and are aboard aircraft using the airport as an intermediate stop. There are generally no transfer passengers at Laughlin/Bullhead International Airport.

NATIONAL FORECASTS

Each year, the FAA updates and publishes a national aviation forecast. Included in this publication are forecasts for the large air carriers, regional/commuter air carriers, air cargo, general aviation, and FAA workload measures. The forecasts are prepared to meet budget and planning needs of the constituent units of the FAA and to provide information that can be used by state and local authorities, the aviation industry, and the general public.

The current edition when this chapter was prepared was FAA *Aerospace Forecasts – Fiscal Years 2007-2020*, published in March 2007. The forecasts use the economic performance of the United States as an indicator of future aviation industry growth. Similar economic analyses are applied to the outlook for aviation growth in international markets.

In the seven years prior to the events of September 11, 2001, the U.S. civil aviation industry experienced unprecedented growth in demand and profits. The impacts to the economy and aviation industry from the events of 9/11 were immediate and significant. The economic climate and aviation industry, however, has been on the recovery.

The Office of Management and Budget (OMB) expects the U.S. economy to continue to grow in terms of Gross Domestic Product (GDP) at an average annual rate of 2.9 percent through 2020. This will positively influence the aviation industry, leading to passenger, air cargo, and general aviation growth throughout the forecast period (assuming there will be no new successful terrorist incidents against either U.S. or world aviation).

Commercial Passenger Airlines

The passenger airlines in the United States are comprised of 33 mainline carriers and 81 regional carriers. The mainline carriers are airlines that primarily use passenger jets with over 90 seats, while the regional carriers are airlines that primarily use smaller propeller and jet aircraft with fewer than 90 seats. The mainline carriers have also emerged into two other groupings: legacy network carriers and low-cost carriers.

Legacy Network Carriers – This group includes the airlines established prior to deregulation in 1978 (e.g., American Airlines, Continental Airlines, Delta Airlines, Northwest Airlines, United Airlines, and US Airways). The legacy airlines were the most impacted by 9/11, and now are undergoing restructuring efforts to redefine their business model in the new operating environment of the industry. These airlines operate primarily in hub-and-spoke networks and generally have higher operating costs. The legacy airlines have been downsizing and cost-cutting to become competitive with the low-cost carriers. The string of negative external events, out of the control of airlines, has made it difficult for most legacy carriers to achieve profitability.

Low-Cost Carriers – This group is comprised of established low-cost carriers, new entrants, and a few restructured legacy carriers AirTran, Frontier Airlines, JetBlue Airways, Southwest Airlines, and Spirit Airlines). These carriers typically operate point-to-point and have lower operating costs than their legacy counterparts. Their post-9/11 strategy has seen growth in airports and city-pairs served, aircraft fleet, and longer-haul flights. The recent sharp increases in oil prices have impacted the profits of the low-cost airlines.

Regionals/Commuters – This group's operating strategy focuses around providing feeder traffic through code-sharing arrangements with mainline airlines. Some, like newly launched ExpressJet, are attempting point-to-point service in competition with the large carriers. Since 9/11, the regionals and commuters have benefited from the route restructuring and cost-cutting of the legacy carriers, taking over service to thinner medium-haul and long-haul markets.

Three distinct trends have occurred over the past five years that have helped shape today's U.S. commercial air carrier industry: (1) major restructuring and downsizing among mainline network carriers; (2) rapid growth among low-cost carriers, particularly in non-traditional long-distance transcontinental markets; and (3) exceptional growth among regional carriers.

After two consecutive years of strong growth in 2004 and 2005, U.S. commercial air carrier system capacity and traffic (domestic and international service) grew at much slower rates in 2006. System capacity, as measured in available seat miles (ASMs), was down 0.2 percent, while system revenue passenger miles (RPMs) and enplanements showed gains of 2.1 and 0.4 percent, respectively. At the end of 2006, commercial air carrier enplanements exceeded pre-9/11 levels by 6.2 percent, while RPMs were 13.9 percent higher than in 2000.

Regional air carriers have benefited from capacity cuts and corporate restructuring made by mainline carriers since 2000. Regional carriers have more than doubled revenue passengers, growing from 82.8 million in 2000 to 156.8 million in 2006. This represented an average annual growth rate of 11.2 percent. Regional carriers are forecast to grow at 3.1 percent annually through 2020.

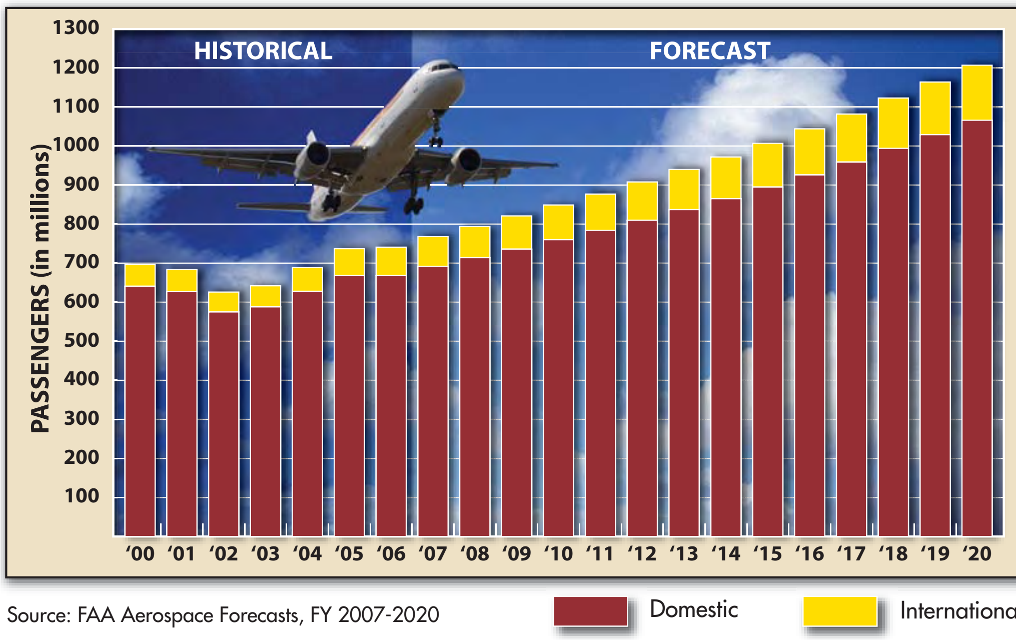
Capacity and demand growth are forecast in 2007 to rebound from the slowdown in 2006. Capacity is projected to grow 2.8 percent as the mainline carrier domestic market capacity stabilizes (after falling almost six percent in 2006), while low-cost carriers continue to add capacity in domestic markets and legacy carriers continue to grow in international markets. Legacy carrier capacity is projected to increase 2.8 percent, while regional carrier capacity rises 3.0 percent.

Passenger demand growth is also projected to rebound, with RPMs forecast to increase 3.4 percent as passenger enplanements rise 3.7 percent. Growth is projected to accelerate in 2008 as RPMs and enplanements increase 4.2 and 3.4 percent, respectively, while capacity increases slightly faster at 4.3 percent. For the balance of the forecast, system capacity is projected to increase an average of 4.4 percent. System-wide RPMs are projected to grow 4.5 percent per year, with regional carriers (5.1 percent) growing faster than mainline carriers (4.4 percent). System passengers are projected to increase an average of 3.5 percent annually, with mainline carriers growing faster than regional carriers (3.7 vs. 3.0 percent a year). The national enplanement history and projections for mainline carriers is depicted on **Exhibit 2A**, while national enplanement history and projections for regional carriers are depicted on **Exhibit 2B**.

While mainline carriers have been reducing the size of aircraft flown domestically, regional carriers have been increasing the size of their aircraft. The most visible example of this trend is the large number of 70-90 seat regional aircraft that are entering the fleet and the ongoing retrofitting of existing regional jets to add seats. The addition of these larger-capacity aircraft is reflected in the FAA forecast, as regional carriers move from an average of 50 seats in 2006, to 59 seats in 2020. This changing aircraft fleet is narrowing the gap between the size of aircraft operated by the mainline and regional carriers.

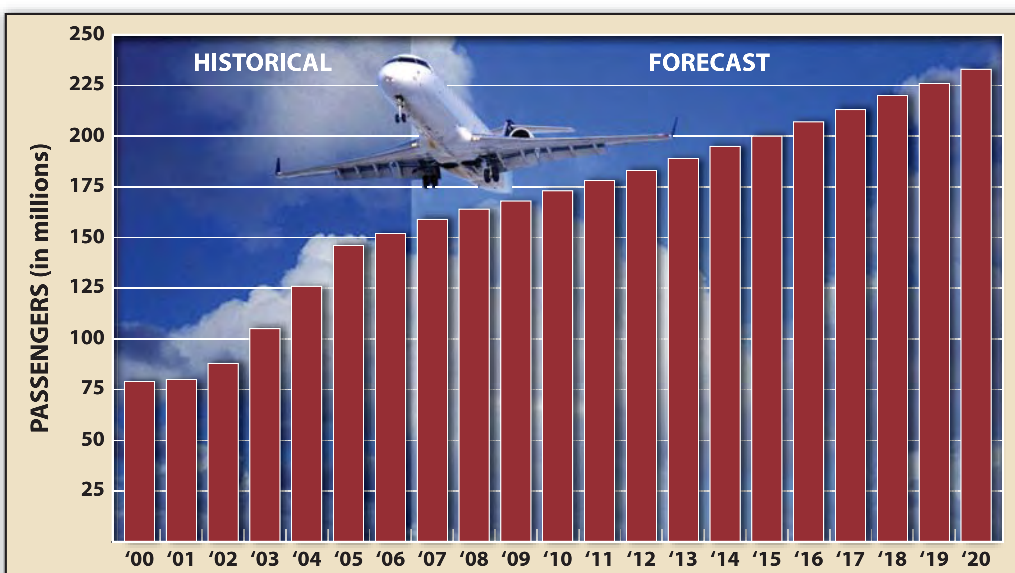
By 2020, aircraft are forecast to become fuller as load factors increase from the record high of 78.8

Exhibit 2A
U.S. SCHEDULED COMMERCIAL AIR CARRIER PASSENGER ENPLANEMENTS



Source: FAA Aerospace Forecasts, FY 2007-2020

Exhibit 2B
U.S. REGIONAL/COMMUTERS SCHEDULED PASSENGER ENPLANEMENTS



Source: FAA Aerospace Forecasts, FY 2007-2020 percent in 2006, to 80.3 percent. Passenger trip length is also forecast to increase, which reflects the faster growth in the relatively longer international trips and longer domestic trips resulting from increased point-to-point service, especially by low-cost regional carriers.

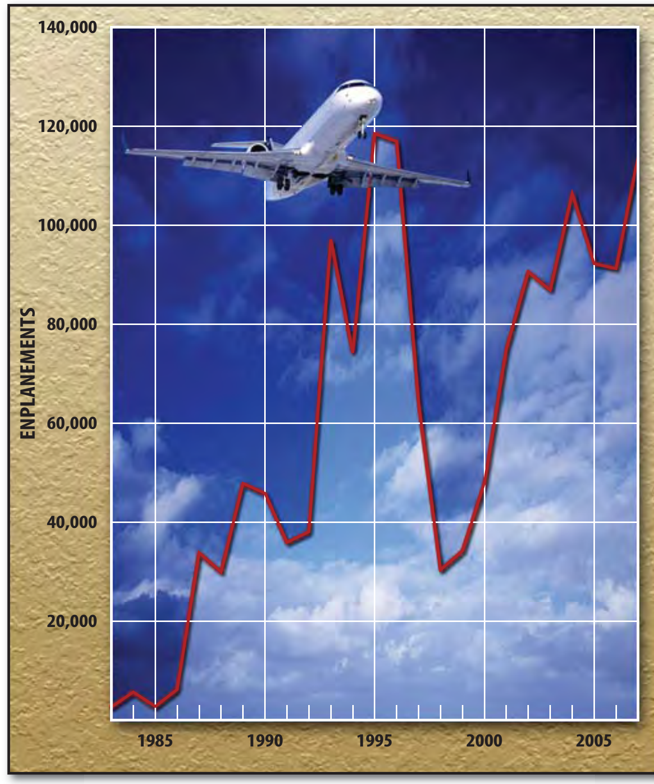
The number of passenger jets in the mainline carrier fleet fell by 39 aircraft in 2006, but is expected to increase by 92 aircraft in 2007 and 108 aircraft in 2008. Over the remaining 12 years of the FAA forecast, the mainline passenger fleet increases by an average of 163 aircraft per year, reaching a total of 6,041 aircraft in 2020. The narrow-body fleet (including the Embraer-190 at JetBlue and U.S. Airways) is projected to grow by 123 aircraft annually over the forecast period; the wide-body fleet grows by 31 aircraft per year, as the Boeing 787 and Airbus 350 enter the fleet.

The regional aircraft fleet has been transitioning away from turboprop aircraft to jet aircraft over the past decade. From 2000 to 2006, the number of regional jets has grown nearly 20 percent annually, from 570 in 2000, to 1,687 in 2006. Over the same period, non-jet regional aircraft have decreased 7.7 percent, from 1,704 to 1,056. This trend toward regional jets is expected to continue through 2020 with the addition of 1,002 jets and the loss of 51 non-jet regional aircraft. This represents a 7.7 percent average annual growth rate for regional jets. Turboprop aircraft will account for just over 27 percent of the regional fleet in 2020, down from a 38.5 percent share in 2006.

AIR SERVICE HISTORY

Exhibit 2C and **Table 2C** examine records of annual passenger enplanements at Laughlin/Bullhead International Airport since 1983. Over the past 25 years, the airport has experienced significant changes in air service and corresponding changes in annual passenger enplanements.

Exhibit 2C
HISTORICAL ENPLANEMENTS



Two periods of quick growth occurred in 1986 and 1993. Between 1986 and 1987, passenger enplanements grew over five-fold from 6,213 enplanements to 33,819 as the airport experienced its first significant improvements in scheduled air service from commuter airlines using aircraft with 36 or less seats. The next period of strong growth occurred in 1993 when annual enplanements jumped from 38,068 to 97,095. In 1992, the existing runway and passenger terminal facilities were completed which allowed the airport to accommodate large commercial airline transport jet aircraft. In 1993, the airport began to handle several large transport jet charter flights, and Morris Air began scheduled air service with Boeing 737-300 aircraft.

Passenger traffic reached a 25-year high in 1995 with 118,484 enplanements. While Morris Air (which had been acquired by Southwest Airlines) no longer provided regularly scheduled service to Laughlin/Bullhead International Airport, Reno Air

Table 2C
HISTORICAL ENPLANEMENTS

Year	IFP Enplanements	Annual Change
1983	2,695	NA
1984	5,667	110%
1985	2,778	-51%
1986	6,213	124%
1987	33,819	444%
1988	29,969	-11%
1989	47,830	60%
1990	45,823	-4%
1991	35,921	-22%
1992	38,068	6%
1993	97,095	155%
1994	74,194	-24%
1995	118,484	60%
1996	116,907	-1%
1997	64,094	-45%
1998	30,387	-53%
1999	34,195	13%
2000	47,920	40%
2001	75,020	57%
2002	90,510	21%
2003	86,855	-4%
2004	106,347	22%
2005	92,206	-13%
2006	91,201	-1%
2007	113,796	25%
2008	123,124	8.2%
AAGR 1983-2008	16.5%	NA
AAGR 1988-2008	7.3%	NA
AAGR 1998-2008	15.0%	NA

Source: Airport Records
AAGR - Average Annual Growth Rate
IFP - Laughlin/Bullhead International Airport

had initiated scheduled service with MD-80 aircraft. America West Express and United Express provided scheduled commuter flights with 19 passenger aircraft to Phoenix and Los Angeles. Charter traffic was a major portion of this activity as well. Charter airlines like Great American and Sun Country carried over half of the total passengers.

By 1998, passenger levels had declined to 30,387, falling more than 74 percent from the 1995 all-time high. Reno Air, under new management and restructuring its route system, discontinued service to Laughlin/Bullhead International Airport in May. Great American Airlines ceased all operations a month earlier in April. United Express had discontinued flights to Laughlin/Bullhead International in November 1996. In 1998, expansion of casino gaming throughout the country, the rise of the American dollar overseas, and the recession in Asia had caused America West Express to reduce its schedule to four flights a day.

Since 1998, the airport has experienced increased annual enplanements each year except in 2003 when enplanements were down four percent. This decline is most likely related to the national recession occurring during this period. The growth pattern for the airport since 1998 is in contrast to most commercial service airports which experienced significant declines in enplanements in 2002 following the events of 9/11. Between 2001 and 2002, the airport grew enplanements by 15 percent. By 2007, enplanements had reached 113,796, a 274 percent increase over the 1998 low. In 2008, enplanements reached an all-time high of 123,124.

The airport has been without daily scheduled airline service since 2001 when Mesa Airlines and Sierra Pacific discontinued service at the airport. Since 2002, the airport has been served by a number of charter airlines including Allegiant, Sun Country, West Jet, Eagle Jet, Air Canada, Ryan (Skyquest), and Canadian North. In 2007 and early 2008, Allegiant, Sun Country, and Canadian North still served the airport. In 2007, Allegiant and Sun Country provided year-round service while Canadian North only provided service during the winter months.

SERVICE AREA

The service area of an airport is defined by its proximity to other airports providing similar service. Laughlin/Bullhead International Airport is one of three airports in Mohave County that has provided or is now providing commercial air service. Starting April 7, 2009, Kingman Airport will once again provide daily essential air service (EAS) subsidized flights to Phoenix. Lake Havasu Municipal Airport does not have daily scheduled airline service.

The Laughlin/Bullhead International Airport service area is significantly influenced by the presence of McCarran International Airport in Las Vegas, Nevada. McCarran International Airport is located approximately 97 miles from the City of Bullhead City via surface transportation and is drivable in approximately one and one-half hours. However, McCarran International Airport provides a significantly different level of service than Laughlin/Bullhead International Airport. Hundreds of daily flights are available from McCarran International Airport to both domestic and international destinations. McCarran International Airport is served by most legacy and low-cost carriers. As a discretionary tourist travel destination, air fare costs remain relatively low at McCarran International Airport. The low air fare costs attract travelers from a wide area surrounding Las Vegas, including much of Mohave County. The 1999 *Arizona Rural Air Service Study*, prepared by the Arizona Department of Transportation – Aeronautics Division (ADOT), found that a majority of Mohave County air passengers travel to McCarran International Airport instead of taking advantage of the air service provided in Mohave County.

The 2000 *State Aviation Needs Study* (SANS) prepared by the ADOT also noted that the commercial service airports in Mohave County are extremely susceptible to air passengers traveling to McCarran International Airport instead of taking advantage of the air service provided in Mohave County. For air service examinations, this is defined as leakage. The 2000 SANS noted the leakage for Laughlin/Bullhead International Airport is approximately 76 percent. In other words, 76 percent of the potential passengers for Laughlin/Bullhead International Airport are using other regional airports such as McCarran International Airport instead of Laughlin/Bullhead International Airport. Similar leakage rates were also noted for Kingman (79 percent) and Lake Havasu (74 percent) when the City had regular air service.

In 2007, the combined population of Laughlin, Nevada and the City of Bullhead City was nearly 50,000. A large majority of the leakage in the market could be the result of not having daily scheduled service to serve the needs of the air travelers from the local market. As described above, the current air service at Laughlin/Bullhead International Airport can be characterized as charter flights for tourists visiting Laughlin, Nevada. While some unsold charter seats may be available to local passengers, the destinations for each flight vary as do the return flights.

The Laughlin/Bullhead International Airport primarily serves some of the air transportation needs for casino/resort activities in Laughlin, Nevada and the surrounding Lake Mead Recreational Area each year. As such, the primary service area can be viewed as being relatively tight geographically and limited to the City of Bullhead City and Laughlin, Nevada. While the service area is small in geographical terms, the service area has more than 4 million tourists each year.

The primary service area will typically generate the majority of enplanements experienced at an airport. Most airports, however, will also attract passengers from areas outside the primary service area, or secondary service areas. Factors that can affect market share in the secondary service area include number of airlines serving the airport, frequency of flights provided, type of aircraft utilized, and nonstop destinations available. The biggest factor, however, tends to be competing air fares. Competition on routes and low-fare airlines are major factors that can draw passengers, especially vacation travelers, to drive as much as two or more hours to a larger airport.

Without daily scheduled service now, there is no viable secondary market for Laughlin/Bullhead International Airport. However, establishment of a daily scheduled service could generate a secondary air service market for Laughlin/Bullhead International Airport. Laughlin/Bullhead International Airport is the last commercial service airport in Arizona or Nevada prior to reaching McCarran International Airport for residents of southern Mohave County. With regularly scheduled air service, Laughlin/ Bullhead International Airport may also be able to capture air travelers now going directly to McCarran International Airport from the south-central and southwest portions of the county. While improved air service at Laughlin/Bullhead International Airport could attract air travelers from the south-central and southwest portions of Mohave County, these passengers will not be as reliable as they will be selective about which airport they utilize on a trip-by-trip basis. McCarran International Airport will be a choice for air travelers in Mohave County due to its air fare costs, schedule, and number and types of airlines.

ENPLANEMENT FORECASTS

Regression Analysis

The first method used to project enplanements at Laughlin/Bullhead International Airport involved time-series and regression analyses with regional socioeconomic factors such as historical Mohave County population and historical Bullhead City population. These analyses each yielded a correlation coefficient less than 0.95. As previously mentioned, an "r^2" value of less than 0.95 reduces predictive reliability. The fluctuating enplanement trend between 1983 and 2007, combined with the generally increasing socioeconomic conditions of the area, do not provide a good statistical correlation. The best correlations were the time-series analysis during the 1983-2007 periods, having an r^2 value of 0.569, and the 1998-2007 periods having an r^2 value of 0.831. Although the correlations are below 0.95, the resulting projections are still useful to indicate the extrapolation of the historic growth pattern in enplanements and are included in the enplanement forecast summary below.

Market Share of U.S. Domestic Enplanements

Another forecasting method examined the airport's historic market share of U.S. domestic enplanements. National forecasts of U.S. domestic enplanements are compiled each year by the FAA and consider the state of the economy, fuel prices, and prior year developments. According to the most recent publication, FAA *Aerospace Forecasts, Fiscal Years 2007-2020*, domestic passenger enplanements are forecast to increase at an average annual rate of 3.4 percent over the 13-year forecast period.

Table 2D examines scheduled enplanements at Laughlin/Bullhead International Airport as a percentage of total domestic U.S. airline enplanements since 1983. The average market share between 1983 and 2007 was 0.011 percent; however, this period included the highest enplanement level ever reached at the airport in 1995. Over the past 10 years, the average market share is nearly identical at 0.012 percent, even though this market share has increased from 0.005 percent in 1998 to 0.016 in 2007.

Table 2D
HISTORICAL AND FORECAST ENPLANEMENTS SHARE OF U.S. DOMESTIC ENPLANEMENTS

Year	IFP Enplanements	U.S. Domestic Enplanements (millions)	IFP % Share
1983	2,695	308.1	0.001%
1984	5,667	333.8	0.002%
1985	2,778	369.9	0.001%
1986	6,213	404.7	0.002%
1987	33,819	441.2	0.008%
1988	29,969	441.2	0.007%
1989	47,830	443.6	0.011%

Table 2D (continued)
HISTORICAL AND FORECAST ENPLANEMENTS SHARE OF U.S. DOMESTIC ENPLANEMENTS

Year	IFP Enplanements	U.S. Domestic Enplanements (millions)	IFP % Share
1990	45,823	456.6	0.010%
1991	35,921	445.9	0.008%
1992	38,068	464.7	0.008%
1993	97,095	470.4	0.021%
1994	74,194	511.3	0.015%
1995	118,484	531.1	0.022%
1996	116,907	558.1	0.021%
1997	64,094	577.8	0.011%
1998	30,387	600.6	0.005%
1999	34,195	537.8	0.006%
2000	47,920	641.2	0.007%
2001	75,020	626.8	0.012%
2002	90,510	574.6	0.016%
2003	86,855	587.8	0.015%
2004	106,347	628.5	0.017%
2005	92,206	668.0	0.014%
2006	91,201	667.7	0.014%
2007	113,796	692.3	0.016%
AAGR	16.9%	3.4%	
Constant Share			
2012	133,200	810.3	0.016%
2017	157,700	959.3	0.016%
2022	186,400	1,133.9	0.016%
2027	220,300	1,340.2	0.016%
AAGR	3.4%	3.4%	
Increasing Share			
2012	145,900	810.3	0.018%
2017	211,000	959.3	0.022%
2022	294,800	1,133.9	0.026%
2027	402,100	1,340.2	0.030%
AAGR	6.5%	3.4%	

Source for historical enplanements: Airport Records.
Source for historical and forecast US Domestic Passengers: FAA Records, 2022 and 2027 Extrapolated.
Source for forecast enplanements: Coffman Associates Analysis.
AAGR – Average Annual Growth Rate.
IFP - Laughlin/Bullhead International Airport.

Two projections were developed utilizing the market share of U.S. domestic enplanements. First, a constant ratio considered the 2007 market share remaining the same through the planning period at 0.016 percent. This projection yielded 220,300 enplanements in 2027. Second, an increasing market share projection, mirroring the growth trend in the past 10 years, yields 402,100 enplanements at Laughlin/Bullhead International Airport in 2027.

Comparable Market Analysis

There are a variety of local factors that affect the potential for passengers within each metropolitan statistical area (MSA). The MSAs with lower enplanement per resident population ratios, also known as the Travel Propensity Factor (TPF), are typically impacted by proximity to other regional airports with higher levels of service or a "hub" airport. While the higher ratios tend to be located farther from hubs, they typically have a service area that extends into other well-populated regions, or have some type of air service advantage that attracts more of those passengers that might otherwise choose the hub airport.

To gain an understanding of these air service factors in similarly-sized communities that are located at a similar distance from a hub airport, population and enplanement data for six communities across the contiguous United States was collected. As shown in **Table 2E**, the TPF for similarly-size communities varies. For the communities in **Table 2E**, the TPF varies from 0.14 to 0.98.

With the exception of Laughlin/Bullhead International Airport, all airports included in **Table 2E** had air service to the nearby regional hub. Each of these airports also had regularly scheduled air service and competition increased enplanement levels. St. Cloud Regional Airport has one air carrier and the lowest TPF of all the communities examined. Rochester International Airport, Easterwood Field, and Tyler-Pounds Regional Airport had two air carriers. Charlottesville-Albemarle Airport had five carriers, and Bellingham Municipal Airport had four air carriers.

Table 2E
COMPARABLE AIR SERVICE MARKETS

MSA	Closest Airport Scheduled Service	2000 Population	2006 Population	2000 Enplanements	2006 Enplanements	2000 TPF	2006 TPF	Nearest Hub Airport	Distance (Miles)
St. Cloud, MN	St. Cloud Regional Airport	168,064	182,784	23,240	25,094	.14	0.14	Minneapolis	70
Rochester, MN	Rochester International Airport	164,390	179,573	150,516	149,600	.92	0.83	Minneapolis	87
Bellingham, WA	Bellingham Municipal Airport	167,656	185,953	112,515	135,129	.67	0.73	Seattle	89
College Station - Bryan, TX	Easterwood Field	185,138	192,152	90,736	85,754	.49	0.45	Houston	94
Mohave County, AZ	**Laughlin/Bullhead International Airport**	**155,032**	**193,035**	**41,920**	**89,316**	**.31**	**0.46**	**Las Vegas**	**97**
Tyler, TX	Tyle Pounds Regional Airport	175,453	194,635	71,715	79,076	.41	0.41	Dallas	102
Charlottesville, VA	Charlottesville-Albemarle Airport	174,733	190,278	165,938	185,891	.95	0.98	Dulles	103

Source: Coffman Associates Analysis
Historical Population - Proximity One
Historical Enplanements - FAA
TPF - Travel Propensity Factor

Both Rochester International Airport and Easterwood Field had lower enplanement levels in 2006 than in 2000. As such, these airports are most likely still recovering from the events of 9/11. While enplanements grew for St. Cloud Regional Airport and Tyler-Pounds Regional Airport, the TPF remained static. The TPF grew in all remaining communities.

The Laughlin/Bullhead International Airport is located approximately mid-range in the TPF ratios presented in **Table 2E**. As evidenced in the table, some airports at similar distances to hub airports as Laughlin/Bullhead International Airport capture higher level of enplanements. For example, Rochester International Airport and Charlottesville-Albemarle Airport have a TPF more than double that of Laughlin/Bullhead International Airport. This clearly demonstrates the leakage in the Laughlin/Bullhead market and the potential for higher enplanement levels at the airport.

TPF ratios can provide a useful forecasting tool. **Table 2F** presents historical TPF ratios for Laughlin/Bullhead International Airport since 1988 and two TPF ratio projections. As indicated in the table, Laughlin/Bullhead International Airport TPF peaked in 1995 at 0.95 when the airport recorded its highest enplanement levels in the past 25 years. The TPF is higher in 2007 than in 1998, but lower than the most recent 10-year high of 0.59 experienced in 2004.

The first projection considered a continued constant TPF ratio of 0.56 throughout the planning period. This forecast would suggest that enplanement growth would continue to mirror exactly the resident population growth in the County. This projection yields 177,700 enplanements by 2027. The second projection considers the TPF growing to historical levels previously achieved in the 1990s and similar to comparable communities. The increasing TPF projection presented in **Table 2F** considers the TPF increasing to 1.0 by 2027, which yields 317,200 enplanements.

FAA Terminal Area Forecast

The FAA *Terminal Area Forecast* (TAF), released in December 2007, is considered for comparative purposes. The FAA TAF is aligned with the federal fiscal year which begins on October 1. The FAA TAF used Fiscal Year 2006 as its base year for enplanements

Table 2F
HISTORICAL AND FORECAST ENPLANEMENTS
TRAVEL PROPENSITY FACTOR (TPF)

Year	Enplanements	County Population	TPF
1988	29,969	87,900	0.34
1989	47,830	92,800	0.52
1990	45,823	95,400	0.48
1991	35,921	102,375	0.35
1992	38,068	105,725	0.36
1993	97,095	114,000	0.85
1994	74,194	120,325	0.62
1995	118,484	124,500	0.95
1996	116,907	127,700	0.92
1997	64,094	133,550	0.48
1998	30,387	138,625	0.22
1999	34,195	142,925	0.24
2000	47,920	155,032	0.31
2001	75,020	161,580	0.46
2002	90,510	166,465	0.54
2003	86,855	170,805	0.51
2004	106,347	180,150	0.59
2005	92,206	188,035	0.49
2006	91,201	198,320	0.46
2007	113,796	204,122	0.56
AAGR	7.3%	4.5%	
Constant Ratio			
2012	131,100	234,196	0.56
2017	148,200	264,600	0.56
2022	163,800	292,462	0.56
2027	177,700	317,239	0.56
AAGR	2.3%	2.2%	
Increasing Ratio			
2012	140,500	234,196	0.60
2017	198,500	264,600	0.75
2022	248,600	292,462	0.85
2027	317,200	317,239	1.00
AAGR	5.3%	2.2%	

Source for historical enplanements: Airport Records.
Source for historical and forecast population:
Arizona Department of Economic Security.
Source for forecast enplanements:
Coffman Associates Analysis.
AAGR - Average Annual Growth Rate.
TPF - Travel Propensity Factor.

at Laughlin/Bullhead International Airport. The FAA projects the airport's enplanements to reach 130,837 by 2022 (no 2027 forecast is provided in the 2007 TAF).

ADOT SANS

The 2000 SANS also provides projections of future annual enplanements at the airport. The 2000 SANS utilized 1998 base year data and projected annual enplanements growing to 101,000 by 2017. Since this forecast is more than 10 years old and has already been exceeded, it is removed from further consideration.

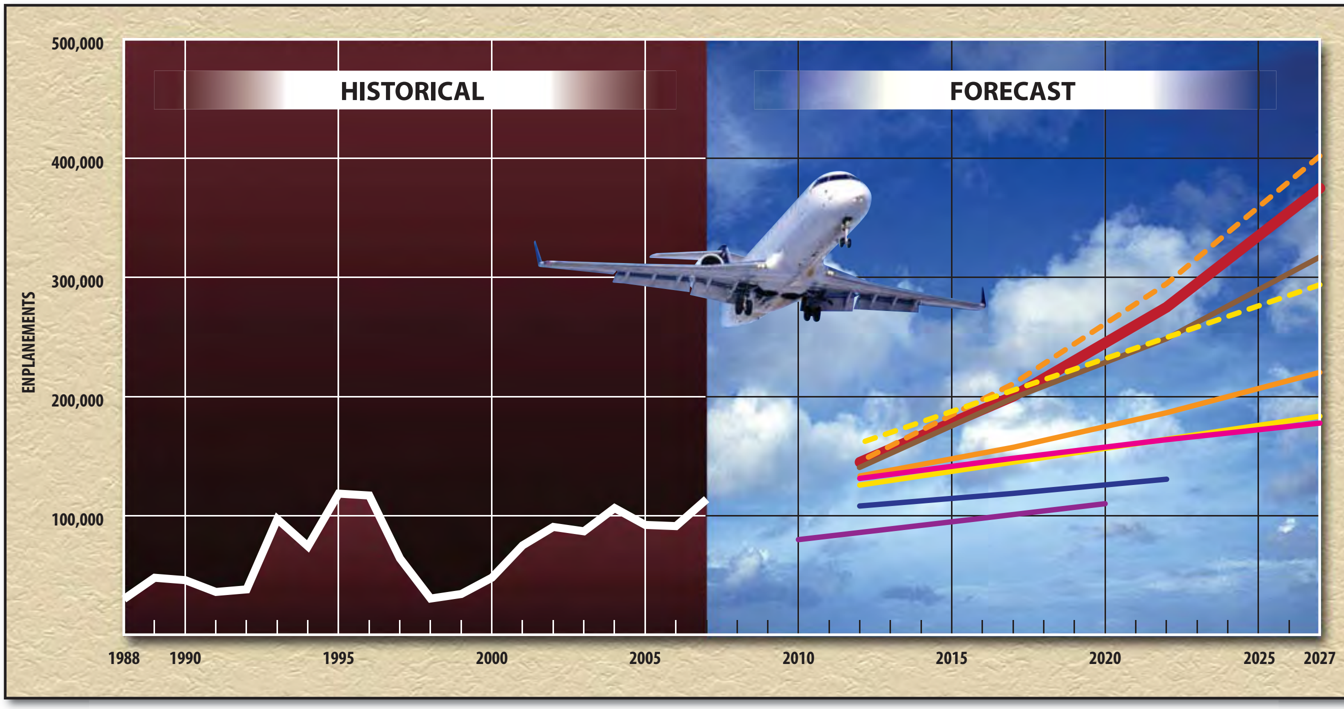
Enplanement Projections Summary

This section has presented an array of enplanement projections utilizing several forecasting methods. The most reliable approach to estimating aviation demand is through the utilization of more than one analytical technique. Oftentimes, it is the combination of several forecasts which point to a certain trend. Other times, the variety of forecasts serve to establish a planning "envelope" from which the selection of one or a combination of several forecasts can be made. The envelope is usually defined by high and low projections, whereas the remainder will fall somewhere in the middle. **Exhibit 2D** graphically depicts the enplanement projections presented earlier.

As shown on the exhibit, the FAA's TAF lies at the low end of the planning envelope. The TAF enplanement forecast more than likely understates long term growth potential for the airport, as the 2012 TAF forecast was surpassed in 2007 and the 2022 forecast is only 17,000 enplanements higher than in 2007.

Two forecasts which lie higher in the planning envelope than the TAF, but closely to each other, are more representative of the low end of the planning

Exhibit 2D
ENPLANEMENT FORECASTS



LEGEND

Time Series
1983-2007
1998-2007

Share of Domestic Enplanements
Constant Share
Increasing Share

2000 State Aviation Needs Study (SANS)

Static Travel Propensity Factor (TPF)

Increasing Travel Propensity Factor (TPF)

2007 FAA Terminal Area Forecast (TAF)

Selected Forecast

envelope. These forecasts are the 1983-2007 time-series projection and the constant TPF ratio projection. These forecasts project enplanements growing at 2.4 percent and 2.3 percent annually, respectively.

The increasing market share of national airline enplanement is the strongest enplanement projection and lies at the upper end of the planning envelope. The increasing TPF projection, 1998-2007 time-series projection, and the constant market share of national airline enplanements lie within the planning envelope. **Table 2G** summarizes all enplanement projections for this analysis.

The selected planning forecast falls near the high end of the planning envelope and closely follows the increasing TPF projection through 2020, then moves closer to the increasing market share of national airline enplanement projections through the end of the planning period. This forecast projects enplanements growing at 6.1 percent annually through 2027. For perspective, the airport averaged an annual growth rate of 16.9 percent between 1983 and 2007, and 15.8 percent between 1998 and 2007. Over the past 20-year period between 1988 and 2007, the airport averaged 7.3 percent annual growth.

To achieve the planning forecast, air service improvements will be necessary. Daily jet service to regional hubs will be necessary to attract the local and business air travelers that are presently not served by the charter flights to and from the airport and now represent nearly all of the passenger

Table 2G
ANNUAL ENPLANEMENT FORECAST SUMMARY

Forecast	2008	2012	2017	2022	2027
Time Series Extrapolation					
1983-2007		125,400	144,800	164,200	183,500
1988-2007		161,000	205,300	249,600	293,900
Share of U.S. Domestic Enplanements					
Constant Share		133,200	157,700	186,400	220,300
Increasing Share		145,900	211,000	294,800	402,100
Travel Propensity Factor (TPF)					
Static		131,100	148,200	163,800	177,700
Increasing		140,500	198,500	248,600	317,200
Comparable Forecasts					
2000 State Aviation Needs Study (SANS)		86,000	101,000	NA	NA
2007 FAA Terminal Area Forecast		108,012	118,876	130,837	NA
Planning Forecast	123,124	145,000	200,000	275,000	375,000

Source: Coffman Associates Analysis
NA - Not Available
2012 & 2017 SANS extrapolated by Coffman Associates

leakage. These passengers are now required to utilize regional airports and most likely will use McCarran International Airport for air travel. Service to western U.S. hubs such as Phoenix, Los Angeles, and Salt Lake City should be considered as these hubs already have significant regular regional airline service and provide connecting service to most domestic cities. The Los Angeles metropolitan area is also a large source of visitors to southern Mohave County. Regular daily jet service may also be able to capture passengers in the secondary air service area. As shown through the comparable markets analysis above, increased competition through the availability of two or more airlines is necessary to achieve higher forecast enplanement levels.

Historically, the Laughlin/Bullhead market has supported daily jet service. In the mid-1990s, the airport grew to an all-time peak of passenger enplanements when regular air service was provided by Reno Air and Morris Air using MD-80 and 737 aircraft. The 2000 SANS indicated that similar service could be conceivable in the future for the Laughlin/Bullhead market, especially given that the Laughlin gaming/resort market has grown and offers a unique experience relative to Las Vegas and other regional gaming alternatives.

Fleet Mix and Operations Forecast

The fleet mix defines a number of key parameters in airport planning, including critical aircraft, stage length capabilities, and terminal gate configurations. Changes in equipment, airframes, and engines have always had a significant impact on airlines and airport planning. There are many ongoing programs by the manufacturers to improve performance characteristics. These programs are focusing on improvements in fuel efficiency, noise suppression, and the reduction of air emissions. A fleet mix projection for Laughlin/Bullhead International Airport has been developed by reviewing the aircraft historically used by air carriers serving the airport.

The fleet mix projections have been used to calculate the average seats per departure, which, after applying a boarding load factor, were used to project annual departures. A boarding load factor is the percentage of enplanements to aircraft seating capacity. The boarding load factor is important to an airline because it is the basis for measuring the ability to profit in a given market. When a load factor is low, an airline will generally cut back the number of seats available by either reducing the size of the aircraft serving the market or reducing the number of flights. Similarly, when the load factor is high, an airline will begin to consider increasing the number of flights or the size of its aircraft.

As previously mentioned, three air carriers currently provide passenger service to Laughlin/Bullhead International Airport. Allegiant Airlines utilizes 150-seat MD-83 aircraft. Sun Country utilizes 162-seat 737-800 aircraft, while Canadian North utilizes 112-seat 737-200 aircraft. **Table 2H** presents historical airline operations information.

As indicated in the table, the charter-type service at Laughlin/Bullhead International Airport has buoyed the boarding load factor (BLF) in recent years as the air carriers maximize sold seats for each flight. As indicated, the BLF was 82 percent in 2006 and 78 percent in 2007. Nationally, the average BLF is 73.8 percent.

The overriding assumption of the fleet mix and operations forecast is that regular passenger service will begin in the early portion of the planning period. This service is assumed to be provided by regional jet aircraft in the 50- to 70- seat range. This category includes the Canadair CRJ200 and CRJ700 series regional jets and the Embraer EMB-145 and 170 regional jets. Regional jets have replaced the 737, MD-80, and DC-9 series of aircraft on feeder routes to hub airports across the country. In fact, regional jets comprise the majority of operations at airports up to 750,000 annual enplanements. As enplanements grow, scheduled passenger service is expected to include larger regional jets with 90 or more passenger seats and perhaps larger transport aircraft such as the 737. Charter service with large transport aircraft, such as the 737 and MD-80 series of aircraft, is projected to continue through the planning period.

Nationally, the FAA projects the average BLF to rise annually though the planning period. However, it is expected that the Laughlin/Bullhead International Airport BLF will experience a temporary decline near the beginning of the planning period as regularly scheduled service is initiated at the airport. The drop in the BLF is the result of the high number of seats which will become available once daily service begins. Similar to the national trend, however, the BLF for the airport will then increase over the remainder of the planning period, reaching 60 percent by 2027.

Table 2H
AIRLINE FLEET MIX AND OPERATIONS FORECAST

	Historical		Forecasts			
SEATING RANGE (TYPICAL AIRCRAFT)	**2006**	**2007**	**2012**	**2017**	**2022**	**2027**
>130 (MD-83/87, A320, B737-900, A310)	97%	98%	46%	31%	25%	20%
90 -129 (CRJ 900, B737-200/700, A318)	3%	2%	1%	35%	40%	45%
50-90 (CRJ-200, ERJ 175)	0%	0%	53%	34%	35%	40%
SEATS PER DEPARTURE	149	150	107	102	98	99
BOARDING LOAD FACTOR	82%	78%	53%	55%	57%	60%
ENPLANEMENTS PER DEPARTURE	122	117	57	56	56	59
ANNUAL ENPLANEMENTS	91,201	113,796	145,000	200,000	275,000	375,000
ANNUAL DEPARTURES	746	972	2,600	3,600	4,900	6,300
ANNUAL OPERATIONS	1,492	1,944	5,200	7,200	9,800	12,600

Source for historical information: Airport Records
Source for forecasts: Coffman Associates Analysis

To compute annual operations, the average seats-per-aircraft was first multiplied by the boarding load factor to obtain average enplanements per departure. Then, forecast operations were obtained by multiplying the number of departures by two. **Table 2H** summarizes the airline operations forecasts according to passenger levels, aircraft mix, and boarding load factors.

AIR CARGO FORECASTS

Air cargo traffic is comprised of freight/express and mail. Air cargo is moved either in the bellies of passenger aircraft or in dedicated all-cargo aircraft. FAA data and forecasts are presented in revenue-ton-miles (RTMs).

NATIONAL FORECASTS

Air cargo activity has historically had a high correlation to Gross Domestic Product (GDP). Other factors that affect air cargo growth are real yields, improved productivity, and globalization. Ongoing trends that are and will continue to improve the air cargo market include the opportunities from open skies agreements, decreasing costs from global airline alliances, and increasing business volumes from e-commerce. At the same time, trends that could limit air cargo growth include increased use of e-mail, decreased costs of sending documents by facsimile, and increased airline costs due to environmental and security restrictions.

Before 2001, air cargo was the fastest growing sector of the aviation industry. From 1994 through 2000, total tons and RTMs grew at annual average rates of 8.0 and 8.6 percent. An economic slowdown in the U.S., combined with the collapse of the high-tech industry and a slowing of imports, resulted in declines of 5.0 percent in tons and 3.9 percent in RTMs. Traffic began to recover in 2002 and is setting new record RTMs, especially in the international market.

The FAA notes there are several structural changes that are occurring within the air cargo industry. Among them are the following:

- **Security regulations** – Security regulations put in place shortly after 9/11 shifted cargo from the passenger airlines to the all-cargo airlines. Additional regulations have been put in place since that time. These include requiring the carriers to conduct random inspections, codifying and strengthening the "known shipper" program, and establishing a security program specifically to all-cargo operations by aircraft over 20,000 pounds.

- **Market maturation** – The express market in the United States has matured after dramatic growth over the last two decades. This is the majority of domestic air cargo activity.

- **Modal shift** – Improved service and economics from the use of alternative modes of cargo transported by the integrated cargo carriers (e.g., FedEx, UPS, and DHL) has matured.

- **Increased USPS use of all-cargo carriers** – This initially resulted from the U.S. Postal Service's (USPS) need to improve control over delivery. The trend has continued due to security regulations.

- **Increased use of mail substitutes** – Substitutes such as e-mail affect mail volume. The residual fear of mail because of terrorism has also been a factor.

FAA's forecasts of air cargo RTMs are predicated on several assumptions:

1) Security restrictions concerning air cargo transportation will stay in place;

2) There will be no additional terrorist attacks in the U.S.;

3) There will be continued domestic and international economic growth;

4) Most of the modal shift from air to ground has occurred; and

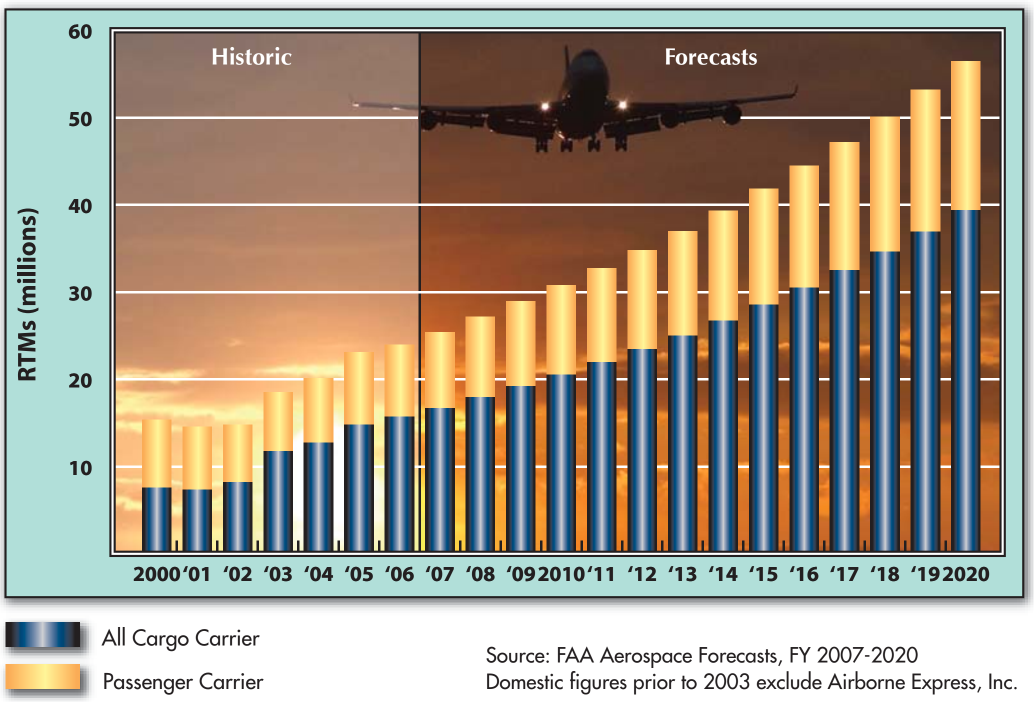
5) In the long term, cargo activity will be tied to economic growth.

The number of RTMs flown by U.S. carriers grew by 1.2 percent in 2006 to 39.7 billion. Total RTMs flown are forecast to increase 4.6 percent in 2007 and 6.1 percent in 2008. Over the following 12 years, total RTMs are projected to increase at an annual average rate of 5.2 percent. **Exhibit 2E** depicts the FAA forecasts for air cargo and mail.

in 2008. From 2008 through 2020, growth is expected to average 3.3 percent annually, based upon projected U.S. economic growth.

Between 1997 and 2006, the all-cargo carrier percentage of U.S. domestic RTMs grew from 65.4 percent to 79.4 percent. Significant growth in express service, coupled with combined higher passenger load factors leaving less room for belly cargo, were key factors in this shift. The October 2001 FAA security directive that strengthened security standards for cargo on passenger flights also impacted belly freight. By 2020, this share is projected to increase to 83.6 percent based upon increases in wide-body capacity for all-cargo carriers and security considerations.

Exhibit 2E
DOMESTIC AIR CARGO REVENUE TON MILES (RTMs) U.S. COMMERCIAL CARRIER



Source: FAA Aerospace Forecasts, FY 2007-2020
Domestic figures prior to 2003 exclude Airborne Express, Inc.

International RTMs flown by U.S. carriers grew to 24.0 billion in 2006, a 3.7 percent increase over the previous year. The FAA forecasts a 5.9 percent increase in 2007, and a 7.0 percent increase in 2008, followed by an average annual increase of 6.3 percent through 2020. The all-cargo carriers' percentage of the international market is projected to increase from 65.5 percent in 2006, to 69.7 percent by 2020, due to increased capacity.

Domestic cargo RTMs decreased 2.4 percent in 2006, to 15.7 billion. This followed a 1.6 percent decline in 2005, and was primarily due to the modal shift from air to ground and the impact of jet fuel surcharges. Domestic RTMs are projected to increase 2.7 percent in 2007 and 4.7 percent

The all-cargo large jet aircraft fleet is expected to grow from 997 in 2006, to 1,468 by 2020. Narrow-body aircraft in the fleet are projected to decline by four aircraft per year over this period. Meanwhile, wide-body aircraft are projected to increase by more than 37 aircraft annually.

ENPLANED CARGO AND OPERATIONS FORECASTS

At Laughlin/Bullhead International Airport, most air cargo is presently carried by contract carriers for FedEx and UPS. The contract carriers provide feeder services to and from regional hubs. At Laughlin/Bullhead International Airport, weekday service for FedEx is provided with Cessna Caravan aircraft, while Beechcraft 99 aircraft are used for UPS service.

Table 2J summarizes historical air cargo operations tracked by the Mohave County Airport Authority (MCAA). As shown in the table, the airport has approximately 1,100 air cargo operations each year. The MCAA does not track enplaned air cargo. Therefore, enplaned cargo was estimated for this study. This estimate was based upon multiplying the cargo carrying capacity of the aircraft that are used at the airport by the number of annual departures. As shown in the table, the airport enplanes nearly 1,300,000 pounds of air cargo each year. Enplaned air cargo was down in 2007 as the result of fewer annual operations.

As discussed above, the air cargo industry has matured as the network is fully established across the country. It is becoming rarer for airports to attract new cargo services due to the mature network. In fact, most cargo companies have shifted to trucking all air-freight within a five hour's drive of an airport served by large cargo aircraft.

The 2000 SANS noted that only Phoenix, Tucson, and Yuma would support the majority of air cargo services in the state of Arizona. Yuma would be supported by trans-border trade, while Tucson would emerge as a regional freight center due to growth in southern Arizona. Phoenix would continue as the center of air cargo activity for the state.

The 2000 SANS noted the following attributes for supporting long term air cargo activities:

1. Population mass
2. Strong base of industry and commerce, and
3. Strength of high-tech companies dependent upon air freight for just-in-time delivery

Table 2J
ENPLANED CARGO AND OPERATIONS

Year	Enplaned Cargo Pounds	Departures	Pounds Per Departure	Total Operations
Historical				
2006	1,322,400	552	2,396	1,104
2007	1,278,400	526	2,430	1,052
% Change	-3%			
Forecast				
2012	1,530,000	600	2,400	1,200
2017	1,840,000	700	2,400	1,400
2022	2,210,000	800	2,400	1,600
2027	2,640,000	1,000	2,400	2,000
AAGR	3.7%			

Source for historical operations: Airport Records
Historical enplaned cargo estimated by Coffman Associates
Forecasts: Coffman Associates Analysis
AAGR - Average Annual Growth Rate

With less population mass, smaller levels of high-tech industrial activity, and a direct roadway network to McCarran International Airport, which has larger cargo operations, it is not expected that significant increases in air cargo activity will occur at Laughlin/Bullhead International Airport. Air cargo activity at the airport is expected to remain regional in nature with service to established regional hubs for express package delivery.

A forecast of enplaned air cargo and operations has been prepared assuming that enplaned air cargo will grow at 3.7 percent annually, consistent with projections for national air cargo growth. Annual operations were determined by multiplying annual departure by two. Annual departures were calculated by dividing enplaned air cargo by the assumed pounds per departure.

GENERAL AVIATION FORECASTS

General aviation is defined as that portion of civil aviation which encompasses all portions of aviation, except commercial operations. To determine the types and sizes of facilities that should be planned to accommodate general aviation activity, certain elements of this activity must be forecast. These indicators of general aviation demand include: based aircraft, aircraft fleet mix, and annual operations.

NATIONAL FORECASTS

In the 13 years since the passage of the *General Aviation Revitalization Act of 1994* (federal legislation which limits the liability on general aviation aircraft to 18 years from the date of manufacture), it is clear that the Act has successfully infused new life into the general aviation industry. This legislation sparked an interest to renew the manufacturing of general aviation aircraft due to the reduction in product liability, as well as renewed optimism for the industry.

After the passage of this legislation, annual shipments of new aircraft rose every year between 1994 and 2000. According to the General Aviation Manufacturers Association (GAMA), between 1994 and 2000, general aviation aircraft shipments increased at an average annual rate of more than 20 percent, increasing from 928 shipments in 1994 to 3,140 shipments in 2000. As shown in **Table 2K**, growth in the general aviation industry slowed considerably after 2000, negatively impacted by the national economic recession and the events surrounding 9/11. In 2003, there were over 450 fewer aircraft shipments than in 2000, a decline of 14 percent.

In 2004, the general aviation production showed a significant increase, returning to near pre-9/11

Table 2K
ANNUAL GENERAL AVIATION AIRPLANE SHIPMENTS MANUFACTURED WORLDWIDE AND FACTORY NET BILLINGS

Year	Total	SEP	MEP	TP	J	Net Billings ($ millions)
2000	3,140	1,862	103	415	760	13,497.0
2001	2,994	1,644	147	421	782	13,866.6
2002	2,687	1,601	130	280	676	11,823.1
2003	2,686	1,825	71	272	518	9,994.8
2004	2,963	1,999	52	321	591	11,903.8
2005	3,580	2,326	139	365	750	15,140.0
2006	4,042	2,508	242	407	885	18,793.0

SEP - Single Engine Piston; MEP - Multi-Engine Piston; TP - Turboprop; J – Turbofan/Turbojet
Source: GAMA

levels for most indicators. With the exception of multi-engine piston aircraft deliveries, deliveries of new aircraft in all categories increased. In 2006, total aircraft deliveries increased 12 percent. The largest increase was in single engine piston aircraft deliveries that increased seven percent, or by over 180 aircraft. Turbojet and multi-engine piston aircraft also increased significantly from the previous year. As evidenced in the table, new aircraft deliveries in 2006 exceeded pre-9/11 levels by approximately 1,000 aircraft.

On July 21, 2004, the FAA published the final rule for sport aircraft: The *Certification of Aircraft and Airmen for the Operation of Light-Sport Aircraft* rules, which went into effect on September 1, 2004. This final rule establishes new light-sport aircraft categories and allows aircraft manufacturers to build and sell completed aircraft without obtaining type and production certificates. Instead, aircraft manufacturers will build to industry consensus standards. This reduces development costs and subsequent aircraft acquisition costs. This new category places specific conditions on the design of the aircraft, to limit them to "slow (less than 120 knots maximum) and simple" performance aircraft. New pilot training times are reduced and offer more flexibility in the type of aircraft the pilot would be allowed to operate.

Viewed by many within the general aviation industry as a revolutionary change in the regulation of recreational aircraft, this new rule is anticipated to significantly increase access to general aviation by reducing the time required to earn a pilot's license and the cost of owning and operating an aircraft. Since 2004, there have been over 30 new product offerings in the airplane category alone. These regulations are aimed primarily at the recreational aircraft owner/operator. By 2020, there are expected to be 13,200 of these aircraft in the national fleet.

While impacting aircraft production and delivery, the events of 9/11 and the subsequent economic downturn have not had the same negative impact on the business/corporate side of general aviation. The increased security measures placed on commercial flights have increased interest in fractional and corporate aircraft ownership, as well as on-demand charter flights. According to GAMA, the total number of corporate operators increased by approximately 2,300 between 2000 and 2006. Corporate operators are defined as those companies that have their own flight departments and utilize general aviation aircraft to enhance productivity. **Table 2L** summarizes the number of U.S. companies operating fixed-wing turbine aircraft between 1991 and 2006.

Table 2L
U.S. COMPANIES OPERATING FIXED-WING TURBINE BUSINESS AIRCRAFT AND NUMBER OF AIRCRAFT, 1991-2006

Year	Number of Operators	Number of Aircraft
1991	6,584	9,504
1992	6,492	9,504
1993	6,747	9,594
1994	6,869	10,044
1995	7,126	10,321
1996	7,406	11,285
1997	7,805	11,774
1998	8,236	12,425
1999	8,778	13,148
2000	9,317	14,079
2001	9,709	14,837
2002	10,191	15,569
2003	10,661	15,870
2004	10,735	16,369
2005	10,809	16,867
2006	11,611	16,965

Source: GAMA/NBAA

The growth in corporate operators comes at a time when fractional aircraft programs are experiencing significant growth. Fractional ownership programs sell a share in an aircraft at a fixed cost. This cost, plus monthly maintenance fees, allows the shareholder a set number of hours of use per year and provides for the management and pilot services associated with the aircraft's operation. These programs guarantee the aircraft is available at any time, with short notice. Fractional ownership programs offer the shareholder a more efficient use of time (when compared with commercial air service) by providing faster point-to-point travel times and the ability to conduct business confidentially while flying. The lower initial startup costs (when compared with acquiring and establishing a flight department) and easier exiting options are also positive benefits.

Since beginning in 1986, fractional jet programs have flourished. **Table 2M** summarizes the growth in fractional shares between 1986 and 2006. The number of aircraft in fractional jet programs grew rapidly from 2001 to 2006, increasing by approximately 250 aircraft. Although there is no data available, it can be projected that fractional shares and aircraft have increased even more since 2005.

Table 2M
FRACTIONAL SHARES AND NUMBER OF AIRCRAFT IN USE

Year	Number of Shares	Number of Aircraft
1986	3	N/A
1987	5	N/A
1988	26	N/A
1989	51	N/A
1990	57	N/A
1991	71	N/A
1992	84	N/A
1993	110	N/A
1994	158	N/A
1995	285	N/A
1996	548	N/A
1997	957	N/A
1998	1,551	N/A
1999	2,607	N/A
2000	3,834	N/A
2001	3,415	696
2002	4,098	776
2003	4,516	826
2004	4,765	865
2005	4,691	949
2006	4,903	984

Source: GAMA

Very light jets (VLJs) entered the operational fleet in 2006. Also known as microjets, the VLJ is commonly defined as a jet aircraft that weighs less than 10,000 pounds. There are several new aircraft that fall in this category, including the Eclipse 500 and Adams 700 jets. While not categorized by Cessna Aircraft as a VLJ, the Cessna Mustang is a competing aircraft to many of the VLJs expected to reach the market. These jets cost between $1 and $2 million, can takeoff on runways less than 3,000 feet, and cruise at 41,000 feet at speeds in excess of 300 knots. The VLJ is expected to redefine the business jet segment by expanding business jet flying and offering operational costs that can support on-demand air taxi point-to-point service. The FAA projects 350 VLJs in service in 2007.

In August 2007, the United States Government Accountability Office (GAO) issued a report GAO-07-1001, *VERY LIGHT JETS*, subtitled, Several Factors Could Influence Their Effect on the National Airspace System. This report was conducted in response to the VLJ phenomenon as many aviation forecasters feared the VLJ would eventually lead to significant airspace congestion. The report was not put forth to provide recommendations, but rather to provide information on the industry.

The following is the summary provided by the GAO report:

"The eight very light jet forecasts GAO examined provided a range of both the number of very light jets projected to be delivered (roughly 3,000 to 7,600) and the dates by which those numbers would be reached (from 2016 to 2025). The forecasts were based on limited information about the market for very light jets and varied based on a number of assumptions, particularly regarding the development of the air taxi market.

The studies GAO reviewed and the experts GAO contacted expressed varying opinions about the impact of very light jets on NAS capacity; however, most of the experts believed that very light jets would have little overall effect on safety. The studies found that the type of airports used by very light jets will influence very light jets' effect on capacity. Experts also mentioned other factors that could affect capacity such as aircraft usage, trip length, and altitude. Most experts GAO contacted believed that very light jets will likely have little impact on safety due to FAA's certification procedures for aircraft, pilots, and maintenance."

The report provided limited forecast information developed by eight entities, one being the FAA projections presented in the previous section. All forecasts assumed moderate to strong economic growth. Other factors which will impact the VLJ industry were also considered.

Many believe that the replacement market will be positive for the VLJ industry as older twin engine piston and turboprop aircraft are retired and some aircraft owners will likely replace them with VLJ aircraft. Another factor is the influence of high numbers of available VLJ models on the market. Rolls-Royce indicated in their analysis that there tends to be a correlation between total aircraft deliveries and number of models on the market. Other factors which will positively influence VLJ growth will be dissatisfaction with other transportation modes, low purchase price of VLJ aircraft, and access to airports with appropriate infrastructure. These factors will be more positive influences on the growth of VLJ markets. Negative factors could include uncertainty of success leading to hesitations in acquiring the VLJ, new training and high cost of insurance, as well as production constraints associated with new aircraft manufacturers.

The eight VLJ forecasts examined by the GAO were somewhat divergent. These forecasts range between 3,106 and 7,649 VLJ deliveries. The difficulty with comparing the forecasts, however, is that several have differing "out years." Some forecast through 2016, while others projected to 2020 and even 2025. **Table 2N** presents the VLJ forecast figures provided by the eight groups.

The FAA forecast assumes that the regulatory environment affecting general aviation will not change dramatically. It is expected that the U.S. economy will continue to expand through 2007 and 2008, and then continue to grow moderately (near three percent annually) thereafter. This will positively influence the aviation industry, leading to passenger, air cargo, and general aviation growth throughout the forecast period (assuming that there

Table 2N
Total Forecast Number of VLJ Deliveries

Forecasting Entity	Forecast End Year	Forecast VLJs Delivered
Embraer – Without strong air taxi demand	2016	~3,000
Embraer – With strong air taxi demand	2016	~6,000
Forecast International (aerospace consulting firm)	2016	~6,000
Honeywell (manufacturer of airspace products)	2016	~5,000
PMI Media (aerospace/defense publisher)	2016	4,124
Teal Group (aerospace consulting firm)	2016	~3,000
Velocity Group (consulting firm) – Moderate air taxi growth	2016	~4,000
Velocity Group (consulting firm) – Strong air taxi growth	2016	~6,000
FAA	2020	6,300
Rolls-Royce	2025	~7,500

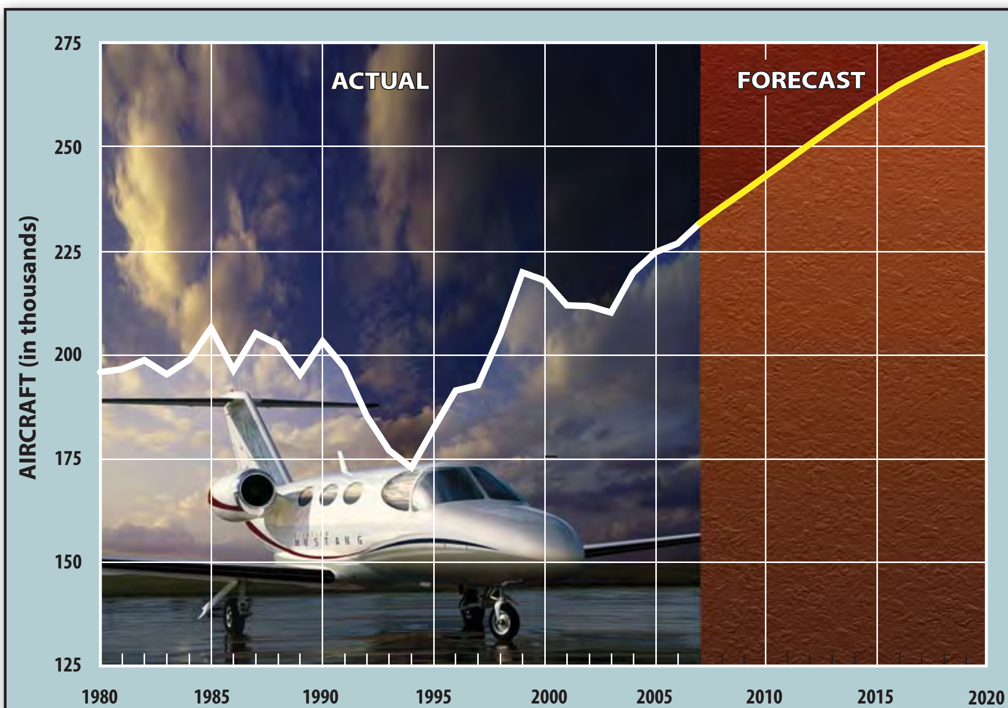
Source: FAA

will not be any new successful terrorist incidents against either U.S. or world aviation). The FAA does recognize that a major risk to continued economic growth is upward pressure on commodity prices, including the price of oil. However, FAA economic models predicted a 4.8 percent decrease in the price of oil in 2007, followed by a 7.1 percent increase in 2008. The price of oil is expected to become somewhat less volatile through the remainder of the forecast period.

The FAA projects the active general aviation aircraft fleet to increase at an average annual rate of 1.4 percent over the 14-year forecast period, increasing from 226,422 in 2006 to 274,914 in 2020. This growth is depicted on **Exhibit 2F**. FAA forecasts identify two general aviation economies that follow different market patterns. The turbine aircraft fleet is expected to increase at an average annual rate of 6.0 percent, increasing from 18,058 in 2006 to 31,558 in 2020. Factors leading to this substantial growth include expected strong U.S. and global economic growth, the continued success of fractional-ownership programs, the growth of the VLJ/microjet market, and a continuation of the shift from commercial air travel to corporate/business air travel by business travelers and corporations. Piston-powered aircraft are projected to show minimal growth through 2020 at 0.3 percent annually. Single engine piston aircraft are projected to grow at 0.3 percent annually, while multi-engine piston aircraft are projected to decrease in number by 0.2 percent annually. Piston-powered rotorcraft aircraft are forecast to increase by 5.7 percent annually through 2020.

Aircraft utilization rates are projected to increase through the 14-year forecast period. The number of general aviation hours flown is projected to increase at 3.4 percent annually. Similar to active aircraft projections, there is projected disparity between piston and turbine aircraft hours flown. Hours

Exhibit 2F
U.S. ACTIVE GENERAL AVIATION AIRCRAFT FORECASTS



U.S. ACTIVE GENERAL AVIATION AIRCRAFT (in thousands)

	FIXED WING				ROTORCRAFT					
	PISTON		TURBINE							
Year	Single Engine	Multi-Engine	Turboprop	Turbojet	Piston	Turbine	Experimental	Sport Aircraft	Other	Total
2006 (Est.)	148.2	19.4	8.0	10.0	3.4	5.9	24.5	0.4	6.6	226.4
2010	150.4	19.2	8.2	13.4	4.8	6.5	27.7	5.6	6.8	242.8
2015	154.0	19.0	8.5	18.0	6.3	7.2	31.1	10.5	6.7	261.4
2020	155.6	18.8	8.8	22.8	7.4	7.9	33.9	13.2	6.6	274.9

Source: FAA Aerospace Forecasts, Fiscal Years 2007-2020.
Notes: An active aircraft is one that has a current registration and was flown at least one hour during the calendar year.

flown in turbine aircraft are expected to increase at 6.1 percent annually, compared with 1.3 percent for piston-powered aircraft. Jet aircraft are projected to increase at 9.4 percent annually over the next 14 years, being the largest increase in any one category for total aircraft hours flown.

The total pilot population is projected to increase by 51,000 in the next 14 years, from an estimated 455,000 in 2006 to 506,000 in 2020, which represents an average annual growth rate of 0.8 percent. The student pilot population is forecast to increase at an annual rate of 1.2 percent, reaching a total of 100,181 in 2020. Growth rates for other pilot categories over the forecast period are as follows: recreational pilots declining 0.1 percent; commercial pilots increasing 0.8 percent; airline transport pilots increasing 0.2 percent; rotorcraft-only pilots increasing 3.1 percent; glider-only pilots increasing 0.4 percent; and private pilots showing no change. The sport pilot is expected to grow significantly through 2020 at 22.6 percent annually. The decline in recreational pilots and no increase in private pilots is the result of the expectation that most new general aviation pilots will choose to obtain the sport pilot license instead.

Over the past several years, the general aviation industry has launched a series of programs and initiatives whose main goals are to promote and assure future growth within the industry. The "No Plane, No Gain" is an advocacy program created in 1992 by GAMA and the National Business Aircraft Association (NBAA) to promote acceptance and increased use of general aviation as an essential, cost-effective tool for businesses. Other programs are intended to promote growth in new pilot starts and introduce people to general aviation. "Project Pilot," sponsored by the Aircraft Owners and Pilots Association (AOPA), promotes the training of new pilots in order to increase and maintain the size of the pilot population. The "Be A Pilot" program is jointly sponsored and supported by more than 100 industry organizations. The NBAA sponsors "AvKids," a program designed to educate elementary school students about the benefits of business aviation to the community and career opportunities available to them in business aviation. The Experimental Aircraft Association (EAA) promotes the "Young Eagles" program which introduces young children to aviation by offering them a free airplane ride courtesy of aircraft owners who are part of the association. Over the years, programs such as these have played an important role in the success of general aviation and will continue to be vital to its growth in the future.

GENERAL AVIATION SERVICE AREA

The service area for general aviation airports is limited by other public use airports providing similar levels of service. The other public general aviation airports within 40 nautical miles of Laughlin/Bullhead International Airport were outlined in Chapter One - Inventory. Of the eight airports studied, only three provided similar services and capabilities as Laughlin/Bullhead International Airport. These included Kingman Airport, Lake Havasu Municipal Airport, and Needles Airport in California. Therefore, these three airports limit the extent of the transient service area to that of Laughlin and Bullhead City, as these other communities have a general aviation airport capable of accommodating most transient activity. Given the national trend for general aviation activities basing nearer their home or business, the general aviation service area is similarly defined as primarily the Town of Laughlin and Bullhead City. Secondary service areas include the contiguous unincorporated areas of Mohave County.

BASED AIRCRAFT FORECASTS

The number of based aircraft is the most basic indicator of general aviation demand. By first developing a forecast of based aircraft, the growth of aviation activities at the airport can be projected. Aircraft basing at the airport is somewhat dependent upon the nature and degree of aircraft ownership in the local service area. As a result, aircraft registrations in the area were reviewed and forecast first.

Registered Aircraft Forecasts

Historical records of aircraft ownership in Mohave County were obtained from the FAA-maintained database of aircraft ownership. **Table 2P** summarizes total aircraft registrations from 1993 to 2007 for Mohave County. Over the past 15 years, 194 additional aircraft have been registered in Mohave County. Of this, the majority were single engine piston aircraft. However, there are now five registered turbojet aircraft and 46 turboprop aircraft. Helicopters and multi-engine piston aircraft have grown by 10.

TIME-SERIES ANALYSIS

Because of the relatively steady growth in registered aircraft in the county over the past 15 years, a time-series analyses for the period from 1993 to 2007 provided a reasonable correlation coefficient of 0.90. Extrapolation of this growth trend through 2027 yields 780 registered aircraft.

MARKET SHARE OF U.S. ACTIVE GENERAL AVIATION AIRCRAFT

Mohave County registered aircraft share of U.S. active general aviation aircraft is presented in **Table 2Q**. The county's market share has fluctuated from a high of 0.024 percent in 2007 to a period low of 0.0191 percent in 1999. Two projections of county registrations were developed as a comparison to U.S. active aircraft. A constant share projection of 0.024 applied to the FAA forecast of U.S. active aircraft yields 869 registered aircraft in the county by 2027. A second projection utilizing a continued increasing trend reaching 0.0293 percent yields 1,061 registered aircraft by 2027.

Table 2P
REGISTERED AIRCRAFT - MOHAVE COUNTY

Year	Total	Single Engine Piston	Multi-Engine Piston	Turboprop	Turbojet	Helicopter	Other
1993	362	313	36	1	0	10	2
1994	384	331	1	36	4	10	2
1995	381	331	37	2	0	8	3
1996	400	341	45	2	0	10	2
1997	412	353	43	1	0	12	3
1998	412	355	42	2	0	11	2
1999	419	357	42	3	0	14	3
2000	428	363	47	1	0	14	3
2001	428	372	37	3	0	13	3
2002	432	375	37	3	0	14	3
2003	465	392	42	10	2	16	3
2004	479	396	41	16	3	19	4
2005	523	437	44	11	6	20	5
2006	537	455	44	8	5	19	6
2007	556	432	46	46	5	20	7
AAGR	3.1%	2.3%	1.8%	31.5%	12.2%	5.1%	9.4%
% Growth	54%	38%	28%	4500%	500%	100%	250%
Change	194	119	10	45	5	10	5

Source: FAA Records
AAGR - Average Annual Growth Rate

Table 2Q
SHARE OF U.S. ACTIVE AIRCRAFT

Year	Mohave Registered Aircraft	U.S. Active Aircraft	Mohave County Share
Historical			
1993	362	177,119	0.204%
1994	384	172,936	0.222%
1995	381	188,089	0.203%
1996	400	191,129	0.209%
1997	412	192,414	0.214%
1998	412	204,710	0.201%
1999	419	219,464	0.191%
2000	428	217,533	0.197%
2001	428	211,535	0.202%
2002	432	211,345	0.204%
2003	465	209,788	0.222%
2004	479	219,426	0.218%
2005	523	224,352	0.233%
2006	537	226,422	0.237%
2007	556	231,343	0.240%
AAGR	3.1%	1.9%	
Constant Share			
2012	602	250,587	0.240%
2017	643	267,470	0.240%
2022	707	294,347	0.240%
2027	869	361,768	0.240%
AAGR	2.3%	2.3%	
Increasing Share			
2012	633	250,587	0.253%
2017	710	267,470	0.265%
2022	821	294,347	0.279%
2027	1,061	361,768	0.293%
AAGR	3.3%	2.3%	

Source for Historical Registered Aircraft: FAA Records
Source for Historical and Forecast U.S. Active Aircraft:
FAA Aerospace Forecasts, Selected Years, 2022 and 2027 Extrapolated
Registered Aircraft Forecasts: Coffman Associates Analysis
AAGR - Average Annual Growth Rate

RATIO OF POPULATION

Similar to enplanement projections, county registered aircraft can be linked with the local population base for forecasting purposes. The next forecast examined the historical registered aircraft as a ratio of 1,000 residents in Mohave County, as presented in **Table 2R**. As shown in the table, aircraft per capita has fluctuated from a low of 3.3 in 2007 to a high of 4.1 in 1993. A constant ratio projection of 3.3 registered aircraft per 1,000 residents yields 1,060 registered aircraft by 2027.

Table 2R
REGISTERED AIRCRAFT PER 1,000 RESIDENTS

Year	Registered Aircraft	County Population	Ratio
Historical			
1993	362	87,900	4.1
1994	384	92,800	4.1
1995	381	95,400	4.0
1996	400	102,375	3.9
1997	412	105,725	3.9
1998	412	114,000	3.6
1999	419	120,325	3.5
2000	428	124,500	3.4
2001	428	127,700	3.4
2002	432	133,550	3.2
2003	465	138,625	3.4
2004	479	142,925	3.4
2005	523	155,032	3.4
2006	537	161,580	3.3
2007	556	166,465	3.3
AAGR	3.1%	4.7%	
Constant Ratio Forecast			
2010	782	234,196	3.3
2015	884	264,600	3.3
2020	977	292,462	3.3
2025	1,060	317,239	3.3
AAGR	3.6%	3.6%	

Source for Historical and Forecast Population:
Arizona Department of Economic Security.
Source for Historical Registered Aircraft: FAA Records
Registered Aircraft Forecasts: Coffman Associates Analysis
AAGR - Average Annual Growth Rate

2000 SANS

The 2000 SANS provides a comparative forecast. As shown in **Table 2S**, the 2000 SANS projects 558 registered aircraft in 2012 and 613 registered aircraft in 2017. With 556 registered aircraft in 2007, this forecast more than likely understates growth potential and will not be considered further.

Table 2S
REGISTERED AIRCRAFT FORECAST SUMMARY

Forecast	2007	2012	2017	2022	2027
Time Series Extrapolation					
1993-2007		592	654	717	780
Share of U.S. Active Aircraft					
Constant Share		602	643	707	869
Increasing Share		633	710	821	1,061
Aircraft Per 1,000 Residents					
Constant Ratio		782	884	977	1,060
Comparable Forecasts					
2000 State Aviation Needs Study (SANS)		558	613	NA	NA
Planning Forecast	556	625	725	825	975

Source: Coffman Associates Analysis
NA - Not Available
2012 & 2017 SANS extrapolated by Coffman Associates

REGISTERED AIRCRAFT FORECAST SUMMARY

Exhibit 2G graphically presents all registered aircraft forecasts. Between 1993 and 2007, registered aircraft grew at an annual rate of 3.1 percent. Considering this historical growth pattern, the time-series projection and constant share of U.S. active aircraft projection appear to understate future growth potential. The aircraft per 1,000 residents and increasing share of U.S. active aircraft project registered aircraft growing at 3.3 percent annually through the planning period. This more than likely overstates future growth potential. The preferred planning forecast for registered aircraft is a mid-range forecast that projects registered aircraft growing at 2.8 percent through 2027.

Based Aircraft Forecasts

Having forecast the registered aircraft for Mohave County, based aircraft at Laughlin/Bullhead International Airport were reviewed to examine the potential change in market share. Historical based aircraft figures were obtained from the FAA's 5010 Form and previous Master Plan. The 2007 total was derived from an on-airport count conducted by the MCAA.

Because only limited counts of based aircraft at the airport over the past 10 years were available, time-series and regression analyses could not be performed. Instead, other methods were used to forecast based aircraft at the airport.

SHARE OF MOHAVE COUNTY
REGISTERED AIRCRAFT

The primary forecasting method of based aircraft examined the airport's market share of registered aircraft in Mohave County, which is presented in **Table 2T**. In 2007, 8.8 percent of aircraft registered in the county were based at Laughlin/Bullhead International Airport. This is a six percent decrease over the airport's market share in 1998 and may be attributable to the relocation of general aviation facilities at the airport and reduced enclosed hangar area. A constant market share (representing the 10-year average) was applied to the projections of

Exhibit 2G
REGISTERED AIRCRAFT FORECAST

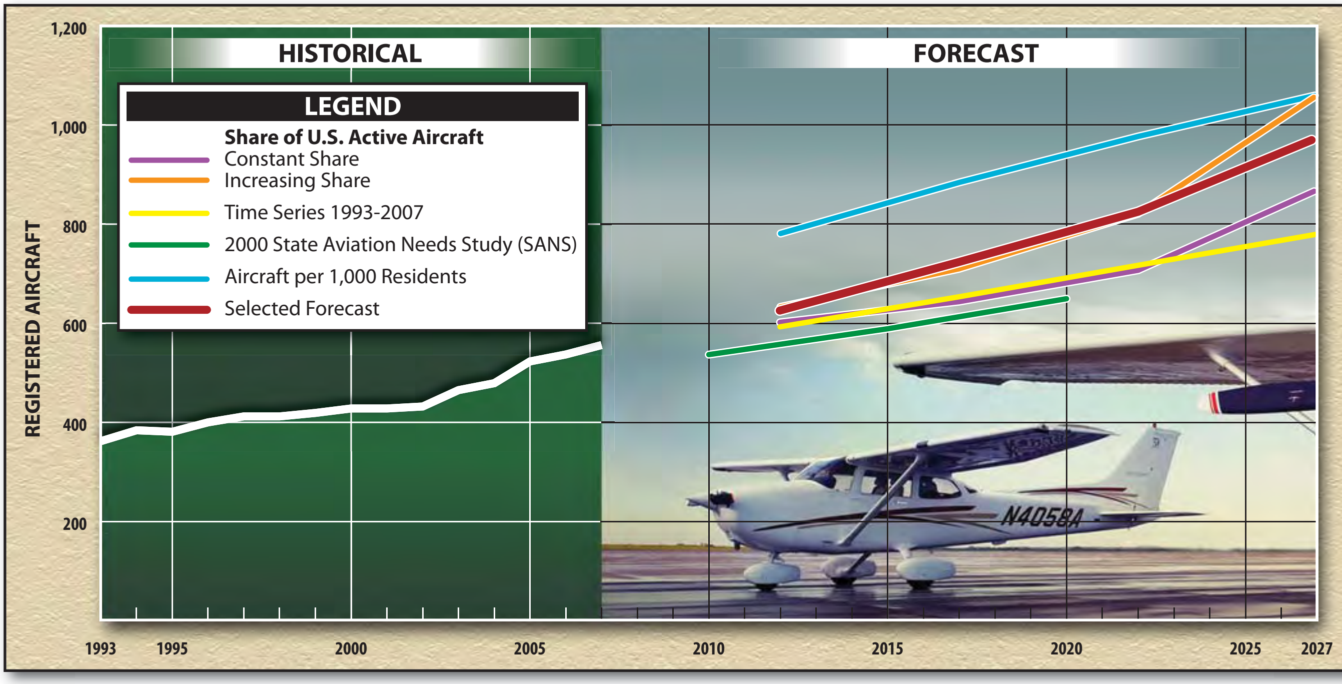


Table 2T
SHARE OF MOHAVE COUNTY REGISTERED AIRCRAFT

Year	IFP Based Aircraft	Registered Aircraft	IFP Share
Historical			
1998	60	412	14.6%
2007	49	556	8.8%
AAGR	-2.2%	3.4%	
Constant Share			
2012	79	625	12.6%
2017	91	725	12.6%
2022	104	825	12.6%
2027	123	975	12.6%
AAGR	4.7%	2.8%	
Increasing Share			
2012	98	625	15.3%
2017	131	725	18.6%
2022	178	825	22.7%
2027	240	975	27.6%
AAGR	8.3%	2.8%	

Source for Historical Based Aircraft:
2000 Master Plan, FAA TAF, Airport Records
Source for historical registered aircraft: FAA
Source for forecast registered aircraft:
Coffman Associates Analysis
Based Aircraft Forecasts: Coffman Associates Analysis
AAGR - Average Annual Growth Rate
IFP - Laughlin/Bullhead International Airport

registered aircraft and yields 123 based aircraft by 2027. An increasing market share was also developed and yields 240 based aircraft by the year 2027.

RATIO OF POPULATION

Future based aircraft potential has also been examined as a ratio of the population in the primary service area. For this analysis, the population of Bullhead City was used even though the primary service area includes Laughlin, Nevada. Separate population forecasts for Laughlin, Nevada could not be obtained for this study.

As shown in **Table 2U**, there were 1.2 based aircraft per 1,000 residents of Bullhead in 2007. This is 0.9 aircraft below the 1998 ratio of 2.1 aircraft per 1,000 residents in 2007. For planning purposes, a ratio of 1.7 based aircraft per 1,000 residents (approximate average since 1998) was projected against forecast Bullhead City population and yielded 95 based aircraft by 2027.

Table 2U
BASED AIRCRAFT FORECAST
RATIO OF BASED AIRCRAFT PER 1,000 RESIDENTS - PRIMARY SERVICE AREA

Year	IFP Based Aircraft	Bullhead Population	Based Aircraft Per 1,000 Residents
1998	60	28,535	2.1
2007	49	41,000	1.2
AAGR	-2.2%	4.1%	
Constant Share Projection			
2011	76	44,422	1.7
2016	82	48,513	1.7
2021	89	52,262	1.7
2026	95	55,596	1.7
AAGR	3.4%	1.5%	

Source for Historical Based Aircraft:
2000 Master Plan, FAA TAF, Airport Records
Source for Historical and Forecast Population:
Arizona Department of Economic Security
Source for forecast based aircraft:
Coffman Associates Analysis
AAGR - Average Annual Growth Rate
IFP - Laughlin/Bullhead International Airport

2007 TAF

As shown in **Table 2V**, the 2007 FAA TAF projected a base year total of 65 aircraft remaining constant through the year 2022.

2000 SANS

The 2000 SANS also provides a comparative forecast. As shown in **Table 2S**, the 2000 SANS projects 88 registered aircraft in 2012 and 103 registered aircraft in 2017.

BASED AIRCRAFT FORECAST SUMMARY

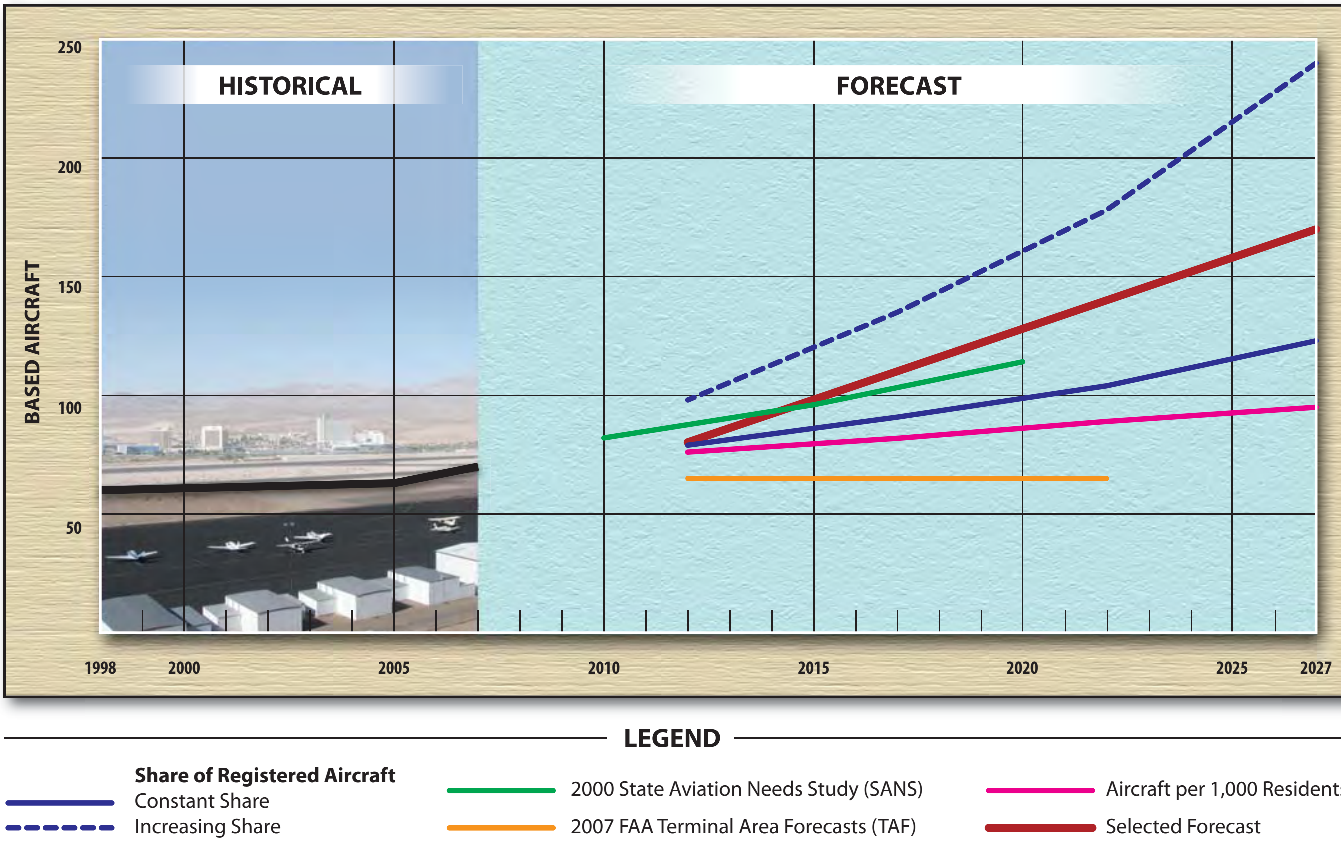
Exhibit 2H graphically presents all based aircraft forecasts. The constant ratio of based aircraft per 1,000 residents in the Bullhead City projection only results in 45 new based aircraft by 2027. This projection may underestimate growth potential. The constant share of based aircraft projection also appears to understate future growth potential as this projection results in only 53 new based aircraft. General socioeconomic growth within the service area should generate more based aircraft through

Table 2V
BASED AIRCRAFT FORECAST SUMMARY

Forecast	2007	2012	2017	2022	2027
Share of Mohave County Registered Aircraft					
Constant Share		79	91	104	123
Increasing Share		98	131	178	240
Aircraft Per 1,000 Residents					
Constant Ratio		76	82	89	95
Comparable Forecasts					
2000 State Aviation Needs Study (SANS)		88	103	NA	NA
2007 FAA Terminal Area Forecast		65	65	65	NA
Planning Forecast	49	80	110	140	170

Source: Coffman Associates Analysis
NA - Not Available
2012 & 2017 SANS extrapolated by Coffman Associates

Exhibit 2H
BASED AIRCRAFT FORECAST



the planning period. Considering this, the preferred planning forecast for based aircraft was developed that accounts for growth in the mid-range of the forecast envelope. The preferred planning forecast projects based aircraft growing at 6.4 percent annually through 2027 and adding 121 new aircraft.

BASED AIRCRAFT FLEET MIX

According to airport records, the current fleet mix consists of the following: 38 single engine aircraft, five multi-engine piston aircraft, one turboprop aircraft, two turbojet aircraft, and one helicopter. While the number of general aviation aircraft based at Laughlin/Bullhead International Airport is projected to increase, it is also important to know the fleet mix of the aircraft expected to use the airport. This will ensure the placement of proper facilities in the future.

The forecast mix of based aircraft was determined by comparing existing and forecast U.S. general aviation fleet trends to the current based aircraft fleet mix. The trend in general aviation is toward a greater percentage of larger, more sophisticated aircraft as part of the national fleet mix. This is reflected in an increasing percentage of jets and turboprop aircraft in the mix at Laughlin/Bullhead International Airport. The number of single engine aircraft is expected to increase, but will decrease as a percentage of total based aircraft following national trends. The general aviation fleet mix projections for the airport are presented in **Table 2W**.

GENERAL AVIATION OPERATIONS

The airport traffic control tower (ATCT) located on the airport collects information regarding aircraft operations (takeoffs and landings). It should be

Table 2W
TOTAL BASED AIRCRAFT FLEET MIX

Year	Total	Single Engine Piston	Multi-Engine Piston	Turboprop	Turbojet	Helicopter
Historical						
2007	49	38	5	1	2	3
Percentage Share						
2007	100.0%	77.6%	10.2%	2.0%	4.1%	6.1%
Forecast						
2012	80	65	6	2	3	4
2017	110	86	8	3	7	6
2022	140	109	9	4	11	7
2027	270	128	10	6	17	9
Percentage Share						
2012	100.0%	81.5%	7.5%	2.0%	4.0%	5.0%
2017	100.0%	79.5%	7.0%	2.5%	6.0%	5.0%
2022	100.0%	77.5%	6.5%	3.0%	8.0%	5.0%
2027	100.0%	75.5%	6.0%	3.5%	10.0%	5.0%
Change	121	90	5	5	15	6

Source: Airport Records, Coffman Associates Analysis

noted that the Laughlin/Bullhead International Airport ATCT is not open 24 hours, and as such, does not collect the true annual count. Some operations are conducted when the ATCT is closed. The previous Master Plan estimated that 20 percent of the annual operations at the airport were conducted after the ATCT was closed.

There are two types of operations at an airport: local and itinerant. A local operation is a take-off or landing performed by an aircraft that operates within sight of the airport, or which executes simulated approaches or touch-and-go operations at the airport. Itinerant operations are those performed by aircraft with a specific origin or destination away from the airport. Generally, local operations are characterized by training operations. Typically, itinerant operations increase with business and commercial uses, since these uses primarily carry people from one location to another.

Table 2X summarizes historical general aviation operations at Laughlin/Bullhead International Airport since 1999. In 1999, the ATCT transferred to the federal contract tower program and historical information began to be recorded and archived. As indicated on the table, total general aviation operations have declined 44 percent in the past nine years. Itinerant activity has declined the most, falling from 21,550 in 1999 to 13,797 in 2007.

Table 2X
HISTORICAL GENERAL AVIATION OPERATIONS

Year	Itinerant	Local	Total	% Change
1999	21,550	1,536	33,086	NA
2000	30,203	7,152	47,355	43%
2001	29,508	16,011	45,519	-4%
2002	22,545	3,306	25,851	-43%
2003	21,362	5,538	26,900	4%
2004	20,612	7,394	28,006	4%
2005	17,156	5,117	22,273	-20%
2006	16,084	5,897	21,981	-1%
2007	13,797	4,738	18,535	-16%
Change	(7,753)	(6,798)	(14,551)	
% Change	-36%	-59%	-44%	

Source: FAA Records

Local operations have declined from 11,536 in 1999 to 4,738 in 2007. Declines in general aviation activity at the airport can be partially attributed to changes in travel patterns related to accessing the entertainment and recreational opportunities in the Laughlin/Bullhead area as well aircraft use patterns. Nationally, total annual general aviation operations have been declining since 2002 as fuel prices have raised. Nationally, the FAA projects operations to increase. The FAA projects national itinerant operations to grow at 2.2 percent annually, while local operations are projected to grow at 1.7 percent annually. In order to develop updated forecasts for general aviation itinerant and local operations, Laughlin/Bullhead International Airport's share of total general aviation operations at towered airports were examined.

GENERAL AVIATION ITINERANT OPERATIONS

According to FAA records, there were a total of 13,797 general aviation itinerant operations in 2007. As shown in **Table 2Y**, this represented 0.07 percent of all general aviation itinerant operations at towered airports in the U.S. This is a decrease from the peak of 0.14 percent in 2001. As discussed above, the generally decreasing market share trend can be directly attributed to national trends in aircraft use related to an economic recession and high fuel prices over the last two years.

One market share projection was made considering a constant market share of U.S. itinerant general aviation operations at towered airports. The constant share forecast of 0.07 percent yields 20,700 annual itinerant general aviation operations by the year 2027. An increasing market share projection results in 68,000 annual operations in 2027.

These projections can be compared against the 2007 FAA TAF. The 2007 FAA TAF projects 16,820 general aviation operations at Laughlin/Bullhead International Airport by 2022. As shown on **Exhibit 2J**, the 2007 FAA TAF projection closely follows the constant market share projection discussed above and is at the low end of the forecast envelope.

Table 2Y
SHARE OF U.S. TOWER ITINERANT GENERAL AVIATION OPERATIONS

Year	IFP Itinerant	Total GA Itinerant Operations (1,000)	IFP Share
1999	21,550	23,019.4	0.09%
2000	30,203	22,844.1	0.13%
2001	29,508	21,433.3	0.14%
2002	22,545	21,450.5	0.11%
2003	21,362	20,231.3	0.11%
2004	20,612	20,007.2	0.10%
2005	17,156	19,315.1	0.09%
2006	16,084	18,751.9	0.09%
2007	13,797	19,220.1	0.07%
AAGR	-5.4%	-2.2%	
Constant Share			
2012	15,300	21,840.3	0.07%
2017	16,900	24,153.6	0.07%
2022	18,600	26,512.9	0.07%
2027	20,700	29,560.5	0.07%
AAGR	2.0%	2.2%	
Increasing Share			
2012	21,800	21,840.3	0.10%
2017	33,800	24,153.6	0.14%
2022	50,400	26,512.9	0.19%
2027	68,000	29,560.5	0.23%
AAGR	8.3%	2.2%	

Source for historical operations: FAA
Source for historical and forecast U.S. GA Operations: FAA Aerospace Forecasts. 2022 and 2027 Extrapolated by Coffman Associates
Source for forecast IFP Itinerant Operations: Coffman Associates Analysis
AAGR - Average Annual Growth Rate
IFP - Laughlin/Bullhead International Airport
GA - General Aviation

GENERAL AVIATION LOCAL OPERATIONS

There were a total of 4,738 general aviation itinerant operations at the airport in 2007. As shown in **Table 2Z**, this represented 0.03 percent of all general

Exhibit 2J
ITINERANT GENERAL AVIATION OPERATIONS

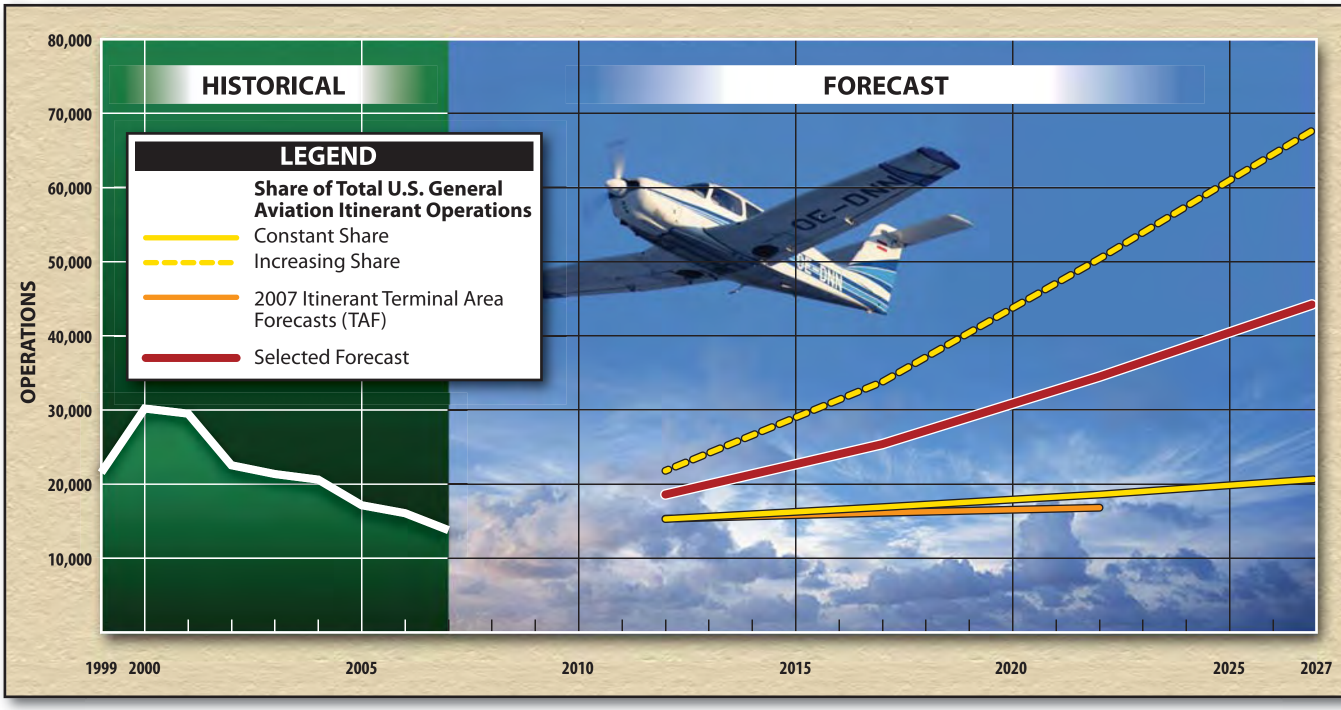


Table 2Z
SHARE OF U.S. TOWER LOCAL GENERAL AVIATION OPERATIONS

Year	IFP Local	Total GA Local Operations (1,000)	IFP Share
1999	11,536	16,908.2	0.07%
2000	17,152	17,034.4	0.10%
2001	16,011	16,193.7	0.10%
2002	3,306	16,172.8	0.02%
2003	5,538	15,292.1	0.04%
2004	7,394	14,960.4	0.05%
2005	5,117	14,845.9	0.03%
2006	5,897	14,378.9	0.04%
2007	4,738	14,833.3	0.03%
AAGR	-10.5%	-1.6%	
Constant Share			
2012	5,300	16,552.9	0.03%
2017	5,700	17,715.8	0.03%
2022	6,000	18,925.1	0.03%
2027	6,600	20,589.4	0.03%
AAGR	1.7%	1.7%	

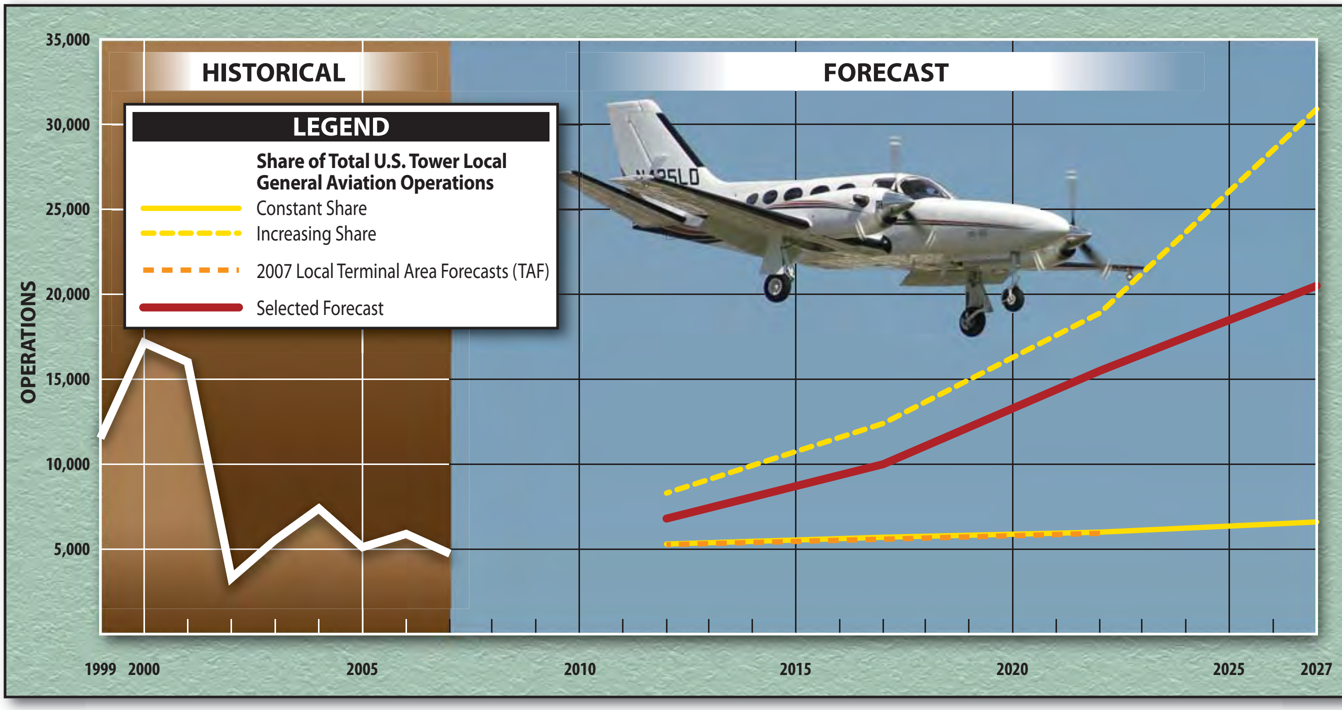
Year	IFP Local	Total GA Local Operations (1,000)	IFP Share
Increasing Share			
2012	8,300	16,552.9	0.05%
2017	12,400	17,715.8	0.07%
2022	18,900	18,925.1	0.10%
2027	30,900	20,589.4	0.15%
AAGR	9.8%	1.7%	

Source for historical operations: FAA
Source for historical and forecast US GA Operations: FAA Aerospace Forecasts. 2022 and 2027 Extrapolated by Coffman Associates
Source for forecast IFP Itinerant Operations:
Coffman Associates Analysis
AAGR - Average Annual Growth Rate
IFP - Laughlin/Bullhead International Airport
GA - General Aviation

aviation itinerant operations at towered airports in the U.S. This is a decrease from the peak of 0.10 percent in 2001. This generally decreasing market share trend can be directly attributed to a reduction in aircraft training at the airport.

Local general aviation operations have been examined as a share of U.S. local general aviation operations in the U.S. Maintaining the 2007 share of 0.03 percent constant through 2027 yields 6,600 operations by the end of the planning period. An

Exhibit 2K
LOCAL GENERAL AVIATION OPERATIONS



increasing market share projection results in 30,900 annual operations in 2027.

These projections can be compared against the 2007 FAA TAF. The 2007 FAA TAF projects 5,930 general aviation operations at Laughlin/Bullhead International Airport by 2022. The 2007 FAA TAF projection falls below the constant market share projection discussed above. All local general aviation operation forecasts are shown on **Exhibit 2K**.

TOTAL GENERAL AVIATION OPERATIONS

Table 2AA summarizes all the local and itinerant general aviation operations forecasts for Laughlin/Bullhead International Airport. **Exhibit 2L** graphically depicts the total general aviation operations which are the sum of total itinerant and total local operations.

The preferred planning forecast for itinerant general aviation operations lays mid-range between the constant share of U.S. itinerant operations forecast and the increasing share of U.S. itinerant operations. This forecast projects general aviation operations growing at 6.0 percent annually through the planning period.

The preferred planning forecast for general aviation operations provides for slightly stronger growth than the preferred planning forecast for itinerant general aviation operations. While the airport presently does not experience many training operations, the preferred planning forecast should account for growing general aviation operations. As based aircraft levels grow, the airport should experience additional local operations for recurrent and advanced training. This forecast should also account for the establishment of a formal training program at the airport. The preferred planning forecast for local general aviation operations projects local operations growing at 7.6 percent annually.

Overall, total general aviation operations are projected to grow at 6.5 percent annually. While itinerant operations presently account for approximately 75 percent of total annual operations,

Table 2AA
GENERAL AVIATION OPERATIONS FORECAST SUMMARY

Forecast	2007	2012	2017	2022	2027
Itinerant					
Share of U.S. Itinerant General Aviation Operations					
Constant Share		15,300	16,900	18,600	20,700
Increasing Share		21,800	33,800	50,400	68,000
2007 FAA Terminal Area Forecast (TAF)		15,335	16,138	16,820	NA
Planning Forecast (Tower Count)	13,797	18,600	25,400	34,500	44,400
Operations after Airport Traffic Control Tower (ATCT) is closed	2,800	3,700	5,100	6,900	8,900
Total Itinerant Operations	**16,597**	**22,300**	**30,500**	**41,400**	**53,300**
Local					
Share of U.S. Local General Aviation Operations					
Constant Share		5,300	5,700	6,000	6,600
Increasing Share		8,300	12,400	18,900	30,900
2007 FAA Terminal Area Forecast (TAF)		5,264	5,586	5,930	NA
Planning Forecast (Tower Count)	4,738	6,800	10,000	15,500	20,500
Operations after Airport Traffic Control Tower (ATCT) is closed	900	1,400	2,000	3,100	4,100
Total Local Operations	**5,638**	**8,200**	**12,000**	**18,600**	**24,600**
Total Operations					
Share of U.S. General Aviation Operations					
Constant Share		20,600	22,600	24,600	27,300
Increasing Share		30,100	46,200	69,300	98,900
2007 FAA Terminal Area Forecast (TAF)		20,599	21,724	22,750	N/A
2000 State Aviation Needs Study (SANS)		70,360	82,897	N/A	N/A
Planning Forecast (Tower Count)	18,535	25,400	35,400	50,000	64,900
Operations after Airport Traffic Control Tower (ATCT) is closed	3,700	5,100	7,100	10,000	13,000
Total Operations	**22,235**	**30,500**	**42,500**	**60,000**	**77,900**
Percent Itinerant	**75%**	**73%**	**72%**	**69%**	**68%**
Percent Local	**25%**	**27%**	**28%**	**31%**	**32%**

Source: Coffman Associates Analysis

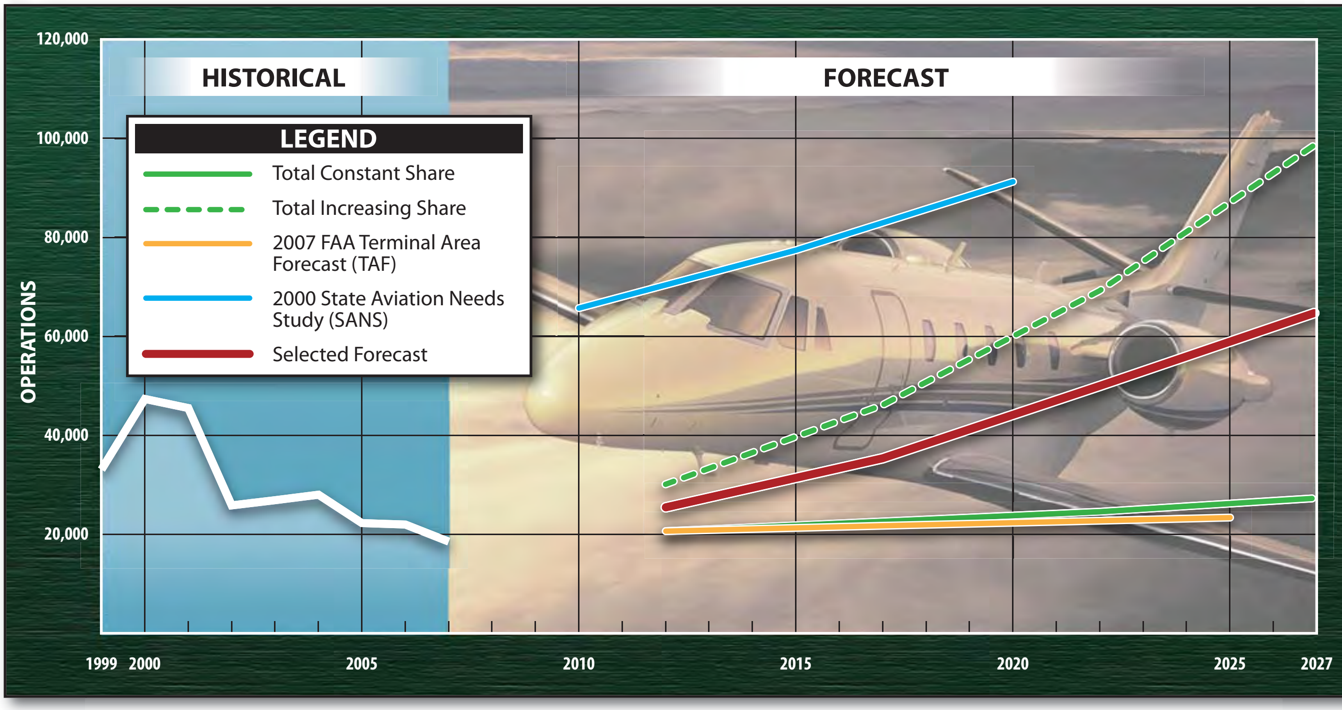
the projected growth in local operations will result in itinerant operations declining to 68 percent of total general aviation operations by 2027.

As mentioned previously, the ATCT is closed for a portion of each day. This means that the ATCT does not record all operations at the airport. The preferred itinerant and preferred local operations planning forecasts have been increased by 20 percent to account for the periods when the ATCT is closed. These adjustments are shown in **Table 2AA**.

OTHER OPERATIONS

In addition to general aviation operations, the ATCT further classifies itinerant and local operations at the airport as air carrier, air taxi, and military. Air carrier operations are those conducted by large airline and air cargo aircraft. Air taxi operations generally include those conducted by regional airlines, regional air cargo operators, general aviation aircraft filing flight plans under 14 CFR Part 135, and sometimes fractional operators. The analysis above

Exhibit 2L
TOTAL GENERAL AVIATION OPERATIONS



in the Commercial Service section has accounted for air carrier operations. Air taxi operations and military operations are discussed below.

AIR TAXI OPERATIONS

Since air cargo operations were projected separately, these operations have been removed from the total air taxi operations registered by the ATCT for this analysis. The remaining air taxi operations are those operations conducted by 14 CFR Part 135 operators and fractional aircraft operators. As shown in **Table 2BB**, air taxi operations grew from approximately 2,091 in 2006 to 2,139 in 2007. These totals assume a 20 percent increase for operations conducted after the ATCT is closed. Future air taxi operations have been projected to grow at 1.9 percent annually, consistent with national forecasts. This results in air taxi operations growing to 3,100 by 2027.

MILITARY OPERATIONS

Projecting future military utilization of an airport is particularly difficult since local missions may change with little notice. However, existing operations and aircraft mix may be confirmed for their impact on facility planning. Presently, the airport experiences very little military activity. In 2007, only 326 military operations were recorded by the ATCT. Since 1999, the airport has averaged only 360 annual military operations.

Table 2BB
AIR TAXI OPERATIONS

Year	Air Taxi
Historical	
2006	2,091
2007	2,139
Forecasts	
2012	2,500
2017	2,700
2022	2,900
2027	3,100
AAGR	1.9%

Source: Coffman Associates Analysis, FAA Records
Note: Historical operations adjusted 20% to account for operations conducted after ATCT is closed.
AAGR - Average Annual Growth Rate

It is difficult to predict the pattern of military operations due to the ever-changing missions of military forces; however, total military operations at the airport have remained relatively constant. Therefore, military operations have been projected at 300 operations annually with 200 being attributed to itinerant activity and 100 being attributed to local activity.

OPERATIONAL MIX

The number and type of aircraft operating at the airport and how this might change over time is important to understand. This type of information is used in determining future noise emissions for the Master Plan. An estimate of the existing operational mix is provided in **Table 2CC**. This estimate was derived from a review of filed instrument flight plans to the airport and landing fee reports maintained by the MCAA. This analysis concluded that fixed-wing aircraft represented approximately 97.5 percent of the total operations at the airport, while helicopters represented the remaining 2.5 percent. Single engine piston aircraft represent the majority of fixed-wing aircraft operations.

A forecast of the operational mix is also shown in **Table 2CC**. This projection assumes that fixed-wing aircraft will grow in number and percentage of the total mix through the planning period. This is consistent with projected based aircraft fleet mix changes for Laughlin/Bullhead International Airport and national trends showing stronger growth rates for the number of active fixed-wing aircraft versus rotorcraft.

Table 2CC
OPERATIONAL MIX

Aircraft Type	Annual Operations	% of Mix
2007		
Single Engine Piston	17,896	64.6%
Multi-Engine Piston	5,421	19.6%
Turboprop	1,282	4.6%
Turbojet	2,414	8.7%
Helicopter	681	2.5%
Total	**27,694**	**100.0%**
2012		
Single Engine Piston	24,400	61.5%
Multi-Engine Piston	6,800	17.1%
Turboprop	1,500	3.8%
Turbojet	6,000	15.1%
Helicopter	1,000	2.5%
Total	**39,700**	**100.0%**
2017		
Single Engine Piston	34,200	63.2%
Multi-Engine Piston	8,900	16.5%
Turboprop	1,700	3.1%
Turbojet	8,100	15.0%
Helicopter	1,200	2.2%
Total	**54,100**	**100.0%**
2022		
Single Engine Piston	48,200	64.6%
Multi-Engine Piston	11,900	16.0%
Turboprop	2,000	2.7%
Turbojet	11,000	14.7%
Helicopter	1,500	2.0%
Total	**74,600**	**100.0%**
2027		
Single Engine Piston	62,700	65.4%
Multi-Engine Piston	14,900	15.5%
Turboprop	2,400	2.5%
Turbojet	14,000	14.6%
Helicopter	1,900	2.0%
Total	**95,900**	**100.0%**

Source: Coffman Associates Analysis

PEAKING CHARACTERISTICS

Most facility planning relates to levels of peak activity. The following planning definitions apply to the peak periods:

- Peak Month – The calendar month when peak activity occurs.
- Design Day – The average day in the peak month.
- Busy Day – The busy day of a typical week in the peak month.
- Design Hour – The peak hour within the design day.

It is important to note that only the peak month is an absolute peak within a given year. All other peak periods will be exceeded at various times during the year. However, they do represent reasonable planning standards that can be applied without overbuilding or being too restrictive. The design day is normally derived by dividing the peak month operations or enplanements by the number of days in the month.

AIRLINE PEAKING CHARACTERISTICS

Since 2001, the peak month for passenger enplanements has always occurred in March. Over this period, the peak enplanement month has ranged from 11.9 percent to 16.3 percent of total annual enplanements, or an average of 14.5 percent of annual enplanements. Typically, the peak month at commercial service airports averages approximately 12 percent of total annual enplanements. The peak month percentage at Laughlin/Bullhead International Airport is higher due to the gaming/resort destination of the area and time of year as activity declines over the warmer summer months at the airport. For planning purposes, the peak month for passenger enplanements is projected to decline to 12 percent of total annual enplanements as regular air service is initiated at the airport.

The design day was calculated by dividing peak month figures by 31. Ideally, hourly enplanements should be used to examine changes in peak hour passengers as a percentage of design day activity. The "design hour" passengers were estimated based on current schedules which typically have two departing aircraft during peak periods. Assuming the type of aircraft currently used at the airport and applying the current BLF of 78 percent results in 233 passengers during the peak hour, or approximately 51 percent of design day activity. This percentage is projected to decline as regular air service for the airport is projected to utilize lower seating capacity regional jets and have more daily flights to disperse the peak periods. Airline operations peak periods were determined by assuming 12 percent of total annual operations would occur in the peak month and that the design hour operations represent 28 percent of design day activity.

General Aviation Peak Periods

According to FAA ATCT records, the peak month for general aviation itinerant operations represents approximately 11 to 12 percent of total general aviation itinerant operations. Forecasts of peak activity have been developed by applying 12 percent to the forecasts of annual itinerant operations. As previously mentioned, design day operations were calculated by dividing the total number of operations in the peak month by the number of days in the month. The design hour was estimated at 20 percent of the design day operations. Busy day operations were estimated at 25 percent higher than design day operations.

Peaking characteristics for Laughlin/Bullhead International Airport are summarized in **Table 2DD**.

ANNUAL INSTRUMENT APPROACHES (AIAs)

An instrument approach, as defined by the FAA, is "an approach to an airport with the intent to land by an aircraft in accordance with an Instrument Flight Rule (IFR) flight plan, when visibility is less than three miles and/or when the ceiling is at or below the minimum initial approach altitude." To qualify as an instrument approach at Laughlin/Bullhead International Airport, aircraft must land at the airport after following one of the published instrument approach procedures to Runway 34 and then properly closing their flight plan. The approach must be conducted in weather conditions which necessitate the use of the instrument approach. If the flight plan is closed prior to landing, then the AIA is not counted in the statistics. It should be noted that practice or training approaches do not count as annual AIAs.

Table 2DD
PEAK PERIOD FORECASTS

		Forecasts			
	2007	2012	2017	2022	2027
Enplaned Passengers					
Annual	113,796	145,000	200,000	275,000	375,000
Peak Month	14,148	17,400	24,000	33,000	45,000
Design Day	456	561	774	1,065	1,452
Design Hour	233	286	271	266	247
Airline Operations					
Annual	1,944	5,200	7,200	9,800	12,600
Peak Month	226	624	864	1,176	1,512
Design Day	7	20	28	38	49
Design Hour	2	6	8	11	14
General Aviation Itinerant Operations					
Annual	16,597	22,300	30,500	41,400	53,300
Peak Month	1,826	2,676	3,660	4,968	6,396
Design Day	59	86	118	160	206
Busy Day	74	108	148	200	258
Design Hour	12	17	24	32	41

Source: Coffman Associates Analysis

Table 2EE
ACTUAL INSTRUMENT APPROACHES FORECAST

		Forecasts			
	2007	2010	2015	2020	2025
Annual Itinerant Operations	21,948	31,400	42,000	55,900	71,200
Actual Instrument Approaches	NA	188	252	335	427

Source: Coffman Associates Analysis

Historical AIA information is not available for Laughlin/Bullhead International Airport. This does not necessarily indicate that this approach is not used. The FAA does not make records available for each airport.

The presence of good flying weather indicates that the weather conditions only occasionally go below the IFR approach minimums. Therefore, actual instrument approach numbers are low. For planning purposes, future AIAs have been projected at 0.6 percent of future itinerant operations due to the prevalence of good flying weather at the airport. This forecast is presented in **Table 2EE**.

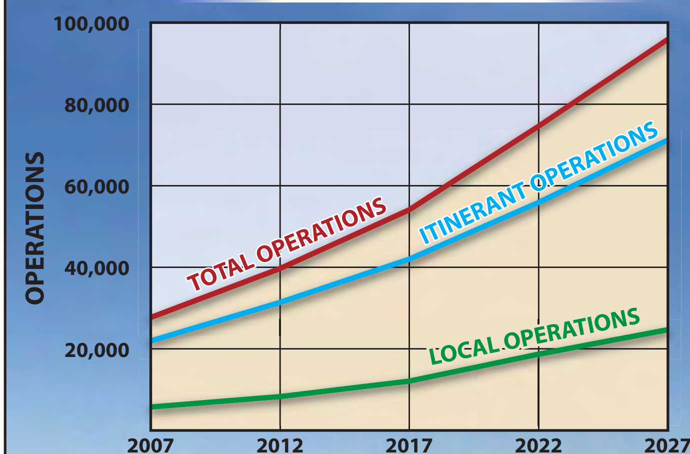
SUMMARY

This chapter has provided forecasts for each sector of aviation demand anticipated over the planning period. **Exhibit 2M** presents a summary of the aviation forecasts developed for Laughlin/Bullhead International Airport. The airport is expected to experience an increase in total based aircraft, annual operations, and annual enplaned passengers throughout the planning period. The next step in this study is to assess the capacity of the existing facilities to accommodate forecast demand and determine what types of facilities will be needed to meet these demands. This is considered a preliminary draft until submitted and approved by the FAA.

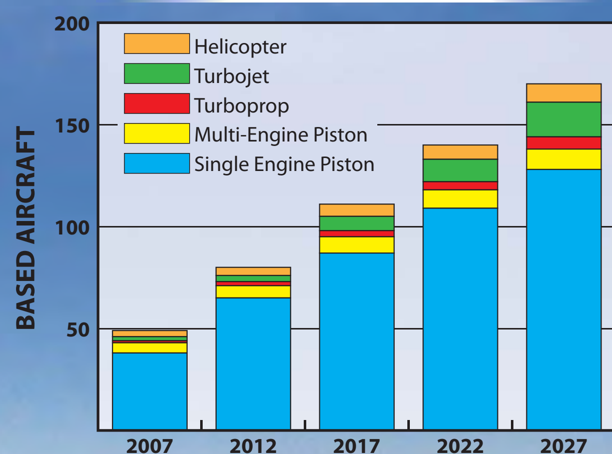
Exhibit 2M
FORECAST SUMMARY

	BASE YEAR	FORECAST			
	2007	2012	2017	2022	2027
Annual Enplaned Passengers	113,796	145,000	200,000	275,000	3 75,000
Annual Enplaned Cargo (pounds)	1,278,400	1,530,000	1,840,000	2,210,000	2 ,640,000
Annual Operations					
Itinerant					
Air Carrier	1,944	5,200	7,200	9,800	12,600
Air Cargo	1,052	1,200	1,400	1,600	2,000
Air Taxi	2,139	2,500	2,700	2,900	3,100
General Aviation	16,597	22,300	30,500	41,400	53,300
Military	216	200	200	200	200
Total Itinerant Operations	**21,948**	**31,400**	**42,000**	**55,900**	**71,200**
Local					
General Aviation	5,638	8,200	12,000	18,600	24,600
Military	109	100	100	100	100
Total Local Operations	**5,747**	**8,300**	**12,100**	**18,700**	**24,700**
Total Annual Operations	**27,695**	**39,700**	**54,100**	**74,600**	**95,900**
Based Aircraft Fleet Mix					
Single Engine Piston	38	65	87	1 09	128
Multi-Enigne Piston	5	6	8	9	10
Turboprop	1	2	3	4	6
Turbojet	2	3	7	11	17
Helicopter	3	4	6	7	9
Total Based Aircraft	**49**	**80**	**110**	**140**	**170**
Actual Instrument Approaches	NA	188	252	335	427

OPERATIONS FORECAST



BASED AIRCRAFT FORECAST



Chapter Three: Facility Requirements

Chapter Three
FACILITY REQUIREMENTS

To properly plan for the future of Laughlin/Bullhead International Airport, it is necessary to translate forecast aviation demand into the specific types and quantities of facilities that can adequately serve this identified demand. This chapter uses the results of the forecasts conducted in Chapter Two, as well as established planning criteria, to determine the airfield (i.e., runways, taxiways, navigational aids, marking and lighting) and landside (i.e., hangars, terminal building, cargo buildings, aircraft parking apron) facility requirements.

The objective of this effort is to identify, in general terms, the adequacy of the existing airport facilities and outline what new facilities may be needed and when these may be needed to accommodate forecast demands. Having established these facility requirements, alternatives for providing these facilities will be evaluated in Chapter Four to determine the most cost-effective and efficient means for implementation.

The cost-effective, efficient, and orderly development of an airport should rely more upon actual demand at an airport than on a time-based forecast figure. In order to develop a master plan that is demand-based rather than time-based, a series of planning horizon milestones have been

established for Laughlin/Bullhead International Airport that take into consideration the reasonable range of aviation demand projections prepared in Chapter Two. It is important to consider that actual activity at the airport may be higher or lower than projected activity levels. By planning according to activity milestones, the resultant plan can accommodate unexpected shifts or changes in the area's aviation demand.

The most important reason for utilizing milestones is that they allow the airport to develop facilities according to need generated by actual demand levels. The demand-based schedule provides flexibility in development, as development schedules can be slowed or expedited according to actual demand at any given time over the planning period. The resultant plan provides airport officials with a financially responsible and needs-based program. **Table 3A** presents the planning horizon milestones for each activity demand category.

AIRFIELD CAPACITY

An airport's airfield capacity is expressed in terms of its annual service volume (ASV). Annual service volume is a reasonable estimate of the maximum level of aircraft operations that can be accommodated in a year without incurring significant delay factors. As aircraft operations surpass the ASV, delay factors increase exponentially. Annual service volume accounts for annual differences in runway use, aircraft mix, and weather conditions. The airport's annual service volume was examined utilizing Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5060-5, *Airport Capacity and Delay*.

A number of factors are included in the calculation of an airport's ASV. These include the airfield characteristics, meteorological conditions, aircraft mix, and demand characteristics (aircraft operations). The following describes the input factors as they relate to Laughlin/Bullhead International Airport.

Table 3A
PLANNING HORIZON ACTIVITY LEVELS

	BASE YEAR	PLANNING HORIZONS		
	2007	Short Term	Intermediate Term	Long Term
Airline Activity				
Enplaned Passengers	113,796	145,000	200,000	375,000
Annual Operations	*1,944*	*5,200*	*7,200*	*12,600*
Cargo Activity				
Enplaned Cargo (pounds)	1,278,400	1,530,000	1,840,000	2,640,000
Annual Operations	*1,052*	*1,200*	*1,400*	*2,000*
General Aviation Activity				
Based Aircraft	49	80	110	170
Air Taxi Operations	*2,139*	*2,500*	*2,700*	*3,100*
Annual Operations				
Local	5,638	8,200	12,000	24,600
Itinerant	16,597	22,300	30,500	53,300
Total General Aviation Operations	*22,235*	*30,500*	*42,500*	*77,900*
Military Activity				
Local	109	100	100	100
Itinerant	216	200	200	200
Total Military Operations	*325*	*300*	*300*	*300*
Total Airport Operations	***27,695***	***39,700***	***54,100***	***95,900***
Annual Instrument Approaches	***NA***	***188***	***252***	***427***

AIRFIELD LAYOUT

RUNWAY CONFIGURATION

A single runway configuration with a full-length parallel taxiway is available at the airport. Instrument approach procedures are available to Runway 34.

RUNWAY USE

Runway use is normally dictated by wind conditions. The direction of takeoffs and landings are generally determined by the speed and direction of wind. It is generally safest for aircraft to takeoff and land into the wind, avoiding a crosswind (wind that is blowing perpendicular to the travel of the aircraft) or tailwind components during these operations. Winds dictate using Runway 16 the majority of the time.

EXIT TAXIWAYS

Exit taxiways have a significant impact on airfield capacity since the number and location of exits directly determines the occupancy time of an

aircraft on the runway. Six entrance/exit taxiways are available along Runway 16-34. The airfield capacity analysis gives credit to exits located within a prescribed range from a runway's threshold. This range is based upon the mix index of aircraft that use the runway. For Laughlin/Bullhead International Airport, those exit taxiways located between 2,000 and 4,000 feet of the landing threshold count in the capacity determination. The exits must be at least 750 feet apart to count as separate exits. Under these criteria, operations to Runway 16 are credited with one exit, while Runway 34 is credited with two exits. The presence of four or more exit taxiways within the prescribed distance and with proper separation will receive maximum credit for exit taxiways in the capacity and delay model. A total of four exits in this range would increase hourly capacity by approximately 13 percent.

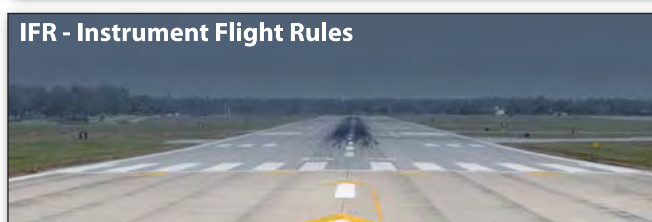
WEATHER CONDITIONS

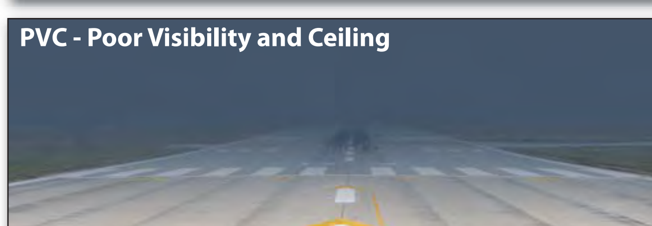
Weather conditions can have a significant effect on airfield capacity. Airport capacity is usually highest in clear weather, when flight visibility is at its best. Airfield capacity is diminished as weather conditions deteriorate and cloud ceilings and visibility are reduced. As weather conditions deteriorate, the spacing of aircraft must increase to provide allowable margins of safety. The increased distance between aircraft reduces the number of aircraft which can operate at the airport during any given period. This, consequently, reduces overall airfield capacity.

There are three categories of meteorological conditions considered in this capacity analysis, each defined by the reported cloud ceiling and flight visibility. Visual meteorological conditions (VMC) exist whenever the cloud ceiling is greater than 1,000 feet above ground level, and visibility is greater than three statute miles. VMC flight conditions permit pilots to approach, land, or take off by visual reference and to see and avoid other aircraft.

Instrument meteorological conditions (IMC) exist when the reported ceiling is less than 1,000 feet above ground level and/or visibility is less than three statute miles. Poor visibility conditions (PVC) apply when the cloud ceilings are below 500 feet above ground level (AGL) and visibility is less than one mile. Under IMC and PVC conditions, pilots must rely on instruments for navigation and guidance to the runway. Other aircraft cannot be seen and safe separation between aircraft must be assured solely by following air traffic control rules and procedures. As mentioned, this leads to increased distances between aircraft, which diminishes airfield capacity.

VMC occurs 98 percent of the time at Laughlin/ Bullhead International Airport. IMC occur two percent of the time. PVC occur less than one percent of the time; therefore, it is considered negligible for this analysis and not included in the ASV calculations.





AIRCRAFT MIX

Aircraft mix refers to the speed, size, and flight characteristics of aircraft operating at the airport. As the mix of aircraft operating at an airport increases to include larger aircraft, airfield capacity begins to diminish. This is due to larger separation distances that must be maintained between aircraft of different speeds and sizes.

Aircraft mix for the capacity analysis is defined in terms of four aircraft classes. Classes A and B consist of single and multi-engine aircraft weighing less than 12,500 pounds. Aircraft within these classifications are primarily associated with piston-powered general aviation operations, but does include some business turboprop and business jet aircraft (e.g., the Cessna 500 Citation business jet and Beechcraft King Air). Class C consists of multi-engine aircraft weighing between 12,500 and 300,000 pounds. This broad classification includes business jets, turboprops, and large commercial airline aircraft. Most of the business jets in the national fleet are included within this category. Class D includes all aircraft over 300,000 pounds and includes wide-bodies and jumbo jets. There are no Class D aircraft currently operating or forecast to operate from the airport.

For the capacity analysis, the percentage of Class C aircraft operating at the airport is critical in determining the annual service volume as this class includes the larger and faster aircraft in the operational mix. The existing and projected operational fleet mix for the airport is summarized in **Table 3B**. Consistent with projections prepared in the previous chapter, the percentage of Class C aircraft in the operational fleet mix at the airport is expected to slightly decrease through the planning period as its small general aviation aircraft operations are expected to grow slightly faster than commercial aviation.

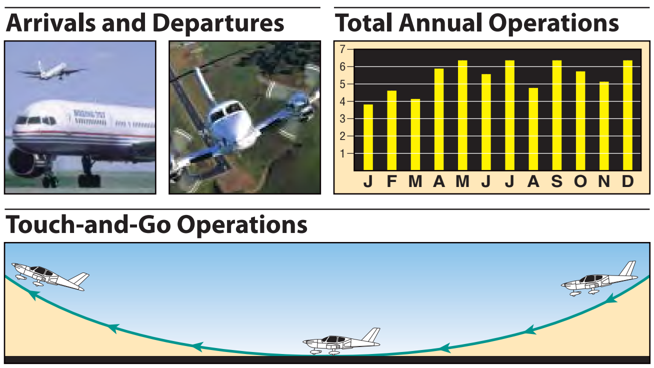
Table 3B
AIRCRAFT OPERATIONAL MIX - CAPACITY ANALYSIS

Aircraft Classification	Current	Short Term (± 5)	Intermediate Term (± 10)	Long Term (± 20)
VFR				
Classes A & B	80%	77%	79%	81%
Class C	20%	23%	21%	19%
Class D	0%	0%	0%	0%
Percent Local Operations (Touch-and-Go's)	20%	21%	22%	26%

Definitions:
- Class A: Small single-engine aircraft with gross weights of 12,500 pounds or less.
- Class B: Small twin-engine aircraft with gross weights of 12,500 pounds or less.
- Class C: Large aircraft with gross weights over 12,500 pounds up to 300,000 pounds.
- Class D: Large aircraft with gross weights over 300,000 pounds.

OPERATIONAL CHARACTERISTICS

Operations, not only the total number of annual operations, but the manner in which they are conducted, have an important effect on airfield capacity. Peak operational periods, touch-and-go operations, and the percent of arrivals impact the number of annual operations that can be conducted at the airport.



PEAK PERIOD OPERATIONS

For the airfield capacity analysis, average daily operations and average peak hour operations during the peak month are calculated. These operational levels were calculated previously in Chapter Two for existing and forecast levels of operations. Typical operational activity is important in the calculation of an airport's annual service level as "peak demand" levels occur sporadically. The peak periods used in the capacity analysis are representative of normal operational activity and can be exceeded at various times through the year.

TOUCH-AND-GO OPERATIONS

A touch-and-go operation involves an aircraft making a landing and an immediate take-off without coming to a full stop or exiting the runway. These operations are normally associated with general aviation training operations and are included in local operations data recorded by the air traffic control tower. Touch-and-go activity is counted as two operations since there is an arrival and a departure involved. A high percentage of touch-and-go traffic normally results in a higher operational capacity because one landing and one takeoff occurs within a shorter time period than individual operations. Touch-and-go operations currently account for approximately 20 percent of total operations.

PERCENT ARRIVALS

The percentage of arrivals as they relate to the total operations in the design hour is important in determining airfield capacity. Under most circumstances, the lower the percentage of arrivals, the higher the hourly capacity. However, except in unique circumstances, the aircraft arrival-departure split is typically 50-50. At the airport, traffic information indicated no major deviation from this pattern, and arrivals were estimated to account for 50 percent of design period operations.

HOURLY RUNWAY CAPACITY

Based upon the input factors described above, current and future hourly capacities for the various operational scenarios at Laughlin/Bullhead International Airport were determined. As the mix of aircraft operating at an airport changes and peak periods become more spread out through the planning period, the hourly capacity of the system increases slightly. The current and future hourly capacities are depicted in **Table 3C**. At Laughlin/Bullhead International Airport, the current hourly capacity is 80 operations. This is expected to increase to 84 operations by the long term planning horizon.

Table 3C
AIRFIELD DEMAND/CAPACITY SUMMARY

	Base Year	Short Term (± 5)	Intermediate Term (± 10)	Long Term (± 20)
Operational Demand				
Annual	27,670	39,700	54,100	95,900
Design Hour	26	51	81	128
Capacity				
Annual Service Volume	138,000	156,000	179,000	218,000
Weighted Hourly Capacity	80	78	82	84
Delay				
Per Operation (Seconds)	6	9	12	24
Total Annual (Hours)	46	99	180	639

ANNUAL SERVICE VOLUME

The weighted hourly capacity is utilized to determine the annual service volume in the following equation:

$$ASV = C \times D \times H$$

C = weighted hourly capacity;
D = ratio of annual demand to the average daily demand during the peak month; and
H = ratio of average daily demand to the design hour demand during the peak month.

The current ratio of annual demand to average daily demand (D) was determined to be 258 for Laughlin/Bullhead International Airport. This is projected to increase to 310 by the long term planning period as the peak month is projected to decline from 12 percent of total annual operations to 10 percent of total annual operations. The current ratio of average daily demand to average peak hour demand (H) was determined to be 6.7. This ratio is projected to increase to 8.3 by the long term planning period as peak hour operations are projected to decrease from 15 percent of peak day operations to 12 percent of peak day operations.

The current ASV was determined to be 138,000 operations. With the slight decrease in Class C aircraft to operate at the airport through the planning period and the lower peak period levels, the annual service volume is projected to increase to 218,000 by the long term planning horizon. The airport is currently at 20 percent of its annual service volume. Assuming projected long term planning horizon annual operations, the airport would be at 44 percent of the airport's ASV. **Table 3C** summarizes the airport's ASV over the long term planning horizon. A comparison of annual service volume to projected annual operations is provided on **Exhibit 3A**.

AIRCRAFT DELAY

As the number of annual aircraft operations approaches the airfield's capacity, increasing amounts of delay to aircraft operations begin to occur. Delays occur to arriving and departing aircraft in all weather conditions. Arriving aircraft delays result in aircraft holding outside of the airport traffic area. Departing aircraft delays result in aircraft holding at the runway end until released by air traffic control.

Exhibit 3A
AIRFIELD DEMAND/CAPACITY

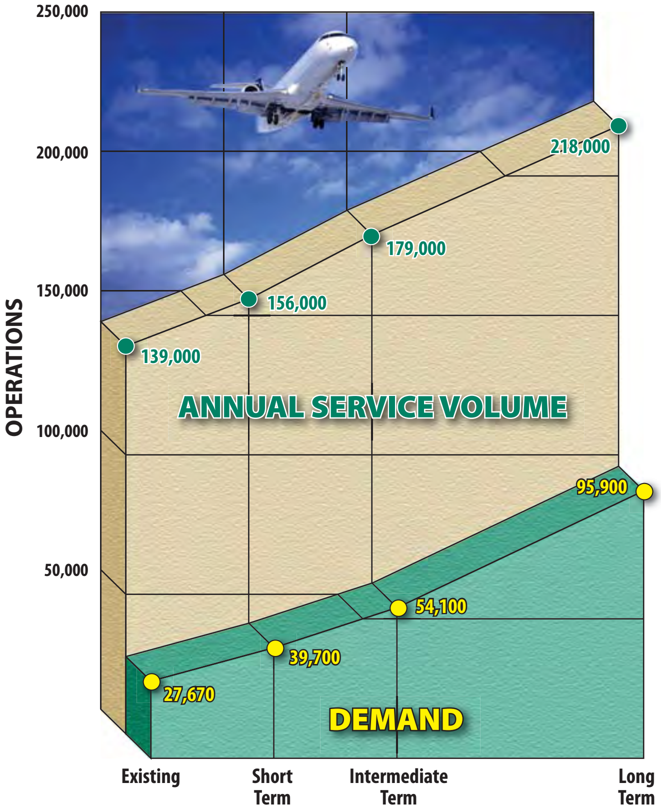


Table 3C also summarizes the aircraft delay analysis conducted for Laughlin/Bullhead International Airport. Current annual delay is negligible and estimated at approximately 46 hours total. Analysis of delay factors for the long range planning horizon indicate that annual delay can be expected to reach over 639 hours. This is only 24 seconds per aircraft operation.

CAPACITY ANALYSIS CONCLUSIONS

FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems* (NPIAS), indicates that improvements for airfield capacity purposes should begin to be considered once operations reach 60 to 75 percent of the annual service volume. From the analysis above, Laughlin/Bullhead International Airport is not expected to exceed 60 percent of annual service volume within the planning period of this master plan.

Typically, a parallel runway is considered when additional capacity is needed at an airport. The current plan for Laughlin/Bullhead International Airport includes a parallel runway south of Runway 16-34 for use by small general aviation aircraft. A parallel runway for small general aviation aircraft maximizes airfield capacity as large and small aircraft are segregated and simultaneous operations can occur at the airport. While the analysis above indicated that a parallel runway may not be needed during the planning period of this master plan, a parallel runway will continue to be planned at Laughlin/Bullhead International Airport. This reserves the property south of the airport for this ultimate use and also allows the City of Bullhead City to continue to properly plan appropriate land uses adjacent to the airport that are compatible with this ultimate use.

CRITICAL DESIGN AIRCRAFT

The selection of appropriate Federal Aviation Administration (FAA) design standards for the development and location of airport facilities is based primarily upon the characteristics of the aircraft which are currently using, or are expected to use, the airport. The critical design aircraft is used to define the design parameters for the airport. The critical design aircraft is defined as the most demanding category of aircraft, or family of aircraft, which conducts at least 500 operations per year at the airport. Planning for future aircraft use is of particular importance since design standards are used to plan many airside and landside components. These future standards must be considered now to ensure that short term development does not preclude the long range potential needs of the airport.

The FAA has established a coding system to relate airport design criteria to the operational and physical characteristics of aircraft expected to use the airport. This airport reference code (ARC) has two components. The first component, depicted by a letter, is the aircraft approach category and relates to aircraft approach speed (operational characteristic). The second component, depicted by a Roman numeral, is the airplane design group and relates to aircraft wingspan (physical characteristic). Generally, aircraft approach speed applies to runways and runway-related facilities, while aircraft wingspan primarily relates to separation criteria involving taxiways, taxilanes, and landside facilities.

According to FAA Advisory Circular (AC) 150/5300-13, Change 12, *Airport Design*, an aircraft's approach category is based upon 1.3 times its stall speed in landing configuration at the certified maximum flap setting and maximum landing weight at standard atmospheric conditions. 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. For example, an aircraft may fall in ADG II for wingspan at 70 feet, but ADG III for tail height at 33 feet. This aircraft would be classified under ADG III. The six ADGs used in airport planning are as follows:

ADG	Tail Height (feet)	Wingspan (feet)
I	<20	<49
II	20-<30	49-<79
III	30-<45	79-<118
IV	45-<60	118-<171
V	60-<66	171-<214
VI	66-<80	214-<262

Source: FAA AC 150/5300-13, Change 12

Representative aircraft by ARC are shown on the following pages. [Chris Riffle distribute ARC pictures in this area.] The airport currently serves an array of aircraft in ARCs up to and including C-III. The aircraft operating at the airport range by operational type from small single engine piston-powered aircraft, such as the Cessna 152, to commercial airline transport aircraft, such as the Boeing 737-800.

The FAA recommends designing airport functional elements to meet the requirements for the most demanding civilian ARC for that airport. In order to determine airfield design requirements, the critical aircraft and critical ARC should first be determined, and then appropriate airport design criteria can be applied. This process begins with a review of aircraft currently using the airport and those expected to use the airport through the long term planning period.

PASSENGER AIRLINE AND CHARTER AIRCRAFT

As outlined in the previous chapter, Laughlin/Bullhead International Airport is served by three air carrier airlines providing charter services supporting the gaming/resort activities in Laughlin, Nevada. Sun Country utilizes the Boeing 737-800 aircraft. Allegiant Airlines utilizes the Boeing (McDonnell-Douglas) MD-83 and MD-88 aircraft. Canadian Northern utilizes the Boeing 737-200. Each of these aircraft falls within ARC C-III. Future facility planning should consider a potential transition to larger air carrier aircraft for charter services. Potential larger charter aircraft would include the Boeing 757 which falls within ARC C-IV.

In the future, regularly scheduled airline service is expected to be provided with regional jet aircraft such as the Embraer regional jet (ERJ) 135 and 145 or Canadair CRJ-200 regional jet. These regional jets fall within ARC C-II. Larger regional jets in the 70- and 90-seat ranges fall within the ARC C-III.

CATEGORY C-III, D-III

- ERJ-170, 190
- Boeing Business Jet
- B 727-200
- B 737-300 Series
- MD-80, DC-9
- Fokker 70, 100
- A319, A320
- Gulfstream V
- Global Express

CATEGORY C-IV, D-IV

- B-757
- B-767
- C-130
- DC-8-70
- DC-10
- MD-11
- L1011

CATEGORY D-V

- B-747 Series
- B-777

CATEGORY A-I

- Beech Baron 55
- Beech Bonanza
- Cessna 150
- Cessna 172
- Cessna Citation
- Cessna Citation Mustang
- Eclipse 500
- Piper Archer
- Piper Seneca

CATEGORY B-I: less than 12,500 lbs.

- Beech Baron 58
- Beech King Air 100
- Cessna 402
- Cessna 421
- Piper Navajo
- Piper Cheyenne
- Swearingen Metroliner
- Cessna Citation I

CATEGORY B-II: less than 12,500 lbs.

- Super King Air 200
- Cessna 441
- DHC Twin Otter

CATEGORY B-I, B-II: over 12,500 lbs.

- Super King Air 300
- Beech 1900
- Jetstream 31
- Falcon 10, 20, 50
- Falcon 200, 900
- Citation II, III, Citation IV, V
- Saab 340
- Embraer 120

CATEGORY C-I, D-I

- Beech 400
- Lear 25, 31, 35, 45, 55, 60
- Israeli Westwind
- HS 125-400, 700

CATEGORY C-II, D-II

- Cessna Citation III, VI, VIII, X
- Gulfstream II, III, IV
- Canadair 600
- ERJ-135, 140, 145
- CRJ-200, 700, 900
- Embraer Regional Jet
- Lockheed JetStar
- Super King Air 350

AIR CARGO AIRCRAFT

Presently, daily air cargo services are provided by contract carriers for FedEx and UPS to regional hubs. The Cessna 208 Caravan and Beechcraft 99 are utilized by the contract carriers. These aircraft fall within ARC B-II. As presented in Chapter Two, air cargo service is not expected to change significantly from the existing feeder-type service experienced at the airport. Therefore, the type of aircraft utilized for this service is not expected to change significantly through the planning period, and the critical air cargo aircraft will remain within ARC B-II.

GENERAL AVIATION

The majority of general aviation operations are conducted by light aircraft, or those weighing less than 12,500 pounds and fall within ARC A-I and ARC B-I. Some general aviation operations, however, are conducted by the full array of business jet aircraft. Business jets have longer wingspans and approach speeds than the light piston-powered aircraft that dominate the general aviation fleet mix; therefore, business jets comprise the critical design aircraft for the general aviation fleet mix at the airport. The business jets that utilize the airport fall within ARC B-I, B-II, C-I, C-II, D-I, and D-II.

To quantify business jet activity at Laughlin/Bullhead International Airport, operational data was obtained from *Airport IQ*, a private company which maintains a database of all aircraft operations which file, fly, and fully complete an instrument flight rule (IFR) flight plan to Laughlin/Bullhead International Airport. Some general aviation operators will depart under visual flight rules (VFR) and open an IFR flight plan enroute, or close their IFR flight plan prior to arriving at Laughlin/Bullhead International Airport. In either case, those operations are not attributed to Laughlin/Bullhead International Airport and are not included in the table. Experience with this data in comparison to actual observed flights at other airports indicates that the *AirportIQ* data could be lower than actual by as much as 50 percent due to the exclusions as explained above. This data does provide valuable information such as aircraft type, origination, destination, and aircraft owner. Thus, the data collected through *AirportIQ* serves to highlight the absolute minimum number of operations as many pilots will open or close a flight plan in the air when visual conditions allow. This is not typically true of air carrier operators and most air taxi operators which are required to fly the full flight plan.

A review of *AirportIQ* data for calendar year 2007 reveals a minimum of 459 private business jet operations at Laughlin/Bullhead International Airport. The largest groupings, or family of jets, were the business jets in ARC B-I and B-II, with 330 operations which represented 72 percent of all private jet operations reported. The next largest group was ARC C-I and C-II, with 101 operations representing 22 percent of total private jet operations. In total, aircraft in ARC D-I and D-II conducted 28 operations at the airport in 2007.

CRITICAL AIRCRAFT SUMMARY

It is evident from the discussion above that the aircraft used in passenger airline service comprise the current critical design aircraft at Laughlin/Bullhead International Airport. As discussed above, the aircraft used in passenger airline service fall within ARC C-III. In the future, larger aircraft could be used in passenger airline service and include aircraft in ADG IV. Therefore, long term facility planning should account for these larger wingspans. Thus, the future critical airplane design group is ADG IV.

The previous master plan had indicated that business jets within Approach Category D may conduct more than 500 operations at the airport in the future and become the critical design aircraft for defining the approach category portion of the ARC. Presently, aircraft in Approach Category D conduct less than 30 annual operations at the airport. While this is significantly below the 500 operations annual threshold, facility planning should still consider Approach Category D operations increasing in the future.

Combining the commercial airline ADG IV with the general aviation Approach Category D indicates that the most appropriate ARC for long term planning remains ARC D-IV. As the primary runway, which accommodates all aircraft operations, Runway 16-34 should be planned to this ARC. A future parallel runway should be planned to ARC B-II as this runway would be designed only for small aircraft operations.

The design of taxiway and apron areas should consider the wingspan requirements of the most demanding aircraft to operate within that specific functional area on the airport. The passenger terminal apron should consider ADG IV. General aviation transient apron and aircraft maintenance and repair hangar areas should consider ADG III requirements to accommodate the largest transient business jets. T-hangar and small conventional hangar areas should consider ADG I requirements as these commonly serve smaller single and multi-engine piston aircraft.

AIRFIELD DESIGN STANDARDS

The FAA has established several imaginary surfaces to protect aircraft operational areas and keep them free from obstructions or incompatible land uses that could affect an aircraft's safe operation. These include the runway safety area (RSA), object free area (OFA), obstacle free zone (OFZ), and runway protection zone (RPZ).

The entire RSA, OFA, and OFZ should be under the direct control of the airport sponsor to ensure these areas remain free of obstacles and can be readily accessed by maintenance and emergency personnel. It is not required that the RPZ be under airport ownership, but it is strongly recommended. An alternative to outright ownership of the RPZ is the purchase of avigation easements (acquiring control of designated airspace within the RPZ) or having sufficient land use control measures in place which ensure that the RPZ remains free of incompatible development.

Dimensional standards for the various safety areas associated with the runways are a function of the ARC as well as the approach visibility minimums. At Laughlin/Bullhead International Airport, presently Runway 16-34 should meet design standards for ARC C-III and one mile visibility minimums. Ultimately, Runway 16-34 should meet design standards for ARC D-IV and one-half mile visibility minimums. A future parallel runway should be designed to ARC B-II design standards with one mile visibility minimums.

RUNWAY SAFETY AREA

The runway safety area (RSA) is "a defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or an excursion from the runway." The RSA must be free from any obstructions and be graded and stabilized to accommodate the weight of the airport's critical aircraft.

The dimension of the RSA is dependent upon the critical aircraft at the airport. For ARC D-IV, the RSA is 500 feet wide, centered on the runway centerline, and extends 1,000 feet beyond both ends of the runway. The FAA has placed a premium on maintaining and protecting adequate RSA at airports, especially at Title 14 of the Code of Federal Regulations (CFR) Part 139 certificated airports such as Laughlin/Bullhead International Airport. **Exhibit 3B** illustrates the required RSA for Laughlin/Bullhead International Airport. As depicted, the airport maintains adequate RSA and should continue maintaining the RSA in the future.

OBJECT FREE AREA

The object free area (OFA) is an area centered on the runway and taxiway centerlines, provided to enhance the safety of aircraft operations. Only those objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes are allowed.

Of particular interest is the runway OFA, which is designed to ensure that the wings of an aircraft traversing the RSA will not impact obstructions outside the RSA. Its dimensions are also based on the airport's critical aircraft. For ARC D-IV, the runway OFA is 800 feet wide (centered on the runway centerline) and extends 1,000 feet beyond the ends of the runway. As shown on **Exhibit 3B**, a portion of the perimeter service road extends through the northeast corner of the OFA. The remainder of the OFA meets FAA standards. The alternatives analysis will examine options available to comply with standards in the northeast portion of the OFA.

OBSTACLE FREE ZONE

An obstacle free zone (OFZ) is a volume of airspace that is required to be clear of objects, except for frangible items required for navigation of aircraft. The OFZ for Runway 16-34 is 400 feet wide, centered along the runway, and extends 200 feet beyond the runway ends. It is bolstered by the precision OFZ, or POFZ, which requires no obstructions in an area 800 feet wide (centered on the runway) beginning at the ends of each runway, having a vertically guided approach, then extending out 200 feet. The POFZ standard would only apply to future runway ends with an instrument approach with one-half mile visibility minimums. As shown on **Exhibit 3B**, Runway 34 meets POFZ requirements and could

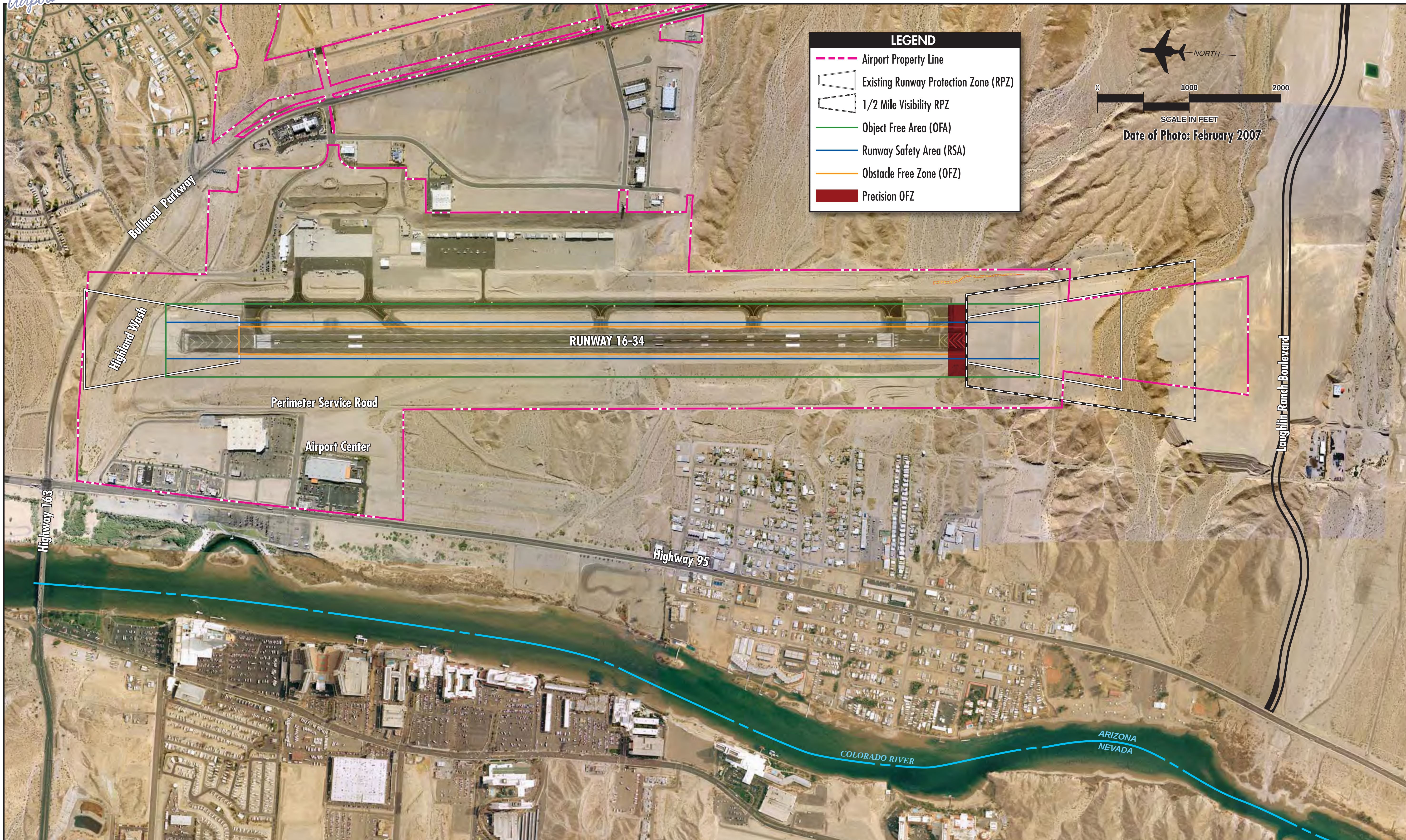


Exhibit 3B
AIRFIELD DESIGN STANDARDS

support a future one-half mile visibility minimum instrument approach. OFZ requirements are also met at Laughlin/Bullhead International Airport.

RUNWAY PROTECTION ZONE

The RPZ is defined as an area off the ends of the runway, designed to enhance the protection of people and property on the ground. The RPZ is trapezoidal in shape and centered about the extended runway centerline. The dimensions of an RPZ are a function of the runway ARC and approach visibility minimums. The RPZ is a two-dimensional space that primarily serves to identify an area where incompatible land uses should not be located. Land uses considered incompatible with the RPZ include any uses which attract groupings of people who occupy the space for long periods of time.

Presently, FAA standards for each runway end require an RPZ having an inner width of 500 feet, outer width of 1,010 feet, and a length of 1,700 feet. As shown on **Exhibit 3B**, the entire Runway 16 RPZ is located on airport property. Portions of the Runway 34 RPZ extend beyond airport property.

A future one-half mile visibility minimum instrument approach requires the largest RPZ having a 1,000-foot inner width, 1,750-foot outer width, and is 2,500 feet long. As shown on **Exhibit 3B**, this larger RPZ would extend off airport property beyond the Runway 34 end. The Runway 34 instrument approach would most likely be upgraded. The alternatives analysis will more closely examine the options to comply with RPZ standards at this runway end.

AIRFIELD DESIGN STANDARDS SUMMARY

Exhibit 3C summarizes the design requirements of airfield design standards according to the associated airport reference code and instrument approach minimum (where applicable) for each runway.

AIRSIDE FACILITIES

Airside facilities include those facilities that are related to the arrival, departure, and ground movement of aircraft. These components include:

- Runways
- Taxiways
- Navigational Approach Aids and Instrument Approaches
- Airfield Lighting, Marking, and Signage

RUNWAY ORIENTATION

For the operational safety and efficiency of an airport, it is desirable for the primary runway of an airport's runway system to be oriented as closely as possible to the direction of the prevailing winds. This reduces the impact of wind components perpendicular to the direction of travel of an aircraft that is landing or taking off (defined as a crosswind).

FAA design standards specify that additional runway configurations are needed when the primary runway configuration provides less than 95 percent wind coverage at specific crosswind components. The 95 percent wind coverage is computed on the basis of crosswinds not exceeding 10.5 knots for small aircraft weighing less than 12,500 pounds and from 13 to 20 knots for aircraft weighing over 12,500 pounds.

Based upon historical wind data, Runway 16-34 exceeds 95 percent for all crosswind components. Therefore, based on this analysis, the runway system at the airport is properly oriented to prevailing wind flows and aircraft operational safety is maximized. No new runway orientations are needed at the airport.

RUNWAY LENGTH

Runway length is the most important consideration when evaluating the airside facility requirements

Exhibit 3C
RUNWAY REQUIREMENTS

EXISTING	SHORT TERM NEED	INTERMEDIATE TERM NEED	LONG TERM NEED
RUNWAY 16-34			
ARC C-III 7,500' x 150' 75,000 SWL 200,000 DWL 400,000 DTWL	ARC C-III 8,500' x 150' 75,000 SWL 200,000 DWL 400,000 DTWL	ARC C-III 8,500' x 150' 75,000 200,000 DWL 400,000 DTWL	ARC D-IV 8,500' x 150' SWL 75,000 SWL 200,000 DWL 400,000 DTWL
Runway Safety Area (RSA) 250' each side of runway centerline 1,000' beyond each runway end	***Runway Safety Area (RSA)*** 250' each side of runway centerline 1,000' beyond each runway end	***Runway Safety Area (RSA)*** 250' each side of runway centerline 1,000' beyond each runway end	***Runway Safety Area (RSA)*** 250' each side of runway centerline 1,000' beyond each runway end
Object Free Area (OFA) 400' each side of runway centerline 1,000' beyond each runway end	***Object Free Area (OFA)*** 400' each side of runway centerline 1,000' beyond each runway end	***Object Free Area (OFA)*** 400' each side of runway centerline 1,000' beyond each runway end	***Object Free Area (OFA)*** 400' each side of runway centerline 1,000' beyond each runway end
Obstacle Free Zone (OFZ) 200' each side of runway centerline 200' beyond each runway end	***Obstacle Free Zone (OFZ)*** 200' each side of runway centerline 200' beyond each runway end	***Obstacle Free Zone (OFZ)*** 200' each side of runway centerline 200' beyond each runway end	***Obstacle Free Zone (OFZ)*** 200' each side of runway centerline 200' beyond each runway end
Runway Protection Zone (RPZ) - Each End Inner Width - 500' Outer Width - 1,010' Length - 1,700'	***Runway Protection Zone (RPZ) - Each End*** Inner Width - 500' Outer Width - 1,010' Length - 1,700'	***Precision Object Free Area (POFA)*** **Runway 34** **400' each side of runway centerline** **200' beyond each runway end** ***Runway Protection Zone (RPZ) - Runway 16*** **Inner Width - 500'** **Outer Width - 1,010'** **Length - 1,700'** ***Runway Protection Zone (RPZ) - Runway 34*** **Inner Width - 1,000'** **Outer Width - 1,750'** **Length - 2,500'**	***Precision Object Free Area (POFA)*** Runway 34 400' each side of runway centerline 200' beyond each runway end ***Runway Protection Zone (RPZ) - Runway 16*** Inner Width - 500' Outer Width - 1,010' Length - 1,700' ***Runway Protection Zone (RPZ) - Runway 34*** Inner Width - 1,000' Outer Width - 1,750' Length - 2,500'

PARALLEL RUNWAY

Note: Items in bold represent future requirement
SWL - Single Wheel Loading
DWL - Dual Wheel Loading
DTWL - Dual Tandem Wheel Loading

ARC B-II
4,700' x 75'
700' from Runway 16-34 centerline
12,500 pounds SWL

Runway Safety Area (RSA)
150' each side of runway centerline
300' beyond each runway end

Object Free Area (OFA)
200' each side of runway centerline
300' beyond each runway end

Obstacle Free Zone (OFZ)
200' each side of runway centerline
200' beyond each runway end

Runway Protection Zone (RPZ) - Each End
Inner Width - 500'
Outer Width - 700'
Length - 1,000'

for future aircraft serving Laughlin/Bullhead International Airport. Runway length requirements are based upon five primary elements: airport elevation, the mean daily maximum temperature of the hottest month, runway gradient, critical aircraft type expected to use the runway, and the stage length of the longest non-stop trip destination.

Aircraft performance declines as elevation, temperature, and runway gradient factors increase. For calculating runway length requirements, the airport is at an elevation of 694 feet above mean sea level (MSL), and the mean daily maximum temperature of the hottest month is 108.2 degrees Fahrenheit (F). The maximum effective gradient is 0.96 percent.

A 1,000-foot extension of Runway 16-34 to the south is currently under environmental review. As required by FAA regulations, an Environmental Assessment (EA) is presently being conducted to determine compliance with the *National Environmental Policy Act* (NEPA). The 1,000-foot extension to the south is being considered to eliminate take-off weight restrictions on commercial airline aircraft that currently operate at the airport. Based upon coordination with Allegiant Airlines and Sun Country Airlines in 2006, the existing 7,500 feet of length on Runway 16-34 does not meet the runway length needs of either airline operating at the airport. Allegiant Airlines notes that the high summertime temperatures experienced at the airport restricts fuel loading. During the warmest summer months, Allegiant Airlines has to make unscheduled fueling stops as they were not able to fully fuel the aircraft at Laughlin/Bullhead International Airport to reach the intended destination. During other times of the year, a longer runway would increase the range of the aircraft operating from Laughlin/Bullhead International Airport. Sun Country Airlines requires a runway length of at least 8,000 feet to fully load their aircraft with passengers and fuel to reach their longest nonstop destination.

Once extended 1,000 feet south, any further extension of Runway 16-34 is unlikely, given current and planned land uses adjacent to the airport. Primarily, an extension of Runway 16-34 any farther south is limited by the location of Laughlin Ranch Boulevard. The current FAA Western-Pacific Region Airports Division's position is that public roadways are not compatible with the RPZ. Therefore, Laughlin Ranch Boulevard cannot cross the Runway 34 RPZ. Considering these requirements, the longest runway length achievable at Laughlin/Bullhead International Airport is 8,500 feet. As detailed above, this length would meet the requirements of the existing airlines using the airport. Based upon FAA planning standards, 8,500 feet of length also exceeds the 7,700 feet of length needed to meet the requirements of the full mix of general aviation aircraft projected to use the airport through the planning period. According to FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*, 7,700 feet of runway length is sufficient to serve 100 percent of the general aviation fleet at 60 percent useful loading. According to the same AC, a runway length of 4,700 feet is appropriate for a future parallel runway. Existing and future runway length needs at Laughlin/Bullhead International Airport are shown on **Exhibit 3C**.

RUNWAY WIDTH

Runway width is primarily determined by the planning ARC for the particular runway. FAA design standards specify a minimum width of 150 feet for ARC D-IV. Runway 16-34 currently meets the standard established by the FAA and should satisfy future needs with normal maintenance. The future parallel runway should be 75 feet wide to conform to ARC B-II standards.

PAVEMENT STRENGTH

The most important feature of airfield pavement is its ability to withstand repeated use by aircraft of significant weight. The current strength rating on Runway 16-34 is 75,000 pounds single wheel loading (SWL), 200,000 pounds dual wheel loading (DWL), and 400,000 pounds dual tandem wheel loading (DTWL). The current runway strength rating is sufficient to accommodate all existing and potential future aircraft that may operate at the airport. A pavement strength rating of 12,500 pounds SWL should be planned for the future parallel runway.

TAXIWAYS

Taxiways are constructed primarily to facilitate aircraft movements to and from the runway system. Some taxiways are necessary simply to provide access between the aprons and runways, whereas other taxiways become necessary as activity increases at an airport to provide safe and efficient use of the airfield. Design standards for separation between the runways and parallel taxiways are based upon the wingspan of the critical aircraft using the runway. Existing taxiways at Laughlin/Bullhead International Airport are constructed of asphalt.

Runway 16-34 is served by a full-length parallel taxiway. The parallel Taxiway A centerline is located 400 feet from the Runway 16-34 centerline. Taxiways A1, A2, A3, A5, A6, A7 and A8 are 75 feet wide. The taxiway widths and separation from the runway meet FAA standards for ARC D-IV aircraft with one-half mile visibility minimum instrument approaches. This taxiway should be maintained in its existing location and width through the planning period.

Taxiways A1, A2, A3, A5, A6, A7 and A8 are entrance/exit taxiways which connect the runway to Taxiway A. Taxiways A2 and A3 connect Taxiway A to the terminal apron. These taxiways should be maintained in the future.

Future facility planning should include providing more entrance/exit taxiways on Runway 16-34 as detailed in the airfield capacity analysis. Up to three additional exit taxiways are needed to achieve the full taxiway exit rating for the calculation of annual service volume. Additional exit taxiways within 2,000 to 4,000 feet from the landing threshold of each runway could increase annual service by 13 percent. The alternatives analysis will examine additional exit taxiways on Runway 16-34.

Holding aprons are available at each end of Runway 16-34. These areas allow aircraft to prepare for departure off the taxiway surface. This allows aircraft ready to depart to by-pass the aircraft in the hold apron. These holding aprons should be maintained through the planning period.

The future parallel runway should be served by a full-length parallel taxiway that is located 240 feet (centerline to centerline) from the runway. All taxiways serving this runway should be 35 feet wide to meet FAA design standards. Holding aprons should be planned for each runway.

Taxiway requirements are summarized on **Exhibit 3D**.

Exhibit 3D
TAXIWAY REQUIREMENTS

EXISTING	SHORT TERM NEED	INTERMEDIATE TERM NEED	LONG TERM NEED
RUNWAY 16-34			
Full Length Parallel Taxiway A 75' wide 400' from Runway 16-34 centerline Six entrance/exit taxiways 75' wide Holding Apron Each End	Full Length Parallel Taxiway A 75' wide 400' from Runway 16-34 centerline Six entrance/exit taxiways 75' wide Holding Apron Each End	Full Length Parallel Taxiway A 75' wide 400' from Runway 16-34 centerline Six entrance/exit taxiways 75' wide Holding Apron Each End	Full Length Parallel Taxiway A 75' wide 400' from Runway 16-34 centerline **Nine entrance/exit taxiways 75' wide** Holding Apron Each End
PARALLEL RUNWAY			
			**Full Length Parallel Taxiway 35' wide 240' from runway centerline Four entrance/exit taxiways 35' wide Holding Apron Each End**

Note: Items in bold represent future requirement

NAVIGATIONAL AND APPROACH AIDS

Electronic and visual guidance to arriving aircraft enhance the safety and capacity of the airfield. Such facilities are vital to the success of the airport and provide additional safety to passengers using the air transportation system. While instrument approach aids are especially helpful during poor weather, they are often used by commercial pilots when visibility is good.

Instrument approaches have historically been categorized as either precision or nonprecision. Precision instrument approach aids provide an exact course alignment and vertical descent path for an aircraft on final approach to a runway, while nonprecision instrument approach aids provide only course alignment information. Most existing precision instrument approaches in the United States are instrument landing systems (ILS), although the Global Positioning System (GPS) is now used to provide both vertical and lateral navigation for pilots. In early 2008, there were over 1,030 published GPS approaches that provided both exact course alignment and vertical descent path information to pilots (precision approach), including one at Laughlin/Bullhead International Airport.

There are currently two published instrument approaches to Laughlin/Bullhead International Airport. This includes the Area Navigation (RNAV) GPS approach to Runway 34 and the very high frequency omnidirectional range (VOR)/distance measuring equipment (DME) approach to Runway 34. Both approaches allow for circling to land on Runway 16, although with increased minimums.

The RNAV GPS approach to Runway 34 provides both course alignment and vertical descent information. The localizer performance with vertical guidance (LPV) minimums allow for an approach to landing when visibility is restricted to two miles and cloud ceilings are as low as 700 feet and visibility is restricted to two miles for Approach Categories A through D. Lateral Navigation (LNAV) (course guidance) minimums allow for landings when the cloud ceilings are as low as 1¼ miles for aircraft within Approach Category A, 1½ miles for aircraft within Approach Category B, and three miles for aircraft in Approach Categories C and D. The cloud ceiling minimum for Approach Categories A through C is 1,000 feet AGL. The cloud ceiling minimum for Approach Category D is 1,100 feet AGL.

The VOR/DME approach provides only course guidance information to the pilot. This approach procedure allows for landings when the cloud ceilings are as low as 1¼ miles for aircraft within Approach Category A, 1½ miles for aircraft within Approach Category B, and three miles for aircraft in Approach Categories C and D. The cloud ceiling minimum for all approaches is 1,800 feet AGL.

The capabilities of the RNAV (GPS) LNAV approach and the VOR/DME approach are very limited. For each of these approaches, the cloud ceiling is very high and the visibility minimums for Approach Categories C and D are the same for visual flight. While the LPV approach has lower minimums, the visibility minimums are still two miles.

Future facility planning should include lowering approach minimums to the extent practicable. Ultimately, it would be preferable to provide landings to Category I minimums – ½ mile visibility and 200-foot cloud ceilings at Laughlin/Bullhead International Airport. Many factors affect the instrument approach minimums. Most notably, the terrain features surrounding the airport may ultimately impact the visibility and cloud ceiling minimums. Lower approach and visibility minimums may ultimately only be achieved with additional lighting aids described below. Only the FAA can change the approach visibility minimums at the airport.

An RNAV (GPS) approach procedure was available to Runway 16; however, this approach was decommissioned in 2007 when Runway 16-34 was reconstructed and the Runway 16 end was relocated to the south. A new approach will now have to be redesigned to Runway 16. This approach should provide both course alignment and vertical descent information. **Exhibit 3E** summarizes instrument approach requirements for Laughlin/Bullhead International Airport through the planning period.

No instrument approach procedures are required for the future parallel runway. This runway is planned for small aircraft use during visual conditions only.

Exhibit 3E
INSTRUMENT APPROACH REQUIREMENTS

EXISTING	SHORT TERM NEED	INTERMEDIATE TERM NEED	LONG TERM NEED
RNAV (GPS) - Runway 34 LPV minimums	RNAV (GPS) - Runway 34 LPV minimums	RNAV (GPS) - Runway 34 **CAT I LPV minimums**	RNAV (GPS) - Runway 34 CAT I LPV minimums
VOR/DME - Runway 34	VOR/DME - Runway 34	VOR/DME - Runway 34	VOR/DME - Runway 34
	RNAV (GPS) - Runway 16 LPV minimums	RNAV (GPS) - Runway 16 LPV minimums	RNAV (GPS) - Runway 16 LPV minimums

RNAV - Area Navigation
VOR - Very High Frequency Omnidirectional Range Facility
DME - Distance Measuring Equipment
GPS - Global Positioning System
LPV - An approach procedure with vertical guidance based on WAAS [wide area augmentation system] lateral and vertical guidance
CAT I - Category I
Note: Items in bold represent future requirement

AIRFIELD MARKING, LIGHTING AND SIGNAGE

In order to facilitate the safe movement of aircraft about the airfield, airports use pavement markings, lighting, and signage to direct pilots to their destinations. Runway markings are designed according to the type of instrument approach available on the runway. FAA Advisory Circular 150/5340-1J, *Marking of Paved Areas on Airports*, provides the guidance necessary to design airport markings. **Exhibit 3F** summarizes marking, lighting, and signage requirements for the airport.

Runway 34 has the necessary markings for a precision approach. Runway 16 has nonprecision markings. These markings will suffice through the planning period. The future parallel runway should have basic markings.

Taxiway and apron areas also require marking. Yellow centerline stripes are currently painted on all taxiway surfaces at the airport to provide this guidance to pilots. The apron areas also have centerline markings to indicate the alignment of taxilanes within these areas. Hold lines are provided at all runway/taxiway intersections. Enhanced taxiway markings were added in 2008. Besides routine maintenance of the taxiway markings, these markings will be sufficient through the planning period.

Airport lighting systems provide critical guidance to pilots during nighttime and low visibility operations. Runway 16-34 is equipped with medium intensity runway lighting (MIRL). Facility planning should include upgrading to high intensity runway lighting (HIRL) to support precision instrument approach minimums. MIRL should be planned for the future parallel runway.

Effective ground movement of aircraft at night is enhanced by the availability of taxiway lighting. Medium intensity taxiway lighting (MITL) is installed

Exhibit 3F
AIRFIELD LIGHTING AND MARKING REQUIREMENTS

EXISTING	SHORT TERM NEED	INTERMEDIATE TERM NEED	LONG TERM NEED
Rotating Beacon Pilot Controlled Lighting (PCL)	Rotating Beacon Pilot Controlled Lighting (PCL)	Rotating Beacon Pilot Controlled Lighting (PCL)	Rotating Beacon Pilot Controlled Lighting (PCL)
RUNWAY 16-34			
Medium Intensity Runway Edge Lighting (MIRL) Medium Intensity Taxiway Edge Lighting (MITL) Lighted Runway/Taxiway Directional Signage Precision Approach Path Indicator (PAPI-4) Each Runway End Runway End Identifier Lights (REILs) Each Runway End Distance Remaining Signs Precision Runway Markings - Runway 34 Nonprecision Runway Markings - Runway 16	Medium Intensity Runway Edge Lighting (MIRL) Medium Intensity Taxiway Edge Lighting (MITL) Lighted Runway/Taxiway Directional Signage Precision Approach Path Indicator (PAPI-4) Each Runway End Runway End Identifier Lights (REILs) Each Runway End Distance Remaining Signs Precision Runway Markings - Runway 34 Nonprecision Runway Markings - Runway 16	**High Intensity Runway Edge Lighting (HIRL)** Medium Intensity Taxiway Edge Lighting (MITL) Lighted Runway/Taxiway Directional Signage Precision Approach Path Indicator (PAPI-4) Each Runway End Runway End Identifier Lights (REILs) Each Runway End Distance Remaining Signs Precision Runway Markings - Runway 34 Nonprecision Runway Markings - Runway 16 **Medium Intensity Approach Lighting System with Runway Alignment Indicator Lighting (MALSR) - Runway 34**	High Intensity Runway Edge Lighting (HIRL) Medium Intensity Taxiway Edge Lighting (MITL) Lighted Runway/Taxiway Directional Signage Precision Approach Path Indicator (PAPI-4) Each Runway End Runway End Identifier Lights (REILs) Each Runway End Distance Remaining Signs Precision Runway Markings - Runway 34 Nonprecision Runway Markings - Runway 16 Medium Intensity Approach Lighting System with Runway Alignment Indicator Lighting (MALSR) - Runway 34
PARALLEL RUNWAY			
			**Medium Intensity Runway Edge Lighting (MIRL)** **Medium Intensity Taxiway Edge Lighting (MITL)** **Lighted Runway/Taxiway Directional Signage** **Precision Approach Path Indicator (PAPI-2) Each Runway End** **Runway End Identifier Lights (REILs) Each Runway End** **Basic Runway Markings**

Note: Items in bold represent future requirement

on all taxiways on the airfield. The existing airfield lighting systems, while adequate in intensity, will require routine maintenance and upgrades during the planning period. MITL should be planned for all future taxiways, including those serving the future parallel runway.

Airfield signage provides another means of notifying pilots of their location on the airport. A system of signs placed at several airfield intersections on the airport is the best method available to provide this guidance. Signs located at intersections of taxiways provide crucial information to avoid conflicts between moving aircraft. Directional signage instructs pilots as to the location of taxiways and terminal aprons. Mandatory hold signs are also installed at the airport. These signs alert the pilot of the proper location to stop and hold prior to taxiing to the runway. At Laughlin/Bullhead International Airport, all signs are lit. These signs are required for certification at the airport and must be maintained through the planning period. Directional signage will also be required for the future parallel runway.

In most instances, the landing phase of any flight must be conducted in visual conditions. To provide pilots with visual guidance information during landings to the runway, a four-box precision approach slope indicator (PAPI-4) system has been installed at the Runway 16 and Runway 34 ends. The PAPI-4s are located on the east side of the runway approximately 700 feet south of the runway end. The PAPI consists of a series of lights that, when interpreted by the pilot, give him or her an indication of being above, below, or on the designed descent path to the runway. The PAPIs should be maintained through the planning period. PAPI-2s should be planned for each end of the future parallel runway.

Runway end identification lights (REILs) provide rapid and positive identification of the approach ends of a runway. An REIL system has been installed at each runway end. An REIL consists of two synchronized flashing lights, located laterally on each side of the runway threshold, facing the approaching aircraft. The REILs should be maintained through the planning period. REILs should be planned for each end of the future parallel runway.

To improve instrument approach minimums at the airport, an approach lighting system may ultimately be required. Therefore, a medium intensity approach lighting system with runway alignment indicator lights (MALSR) should be planned for Runway 34. An MALSR provides visual guidance to landing aircraft by radiating light beams in a directional pattern by which the pilot aligns the aircraft with the extended centerline of the runway.

The location of an airport at night is universally indicated by a rotating beacon which projects two beams of light, one white and one green, 180 degrees apart. The rotating beacon at Laughlin/Bullhead International Airport is located atop a metal tower northeast of the Runway 16 end. The rotating beacon should be maintained through the planning period.

Runway 16-34 is equipped with distance remaining signs. These signs are set in 1,000-foot increments to notify the pilot of the remaining runway length. These signs should be maintained through the planning period.

The MIRL system on Runway 16-34 is connected to the pilot-controlled lighting system (PCL). This system allows pilots to turn on or increase the intensity of the MIRL from the aircraft with the use of the aircraft's radio transmitter. Future facility planning should include connecting the PAPIs, REILS, and future MALSR to the PCL.

Weather Reporting

The airport has a lighted wind cone and segmented circle. A lighted wind cone provides information to pilots regarding wind conditions. The segmented circle surrounds the lighted wind cone and provides traffic pattern information to pilots. A lighted wind sock is also available between the runway and Taxiway A adjacent to Taxiway A2, while another is located approximately 1,000 feet north of the Runway 34 threshold. The segmented circle and lighted wind cone are required by regulation as the airport traffic control tower (ATCT) is not open 24 hours a day. As shown on **Exhibit 3G**, these systems should be maintained through the planning period.

An Automated Weather Observation System III (AWOS-III) was installed at the airport in 2007. The AWOS automatically records weather conditions such as wind speed, wind gusts, wind direction,

Exhibit 3G
WEATHER/COMMUNICATION FACILITY REQUIREMENTS

EXISTING	SHORT TERM NEED	INTERMEDIATE TERM NEED	LONG TERM NEED
Lighted Wind Indicator	Lighted Wind Indicator	Lighted Wind Indicator	Lighted Wind Indicator
Segmented Circle	Segmented Circle	Segmented Circle	Segmented Circle
Automated Weather Observing System (AWOS)	Automated Weather Observing System (AWOS)	Automated Weather Observing System (AWOS)	Automated Weather Observing System (AWOS)
Remote Transmitter/Receiver	Remote Transmitter/Receiver	Remote Transmitter/Receiver	Remote Transmitter/Receiver
Airport Traffic Control Tower (ATCT)	Airport Traffic Control Tower (ATCT)	Airport Traffic Control Tower (ATCT)	Airport Traffic Control Tower (ATCT)

variable wind direction, temperature, dew point, altimeter setting, density altitude, visibility, variable visibility, precipitation, sky condition, and cloud height. This information is then transmitted at regular intervals. The AWOS is located adjacent to the segmented circle and should be maintained through the planning period.

Communication Facilities

The ATCT is located east of the runway approximately at midfield. The ATCT is staffed through a contract with the FAA from 8:00 a.m. to 6:00 p.m. local time. Remote transmitter/receiver (RTR) equipment at the airport provides for contacting the Los Angeles ARTCC after the ATCT is closed for opening and closing flight plans. The ATCT and RTR enhance safety at the airport and should be maintained through the planning period.

LANDSIDE REQUIREMENTS

Landside facilities are those necessary for handling aircraft, passengers, and freight while on the ground. These facilities provide the essential interface between air and ground transportation modes. The capacities of the various components of each area were examined in relation to projected demand to identify future landside facility needs.

AIRLINE TERMINAL

Components of the terminal area complex include the terminal building, gate positions, and apron area. This section identifies the facilities required to meet the airport's needs through the planning period.

The existing airline terminal area facilities were evaluated based on planning guidelines relating to the major functional elements of the terminal area as presented in AC 150/5360-9, *Planning and Design of Airport Terminal Facilities at Non-hub Locations*, the consultant's database of terminal planning criterion, and information collected during the inventory element to prepare estimates of various terminal building requirements.

Facility requirements were updated to reflect the planning horizon for enplanement milestones. This included the enplanement levels of 145,000, 200,000, and 375,000 annual enplaned passengers. Peak hour enplaned passenger levels dictate many of the terminal requirements. The peak hour enplaned passenger levels are forecast at 286, 310, and 508 passengers for each future planning horizon. These peak hour passengers reflect the introduction of regularly scheduled passenger services at the airport and the continuation of charter services supporting the gaming/resort activities in Laughlin, Nevada.

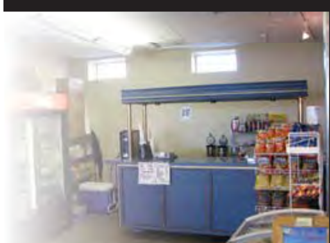
Airline terminal capacity and requirements were developed for the following functional areas as shown on **Exhibit 3H**.

- Airline Ticketing and Operations
- Departure Facilities
- Baggage Claim
- Terminal Services
- Public Use Areas and Security
- Administration/Support

Commercial airline terminal functions are provided in two separate single-level buildings located in the northeast portion of the airport. The main terminal building provides space for ticketing, airline operations, checked baggage screening and make-up, secure screening, rental cars, airport administration, and Transportation Security Administration (TSA) offices. Baggage claim is located at the far western end of the building. The baggage claim shelf and lobby are located outside in a covered area.

Departure functions are contained in a second separate building located southeast of the main terminal building. Access to this building is

Exhibit 3H
PASSENGER TERMINAL BUILDING REQUIREMENTS

	AVAILABLE	PASSENGER DEMAND LEVELS		
		145,000	200,000	375,000
Peak Hour Enplaned Passengers	N/A	286	310	508
TICKETING 				
Counter Length (l.f.)	49	128	138	227
Counter Area (s.f.)	0	1,300	1,400	2,300
Ticket Lobby (s.f.)	1,400	3,200	3,500	5,700
Airline Operations/ Bag Make-Up (s.f.)	1,400	6,900	8,100	11,100
DEPARTURE FACILITIES 				
Aircraft Gates	2	3	4	7
Security Stations	2	2	2	3
Checkpoint Security Screening/ Quequing Area (s.f.)	2,900	3,400	3,700	6,100
Holdroom Area (s.f.) [Note 1]	6,300	6,300	6,800	11,200
BAGGAGE CLAIM				
Claim Display (l.f.)	30	286	310	508
Baggage Claim Lobby (s.f.) [Note 2]	1,200	7,900	7,600	14,00
TERMINAL SERVICES 				
Rental Car				
Counter Length (l.f.)	24	95	103	169
Office Area (s.f.)	600	1,900	2,100	3,400
Counter Queue Area (s.f.)	300	1,000	1,100	1,700
Food/Beverage (s.f.)	400	3,800	4,100	6,800
Retail (s.f.)	0	1,000	1,100	1,700
Restrooms (s.f.)	1,600	1,900	2,000	3,100
PUBLIC LOBBY 				
Seating/Greeting/Farewell Area/ Circulation (s.f.)	2,200	5,200	5,600	9,200
OTHER AREAS 				
Airport Adminstration/ Office Space	2,300	4,900	4,900	4,900
Subtotal Programmed Area	20,600	48,700	52,000	81,200
General Circulation	2,200	7,300	7,900	12,200
Mechanical/Electrical, & Storage (s.f.)	N/A	5,600	6,100	9,300
TOTAL TERMINAL BUILDING	**22,800**	**61,600**	**66,000**	**102,700**

Note 1: Includes unused areas
Note 2: Existing square-footage not included in total.

via a covered secure walkway. The walkway is enclosed by chain link fencing and/or steel bar fencing on both sides. This building provides the departure gates, hold rooms, and vending/ snack bar. All aircraft boarding is ground level through aircraft stairs.

TICKETING AND AIRLINE OPERATIONS

The first destination for enplaning passengers in the terminal building is usually the airline ticket counter. The ticketing area consists of the ticket counters, queuing area for passengers in line at the counters, and the ticket lobby which provides circulation. Presently, there are up to four separate ticketing areas at Laughlin/Bullhead International Airport. Four airline offices are provided behind and adjacent to the ticket counters. The TSA has installed an explosive detections system (EDS) for checked baggage screening.

The ticket lobby should be arranged so that the enplaning passenger has immediate access and clear visibility to the individual airline ticket counters upon entering the building. Circulation patterns should allow the option of bypassing the counters with minimum interference. Provisions for seating should be minimal to avoid congestion and to encourage passengers to proceed to the gate area. Airline ticket counter frontage, counter area, counter queuing area, ticketing lobby, and airline office and operations area requirements for each potential enplanement level have been calculated. The current arrangement of the ticketing area meets these functional requirements.

The analysis of the airline ticketing functional areas at the airport indicates that additional area will be needed through the planning period. This includes additional counter length, ticket lobby space, and airline operations/baggage make-up.

DEPARTURE GATES AND HOLDROOMS

There are two ground level departure gates at the airport. While ground level loading and unloading of passengers can be used by regional jets which may provide scheduled airline service in the future, ground level boarding is more complicated for the large transport jets that utilize the airport for charter services. Long term facility planning should include second-level boarding capabilities with loading bridges. Furthermore, as shown on **Exhibit 3H**, long term planning anticipates the need for up to seven departure gates for peak periods.

The number of gates required to accommodate the combined peak hour activity and the aircraft seating capacities determines holdroom capacity requirements. Holdrooms should be sized to provide adequate space and area for the largest group of people that can use each gate. Currently, there is one large holdroom for passengers. Forecasts indicate that the existing holdroom area will need to be increased to meet peak passenger levels. Additional unused space is available in the departure facility for additional holdroom area, although this area will not meet projected long term needs.

PASSENGER SCREENING

Current security screening is positioned in the main terminal building. The size of the existing security areas, however, is not fully adequate to facilitate efficiency. The existing secure station queuing area is undersized for future peak passenger levels. Future areas should be planned to fully accommodate not only the needs of the security stations, but also increase queuing space.

BAGGAGE CLAIM

The passenger arrival process consists primarily of those facilities and functions that reunite the arriving passengers with their checked baggage. The existing claim device at the airport consists of a single display shelf located outside the main terminal building in a covered patio area. The bags are loaded onto the shelf via the baggage tug carts from the apron.

Short term planning should consider enclosing the baggage claim area. Forecasts call for an increase in the size of the current baggage claim area through the planning period. Future consideration would include a mechanized device to display baggage. The location of the baggage claim area will be more fully explored within the alternatives.

TERMINAL SERVICES

Similar to airline ticketing, rental car counter facilities include office, counter area, and queue areas. There are currently three counters identified for rental car services. The forecasts show a need for additional rental car area through the planning period. Additional space may be required sooner should additional rental car providers initiate service at the airport.

As shown on **Exhibit 3H**, additional space for food and beverages may be required through the long term. Retail space is also projected to be needed through the planning period. Public restroom space will need to increase through the planning period.

PUBLIC-USE AREA

The public lobby is where passengers or visitors may comfortably relax while waiting for arrivals or departures. In today's environment, visitors must remain out of the secure departure areas, so a public lobby is important. The terminal building provides more than 2,200 square feet of space for this purpose. Within the main terminal building, circulation space is particularly limited as most areas are dedicated for ticketing and passenger screening queuing. Additional circulation space will be needed through the long term planning period.

BUILDING SUPPORT AND ADMINISTRATION

Building support facilities include all miscellaneous spaces at the airport, including mechanical, telephone, business centers, walls/structures, and general circulation. As other components of the airport increase in size, so will supporting spaces.

The administrative offices are located within the terminal building. This includes space for airport management. The space needed for these facilities will be dependent upon the Mohave County Airport Authority's (MCAA) needs through the planning period.

TERMINAL APRON

The existing terminal apron encompasses approximately 43,100 square yards. Space is available to park up to three large transport jet aircraft. Depending upon future boarding gate design, more than 35,000 square yards of apron will be needed for aircraft parking. While the existing apron exceeds this space requirement, this apron is also used by the air cargo carriers.

TERMINAL ACCESS ROADWAY

Principal access to the terminal is from Laughlin View Drive. Laughlin View Drive is a two-lane road intersecting with Bullhead Parkway, north of the airport across the Highland Wash as well as to the east. The northern connection can be closed when there is high water present in the Highland Wash. Bullhead Parkway connects to the regional highway network. Access to the main terminal building is via a one-way loop road. The expansion of the terminal parking area eliminated the need to cross in front of the terminal. A new two-way access road extends along the northern section of the parking area. Access to the departure facility is via Aston Drive. Future access needs will be dependent upon the final location of the terminal.

TERMINAL CURB FRONTAGE

The curb element is the interface between the terminal building and the ground transportation system. The length of curb required for the loading and unloading of passengers and baggage is determined by the type and volume of ground vehicles anticipated in the peak period on the design day.

Exhibit 3J
AUTOMOBILE PARKING AND TERMINAL CURB REQUIREMENTS

	AVAILABLE	PASSENGER DEMAND LEVELS		
		145,000	200,000	375,000
AUTO PARKING				
Public Parking	310	207	270	493
Employee	NA	58	80	150
Rental Car	90	103	142	266
Total Auto Parking	400	368	492	909
TERMINAL CURB				
Length (ft)	330	560	610	990

A typical problem for terminal curb capacity is the length of dwell time for vehicles utilizing the curb. At airports where the curb front has not been strictly patrolled, vehicles have been known to be parked at the curb while the driver and/or riders are inside the terminal checking in, greeting arriving passengers, or awaiting baggage pick-up. Since most curbs are not designed for vehicles to remain curbside for more than two to three minutes, capacity problems can ensue. Since the events of 9/11, most airports police the curb front much more strictly for security reasons. This alone has reduced the curb front capacity problems at most airports.

At the airport, the terminal roadway provides one lane for loading and unloading of passengers and two through lanes for automobile flow. The curb frontage totals approximately 330 feet in length. As shown on **Exhibit 3J**, additional curb length may be needed through the planning period as peak passenger levels increase. This will avoid situations of double-parking near the bag claim or ticketing areas

VEHICLE PARKING

Vehicle parking in the airline passenger terminal area of the airport includes those spaces utilized by passengers, visitors, and employees of the airline terminal facilities. Parking spaces are classified as public, employee, and rental car. Most vehicle parking is located in a surface lot immediately north of the terminal building and is used for public, employee, and some rental car parking. A second rental car parking area is located east of the terminal building.

Exhibit 3J presents the parking requirements for the planning horizons. Public parking requirements were based upon design hour (short term) and design day (long term) passenger levels. Public parking will need to be significantly expanded through the planning period. Rental car parking needs depend upon the operational requirements of the rental car agencies. However, it appears that additional rental car spaces will be required through the planning period.

TERMINAL REQUIREMENTS SUMMARY

The existing space dedicated to passenger airline functions is insufficient to efficiently serve project-

ed airline passenger levels. Additional space will be needed to accommodate growth in passenger levels at the airport. This can only be accomplished through expansion of the existing buildings or new building construction. Additional parking areas will also be needed. The previous master plan relocated long term terminal functions to the south end of the airport to accommodate long term passenger levels. This will be reexamined within this Master Plan.

AIR CARGO

The two primary cargo-related facilities requiring analysis include the cargo apron and building space. Presently, there is no single building or facility dedicated solely to air cargo on the airport. Air cargo is presently transferred directly from aircraft to vehicles on the apron area. This practice is expected to continue through the planning period. The cargo carriers are currently located in temporary facilities along the southern edge of the apron. Facility planning should include relocating these carriers to the east edge of the apron so that the vehicles do not cross the entire apron and Taxiway A2 to reach the aircraft.

GENERAL AVIATION

General aviation facilities are those necessary for handling general aviation aircraft and passengers while on the ground. This section is devoted to identifying future general aviation facility needs during the planning period for the following types of facilities normally associated with general aviation terminal areas.

GENERAL AVIATION TERMINAL SERVICES

The general aviation facilities are often the first impression of the community that corporate officials and other visitors will encounter. General aviation terminal facilities at an airport provide space for passenger waiting, pilots' lounge, pilot flight planning, concessions, management, storage, and various other needs. Landmark Aviation plans the construction of a new 3,000-square-foot general aviation terminal in 2008.

The methodology used in estimating general aviation terminal facility needs was based upon the number of airport users expected to utilize general aviation facilities during the design hour. Space requirements for terminal facilities were based on providing 120 square feet per design hour itinerant passenger. **Exhibit 3K** outlines the space requirements for general aviation terminal services at Laughlin/Bullhead International Airport through the long term planning horizon. As shown in the table, up to 10,800 square feet of space should be provided in the long term for general aviation passengers.

HANGARS

Utilization of hangar space varies as a function of local climate, security, and owner preferences. The trend in general aviation aircraft, whether single or multi-engine, is toward more sophisticated aircraft (and, consequently, more expensive aircraft); therefore, many aircraft owners prefer enclosed hangar space to outside tie-downs.

The demand for aircraft storage hangars is dependent upon the number and type of aircraft expected to be based at the airport in the future. For planning purposes, it is necessary to estimate hangar requirements based upon forecast operational activity. However, hangar development should be based upon actual demand trends and financial investment conditions.

Laughlin/Bullhead International Airport has a number of individual T-hangar spaces. T-hangars are popular with aircraft owners having only one small aircraft as they provide space for a single aircraft. Commonly, large T-hangar structures are constructed that combine several individual spaces within a larger structure, allowing aircraft owners privacy and individual access to their space. Conventional hangars range in configuration and total area. These hangars are open space facilities with no supporting structure interference. Often, other airport services are offered from the conventional hangars. There are 14 conventional hangars at the airport totaling 67,700 square feet. Currently, there are 15 individual T-hangar positions available on the airport. For T-hangars, a planning standard of 1,200 square feet per based aircraft will be used to determine future requirements.

The current storage mix indicates that all the hangars are full, with the remaining based aircraft located on the apron. In the future, the majority of single engine based aircraft were assumed to be located within the T-hangars, while all future turboprop, turbojet, and helicopters would be located within a conventional hangar. As the trend toward more sophisticated aircraft continues throughout the planning period, it is important to determine the need for more conventional hangars. For conventional hangars, a planning standard of 2,500 square feet per aircraft was utilized.

Since portions of the conventional hangars are also used for aircraft maintenance and servicing, requirements for maintenance/service hangar area were estimated using a planning standard of 20 percent of the conventional hangar space needs.

Future hangar requirements for the airport are summarized on **Exhibit 3K**. The analysis indicated that there will be a need for additional hangar storage positions, both T-hangar and conventional hangar, for storage of based general aviation aircraft. **Exhibit 3K** also presents hangar storage needs in terms of hangar square footage. By the long term of the plan, up to 380,200 square feet of aircraft storage space may be needed at the airport.

Exhibit 3K
GENERAL AVIATION FACILITY REQUIREMENTS

	AVAILABLE	SHORT TERM NEED	INTERMEDIATE TERM NEED	LONG TERM NEED
HANGAR AREA REQUIREMENTS				
Aircraft to be Hangared	37	64	93	151
T-Hangars	15	26	47	91
Conventional Hangar Positions	18-35	38	47	60
T-Hangar Area (s.f.)	19,400	51,200	113,900	246,200
Conventional Hangar Storage Area (s.f.)	67,700	71,900	86,000	111,700
Maintenance Area (s.f.)	N/A	14,200	17,200	22,300
Subtotal Convential Hangar Area (s.f.)	67,700	85,200	103,200	134,000
Total Hangar Area (s.f.)	87,100	136,400	217,100	380,200
OTHER FACILITIES				
		Aircraft Wash Rack	Aircraft Wash Rack	Aircraft Wash Rack
HELICOPTER OPERATIONS				
		Two Paved Hardstands	Two Paved Hardstands	Two Paved Hardstands
TERMINAL				
	3,800	3,900	5,800	10,800

AIRCRAFT PARKING APRON

A parking apron should be provided for transient aircraft, as well as some daytime ramp space to hold based aircraft. At the present time, there are 12 based aircraft stored on the ramp. With a total of 67 tiedown positions, approximately 82 percent of tiedowns are available for based and transient aircraft use. In the future, up to 25 based aircraft positions on the apron are forecast. Although some aircraft are stored in conventional hangars, they may be moved to the ramp during the day to provide hangar area for aircraft maintenance.

Exhibit 3L
AIRCRAFT PARKING APRON REQUIREMENTS

	AVAILABLE	SHORT TERM NEED	INTERMEDIATE TERM NEED	LONG TERM NEED
Single, Multi-engine Transient Aircraft Positions		11	15	29
Apron Area (s.y.)		9,000	12,200	23,000
Transient Business Aircraft Positions		5	7	10
Apron Area (s.y.)		8,000	11,200	16,000
Locally-Based Aircraft Positions		20	22	25
Apron Area (s.y.)		10,000	11,000	12,500
Total Positions	67	36	44	64
Total Apron Area (s.y.)	95,400	27,000	34,400	51,500

FAA Advisory Circular 150/5300-13, *Airport Design*, suggests a methodology by which transient apron requirements can be determined from knowledge of busy-day operations. At Laughlin/Bullhead International Airport, the number of itinerant spaces required was estimated to be approximately 15 percent of the busy-day itinerant operations. A planning criterion of 800 square yards was used for single and multi-engine itinerant aircraft, while a planning criterion of 1,600 square yards was used to determine the area for transient jet aircraft. As shown in **Exhibit 3L**, the existing general aviation apron and parking positions should be adequate through the planning period. The existing available apron area meets or exceeds all demand forecast requirements.

VEHICULAR PARKING

General aviation vehicular parking demands have also been determined for Laughlin/Bullhead International Airport. Space determinations were based on an evaluation of existing airport use, as well as industry standards. Terminal automobile parking spaces required to meet general aviation itinerant and fixed base operator (FBO) demands were calculated by multiplying design hour itinerant passengers by the industry standard of 1.9 in the short term, increasing to 2.5 for the long term as corporate operations increase. The parking requirements of based aircraft owners should also be considered. Although some owners prefer to park their vehicles in their hangar, safety can be compromised when automobile and aircraft movements are intermixed. For this reason, separate parking requirements, which consider one-half of based aircraft at the airport, were applied to general aviation automobile parking space requirements. Utilizing this methodology, parking requirements for general aviation activity is for 72 spaces in the Short Term Planning Horizon, 103 spaces in the Intermediate Term Planning Horizon, and 175 spaces in the Long Term Planning Horizon.

Presently, there are no existing paved general aviation parking areas. Access to the hangar area is along the apron. Facility planning should include developing paved parking areas at the airport and including segregated vehicle access to the aircraft hangars.

SUPPORT REQUIREMENTS

Various facilities that do not logically fall within classifications of airfield, terminal building, or general aviation facilities have been identified for inclusion in this master plan. Facility requirements have been identified for these remaining facilities:

- Aircraft Wash Facilities
- Helicopter Operations
- Airport Rescue and Firefighting Facilities
- Airport Maintenance Facilities
- Fuel Storage

AIRCRAFT WASH FACILITY

Presently, there are no designated aircraft wash facilities on the airport. Consideration should be given to establishing an aircraft wash facility at the airport to collect aircraft cleaning fluids used during the cleaning process.

HELICOPTER PARKING

Presently, there are eight helicopter parking areas on the airport. Helicopters operate on the apron areas shared by fixed-wing aircraft. Helicopter operations should be segregated to the extent practicable. Long term facility planning should consider establishing helicopter hardstands for segregating helicopter parking.

AIRCRAFT RESCUE AND FIREFIGHTING

Requirements for aircraft rescue and firefighting (ARFF) services at an airport are established under Title 14 of the Code of Federal Regulations (CFR) Part 139, which applies to the certification and operation of land airports served by any scheduled or unscheduled passenger operation of an air carrier using an aircraft with nine or more passenger seats. Paragraph 139.315 establishes ARFF index ratings based on the length of the largest aircraft with an average of five or more daily departures.

The following indicates the requirements for each ARFF Index and the associated equipment requirements:

Index A - Includes aircraft less than 90 feet in length (Saab 340, Regional Jet).
Index B - Includes aircraft at least 90 feet but less than 126 feet in length (Boeing 737).
Index C - Includes aircraft at least 126 feet but less than 159 feet in length (Boeing 757).
Index D - Includes aircraft at least 159 feet but less than 200 feet in length (Boeing 767).
Index E - Includes aircraft at least 200 feet in length (Boeing 747).

The Laughlin/Bullhead International Airport ARFF facility currently maintains Index B capability. To meet Index B requirements, at least one vehicle able to carry 500 pounds of sodium-based dry chemical or Halon 1211, 1,500 gallons of water, and the commensurate quantity of aqueous film forming foams AFFF for foam production is required. If two ARFF vehicles are used, one must carry those agents listed for Index A requirements, and the other vehicle must carry an amount of water and the commensurate quantity of AFFF so that the total quantity of water for foam production carried by both vehicles is at least 1,500 gallons.

The requirement to meet any higher index would need to be based on the number of daily operations of aircraft within that index. Regional jet aircraft are anticipated to be used through the planning period for scheduled passenger service. With the exception of the Embraer 145, all existing regional jets with less than 50 seats are less than 90 feet in length and fall within Index A. Larger seating capacity regional jets fall within Index B.

While Index B should be adequate through the planning period, Index C may become necessary if larger aircraft such as the Boeing 757 are utilized at the airport. Index C requires either of the following: (1) Three vehicles, one vehicle carrying 500 pounds of sodium-based dry chemical or halon 1211; or 450 pounds of potassium-based dry chemical and water with a commensurate quantity of AFFF to total 100 gallons for simultaneous dry chemical and AFFF foam application, and two vehicles carrying an amount of water and the commensurate quantity of AFFF so that the total quantity of water for foam production carried by all three vehicles is at least 3,000 gallons, or (2) Two vehicles, one vehicle carrying 500 pounds of sodium-based dry chemical or halon 1211; or 450 pounds of potassium-based dry chemical and water with a commensurate quantity of AFFF to total 100 gallons for simultaneous dry chemical and AFFF foam application, and one vehicle carrying an amount of water and the commensurate quantity of AFFF so that the total quantity of water for foam production carried by both vehicles is at least 3,000 gallons. Replacement of the existing ARFF vehicle should be considered in the short term.

The existing ARFF facility at Laughlin/Bullhead International Airport is located on the north end of the airfield, providing quick response capability. Regulations require that at least one vehicle must be capable of reaching the midpoint of the farthest runway within three minutes from the time of the alarm to the time of initial agent application. The existing location is well-suited to meet this criterion.

AVIATION FUEL STORAGE

All fuel storage and dispensing facilities at the airport are privately owned and operated. Presently, all Landmark fuel storage is in aboveground tanks located at the terminus of Aston Drive as shown previously on Exhibit 1C. Jet fuel storage totals 40,000 gallons. 100LL fuel storage totals 12,000 gallons. All fuel is dispensed via mobile fueling trucks. Tri-State Care Flight maintains a 12,000 gallon above ground fule storage tank between hangars 31 and 32 for self-fueling. Any future fuel storage needs should be determined by the FBOs providing fueling services and will be dependent upon delivery schedules. The existing consolidated fuel storage area should be maintained through the planning period, as this area provides ease of access for both the fuel delivery vehicles as well as the mobile fuel trucks.

AIRPORT MAINTENANCE FACILITIES

All equipment necessary to maintain the airport to Part 139 standards is available at the airport. The present airport maintenance facility is west of the passenger terminal building in the same building that stores the ARFF equipment. The alternatives analysis will examine alternative locations for an airport maintenance facility to provide more area and segregate from ARFF functions should that be desired by the MCAA in the future.

UTILITIES

Electrical, water, natural gas, and sanitary sewer services are available at the airport. No information collected during the inventory effort revealed any deficiencies in providing electrical, water, or sanitary sewer services at the airport. Therefore, it is assumed that all future infrastructure needs for these services will be sufficiently met.

SUMMARY

The intent of this chapter has been to outline the facilities required to meet aviation demands projected for Laughlin/Bullhead International Airport through the long term planning horizon. Following the facility requirements determination, the next step is to develop a direction for development to best meet these projected needs. The remainder of the Master Plan will be devoted to outlining this direction, its schedule, and its costs.

Chapter Four: Alternatives

LAUGHLIN BULLHEAD INTERNATIONAL Airport

Chapter Four
ALTERNATIVES

Prior to defining the recommended development program for Laughlin/Bullhead International Airport, it is important to consider development potential and constraints at the airport. The purpose of this chapter is to consider the actual physical facilities which are needed to accommodate projected demand and meet the program requirements as defined in Chapter Three, Facility Requirements.

In this chapter, a number of airport development alternatives are considered for the airport. For each alternative, different physical facility layouts are presented for the purposes of evaluation. The ultimate goal is to develop the underlying rationale which supports the final recommended master plan development concept. Through this process, an evaluation of the highest and best uses of airport property is made while considering local development goals, physical and environmental constraints, and appropriate federal airport design standards.

Any development proposed by a Master Plan evolves from an analysis of projected needs. Though the needs were determined by the best methodology available, it cannot be assumed that future events will not change these needs. Therefore, to ensure flexibility in planning and development to respond to unforeseen needs, some of the landside alternatives consider the maximum development potential of airport property.

The alternatives presented in this chapter have been developed to meet the overall program objectives for the airport in a balanced manner. Through coordination with the Planning Advisory Committee (PAC), the public, and the Mohave County Airport Authority (MCAA), the alternatives (or combination thereof) will be refined and modified as necessary to develop the recommended development concept. Therefore, the alternatives presented in this chapter can be considered a beginning point in the development of the recommended concept for the future development of Laughlin/Bullhead International Airport. Input from the general public and members of the PAC will be necessary to define this concept and the resultant capital improvement program.

NO-BUILD ALTERNATIVE

In analyzing and comparing the advantages and disadvantages of various development alternatives, it is important to consider the consequences of no future development at Laughlin/Bullhead International Airport. The "no-build" or "do-nothing" alternative essentially considers keeping the airport in its present condition and not providing for any type of expansion or improvement to the existing facilities (other than general airfield and terminal building maintenance projects, tenant-defined projects, and any other miscellaneous projects beyond the MCAA's purview and control). The primary result of this alternative, as with any growing air transportation market, would be the eventual inability of the airport to satisfy the increasing demands of the airport service area. The potential growth of activity at Laughlin/Bullhead International Airport is partially a function of the growing gaming/resort activities in Laughlin, Nevada and the growing economy and population of the regional area.

The analysis of facility needs indicated needs for airfield, commercial airline terminal area, aircraft storage, and access needs resulting from existing demand and projected demand. Based upon coordination with existing airlines serving the airport, additional runway length is needed in the short term to alleviate departure payload restrictions. While improvements have been made recently to the functional areas of the airline terminal building and additional automobile parking areas are being constructed in 2008, growth in commercial airline passengers will require additional function space within the terminal as well as additional gates and second level boarding. Additional aircraft storage area is needed to accommodate based aircraft.

Following the no-build alternative would not allow for any of these improvements discussed above. Following the no-build alternative would not support the private businesses that have made considerable investments at Laughlin/Bullhead International Airport. As these businesses grow, the airport will need to be able to accommodate the infrastructure needs of new hangars, expanded apron, and automobile parking needs. Each of the businesses on the field provides jobs for local residents, interject economic revenues into the community, and pay taxes for local government operations.

Even if the no-build alternative is chosen, the airport would still need to be maintained in a safe condition. This would require continual maintenance to paved areas and even replacement over time. As a federally funded airport, the MCAA is obligated to maintain the federal investment made in the airport.

The MCAA is charged with the responsibility of developing aviation facilities necessary to accommodate aviation demand and to minimize operational constraints. Flexibility must be programmed into airport development to assure adequate capacity should market conditions change unexpectedly. While these objectives may not be all-inclusive, they should provide a point of reference in the alternatives evaluation process.

In essence, the no-build alternative is inconsistent with the long-term goals of the MCAA, FAA, and Arizona Department of Transportation – Aeronautics Division (ADOT), which are to enhance local and interstate commerce. This alternative, if pursued, would affect the long-term viability of the airport and its services to the City of Bullhead City and Town of Laughlin.

AIRFIELD CONSIDERATIONS

The airfield issues to be considered in this analysis are summarized on **Exhibit 4A** and more fully below. These issues are the result of the findings of the Facility Requirements evaluations and include input from the PAC and MCAA.

Exhibit 4A
AIRFIELD PLANNING CONSIDERATIONS

- Extend Runway 16-34 1,000 feet south
- A parallel runway for small aircraft use
- Provide three additional exit taxiways
- Precision instrument approach to Runway 34
- Provide for the precision obstacle free zone (OFZ) to Runway 34
- A medium intensity approach lighting system with runway alignment indicator lights (MALSR) to Runway 34

RUNWAY EXTENSION

Based upon coordination with existing airlines serving Laughlin/Bullhead International Airport, up to 8,500 feet of length is needed on Runway 16-34 to eliminate existing payload restrictions and increase range. Presently, Runway 16-34 is 7,500 feet long.

Runway 16-34 can only be extended to the south. Highland Wash, Bullhead Parkway, and the need to maintain a perimeter service road around the north end of the runway limits any potential extension to the north. In fact, the Runway 16 threshold was relocated 500 feet south in 2007 to provide adequate runway safety area (RSA) beyond the Runway 16 end.

A 1,000-foot extension of Runway 16-34 to the south is currently under environmental review. As required by FAA regulations, an Environmental Assessment (EA) is presently being conducted to determine compliance with the *National Environmental Policy Act* (NEPA). This 1,000-foot extension is shown on **Exhibit 4B**. The RSA beyond the extended Runway 34 end will cross an unnamed wash south of the airport. A Section 404 permit application is currently being developed for the fill that will be placed in this unnamed wash. Once extended 1,000 feet south, any further extension of Runway 16-34 is unlikely, given the location of the planned Laughlin Ranch Boulevard.

EXIT TAXIWAYS

Airfield capacity and efficiency is enhanced with a sufficient number of properly spaced exit taxiways. The Facility Requirements analysis indicated the need for up to three additional exit taxiways. **Exhibit 4B** depicts these three additional taxiways. Each taxiway is designed as a high speed exit. This design allows the aircraft to exit the runway at a higher speed when compared with a perpendicular (right angle) exit. This reduces runway occupancy time. Two of these exits are placed near mid-field. The third exit is properly spaced for landings by large aircraft on Runway 16.

PARALLEL RUNWAY

The current airfield plan for Laughlin/Bullhead International Airport includes a parallel runway west of Runway 16-34 for use by small general aviation aircraft. A parallel runway for small general aviation aircraft maximizes airfield capacity as large and small aircraft are segregated and simultaneous operations can occur at the airport. While the airfield capacity analysis in Chapter Three indicated that a parallel runway may not be needed during the planning period of this Master Plan, a parallel runway will continue to be planned at Laughlin/Bullhead International Airport. This reserves the property south and west of the airport for this ultimate use and also allows the City of Bullhead City to continue to properly plan appropriate land uses adjacent to the airport that are compatible with this ultimate use.

Exhibit 4B depicts the development of a 4,700-foot long, 75-foot wide parallel runway located 700 feet west of the Runway 16-34 centerline per FAA design standards. This parallel runway would be served by a parallel taxiway located 240 feet east of the parallel runway. This is the placement of the parallel runway recommended by the previous Master Plan and shown on the currently approved Airport Layout Plan (ALP) drawing.

The parallel runway will require the acquisition of approximately 70 acres of land on the west and south sides of the airport. This land acquisition is needed to support the actual construction of the runway and protect the RSA, object free area (OFA), and runway protection zone (RPZ) beyond each runway end.

Exhibit 4B also depicts a relocated perimeter service road. The construction of the parallel runway and extension of Runway 16-34 to the south will require that the perimeter service road be located outside the RSA and OFA of each runway.

PRECISION INSTRUMENT APPROACH

As detailed in Chapter Three, Facility Requirements, future facility planning should include lowering approach minimums to the extent practicable. Ultimately, it would be preferable to provide landings to Category I minimums – one-half mile visibility and 200-foot cloud ceilings at Laughlin/Bullhead International Airport. Due to terrain features to the north, a precision approach is most likely only feasible from the south to Runway 34.

A precision instrument approach to Runway 34 could either be developed utilizing the satellite-based Global Positioning System (GPS) or through the installation of the ground-based instrument landing system (ILS) at the airport. In either case, a precision instrument approach utilizing GPS or the ILS requires consideration of FAA design standards and the addition of new approach lighting.

Exhibit 4B depicts the addition of a medium intensity approach lighting system with runway alignment indicator lights (MALSR). The MALSR is required to lower visibility minimums below three-fourths of a mile.

FAA design standards specify that a precision instrument approach has a larger RPZ than currently provided at the airport. **Exhibit 4B** depicts this larger RPZ beyond Runway 34 and the acquisition of approximately 35 acres of land to protect the RPZ from incompatible development.

The FAA also requires that the precision obstacle free zone (POFZ) remain clear during precision instrument approach operations when the reported cloud ceiling is less than 250 feet and/or visibility is less than three-fourths statute mile and an aircraft is on approach within two miles of the runway threshold. The POFZ would be located beyond Runway 34 and is 200 feet long and 800 feet wide centered on the runway centerline. To ensure no aircraft are located within the POFZ, the hold apron at the Runway 34 end would need to be located east of Taxiway A as shown on **Exhibit 4B**.

LANDSIDE ALTERNATIVES

While the airfield is comprised of facilities where aircraft movement occurs – runways, taxiways, ramps – other "landside" functions occur outside of this area. The primary functions to be accommodated landside at Laughlin/Bullhead International Airport include commercial airline facilities, air cargo/air freight facilities, general aviation public terminal facilities, aircraft storage hangars, aircraft parking aprons, transient helicopter parking, airport maintenance, airport rescue and firefighting (ARFF) facilities, and automobile parking and access. The interrelationship of these functions is important to defining a long range landside layout for aviation uses at the airport. Runway frontage should be reserved for those uses with a high level of airfield interface, or need of exposure. Other uses with lower levels of aircraft movements or little need for runway exposure can be planned in more isolated locations.

COMMERCIAL AIRLINE AND AIR CARGO FACILITIES

Commercial airline terminal functions at Laughlin/Bullhead International Airport are provided in two separate single-level buildings located in the northeast portion of the airport. The main terminal building provides space for ticketing, airline operations, checked baggage screening and make-up, secure screening, rental cars, airport administration, and Transportation Security Administration (TSA) offices. Bag claim is located outside the terminal along a covered patio area. This building was renovated and expanded in 2007.

Departure functions are contained in a second separate building located southeast of the main terminal building. Access to this building is via a covered secure walkway. This building provides access to the departure gates, hold rooms, and vending/snack bar. All aircraft boarding is ground level through aircraft stairs.

In 2008, the public parking area was being expanded and rehabilitated. Following construction, a total of 476 parking spaces will be available for public parking and rental cars.

As shown on **Exhibit 4C**, the facility requirements analysis revealed a number of needs for the

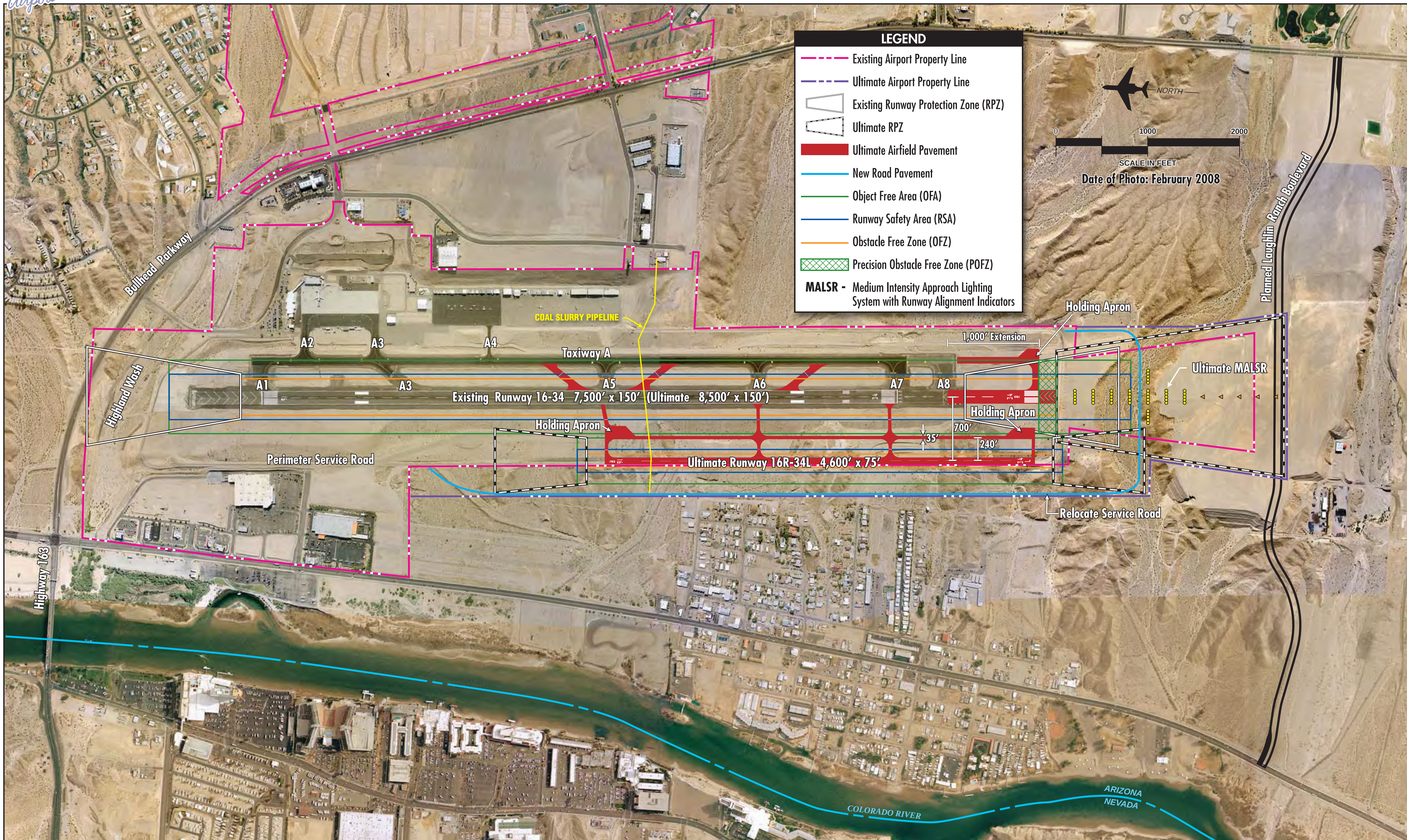
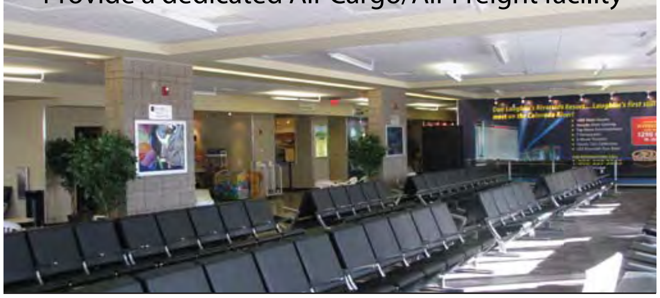


Exhibit 4B
AIRFIELD CONSIDERATIONS

Exhibit 4C
COMMERCIAL AIRLINE AND AIR CARGO PLANNING CONSIDERATIONS

- Second level aircraft boarding
- Larger departure holdrooms
- Seven total departure gates
- Enclosed baggage claim with display devices
- Larger ticketing areas
- Larger passenger screening areas
- Additional retail/food service areas
- Approximately 900 total parking spaces
- Provide a dedicated Air Cargo/Air Freight facility



terminal building to handle existing and increased commercial airline operations and passengers. Second level boarding is needed due to the mix of large transport aircraft that currently serve the airport. Passenger convenience and comfort are diminished through boarding outside on stairs. Disabled passenger loading proves difficult with a requirement to utilize a lift for these passengers.

As commercial activity grows, up to seven departure gates will be needed. Presently, there is space for parking three transport-sized aircraft near the departure building. Some additional area is available within the departure facility for additional hold room seating; however, this facility would need to be expanded to accommodate seven departure gates.

Within the main terminal area, larger ticketing areas and passenger screening areas are needed. Presently, very little space is available for passenger circulation and queuing when two large charter flights depart at the same time. The addition of scheduled passenger flights could increase peak passenger levels and further constrain these areas. An enclosed bag claim area with mechanical display devices will be needed as passenger levels grow to segregate airline bags and ensure the convenience and comfort of the traveling public. Ideally, all terminal functions should be located within a single building.

Two alternatives can be considered for meeting long range commercial airline terminal needs: 1) Expand or construct a new terminal building along the existing terminal apron; and 2) move airline terminal building to a different location.

FAA Advisory Circular 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities*, identifies a number of basic considerations that affect the location of a terminal building. The primary considerations include the following:

1. **Runway configuration**: The terminal should be located to minimize aircraft taxiing distances and times, and the number of runway crossings. The existing terminal site is located east of Runway 16-34 adjacent to parallel Taxiway A. Each runway end can be accessed easily along the parallel taxiway without crossing the runway.

2. **Access to transportation network**: The terminal should be located to provide the most direct/shortest routing to the regional roadway network. The existing terminal is located with direct access to Bullhead Parkway which provides connections to Highway 95 and other regional arterial roadways; although, the northerly exit from the terminal area can be blocked by high water in the Highland Wash.

3. **Expansion potential**: The long range viability of the terminal is dependent upon the ability of the site to accommodate expansion of the terminal beyond forecast requirements. The configuration of the existing terminal site prevents any meaningful expansion. The terminal apron cannot be expanded to the south due to the location of existing general

aviation hangars and the development of the planned air cargo/air freight building. While the apron area can be expanded to the west for aircraft parking only, the building restriction line limits the westerly expansion of the main terminal building to less than 100 feet west of its existing location. Expansion to the north is limited by terrain features, the Highland Wash, and available airport property. Expansion to the east is limited by terrain features and available airport property.

Current MCAA facility planning includes the development of an air cargo/air freight building south of the existing departure facility. Presently, air cargo operators are located on the west side of the terminal apron area inside the perimeter security fencing. Delivery vehicles, as well as the customers of the air cargo/air freight operators, must be escorted through the fence and cross the apron area used by airline aircraft. For security and safety reasons, the air cargo/air freight operations are planned to be moved to the east side of the terminal apron, south of the departure facility. This will eliminate the need for vehicles to access the apron area as public access will be provided from Aston Drive. There is presently no other location on airport property available for the development of the air cargo/air freight facility.

4. **FAA Geometric Design Standards**: The existing terminal site does not impact any FAA design standards.

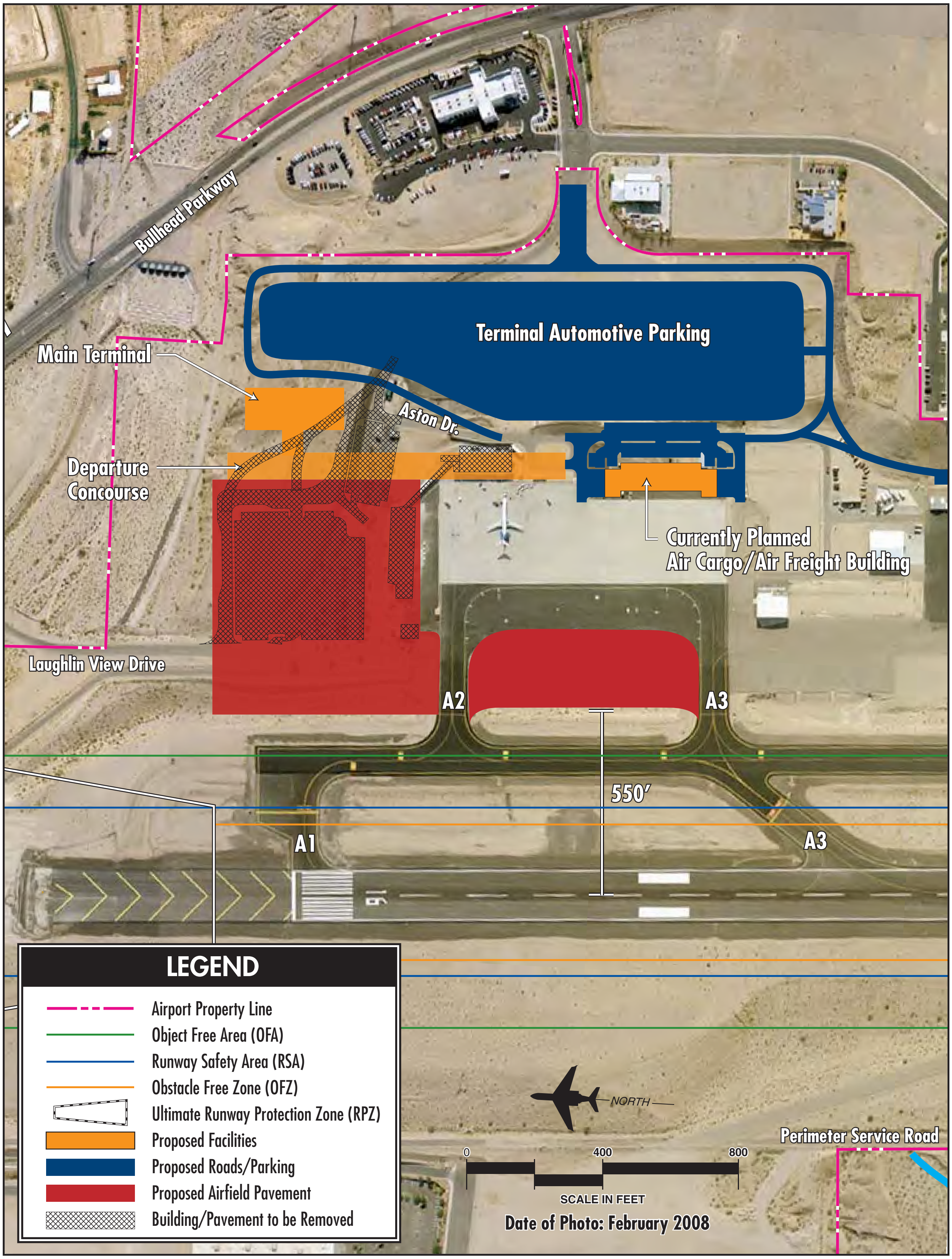
Exhibit 4D depicts an alternative for development of a new commercial terminal area along the existing north apron to meet projected long term needs. This alternative creates a linear departure concourse along the east edge of the apron. The main terminal core, where ticketing and bag claim take place, is placed near the north end of the concourse. This allows for the maximum construction of automobile parking east of the terminal building and Aston Drive. Aston Drive is integrated into the terminal circulation roadway to maintain access to the air cargo/air freight building. Access to the terminal circulation roadway is developed off of Laughlin View Drive. Due to the location of the terminal, Laughlin View Drive would no longer extend across Highland Wash to the north. The apron is expanded to the north and west to accommodate aircraft parking and circulation.

Due to physical constraints, this alternative maintains automobile parking within 300 feet of the terminal building. During high alert periods, the Transportation Security Administration (TSA) has required that unattended vehicles remain outside this radius. Should this rule be implemented with this alternative, much of the public parking area would be closed.

While this concept technically meets projected long term needs in this master plan, this proposed development represents the maximum area that can be developed in the northeastern portion of the airport. Growth beyond those levels projected in this master plan could not be accommodated at the site without affecting planned facilities. The departure concourse could be expanded to the south, but only with the removal of the planned air cargo/air freight building. There is no other area on the existing airport site to accommodate air cargo/air freight. Significant earthwork would also be necessary to accommodate the surface automobile parking lot shown in this alternative. Due to these constraints, alternatives to develop a replacement terminal site at the south end of Runway 16-34 are considered.

Exhibit 4E depicts the development of a new terminal site on the south end of the runway. This area is currently off airport property and would require land acquisition. Approximately 300 acres of land are shown for acquisition. This is land currently managed by the State of Arizona Land Department.

Exhibit 4D
NORTH TERMINAL BUILDING ALTERNATIVE



The entire 300 acres of land would not be needed for long range terminal needs. Portions of this land, particularly along Bullhead Parkway, are reserved for non-airfield access revenue support parcels. This area could be developed similar to the Airport Center which is located on the west side of the airport. FAA approval would be needed prior to developing that portion of the airport for non-aviation commercial/ industrial uses.

A single terminal building with a single departure pier extending to the west is shown on **Exhibit 4E**. The departure pier concept is used at many commercial service terminal buildings. It allows for expansion as new gates are needed. However, it requires that the initial terminal building be located to accommodate projected long term pier configuration. In the case of Laughlin/Bullhead International Airport, this could initially increase development costs as the terrain rises to the east, which would require extensive earthwork as the terminal would be constructed at higher elevations above the runway and parallel taxiway. An advantage of this configuration is that both sides of the concourse are utlized for boarding, which maximizes development costs.

This alternative also reserves an area south of the proposed terminal location for long term air cargo/ air freight functions. The relocation of the passenger terminal functions would allow the existing commercial terminal area to be redeveloped for general aviation uses. Facility planning should include segregating general aviation and commercial airline/air cargo activities.

Exhibit 4F depicts an alternative layout for the commercial terminal functions in the southeast portion of the airport. In contrast with Alternative A, the passenger terminal building is located closer to the Runway 34 end and is preceded by the air cargo/air freight area. The departure concourse is constructed in a north/south orientation. This concept has easy expansion potential on either end. The advantage for Laughlin/Bullhead International Airport is that this terminal design can be constructed closer to the runway which may reduce development costs due to the terrain features in this area. In this alternative, the terminal would be constructed closer to the runway and taxiway elevation. However, only one side of the departure concourse is used for boarding. Similar to Alternative A, area is reserved for terminal support functions such as rental cars. Area not required for airline and air cargo/air freight uses is reserved for non-airfield access revenue support.

Alternative C is depicted on **Exhibit 4G**. This alternative utilizes a similar terminal configuration as Alternative B. However, the terminal is constructed in the northwest section of the new acquisition area. This allows for maximum terminal expansion to the south. The roadway network provides for two connectors to Bullhead Parkway, which surrounds non-airfield access revenue support panels. Air cargo/air freight is reserved at the south end of the existing general aviation apron area.

Following the events of September 11, 2001, the Transportation Security Administration (TSA) implemented rules that limited unattended vehicles within 300 feet of the terminal building. Alternative B places the parking area 300 feet from the terminal. Alternative A and Alternative C maintain the public parking closer to the terminal for passenger convenience. In high alert periods, parking may be limited in Alternatives A and C to comply with TSA requirements.

For all three alternatives, advantages of developing a new terminal in this new area include:

- Continued direct access to Bullhead Parkway.
- Sufficient area to expand beyond long term forecast needs.
- Sufficient area to consolidate terminal support functions such as rental cars.
- Sufficient area to provide automobile parking in a single lot.
- This location is along the existing parallel taxiway serving Runway 16-34.

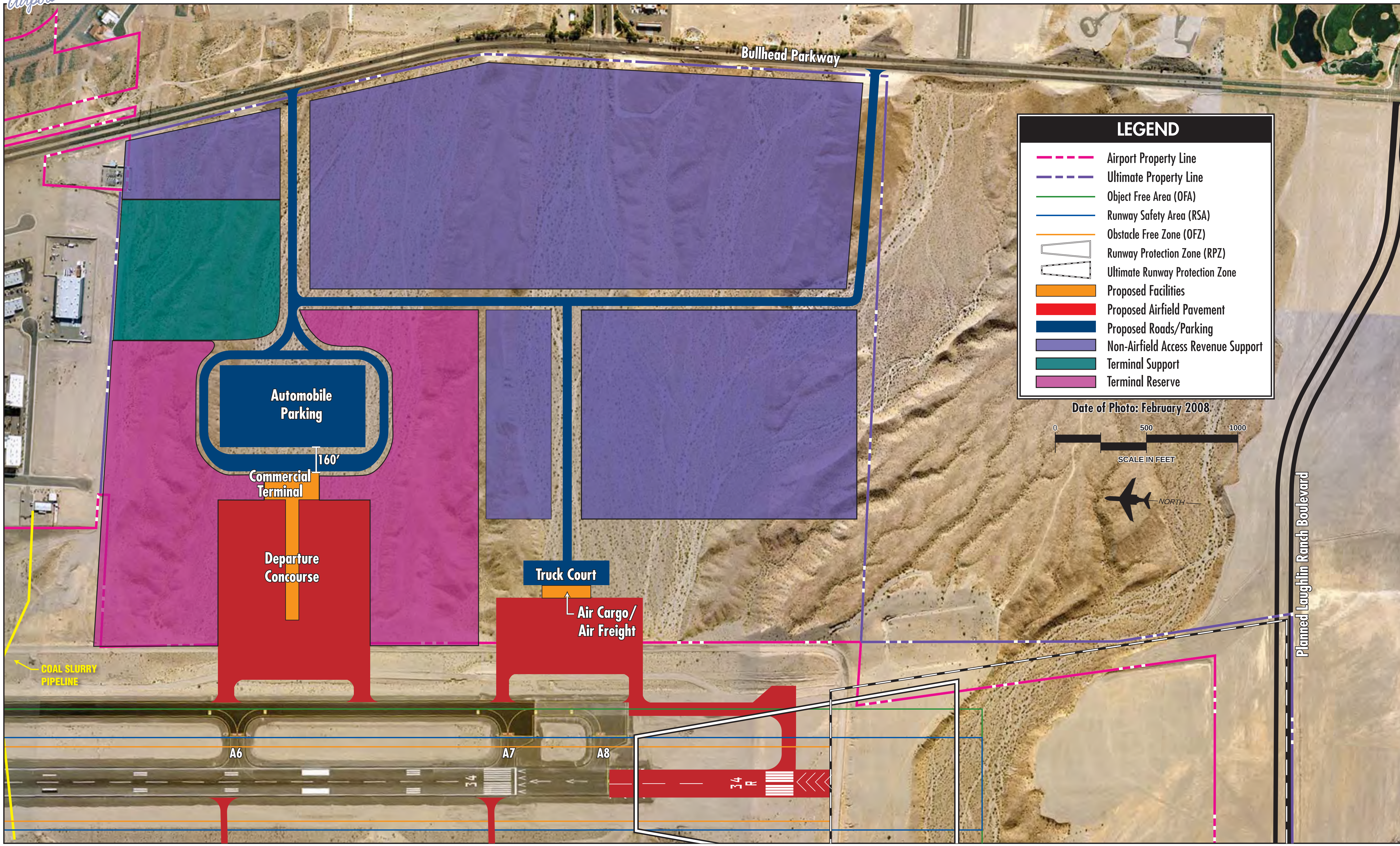
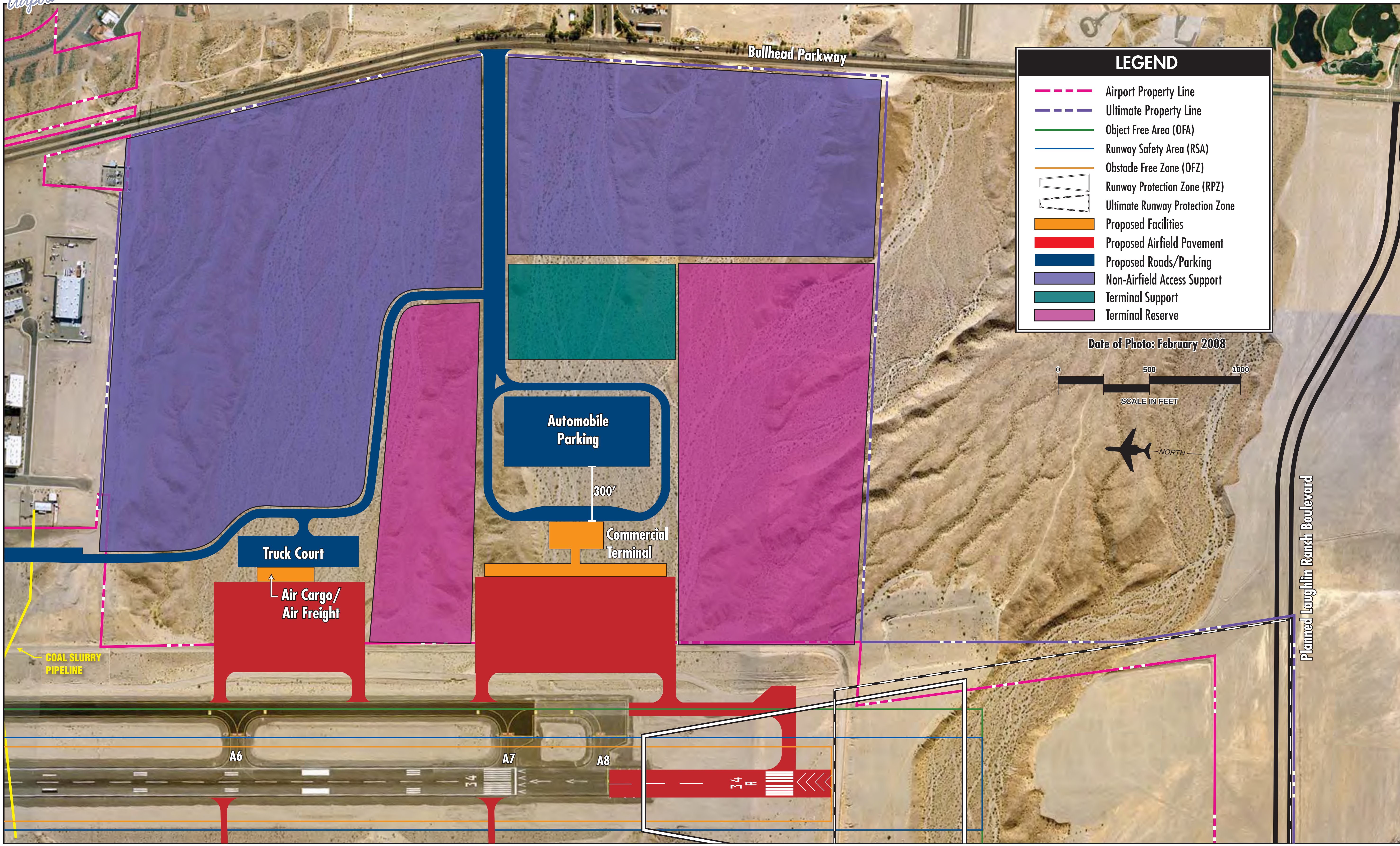


Exhibit 4E
SOUTHEAST LANDSIDE ALTERNATIVE A



SOUTHEAST LANDSIDE ALTERNATIVE B

Exhibit 4G
SOUTHEAST LANDSIDE ALTERNATIVE C

GENERAL AVIATION AND SUPPORT FACILITIES

Exhibit 4H summarizes the general aviation and support facility planning considerations. The following describes these planning considerations in more detail.

Public Terminal Facilities

While a public terminal building is not specifically required for general aviation, a public terminal provides some benefits. It provides a central gathering point for air travelers. A terminal building can provide a pilots' lounge and flight planning area. A terminal building sometimes houses a restaurant which is an attractive quality for an airport. Terminal buildings can provide leaseable space for aviation-related businesses desiring to be located on an airport. A 3,000 square-foot public use general aviation terminal is planned to be constructed and operated privately at Laughlin/Bullhead International Airport. This building is planned to be located along the general aviation apron as shown on **Exhibit 4J**.

Two alternatives can be considered for meeting long range general aviation terminal buildings needs. First, the planned general aviation terminal can remain in its currently planned site. Second, one of the existing commercial airline terminal buildings could be renovated and used for general aviation terminal building functions once commercial airline activity is relocated to the south. Each of these alternatives will be discussed in greater detail in the following sections.

Commercial General Aviation Activities

This essentially relates to providing areas for the development of facilities associated with aviation businesses that require airfield access. This includes businesses involved with (but not limited to) aircraft rental and flight training, aircraft charters, aircraft maintenance, line service, and aircraft fueling. These types of operators are commonly referred to as Fixed-Base Operators (FBOs). High levels of activity characterize businesses such as these, with a need for apron space for the storage and circulation of aircraft. These facilities are best placed along ample apron frontage with good visibility from the runway system for transient aircraft. The facilities commonly associated with businesses such as these include large conventional type hangars that hold several aircraft. Utility services are needed for these types of facilities, as well as automobile parking areas.

Planning for commercial general aviation activities is important for this Master Plan. The mix of aircraft using Laughlin/Bullhead International Airport has changed recently to include some business class aircraft which have larger wingspans than the mix of aircraft using the airport in the past. These larger

Exhibit 4H
GENERAL AVIATION & SUPPORT AREA PLANNING CONSIDERATIONS

- Provide areas for additional enclosed aircraft storage hangars
- Provide for an aircraft wash rack
- Provide two helicopter hardstands
- Larger general aviation terminal building
- Segregated vehicle access to existing general aviation hangars
- Approximately 175 parking spaces for general aviation users
- A new airport rescue and firefighting (ARFF) building
- A larger airport maintenance building
- Relocated/upgraded electrical vault

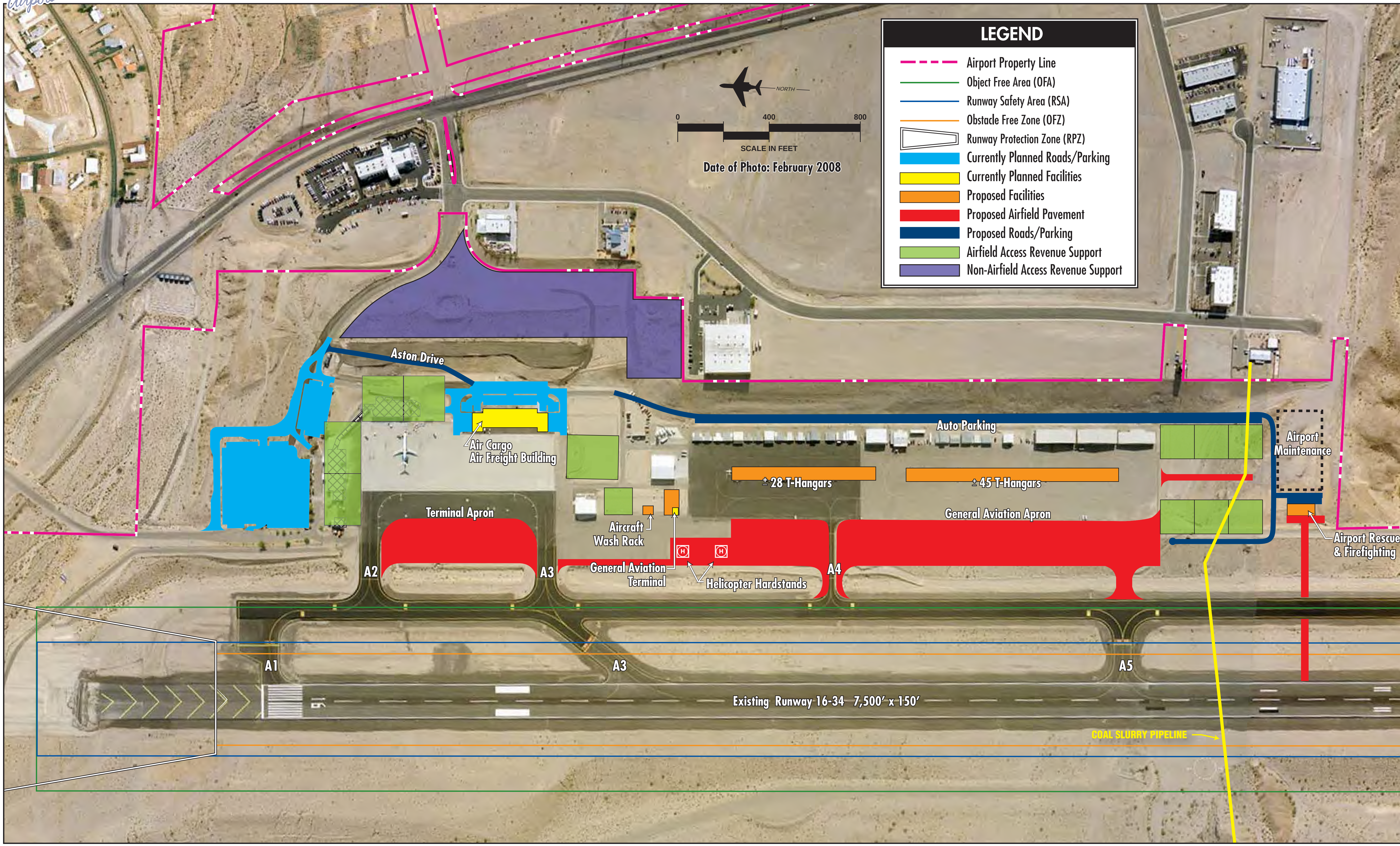


Exhibit 4J
NORTHEAST LANDSIDE ALTERNATIVE A

aircraft which have wingspans approaching 100 feet require greater separation distance between facilities, larger apron areas for parking and circulation, and larger hangar facilities.

Corporate Hangar Areas

This includes areas for large hangar development. Typically, these types of hangars are used by corporations with company-owned aircraft. Since large business jets utilize these areas, the minimum parcel size must be at least one acre, and up to two-acre parcels are commonly requested. Corporate hangar areas require all utilities and segregated roadway access.

Small Aircraft Storage Hangars

The facility requirements analysis indicated a need for the development of small general aviation aircraft storage hangars. This primarily involves additional T-hangars but may also include some clearspan hangars for accommodating several aircraft simultaneously. Since storage hangars often have lower levels of activity, these types of facilities should be located away from the primary apron areas which should be reserved for commercial general aviation activity and can be located in more remote locations of the airport. Since most of the aircraft owners want to access their aircraft directly and park their vehicle in their hangars when they are gone, these facilities do not have a requirement for large parking areas. Limited utility services are needed for these areas. Typically, this involves water, sanitary sewer, and electricity.

Transient Helicopters

A helicopter parking area should be considered. There is currently no designated helipad, and helicopters must use apron areas typically designed for use by fixed-wing aircraft. Fixed-wing aircraft and rotary aircraft should be segregated to the extent practical.

Public Access and Automobile Parking

Public vehicle access and parking at the airport is a primary concern in the planning process. The lack of available automobile parking is a concern for the existing general aviation area. Access to the hangars is only available by crossing the apron area through the perimeter security fencing. Segregating vehicle access and increasing automobile parking areas will be a goal of the planning process.

Airport Rescue And Firefighting

The airport rescue and firefighting (ARFF) vehicle is stored in a building west of the main airline terminal building. This building also serves as the airport maintenance building. Consideration is given in this Master Plan to relocating the ARFF building. MCAA capital planning includes the addition of a second ARFF vehicle which will require additional storage area not available in the existing building. Federal regulations require minimum response times for ARFF vehicles. Therefore, the ARFF building should be located with direct access to the runway with a minimum of turns.

Airport Maintenance

Airport maintenance includes building space for storage maintenance equipment and supplies as well as an outside equipment yard. For this Master Plan, relocation of the airport lighting vault is also considered. The existing lighting vault is located between the main terminal building and airport maintenance/ARFF building. The transformers need to be upgraded and additional space provided in the electrical vault.

Aircraft Wash Rack

An aircraft wash rack is considered in this Master Plan. The aircraft wash rack allows for the collections of cleaning fluids and debris during the cleaning process.

Alternative A

Alternative A is shown on **Exhibit 4J**. In this alternative, small aircraft T-hangars are constructed on the apron west of the existing row of storage hangars. Essentially, these hangars are constructed over existing tiedowns. This has the advantage of maintaining existing taxilane corridors which extend in a north/south manner.

This alternative depicts the maximum expansion potential of all apron areas to the west should this area be needed to accommodate long term needs and replace tiedown areas lost to T-hangar development. FAA design standards specify the apron can extend within 500 feet of the Runway 16-34 centerline at Laughlin/Bullhead International Airport. A significant amount of fill material must be moved to expand the general aviation apron area to the west. A taxilane connecting to Taxiway A at Taxiway A4 is shown in this alternative.

The general aviation terminal building is expanded in its currently planned location to meet long range needs. An aircraft wash rack is constructed north of the terminal building. Helicopter parking is located along the west edge of the parking apron near the planned general aviation terminal building to conveniently serve transient helicopters.

In this alternative, once airline and air cargo/air freight operations are relocated south, the existing passenger terminal buildings are removed and redeveloped for airfield-access revenue support parcels. This could include aircraft storage hangars for corporate aircraft storage or for commercial general aviation (FBO) activities.

Aviation access parcels are also proposed for the south end of the general aviation apron. These six parcels would be served by a single taxiway extending south from the apron. Segregated roadway access and automobile parking for the general aviation area extends along the eastern side of the existing general aviation hangars. This roadway extends to the ARFF building and airport maintenance area where the electrical vault is relocated. Placing the electrical vault in this location moves it closer to the airport traffic control tower (ATCT) and could facilitate providing the ATCT with airfield lighting system controls. This ARFF facility is located with direct access to the runway via a service road. A large amount of fill will need to be relocated to construct the taxiway and provide space for these parcels and the ARFF and airport maintenance.

Alternative B

Alternative B is shown on **Exhibit 4K**. This alternative places small aircraft T-hangars along the existing general aviation apron in an east/west configuration. The apron area is expanded to the west to allow for circulation taxilanes for the T-hangars. While allowing for a sufficient number of T-hangars to meet long term needs, the configuration of hangars in this manner disrupts the existing circulation patterns on this apron. Taxilanes on the apron extend in a north/south manner.

In this alternative, the general aviation apron is expanded to the south to provide areas for large conventional hangars. These hangars could be utilized for commercial general aviation (FBO) activities and/or corporate aircraft storage.

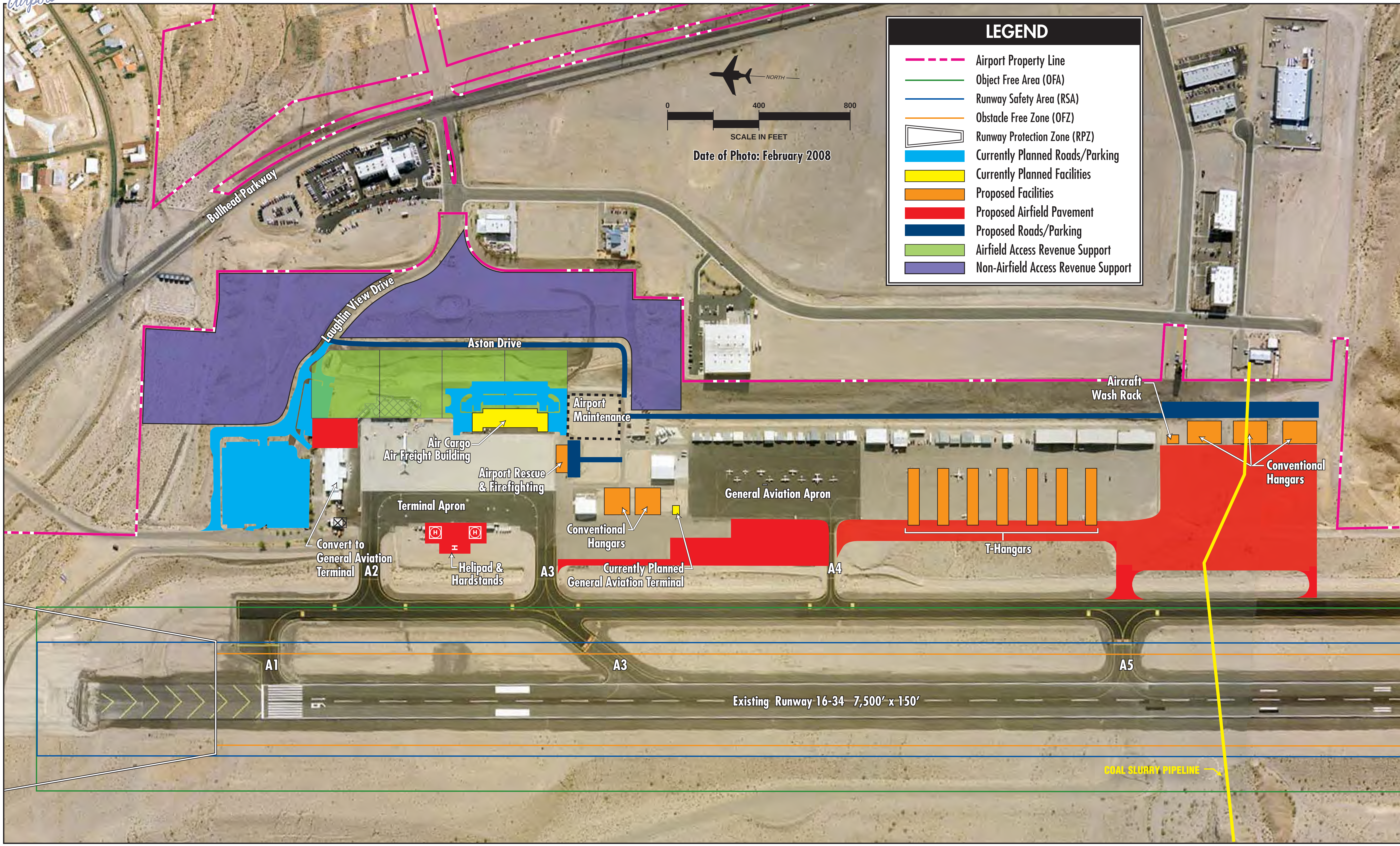


Exhibit 4K
NORTHEAST LANDSIDE ALTERNATIVE B

Conventional hangars are also located north of the planned general aviation terminal building.

The aircraft wash rack is located south of the existing apron area. This location allows for construction of the wash rack prior to the full expansion of the apron to the south.

The existing main commercial airline terminal building is converted to a general aviation terminal in this alternative once commercial airline activities are relocated south. This allows the continued use of the existing public parking facilities for general aviation terminal activities. The departure facility and air cargo/air freight building are removed and replaced with aviation access revenue support facilities. These areas could be utilized for commercial general aviation (FBO) activities and/or corporate aircraft storage. Aston Drive is relocated east to allow for large airfield access parcels.

Airport maintenance and ARFF facilities are constructed west of Aston Drive along the south side of the terminal apron. While the ARFF facility would have direct access to the runway via Taxiway A3, the ARFF facility is oriented to the north and would require a series of turns to access the runway. Furthermore, the area north of the ARFF facility could be obstructed by aircraft accessing the facilities on the east side of the apron.

In this alternative, a formal helipad is provided adjacent to the helicopter parking hardstands. The helipad would allow for the takeoff and landing of aircraft. Helicopter hardstands must be accessed via hover taxi operations only. While this location is near the ultimate terminal building location, in the short term prior to the relocation of commercial airline activities to the south, this helipad would be located a distance from the ultimate general aviation terminal building.

Similar to Alternative A, segregated roadway access and automobile parking for the general aviation area extends along the eastern side of the existing general aviation hangars.

Alternative C

Alternative C is depicted on **Exhibit 4L**. For this alternative, the apron is extended to the south to support both conventional hangar development and T-hangar development. This area is served by segregated roadway access extending along the eastern edge of the apron area. T-hangars are also placed on the general aviation apron. In contrast with Alternative A, two rows of hangars are shown replacing existing tiedown locations.

The ARFF facility is located along the apron area between the currently planned general aviation terminal and an existing conventional hangar. This location allows the ARFF station to face the runway for more direct access. Airport maintenance and the electrical vault are located east of Aston Drive.

The aircraft wash rack is located on the south end of the terminal apron. While this parcel is readily available for development and close to existing utility infrastructure, this mixes general aviation uses with commercial airline and air cargo/air freight activities in the short term prior to relocating these activities to the south.

Once commercial airline and air cargo/air freight activities are relocated to the south, the existing departure facility is converted to the general aviation terminal area. This building is not currently served by a dedicated parking area. Thus, this alternative proposes to construct a public parking lot east of Aston Drive for that purpose. The main terminal building is removed to allow for airfield access revenue support parcels.

Helicopter parking is shown along the western edge of the general aviation area. While conveniently located for access to the currently planned general aviation terminal, this location is distant from the location identified for the ultimate general aviation terminal building in this alternative.

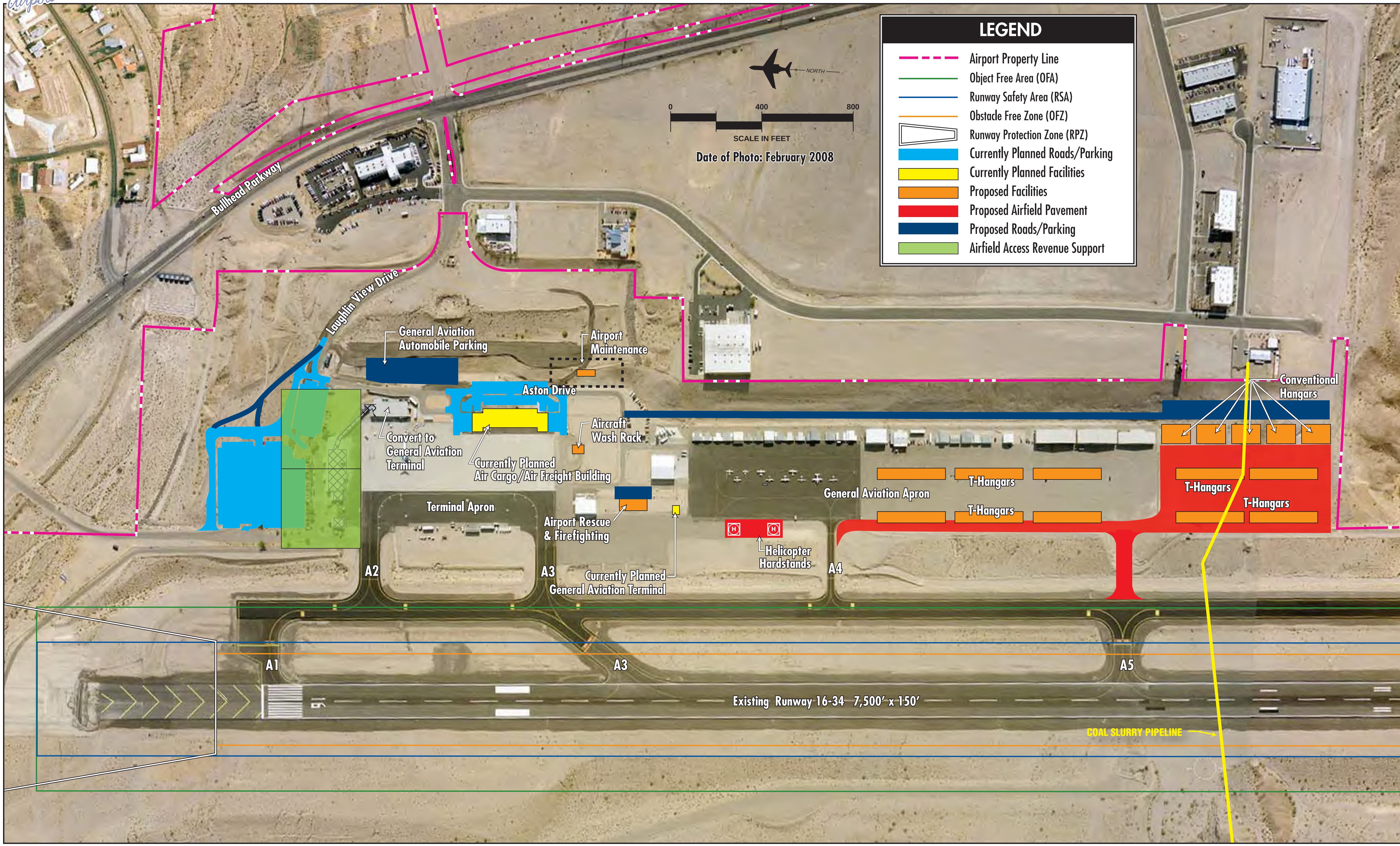


Exhibit 4L
NORTHEAST LANDSIDE ALTERNATIVE C

SUMMARY

The process utilized in assessing airside and landside development alternatives involved a detailed analysis of short and long term requirements, as well as future growth potential. Current airport design standards were considered at each stage of development.

These alternatives present an ultimate configuration of the airport that would need to be able to be developed over a long period of time. The next phase of the Master Plan will define a reasonable phasing program to implement a preferred Master Plan development concept over time.

Upon review of this chapter by the MCAA, the public, and the PAC, a final Master Plan concept can be formed. The resultant plan will represent an airside facility that fulfills safety and design standards, and a landside complex that can be developed as demand dictates.

The preferred Master Plan development concept for the airport must represent a means by which the airport can grow in a balanced manner, both on the airside as well as the landside, to accommodate forecast demand. In addition, it must provide for flexibility in the plan to meet activity growth beyond the 20-year planning period.

The remaining chapters will be dedicated to refining these basic alternatives into a final development concept with recommendations to ensure proper implementation and timing for a demand-based program.

Chapter Five: Recommended Master Plan Concept and Capital Program

Chapter Five

RECOMMENDED MASTER PLAN CONCEPT AND CAPITAL PROGRAM

The planning process for the Laughlin/Bullhead International Airport Master Plan has included several analytic efforts in the previous chapters intended to project potential aviation demand, establish airside and landside facility needs, and evaluate options for improving the airport to meet those airside and landside facility needs. The process, thus far, has included the presentation of two draft phase reports (representing the first four chapters of the Master Plan) to the Planning Advisory Committee (PAC) and the Mohave County Airport Authority (MCAA). A plan for the use of Laughlin/Bullhead International Airport has evolved considering their input. The purpose of this chapter is to describe, in narrative and graphic form, the plan for the future use of Laughlin/Bullhead International Airport.

DEMAND-BASED PLAN

The Master Plan for Laughlin/Bullhead International Airport has been developed according to a demand-based schedule. Demand-based planning establishes planning guidelines for the airport based upon airport activity levels, instead of points in time. By doing so, the levels of activity derived from the demand forecasts can be related to the actual capital investments needed to safely and efficiently accommodate the level of demand being experienced at the airport. More specifically, the intention of this Master Plan is that the facility improvements needed to serve new levels of demand should only be implemented when the levels of demand experienced at the airport justify their implementation.

For example, the aviation demand forecasts indicate airline enplanements at Laughlin/Bullhead International Airport can be expected to grow over the long term. This forecast is supported by the airport service area's expectation for a growing population and economy, as well as historical trends that indicate higher enplanement levels can be supported by the airport service area.

Future enplanement levels, however, will be dependent upon the actual growth in population and the economy, air service levels, as well as the trends in the industry. Factors affecting future enplanement levels could include the number of airlines serving the airport, destinations served, schedule, and ticket prices. Individually or collectively, these factors can slow or accelerate based aircraft levels differently. Since changes in these factors can affect the accuracy of time-based forecasts over time, it can be difficult to predict the exact time a given improvement may become justified for the later portions of the planning period.

For these reasons, the Laughlin/Bullhead International Airport Master Plan has been developed as a demand-based plan. The Master Plan projects 145,000 enplaned passengers by the short term planning horizon. As such, the five-year capital improvement program (CIP) should be considering those needs necessary to accommodate a milestone of 145,000 enplaned passengers. When the airport reaches 145,000 enplaned passengers, the Master Plan suggests planning begin to consider the next horizon level of 200,000 enplaned passengers. While the aviation demand forecasts suggest this level could be reached in another five years, a varying economy or changes in the airport service area could speed up or slow down when this horizon is reached.

Should the 145,000 enplaned passengers level take longer to achieve than projected in the aviation demand forecasts, any related improvements to accommodate the next horizon of 200,000 enplaned passengers would be delayed. Should this level be reached sooner, the schedule to implement the improvements could be accelerated. This provides a level of flexibility in the master plan and can extend the time between master plan updates.

A demand-based master plan does not specifically require the implementation of any of the demand-based improvements. Instead, it is envisioned that implementation of any master plan improvement would be examined against demand levels prior to implementation. In many ways, this master plan is similar to a community's general plan. The master plan establishes a plan for the use of airport facilities consistent with the potential aviation needs and capital needs required to support that use. However, individual projects in the plan are not implemented until the need is demonstrated and the project is approved for funding. **Table 5A** summarizes the planning milestones used in this Master Plan.

RECOMMENDED MASTER PLAN CONCEPT

The Master Plan Concept represents the development direction for the Laughlin/Bullhead International Airport through the planning period of this Master Plan. The Master Plan Concept is the consolidation and refinement of the airfield and landside alternatives presented in Chapter Four into a single development concept collectively representing input received from the PAC and the MCAA.

AIRSIDE PLAN

The airside plan is shown on **Exhibit 5A**. Elements of the Airside Plan are more fully explained below. This exhibit depicts the new taxiway designations implemented in 2008.

Runway Extension

The Airside Plan includes an extension of Runway 16-34 and Taxiway A 1,000 feet south to provide a total runway length of 8,500 feet. As detailed in Chapter Three, this additional length is needed by existing airlines serving Laughlin/Bullhead

Table 5A
PLANNING HORIZON ACTIVITY LEVELS

	BASE YEAR	PLANNING HORIZONS		
	2007	Short Term	Intermediate Term	Long Term
Airline Activity				
Enplaned Passengers	113,796	145,000	200,000	375,000
Annual Operations	*1,944*	*5,200*	*7,200*	*12,600*
Cargo Activity				
Enplaned Cargo (pounds)	1,278,400	1,530,000	1,840,000	2,640,000
Annual Operations	*1,052*	*1,200*	*1,400*	*2,000*
General Aviation Activity				
Based Aircraft	49	80	110	170
Air Taxi Operations	*2,139*	*2,500*	*2,700*	*3,100*
Annual Operations				
Local	5,638	8,200	12,000	24,600
Itinerant	16,597	22,300	30,500	53,300
Total General Aviation Operations	*22,235*	*30,500*	*42,500*	*77,900*
Military Activity				
Local	109	100	100	100
Itinerant	216	200	200	200
Total Military Operations	*325*	*300*	*300*	*300*
Total Airport Operations	***27,695***	***39,700***	***54,100***	***95,900***
Annual Instrument Approaches	***NA***	***188***	***252***	***427***

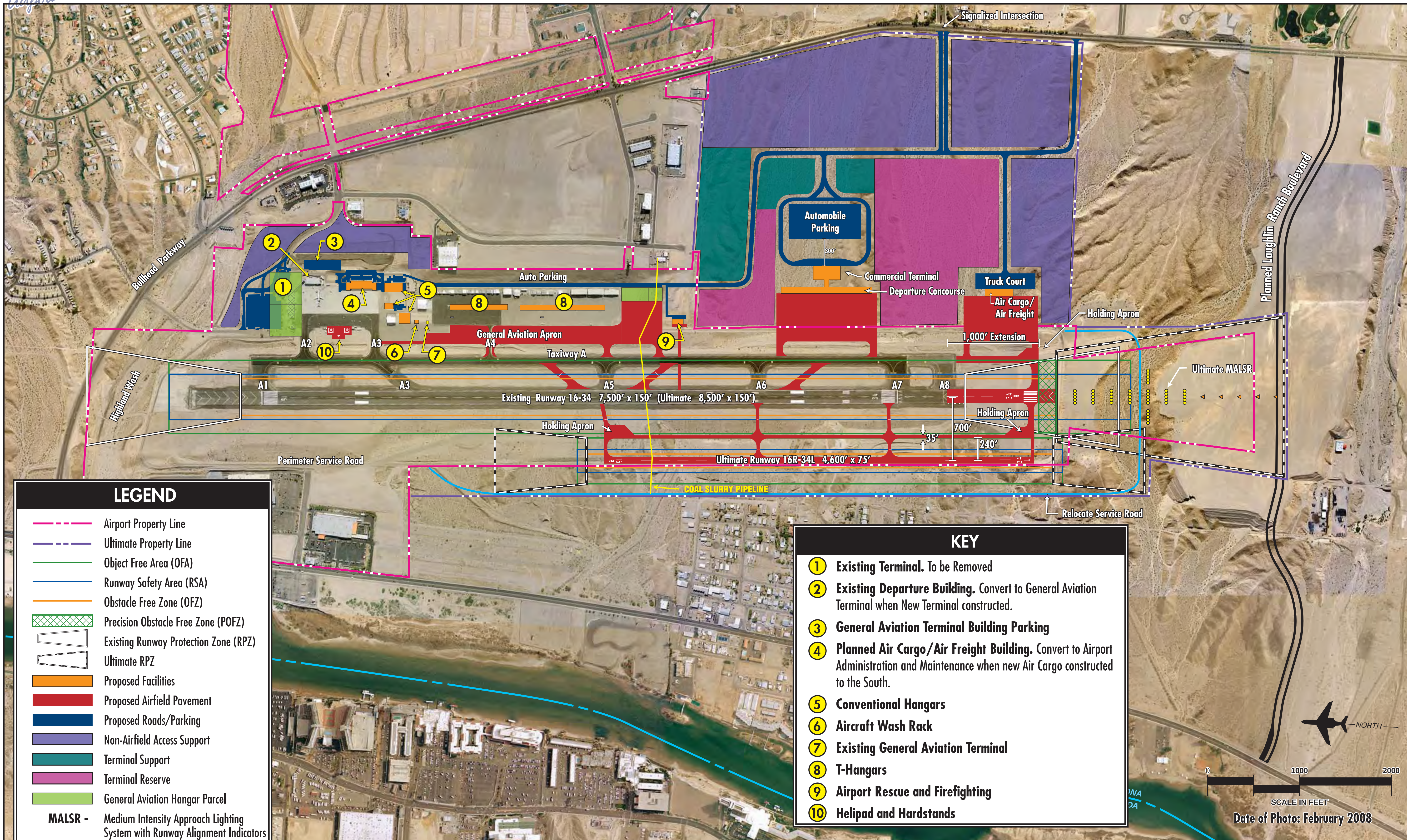


Exhibit 5A
RECOMMENDED MASTER PLAN CONCEPT

International Airport to eliminate existing payload restrictions when operating at the airport and to increase range.

A 1,000-foot extension of Runway 16-34 to the south is currently under environmental review. As required by FAA regulations, an Environmental Assessment (EA) is presently being conducted to determine compliance with the *National Environmental Policy Act* (NEPA). The RSA beyond the extended Runway 34 end will cross an unnamed wash south of the airport. A permit from the United States Army Corps of Engineers (USACE), in accordance with Section 404 of the *Clean Water Act*, is being developed for the fill that will be placed in this unnamed wash and the culvert which will maintain storm flow through the wash.

Once extended 1,000 feet south, any further extension of Runway 16-34 is unlikely, given current and planned land uses adjacent to the airport. Primarily, an extension of Runway 16-34 any farther south is limited by the location of the planned Laughlin Ranch Boulevard. (The alignment of Laughlin Ranch Boulevard has been partially graded, but construction was not complete at the end of 2008 when this report was prepared.) The terrain also increases to the south.

The extension of Runway 16-34 south requires a relocation of the perimeter service road as shown on the Airside Plan. The perimeter service road needs to be maintained outside the limits of the Object Free Area (OFA) in accordance with FAA design standards. The acquisition of approximately 13 acres of land is needed to accommodate the relocated perimeter service road and keep the road outside the OFA as required by FAA standards. This relocated service road will impact jurisdictional Waters of the United States as it will cross the unnamed wash south of the airport. Coordination with the United States Army Corps of Engineers (USACE) will be necessary prior to construction.

Exit Taxiways

Airfield capacity and efficiency is enhanced with a sufficient number of properly spaced exit taxiways. The Facility Requirements analysis indicated the need for three additional exit taxiways. The Airfield Plan includes two additional taxiways. Each taxiway is designed as a high speed exit. This design allows the aircraft to exit the runway at a higher speed when compared with a perpendicular (right angle) exit. This reduces runway occupancy time.

Parallel Runway

A parallel runway for small general aviation aircraft maximizes airfield capacity as large and small aircraft are segregated and simultaneous operations can occur at the airport. While the airfield capacity analysis in Chapter Three indicated that a parallel runway may not be needed during the planning period of this Master Plan, a parallel runway will continue to be planned at Laughlin/Bullhead International Airport. This reserves the property south and west of the airport for this ultimate use and also allows the City of Bullhead City to continue to properly plan appropriate land uses adjacent to the airport that are compatible with this ultimate use.

The parallel runway is planned at 4,700 feet long and 75 feet wide and is located 700 feet west of the Runway 16-34 centerline per FAA design standards. This parallel runway would be served by a parallel taxiway located 240 feet east of the parallel runway. The parallel runway will require the acquisition of approximately 70 acres of land on the west and south sides of the airport. This land acquisition is needed to support the actual construction of the runway and protect the RSA, object free area (OFA), and runway protection zone (RPZ) beyond each runway end. Precision approach path indicators (PAPIs) and runway end identifier lights (REILs) are planned for each runway end.

Precision Instrument Approach

As detailed in Chapter Three, Facility Requirements, future facility planning should include lowering approach minimums to the extent practicable. Ultimately, it would be preferable to provide landings to Category I minimums – one-half mile visibility and 200-foot cloud ceilings at Laughlin/Bullhead International Airport. Due to terrain features to the north, a precision approach is most likely only feasible from the south to Runway 34.

A precision instrument approach to Runway 34 could either be developed utilizing the satellite-based Global Positioning System (GPS) or through the installation of the ground-based instrument landing system (ILS) at the airport. In either case, a precision instrument approach utilizing GPS or ILS requires consideration of FAA design standards and the addition of new approach lighting.

The Airfield Plan includes the addition of a medium intensity approach lighting system with runway alignment indicator lights (MALSR). The MALSR is required to lower visibility minimums below three-fourths of a mile. High intensity runway lighting (HIRL) is also planned to replace the existing medium intensity runway lighting (MIRL) as required by FAA

FAA design standards specify that a precision instrument approach has a larger RPZ than currently required for Runway 34. **Exhibit 5A** depicts this larger RPZ beyond Runway 34 and the acquisition of approximately 56 acres of land to protect the RPZ from incompatible development. Portions of this larger RPZ would extend over the current alignment of Laughlin Ranch Boulevard. The current position of the FAA Western-Pacific Region Los Angeles Airports District Office (ADO) is that public roadways should not extend through an RPZ. Therefore, consideration should be given to possibly realigning Laughlin Ranch Boulevard outside the limits of this ultimate RPZ when it is permanently constructed.

The FAA also requires that the precision obstacle free zone (POFZ) remain clear during precision instrument approach operations when the reported cloud ceiling is less than 250 feet and/or visibility is less than three-fourths of a statute mile and an aircraft is on approach within two miles of the runway threshold. The POFZ would be located beyond Runway 34 and is 200 feet long and 800 feet wide centered on the runway centerline. To ensure no aircraft are located within the POFZ, the hold apron at the Runway 34 end would need to be located east of Taxiway A as shown on **Exhibit 5A**.

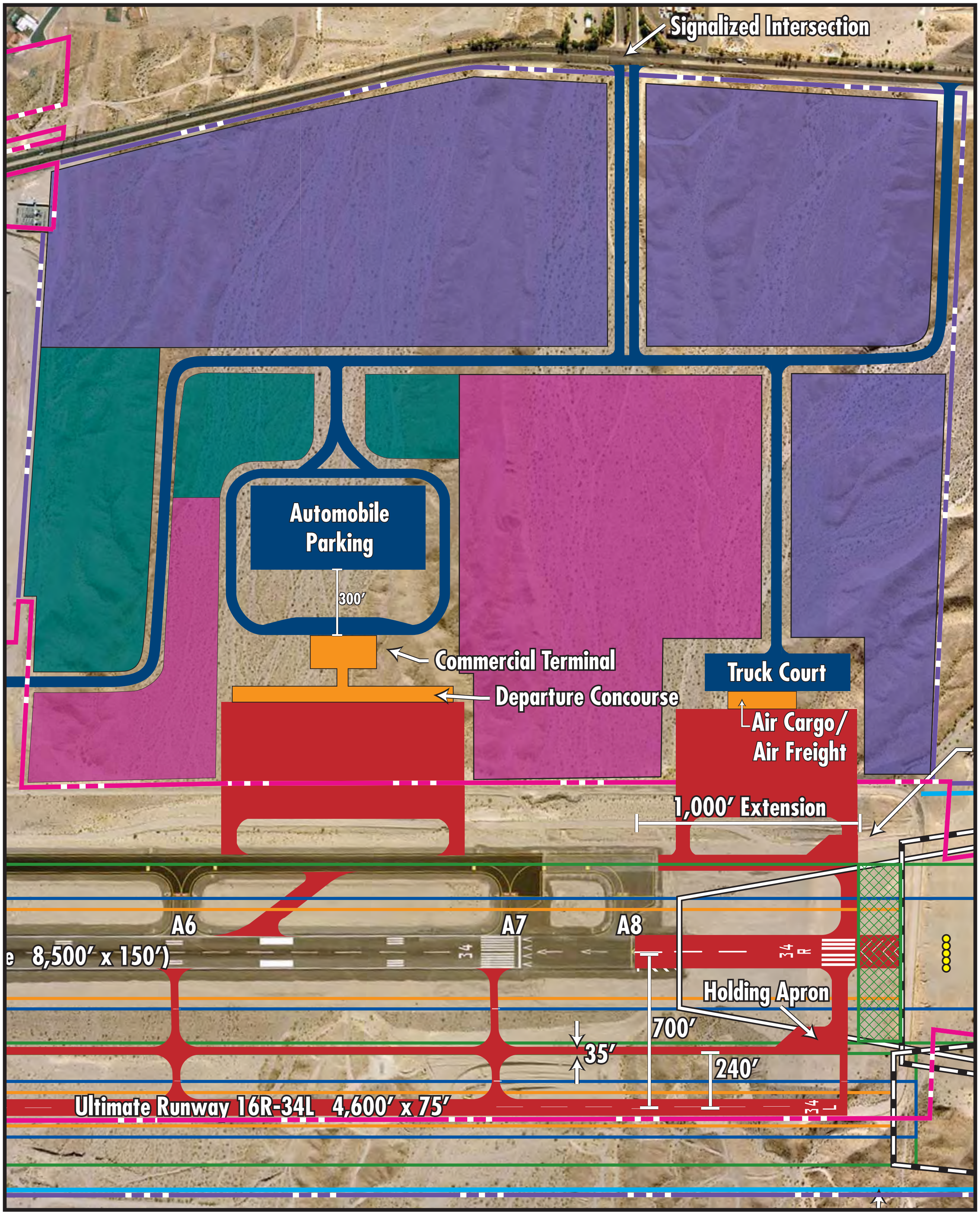
LANDSIDE PLAN

The planned landside development is shown on **Exhibit 5B**. The Landside Plan includes provisions for a new commercial service terminal area to serve projected long term airline needs, a long term segregated air cargo area, redevelopment of the existing airline terminal area for general aviation uses, expanded support/safety facilities, and new areas for commercial/industrial uses to support increased revenue for the airport.

Land Acquisition

The Landside Plan includes the acquisition of approximately 300 acres of land southeast of the airport between existing airport property and Bullhead Parkway as shown on **Exhibit 5B**. This land, currently owned by the Arizona State Land Department (ASLD), will accommodate future commercial airline and air cargo needs. Portions of the property along Bullhead Parkway are slated for industrial/ commercial opportunities which can enhance the revenue potential to the MCAA. The area along Bullhead Parkway would be developed in a similar manner to the Airport Center located in the northwest quadrant of the airport.

Exhibit 5B
RECOMMENDED SOUTHEAST LANDSIDE PLAN



Commercial Terminal Area

A new commercial service terminal area is planned to replace the existing terminal building. This new area is planned in the southeast quadrant of the airport on land proposed to be acquired from the ASLD. As shown in Chapter Four, the existing terminal area is tightly constrained and has limited ability to accommodate projected growth in airline activity at the airport through the planning period and beyond. Developing in the southeast quadrant of the airport allows sufficient area to expand beyond the planning period of this Master Plan while maintaining the terminal area along Taxiway A for direct airfield access. Once commercial service activities are relocated to the south, the existing terminal area will be converted to general aviation uses. This redevelopment is more fully described below.

The commercial terminal area plan considers providing all terminal functions within a single building. A single linear departure concourse pier with seven second-level boarding gates extending to the north and south is planned. This departure pier concept is used at many commercial service terminal buildings as it allows for expansion as new gates are needed along the north and south sides of the pier. The advantage for Laughlin/Bullhead International Airport is that this terminal design can be constructed closer to the runway which can reduce development costs due to the rising terrain features to the east in this area.

The public parking area is located 300 feet from the terminal building. During periods of high alert in the past, the Transportation Security Administration (TSA) has limited unattended vehicles within 300 feet of the terminal building. Locating the parking area at this distance ensures that, should this rule be enforced once again, portions of the public parking area are not lost or require expensive inspection/surveillance.

Access to the new terminal area will be via Bullhead Parkway. Primary access is planned at the signalized intersection of Bullhead Parkway and Desert Foothills Parkway. Circulation roads would extend to the north and south, which would provide access from the existing airport facilities located to the north.

Construction of the terminal area would require that all primary utilities be extended as this area is without primary utility service. Construction in this area would also impact existing washes which are under the jurisdiction of the USACE and would require permitting under Section 404 of the *Clean Water Act*.

Air Cargo

Current MCAA facility planning includes the development of an air cargo/air freight building south of the existing departure facility. Since air cargo operators are located on the west side of the terminal apron area inside the perimeter security fencing, delivery vehicles as well as the customers of the air cargo/air freight operators, must be escorted through the fence and across the apron area used by airline aircraft. Constructing this facility increases security and safety reasons by moving the air cargo/air freight operations to the east side of the terminal apron where public vehicle access is available via Aston Drive. There is presently no other location on airport property available for the development of the air cargo/air freight facility.

Long term planning includes accommodating air cargo facilities in the southeast quadrant of the airport. As shown on **Exhibit 5B**, a dedicated air cargo apron is planned along with a building for sorting. This area offers a sterile security environment for air cargo activities that is segregated from other uses, such as general aviation, which have different security requirements.

General Aviation

The Landside Plan focuses general aviation facility development south of the terminal apron area until such time as commercial airline activities are relocated to the southeast quadrant of the airport. A 3,000 square-foot public use general aviation terminal is planned to be constructed in 2008/2009 and operated privately at Laughlin/Bullhead International Airport. This building is planned on the south general aviation apron area as shown on **Exhibit 5C**. An aircraft wash rack is planned north of this terminal building. The aircraft wash rack would allow for the collection of cleaning fluids and debris from the washing of aircraft in a manner that is in compliance with storm water discharge permitting for the airport.

Larger conventional hangars are planned north of the aircraft wash rack and to the east along the southern edge of the northern terminal apron area. These larger conventional hangars could be utilized for aircraft storage or by businesses involved with (but not limited to) aircraft rental and flight training, aircraft charters, aircraft maintenance, line service, and aircraft fueling. These types of operators are commonly referred to as Fixed-Base Operators (FBOs).

Small aircraft T-hangars are planned along the south apron west of the existing row of storage hangars. Essentially, these hangars are constructed over existing tiedowns. This has the advantage of maintaining existing taxilane corridors. Approximately 73 T-hangars can be constructed as shown on **Exhibit 5C**.

The south apron area is expanded to the south and west to replace tiedown areas lost to T-hangar development. FAA design standards specify the apron can extend within 500 feet of the Runway 16-34 centerline at Laughlin/Bullhead International Airport. The southerly extension is planned to accommodate additional general aviation hangar development. Segregated roadway access and automobile parking for the general aviation area extends along the eastern side of the existing general aviation hangars.

Once airline and air cargo/air freight operations are relocated south, the existing passenger terminal area is planned for alternate uses. The existing departure facility is planned to be converted to the long term general aviation terminal building. Since this building is not currently served by a dedicated parking area, a public parking lot is planned east of Aston Drive. The main terminal building is planned to be removed to allow for airfield access revenue support parcels. These parcels could be utilized for constructing aircraft storage or to provide commercial general aviation (FBO) service. The air cargo/air freight building is planned to be converted to airport maintenance and administration once air cargo activities are relocated to the south.

A formal helipad and two helicopter parking pads are planned on the west end of the main terminal area. The helipad would allow for the takeoff and landing of helicopters, while the helicopter parking pads must be accessed via hover taxi operations only.

Support Facilities

A new airport rescue and firefighting (ARFF) facility is planned at the south end of existing airport property along Taxiway A. This location provides direct access to the runway via a service road as shown on **Exhibit 5C**. Public vehicular access is from the roadway extended on the east side of the general aviation area. This will replace the existing ARFF facility located west of the terminal building.

The airfield electrical vault is planned to be relocated to the area east of the new ARFF facility. Placing the electrical vault in this location moves it closer to the airport traffic control tower (ATCT) and could facilitate providing the ATCT with airfield lighting system controls.

The aviation fuel farm is planned to remain in its existing location. This location provides public access via Aston Drive while being conveniently located near the aircraft operations area for access by the on-airport fuel trucks.

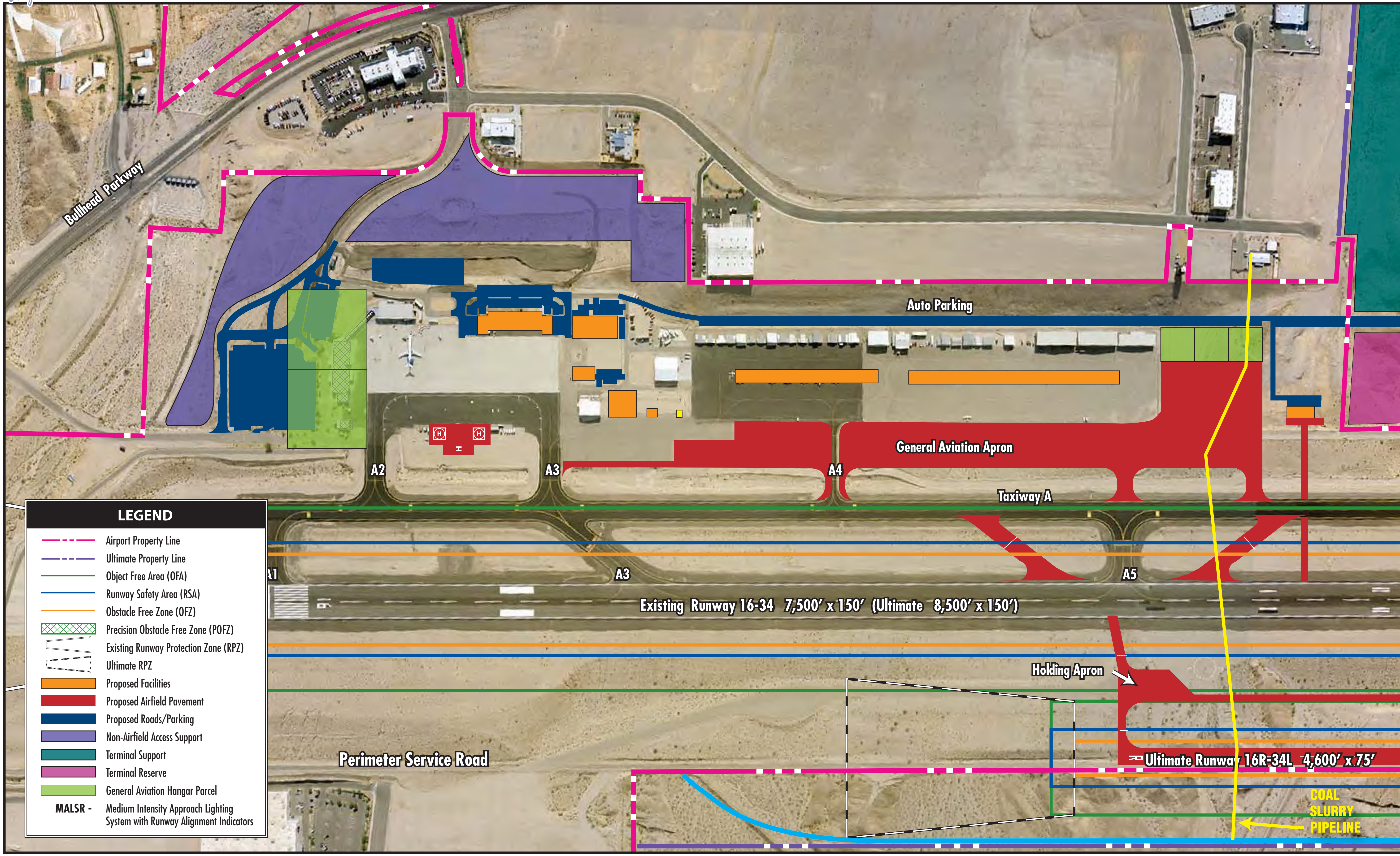


Exhibit 5C
RECOMMENDED LANDSIDE CONCEPT

Non-Aeronautical Land Uses

Implementation of the Recommended Master Plan Concept may result in portions of obligated airport property being used for non-aeronautical revenue support. As shown on **Exhibit 5A**, this can include areas along Bullhead Parkway and east of the existing terminal area along Laughlin View Drive. These are areas of the airport that do not have airfield access potential; therefore, these areas cannot be readily used for aeronautical purposes. Land uses could include retail, office, or light industrial.

It should be noted that the MCAA does not have the approval to use these portions of airport property for non-aeronautical purposes at this time. This requires specific approval from the FAA. The Master Plan does gain approval for non-aeronautical uses, even if these uses are ultimately shown in the Master Plan. A separate request justifying the use of airport property for non-aeronautical uses will be required once the Master Plan is complete. The Master Plan can be a source for developing that justification.

Federal law obligates an airport sponsor to use all property shown on an Airport Layout Plan (ALP) and/or Property Map for public airport purposes. A distinction is generally not made between property acquired locally and property acquired with federal assistance. However, property acquired with federal assistance or transferred as surplus property from the federal government may have specific covenants or restrictions on its use different from property acquired locally.

These obligations will require that the MCAA formally request from the FAA a release from the terms, conditions, reservations, and restrictions contained in any conveyance deeds and assurances in previous grant agreements. A release is required even if the airport desires to continue to own the land and only lease the land for development. The obligations relate to the use of the land just as much as they do to the ownership of the land.

U.S. Code 47153 authorizes the FAA to release airport land when it is convincingly clear that:

a. Airport property no longer serves the purpose for which it was conveyed. In other words, the airport does not need the land now or in the future because it has no airport-related or aeronautical use, nor does it serve as approach protection, a compatible land use, or a noise buffer zone.
b. The release will not prevent the airport from carrying out the purpose for which the land was conveyed. In other words, the airport will not experience any negative impacts from relinquishing the land.
c. The release is actually necessary to advance the civil aviation interests of the counters. In other words, there is a measurable and tangible benefit for the airport or the airport system.

Ultimately, the ability of the MCAA to use airport property for non-aeronautical revenue production will rest upon a determination by the FAA that portions of the airport property are no longer needed for airport-related or aeronautical uses. To prove that land is not needed for aeronautical purposes, an assessment and determination of the area that will be required for aeronautical purposes will be needed. The Master Plan provides this analysis.

A formal request to the FAA for a release from federal obligations will have several distinct elements. The major elements of the request will include:

1. A description of the obligating conveyance instrument or grant.
2. A complete property description including a legal description of the land to be released.
3. A description of the property condition.

4. A description of federal obligations.
5. The kind of release requested (lease or sale).
6. Purpose of the release.
7. Justification for the release.
8. Disposition and market value of the released land.
9. Reinvestment agreement. A commitment by the airport sponsor to reinvestment any lease revenues exclusively for the improvement, operation, and maintenance of the airport.
10. Draft instrument of release.

An environmental determination will also be required. While FAA Order 1050.1E, *Environmental Policies and Procedures*, states that a release of an airport sponsor from federal obligations is normally categorically excluded and would not normally require an EA, the issuance of a categorical exclusion is not automatic and the FAA must determine that no extraordinary circumstances exist at the airport. Extraordinary circumstances would include a significant environmental impact to any of the environmental resources governed by federal law. An EA may be required if there are extraordinary circumstances.

ENVIRONMENTAL OVERVIEW

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 Laughlin/Bullhead International 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 any improvements depicted on the Airport Layout Plan (ALP) will require compliance with the *National Environmental Policy Act* (NEPA) *of 1969*, as amended. This includes privately funded projects in addition to those projects receiving federal funding. Prior to any development on the airport, the MCAA needs to coordinate with the FAA Western-Pacific Region Airports Division environmental staff.

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). In instances where 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* (NEPA) *Implementation Instructions for Airport Actions*.

The following sections provide a description of the environmental resources which could be impacted by the proposed airport development. Of the 20 environmental categories, the following resources are not found within the airport environs:

- Coastal Resources
- Farmland
- Wild and Scenic Rivers

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 Oxide (NO), Particulate matter (PM_{10} and $PM_{2.5}$), and Lead (Pb). Various levels of review apply within both NEPA and permitting requirements. 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. Mohave County is in non-attainment for Particulate Matter (PM_{10} and $PM_{2.5}$). Further air quality analysis is required to determine potential air quality impacts which could result from proposed airport development projects.

NOISE

Aircraft sound emissions are often the most noticeable environmental impact an airport will produce on a surrounding community. If the sound is sufficiently loud or frequent in occurrence, it may interfere with various activities or otherwise be considered objectionable. To determine noise-related impacts that the proposed action could have on the environment surrounding the airport, noise exposure patterns based on projected future aviation activity were analyzed.

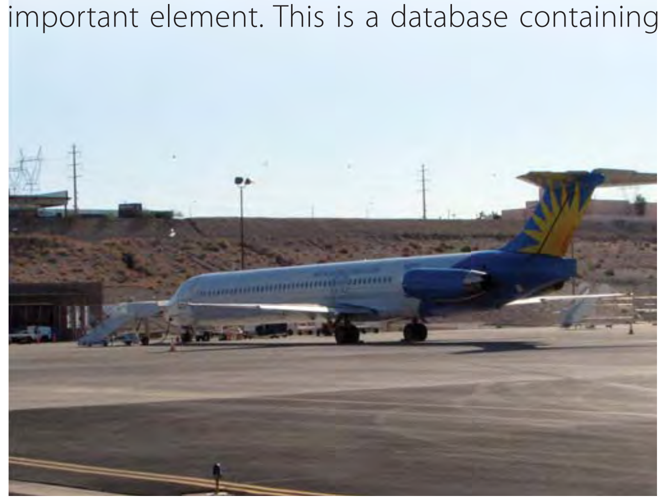
Aircraft Noise Analysis Methodology

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

The INM describes aircraft noise in the Day-Night Noise Level (DNL) metric. DNL is defined as the average A-weighted sound level as measured in decibels (dB) during a 24-hour period. A 10 dB penalty applies to noise events occurring at night (10:00 p.m. to 7:00 a.m.). DNL is a summation metric which allows objective analysis and can describe noise exposure comprehensively over a large area. The 65 DNL contour has been established as the threshold of incompatibility for certain land uses such as residential. This means that noise levels below 65 DNL are considered compatible with all underlying land uses. DNL is an accepted metric by the FAA, Environmental Protection Agency (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 point 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 decades of research, including extensive field measurements. 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 the purposes of 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 aircraft assignments to individual flight tracks.

- **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. Existing airport activity (i.e., take-offs and landings, or operations by aircraft) was derived from airport-maintained records and counts maintained by the ATCT. **Table 5B** provides a breakdown of operations for the baseline condition as well as the long term (2027) forecasts.

- **Fleet Mix**

The selection of individual aircraft types is important to the modeling process because different aircraft types generate different noise levels. The aircraft fleet mix was derived from a review of filed flight plans available through AirportIQ, a content provider of completed flight plans and landing fee records maintained by the MCAA. **Table 5B** summarizes the generalized fleet mix data input into the noise analysis.

Because single engine aircraft in the general aviation fleet are consistent in their noise characteristics, the INM utilizes two composite single engine models. The FAA's substitution list indicates that the general aviation single engine variable pitch propeller model, the GASEPV, represents a number of single engine general aviation aircraft such as the Beech Bonanza, Cessna 177 and 180, Piper Cherokee Arrow, Piper PA-32, Cirrus, and Mooney aircraft. The general aviation single engine fixed pitch propeller model, the GASEPF, represents the Cessna 150 and 172, Piper Archer, Piper PA-28-140 and -180, and the Piper Tomahawk, among others.

The FAA recommends the BEC58P, the Beech Baron, to represent the light twin-engine aircraft such as the Piper Navajo, Beech Duke, Cessna 310, and others. The CNA441, typically the Cessna 441, effectively represents the light turbo-prop aircraft such as the Beech King Air, Cessna Conquest, and others. The Bell 206 effectively represents the helicopter activity at Laughlin/Bullhead International Airport.

For the business jet fleet, the CNA500 effectively represents the Cessna Citation I, II, and V series aircraft – or the smaller jets within the fleet such as the Eclipse 500 and the Cessna Mustang. Aircraft such as the Lear 30, 40, 50, and 60 series; the Hawker 800 and 1000; and the Falcon 10, 20, Beechjet 400A, and Raytheon Premier are effectively represented by the LEAR35 designator. The Mitsubishi MU3001 also represents the Cessna Citation 551, 560 (Encore and Ultra), 550, 552, and 560XL (Excel). The Canadair CL600 also represents the Citation 750, and Falcon 900 and 2000. All the above choices conform to the Pre-Approved Substitution List

TABLE 5B
Annual Operations and Fleet Mix

Aircraft Designation	Annual Operations 2008	Annual Operations Long Term
Itinerant		
McDonnell-Douglas MD88	900	-
Boeing 737-800	600	2,520
Airbus A318	-	5,620
Embraer EMB-175	-	5,040
Boeing 737-200	50	-
Dornier 328	28	-
Embraer EMB 135	2	-
Embraer EMB 145	10	-
Cessna CNA441	500	10,280
Cessna 208	500	1,000
Cessna Citation III	137	507
Canadair CL600	137	507
Cessna Citation CNA500	916	3,394
Gulfstream GIV	55	203
Gulfstream GV	14	307
Gulfstream IA1125	96	-
LEAR 25	41	-
LEAR 35	478	1,773
Mitsubishi MU3001	410	1,770
Boeing UH60	186	100
C12	186	100
GAPF	5,434	17,963
GAPV	4,822	7,719
Bell 206	1,000	1,400
Beech Baron	1,923	10,998
Subtotal Itinerant	**18,423**	**71,200**
Local		
C12	214	100
Bell 206	250	500
GAPF	1,236	11,809
GAPV	1,078	5,061
Beech Baron	742	7,230
Subtotal Local	**3,520**	**24,700**
Total Operations	**21,943**	**95,900**

Sources: FAA APO Data System, Airport IQ, Master Plan Forecasts
GAPV- General Aviation Propeller Variable
GAPF – General Aviation Propeller Fixed

published by the FAA Office of Environment and Energy (AEE) branch in Washington, D.C. The Lear 25 and Gulfstream IA1125 are considered Stage II business jets (built before 1976) and are expected to be retired from the fleet in the coming years. Therefore, these aircraft are not assumed in the long term noise calculations for the airport.

- **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 modeling the noise exposure contours, five percent of operations were assumed to occur at night.

- **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. With the current single runway configuration, Runway 16 was assumed to be used 61 percent of the time; whereas Runway 34 was assumed to be used 39 percent of the time. The projected long term noise exposure calculation assumes the development of the parallel runway. Since the parallel runway is designed for small aircraft use only, the runway use percentages change based on aircraft type. **Table 5C** summarizes projected long term runway use assumptions.

INM Output

Noise contours were prepared for the baseline (2008) and projected long term (2027) conditions at the airport. As indicated on **Exhibit 5D**, the baseline 65 DNL or higher noise contours do not extend beyond existing airport property. In the projected long term noise conditions, the 65 DNL or higher noise contours remain mostly on existing or ultimate property owned by the MCAA. Therefore, no incompatible land uses are expected to be contained within the baseline or projected long term noise exposure contours for the airport.

TABLE 5C
Projected Long Term Runway Use Assumptions

Aircraft Type	16L	34R	16R	34L
McDonnell-Douglas MD88	61%	39%	0	0
Boeing 737-800	61%	39%	0	0
Airbus A318	61%	39%	0	0
Embraer EMB-175	61%	39%	0	0
Cessna CNA441	34%	16%	34%	16%
Cessna 208	34%	16%	34%	16%
Cessna Citation III	61%	39%	0	0
Canadair CL600	61%	39%	0	0
Cessna Citation CNA500	34%	16%	34%	16%
Gulfstream IV	61%	39%	0	0
Gulfstream V	61%	39%	0	0
Lear 35	61%	39%	0	0
Mitsubishi MU3001	61%	39%	0	0
C12	61%	39%	0	0
GAPF	34%	16%	34%	16%
GAPV	34%	16%	34%	16%
Beech Baron	34%	16%	34%	16%

Source: Coffman Associates analysis
GAPV- General Aviation Propeller Variable
GAPF – General Aviation Propeller Fixed

COMPATIBLE LAND USE

The compatibility of existing and planned land uses in the vicinity of an airport is usually associated with the extent of the airport's noise impacts. Typically, significant impacts will occur over noise-sensitive areas within the 65 DNL noise contour. As indicated above, no noise-sensitive residential land uses are currently contained within the 65 DNL and higher noise contours.

As discussed in Chapter One of this Master Plan, Chapter 17.34, *Airport Noise and Height Overlay District*, of the City of Bullhead City municipal code provides for land use controls to promote the compatibility of the airport within the community. The MCAA should give consideration to requests that the City of Bullhead City update the existing Noise Overlay District in the municipal code based upon the new noise contours for prepared for this Master Plan.

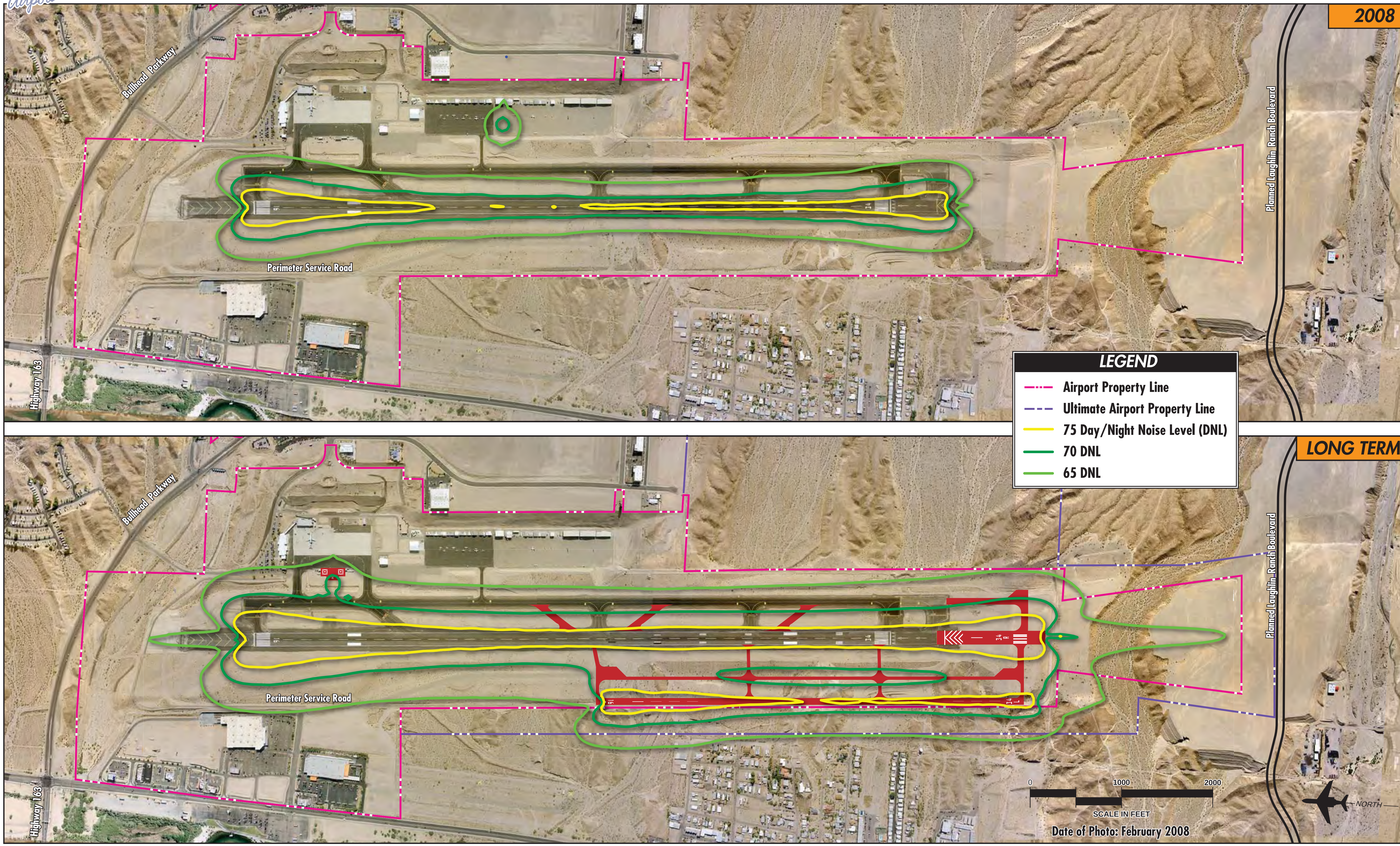


Exhibit 5D
NOISE EXPOSURE CONTOURS

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 the Arizona Pollutant Discharge Elimination System (AZPDES) General Permit. Use of these measures typically alleviates potential resource impacts.

Short-term construction-related noise impacts could occur with implementation of the proposed project as there are scattered residences in the vicinity. However, these impacts typically do not arise unless construction is being undertaken during early morning, evening, or nighttime hours. Furthermore, the proposed projects will be undertaken on a demand basis and will not be constructed simultaneously.

Construction-related air quality impacts can be expected. Air emissions related to construction activities will 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)

Section 4(f) properties include publicly owned land from a public park, recreational 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. The Lake Mead National Recreation Area is located less than one-half mile north of the airport. Continued coordination will be necessary with the National Park Service.

FISH, WILDLIFE, AND PLANTS

A number of regulations have been established to ensure that projects do not negatively impact protected plants, animals, or their designated habitat. Section 7 of the *Endangered Species Act* (ESA), as amended, applies to federal agency actions and sets forth requirements for consultation to determine if the proposed action "may affect" a federally endangered or threatened species. The *Sikes Act* and various amendments authorize states to prepare statewide wildlife conservation plans for resources under their jurisdiction. As detailed in Chapter One, recent surveys at the airport did not indicate suitable habitat for any federally listed threatened or endangered species. Additional surveys will be required for project implementation in the future; in particular, to development on land to be acquired and previously undisturbed areas of the airport.

FLOODPLAINS

The 100-year floodplain near Laughlin/Bullhead International Airport was previously depicted on **Exhibit 1A**. Future development within this floodplain area will require additional study to determine the impacts, if any, to the floodplain caused by development.

HAZARDOUS MATERIALS AND POLLUTION PREVENTION

The airport must comply with applicable pollution control statutes and requirements. Impacts may occur when changes to the quantity or type of solid waste generated, or type of disposal, differ greatly from existing conditions. No impaired waters or regulated hazardous material sites are located on or in the vicinity of the airport.

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.

HISTORICAL, ARCHITECTURAL, AND CULTURAL RESOURCES

Determination of a project's impact to historical and cultural resources is made in compliance with the *National Historic Preservation Act* (NHPA) *of 1966*, as amended for federal undertakings. Two state acts also require consideration of cultural resources. The NHPA requires that an initial review be made of an undertaking's *Area of Potential Effect* (APE) to determine if any properties in, or eligible for inclusion in, the National Register of Historic Places are present in the area. No known historical or archaeological resources are located on airport property. Prior to development, surveys should be conducted to assist with Section 106 consultation with the State Historic Preservation Officer.

LIGHT EMISSIONS AND VISUAL IMPACTS

Impacts occur when lighting associated with an action will create an annoyance among people in the vicinity or interfere with their normal activities. Aesthetic impacts relate to the extent that the development contrasts with the existing environment and whether the jurisdictional agency considers this contrast objectionable.

New airside lighting includes a medium intensity approach lighting system with runway alignment indicator lights (MALSR), new pavement edge lighting, precision approach path indicators (PAPIs), and runway end identifier lights (REILs) on the proposed parallel runway. Landside development at the airport will create new hangar space, a new terminal building area, additional automobile parking areas, and the potential for new aviation revenue support parcels. No residential development is located adjacent to the airport. However, residential homes north of Bullhead Parkway, which are at a higher elevation than the airport, may experience an increase of annoyance due to light and visual impacts created by new lighting added at the airport. Some shielding of the MALSR and REILs may be possible to reduce glare from these lighting systems.

NATURAL RESOURCES AND ENERGY SUPPLY

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 operations at the airport grow. None of the planned development projects are anticipated to result in significant increases in energy consumption.

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. Future socioeconomic impacts resulting from the proposed development are anticipated to be primarily positive in nature.

SOCIOECONOMIC IMPACTS, ENVIRONMENTAL JUSTICE, AND CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISKS

Impacts occur when disproportionately high and adverse human health or environmental effects occur to minority and low-income populations; disproportionate health and safety risks occur to children; and extensive relocation of residents, businesses, and disruptive traffic patterns are experienced. Development is expected to occur on the airport or on property to be acquired that is presently undeveloped. These actions will not cause any disproportionate impacts for minority or low income populations. The health and safety risks to children are not expected to be disproportionate with the existing operation of the airport that limits access to the aircraft operational areas and construction areas as a matter of ongoing security and safety compliance with the airport's certification.

The proposed action includes the development of internal airport roads and new connections to Bullhead Parkway. These roads will provide access to the proposed aviation-related facilities. These roads are not anticipated to disrupt the local transportation patterns.

The Master Plan Concept includes land acquisition. Compliance with the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970* (URARPAPA) will be required during property acquisition. FAA Order 5050.4B provides that where the relocation or purchase of a residence, business, or farmland is involved, the provisions of the URARPAPA must be met. The Act requires that landowners whose property is to be purchased are compensated fair market value for their property.

SOLID WASTE

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

WATER QUALITY

Water quality concerns associated with airport expansion most often relate to domestic sewage disposal, increased surface runoff and soil erosion, and the storage and handling of fuel, petroleum, solvents, etc.

Construction of the proposed improvements will result in an increase in impermeable surfaces and a resulting increase in stormwater runoff. During the construction phase, the proposed development may result in short-term impacts on water quality. Temporary measures to control water pollution, soil erosion, and siltation through the use of BMPs should be used. The airport will need to continue to comply with its current AZPDES operations permit requirements.

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, including the preparation of a *Notice of Intent* and a *Stormwater Pollution Prevention Plan* prior to the initiation of product construction activities.

As development occurs at the airport, the Storm Water Pollution Prevention Plan (SWPPP) will need to be modified to reflect the additional impervious surfaces and any stormwater retention facilities. The addition and removal of impervious surfaces may require modifications to this plan should drainage patterns be modified.

WETLANDS/WATERS OF THE U.S.

The U.S. Army Corps of Engineers regulates the discharge of dredged and/or fill material into waters of the United States, including adjacent wetlands, under Section 404 of the *Clean Water Act*. Based on previous surveys, no wetlands are present on the airport. However, several ephemeral drainage areas are located near the airport. These ephemeral washes drain directly to the Colorado River and are considered under the jurisdiction of the U.S. Army Corps of Engineers. A permit in compliance with Section 404 of the *Clean Water Act* will be required for any future development proposed in the ephemeral washes adjacent to the airport. This includes the drainage swell that is located on the east side of Taxiway A in between the taxiway and apron areas.

PUBLIC AIRPORT DISCLOSURE MAP

Arizona Revised Statues (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. The DNL is calculated for the 20-year forecast condition. 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 5E depicts the Disclosure Map for Laughlin/Bullhead International Airport, considering the requirements of the statute above. Traffic pattern airspace is defined in FAA Order 7400.2D, *Procedures for Handling Airspace Matters*. Traffic pattern airspace is a function of the approach category for the runway. Approach category C is planned for Runway 16-34, while approach category B is planned for the parallel runway.

According to FAA Order 7400.2D, the traffic pattern airspace for approach category C extends three miles beyond each runway end and four miles laterally from the runway centerline to encompass the traffic pattern. For approach category B, the traffic pattern airspace extends 1.5 miles beyond each runway end and1.5 miles laterally from the runway centerline to encompass the traffic pattern.

The Disclosure Map for Laughlin/Bullhead International Airport extends the limits of public disclosure four nautical miles to the east and four nautical miles west of the Runway 16-34 centerline. The area within 2.25 nautical miles of the runway centerline is also included in the limits of public disclosure. The 65 DNL contour is shown as required by the statute.

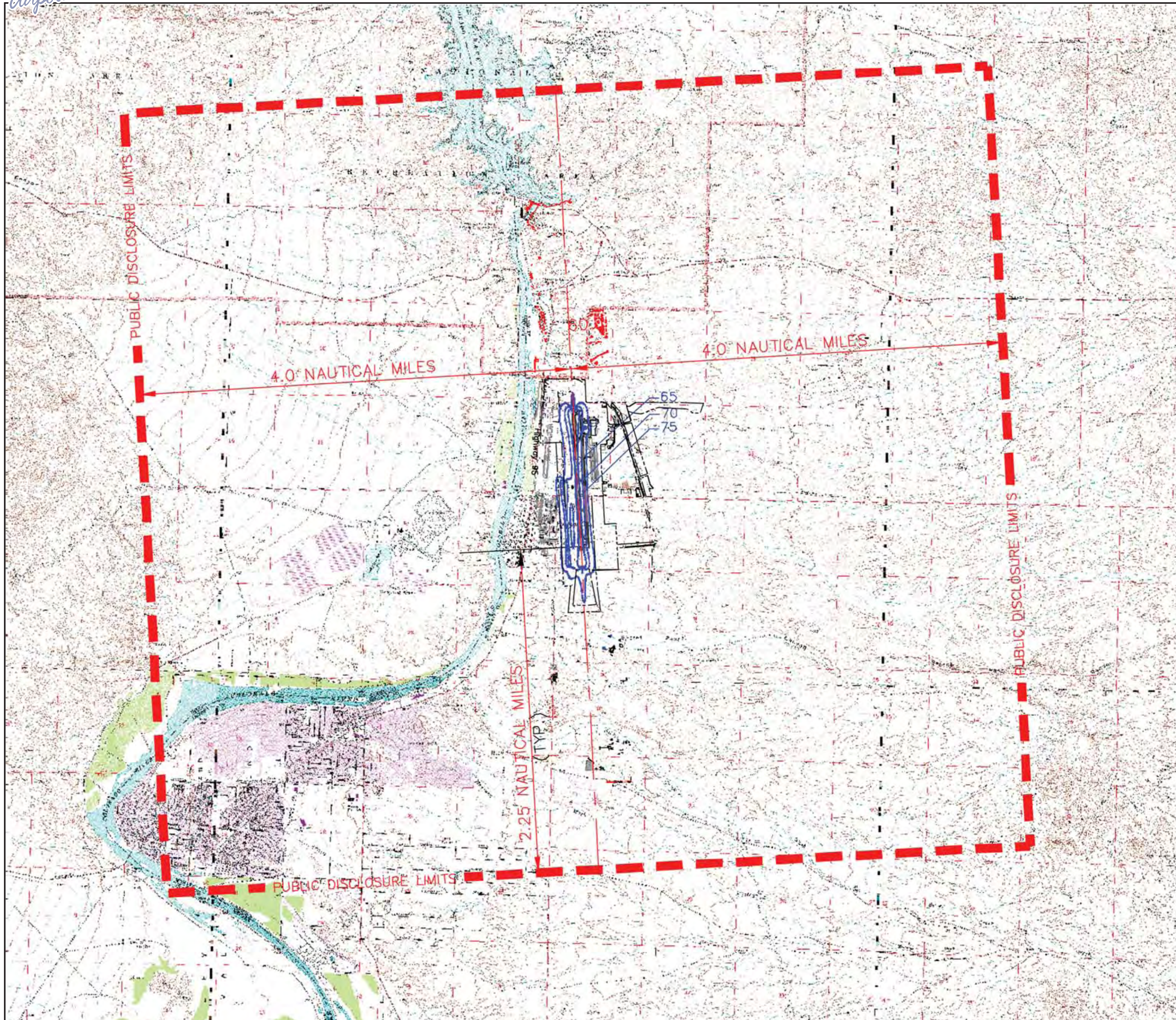
CAPITAL PROGRAM

The previous sections presented the needs of the airport, on both the airside and the landside, over the course of the next 20 years. In this section, a capital program will be presented which identifies the specific development projects recommended for the airport to achieve the master plan vision. The master plan vision is based on the airport achieving specific demand-based triggers such as a growth in enplanements, based aircraft, enplaned cargo, and an overall increase in operations.

AIRPORT DEVELOPMENT SCHEDULES AND COST SUMMARIES

With the establishment of a recommended master plan concept, the next step is to determine a realistic schedule and the associated costs for implementing the plan. This section will examine the overall cost of each item in the development plan and present a development schedule. This plan assumes hangars will be constructed with private funds, while the MCAA will maximize grant funding for taxilane and infrastructure development. The MCAA will construct the new passenger terminal building, air cargo buildings, and support facilities.

As a master plan is a conceptual document, implementation of these capital projects should only be undertaken after further refinement of their design and costs through architectural and engineering analyses. Moreover, all projects will require further environmental study and documentation for compliance with NEPA.



LEGEND

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

NOTES:

1. This map has been prepared in accordance with the Arizona Revised Statutes, Section 28-8486, relating to Public Airport Disclosure.
2. The Airport Noise Contours have been developed with the Integrated Noise Model (Version 7.0a) and are based on Total Annual Operations (Take-offs and Landings) of 95,900.
3. 1 Nautical mile = 6,080 feet or 1.1516 statute miles.
4. Base map derived from electronic USGS quadrangles Bridge Canyon, Davis Dam, Mt. Manchester and Davis Dam SE.

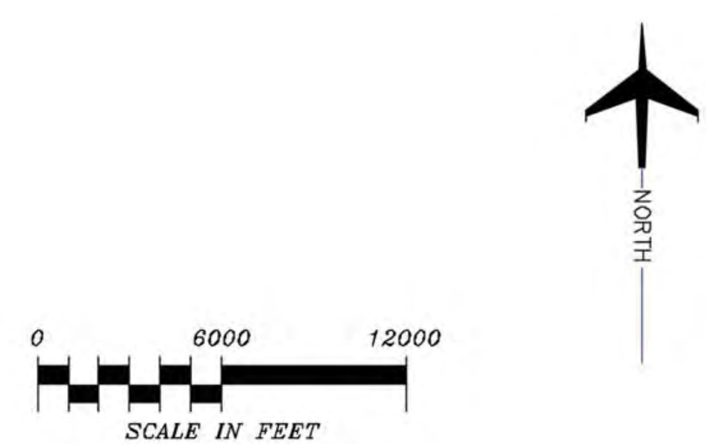


Exhibit 5E
PUBLIC AIRPORT DISCLOSURE MAP

The cost estimates presented in this chapter have been increased by 20 percent to allow for contingencies that may arise on the project. The cost estimates also include 28 percent for design and engineering, and construction inspection and project management. Capital costs presented here should be viewed only as estimates subject to further refinement during design. Nevertheless, these estimates are considered reasonable for planning purposes. Cost estimates for each of the development projects listed in the capital program are in 2008 dollars.

The proposed capital improvement program (CIP) has been divided into three planning horizons: short, intermediate, and long term. By grouping the projects, airport administration can accelerate projects that become critical or delay projects that are not priorities.

On an annual basis, airports submit a five-year capital improvement plan to the FAA and Arizona Department of Transportation – Aeronautics Division (ADOT). The annual CIP submittal is intended to alert the FAA and ADOT to priority projects for which the airport intends to request grant funding. Items from the most recent airport CIP submittal are included in this 20-year CIP.

SHORT TERM IMPROVEMENTS

Exhibit 5F depicts the proposed airport development needs over the next six fiscal years. The short term planning period is the only planning period separated into years. This is to allow the plan to be coordinated with the five-year planning cycle of the FAA and ADOT-Aeronautics programs. In later planning periods, actual demand levels will dictate implementation.

Fiscal year (FY) 2009 is focused on designing both the ARFF building and the bag claim enclosure for the terminal building. Presently, the baggage claim display is outside the main terminal building on a covered patio. This project would enclose this area and allow for climate control. This project would be constructed in FY 2010. The ARFF building replaces the existing ARFF building and allows more area for vehicle storage and maintenance while locating the ARFF station near the midpoint of the runway. Construction of the ARFF station would occur in two phases in FY 2010 and FY 2011. Extensive earthwork is necessary as this building is located in an area of rising terrain that also requires all primary utility extensions.

Equipment acquisitions in FY 2010 include a new ARFF vehicle and a high speed pavement sweeper. Both pieces of equipment allow the airport to meets its airport certification requirements. Additional projects in FY 2010 include an Environmental Assessment (EA) to acquire 300 acres of land from the ASLD at the southeast corner of the airport. This property would be acquired in four phases over FY 2011 through FY 2014. As discussed previously, this property would ultimately be used for a replacement commercial airline terminal building, air cargo area, and land for commercial/industrial uses.

The extension of Runway 16-34 and Taxiway A 1,000 feet south is programmed over three fiscal years. Design is programmed for FY 2010 with site preparation occurring in FY 2011 and actual construction occurring in FY 2012 including the addition of pavement edge lighting on the runway and taxiway.

The rehabilitation of Taxiway A is programmed in FY 2013 along with runway safety area (RSA) erosion protection and drainage improvements. The construction of T-hangar infrastructure and the completion of RSA erosion protection and drainage improvements is programmed in FY 2014. The RSA erosion protection and drainage improvements are intended to reduce the maintenance of the existing RSA along both sides of the runway which erodes during storm events. The MCAA must groom the RSA frequently to maintain the RSA in compliance with certification requirements.

Exhibit 5F
SHORT TERM DEVELOPMENT PROGRAM

		TOTAL COST	FEDERALLY ELIGIBLE	STATE ELIGIBLE	LOCAL SHARE
SHORT TERM PLANNING HORIZON					
FY2009					
09-1	ARFF Building - Phase I (Design Only)	$ 472,000	$ 448,400	$ 11,800	$ 11,800
09-2	Terminal Bag Claim Area Enclosure (Design Only)	75,000	71,250	1,875	1,875
Subtotal (FY 2009)		$ 547,000	$ 519,650	$ 13,675	$ 13,675
FY2010					
10-1	ARFF Building - Phase II (Site Prep/Drainage/Infrastructure/Generator)	$ 1,170,000	$ 1,111,500	$ 29,250	$ 29,250
10-2	Acquire ARFF Vehicle	850,000	807,500	21,250	21,250
10-3	Acquire High-Speed Sweeper	185,000	175,750	4,625	4,625
10-4	Terminal Bag Claim Enclosure	1,025,000	973,750	25,625	25,625
10-5	Environmental Assessment	300,000	285,000	7,500	7,500
10-6	Extend Runway 16-34 (Design Only)	1,000,000	950,000	25,000	25,000
10-7	Airport Drainage/Safety Area Improvements	947,368	900,000	23,684	23,684
Subtotal (FY 2010)		$ 5,477,368	$ 5,203,500	$ 136,934	$ 136,934
FY2011					
11-1	ARFF Building - Phase II (Construct Building)	$ 2,400,000	$ 2,280,000	$ 60,000	$ 60,000
11-2	Acquire ASLD Land - Phase I (75 acres)	3,750,000	3,562,500	93,750	93,750
11-3	Extend Runway 16-34 (Site Preparation)	5,000,000	4,750,000	125,000	125,000
Subtotal (FY 2011)		$ 11,150,000	$ 10,592,500	$ 278,750	$ 278,750
FY2012					
12-1	Acquire ASLD Land - Phase II (75 acres)	$ 3,750,000	$ 3,562,500	$ 93,750	$ 93,750
12-2	Extend Runway 16-34 (1,000'x150')	5,500,000	5,225,000	137,500	137,500
12-3	Extend Taxiway A (1,000'x75')	2,900,000	2,755,000	72,500	72,500
12-4	Install Medium Intensity Runway Lighting (MIRL)	500,000	475,000	12,500	12,500
12-5	Install Medium Intensity Taxiway Lighting (MITL)	500,000	475,000	12,500	12,500
Subtotal (FY 2012)		$ 13,150,000	$ 12,492,500	$ 328,750	$ 328,750
FY2013					
13-1	Acquire ASLD Land - Phase III (75 acres)	$ 3,750,000	$ 3,562,500	$ 93,750	$ 93,750
13-2	Pavement Rehabilitation - Taxiway A	450,000	427,500	11,250	11,250
13-3	RSA Erosion Protection/Drainage	1,000,000	950,000	25,000	25,000
Subtotal (FY 2013)		$ 5,200,000	$ 4,940,000	$ 130,000	$ 130,000
FY2014					
14-1	Acquire ASLD Land - Phase IV (75 acres)	$ 3,750,000	$ 3,562,500	$ 93,750	$ 93,750
14-2	Construct T-Hangar Infrastructure	750,000	712,500	18,750	18,750
14-3	RSA Erosion Protection/Drainage	1,000,000	950,000	25,000	25,000
Subtotal (FY 2014)		$ 5,500,000	$ 5,225,000	$ 137,500	$ 137,500
SUBTOTAL SHORT TERM PLANNING HORIZON		$ 41,024,368	$ 38,973,150	$ 1,025,609	$ 1,025,609

ARFF - Airport Rescue and Firefighting
RSA - Runway Safety Area
ASLD - Arizona State Land Department

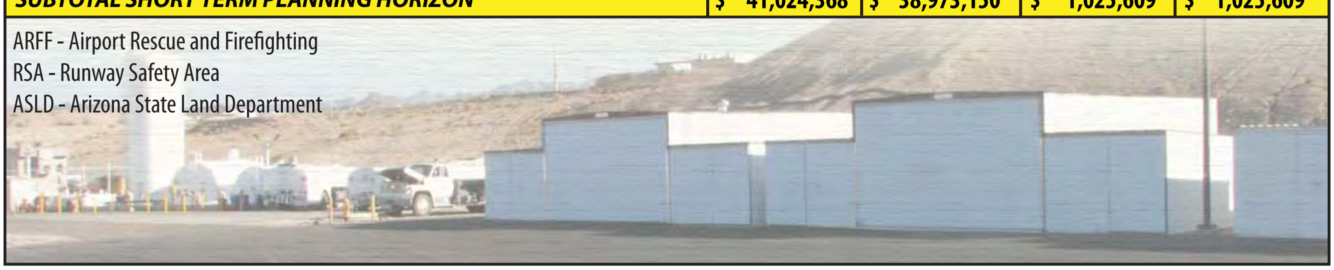


Exhibit 5G
INTERMEDIATE TERM DEVELOPMENT PROGRAM

		TOTAL COST	FEDERALLY ELIGIBLE	STATE ELIGIBLE	LOCAL SHARE
	INTERMEDIATE TERM PLANNING HORIZON (6-10 YEARS)				
1	New Electric Vault, Extend Airfield Lighting Controls to ATCT	$ 908,000	$ 862,600	$ 22,700	$ 22,700
2	Environmental Assessment for Projects in the Intermediate Term	750,000	712,500	18,750	18,750
3	Land Acquisition to Relocate Service Road (1 acre)	70,000	66,500	1,750	1,750
4	Service Road Relocation	677,000	643,150	16,925	16,925
5	Construct Segregated Access for General Aviation and 175 Parking Spaces	1,934,000	1,837,300	48,350	48,350
6	Construct Segregated Access to ARFF Building	225,000	213,750	5,625	5,625
7	Construct Aircraft Wash Rack	945,000	897,750	23,625	23,625
8	Construct Access Roadway to South Terminal/Extend Utilities	19,586,000	18,606,700	489,650	489,650
9	Construct South Terminal - Phase I	17,747,000	16,859,650	443,675	443,675
10	Construct South Terminal - Phase I	39,584,000	37,604,800	989,600	989,600
11	Construct South Terminal Automobile Parking - Phase I	2,296,000	2,181,200	57,400	57,400
12	Construct South Terminal Roadway/Extend Utilities	13,366,000	12,697,700	334,150	334,150
13	RPZ Land Acquisition (50 acres)	2,800,000	2,660,000	70,000	70,000
14	Install MALSR Runway 34	1,026,000	974,700	25,650	25,650
15	Install Instrument Landing System (ILS) Runway 34	2,835,000	2,693,250	70,875	70,875
16	Install High Intensity Runway Lighting (HIRL) on Runway 16-34	2,940,000	2,793,000	73,500	73,500
17	Expand General Aviation Apron West - Phase I	1,598,000	1,518,000	39,950	39,950
18	Construct Helipad and Hardstands	743,000	705,850	18,575	18,575
19	Existing Terminal Apron Pavement Maintenance/Rehabilitation	100,000	95,000	2,500	2,500
20	Existing GA Apron Pavement Maintenance/Rehabilitation	2,000,000	1,900,000	50,000	50,000
	SUBTOTAL INTERMEDIATE TERM PLANNING HORIZON (6-10 YEARS)	$ 112,130,000	$ 106,523,500	$ 2,803,250	$ 2,803,250

ATCT - Airport Traffic Control Tower
MALSR - Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
RPZ - Runway Protection Zone
ARFF - Airport Rescue and Firefighting

The total investment necessary for the short term capital improvement program is approximately $41,024,368. Of this total, $38,973,150 is eligible for FAA grant and/or PFC funding and approximately $1,025,609 is eligible for state funding. The remaining $1,025,609 would be the responsibility of the MCAA.

INTERMEDIATE TERM IMPROVEMENTS

The intermediate term planning horizon capital needs are shown on **Exhibit 5G**. Support facility improvements programmed for this planning horizon include relocating and expanding the electrical vault from near the existing commercial service terminal to east of the ARFF station. This location will allow the extension of airfield lighting controls to the ATCT. The relocation of the perimeter service road around the extended Runway 34 end is programmed. This requires land acquisition and an EA since this roadway crosses jurisdictional Waters of the U.S.

Segregated vehicular access for the south apron general aviation facilities and parking areas are programmed. Presently, all vehicles must cross the apron to access the general aviation facilities on this south apron area. This roadway and parking will increase security and safety for the south apron by segregating vehicles from aircraft operational areas. Segregated access to the ARFF building is programmed. In the short term, access to the ARFF building will only be available via the existing perimeter service road.

Construction of the new south terminal area is programmed for this planning horizon. Projects include the construction of the terminal building, departure concourse, vehicular parking, aircraft apron, and vehicular access roads.

Establishing a precision approach to Runway 34 is included in this planning horizon. This includes the acquisition of 56 acres of land to protect the runway protection zone (RPZ), installation of the medium intensity approach lighting system with runway alignment indicator lights (MALSR), and high intensity runway edge lights as necessary to achieve one-half statute mile visibility minimums.

The construction of a helipad and helicopter parking, as well as expansion of the general aviation apron, is also programmed. Maintenance projects include rehabilitation of the south general aviation apron and existing terminal apron area.

The total investment necessary for the intermediate term capital improvement program is approximately $112.1 million. Of this total, $106.2 million is eligible for FAA grant funding and approximately $2.8 million is eligible for state funding. The remaining $2.8 million would be the responsibility of the MCAA.

LONG TERM IMPROVEMENTS

As shown on **Exhibit 5H**, the long term planning horizon capital needs focuses on redeveloping the existing terminal area for general aviation uses. This includes converting the departure facility to serve as a new general aviation terminal and the construction of automobile parking for this facility. Exit taxiways are planned for Runway 16-34 to reduce runway occupancy time. The expansion of

Exhibit 5H
LONG TERM DEVELOPMENT PROGRAM

		TOTAL COST	FEDERALLY ELIGIBLE	STATE ELIGIBLE	LOCAL SHARE
LONG TERM PLANNING HORIZON (11-20YEARS)					
1	Convert Existing Departure Facility to General Aviation Terminal	$ 971,000	$ 922,450	$ 24,275	$ 24,275
2	EA for Exit Taxiway, Apron Expansion, Air Cargo Development, Termnal Expansion	500,000	475,000	12,500	12,500
3	Construct General Aciation Auromobile Parking at Converted Terminal	5,745,000	5,457,750	143,625	143,625
4	Construct Exit Taxiways	1,540,000	1,463,000	38,500	38,500
5	Expand General Aviation Apron West - Phase II	6,155,000	5,847,250	153,875	153,875
6	Expand General Aviation Apron South	12,078,000	11,474,100	301,950	301,950
7	Construct Air Cargo Building, Access, Parking, and Apron	27,025,000	25,673,750	675,625	675,625
8	Construct South Terminal - Phase II	22,833,000	21,691,350	570,825	570,825
9	Construct South Terminal Apron - Phase II	13,560,000	12,882,000	339,000	339,000
10	Construct South Terminal Automobile Parking - Phase II	2,114,000	2,008,300	52,850	52,850
11	Pavement Maintenace/Rehabilitation	10,000,000	9,500,000	250,000	250,000
12	EA for Parallel Runway	350,000	332,500	8,750	8,750
13	Land Acquisition for Parallel Runway (56 acres)	3,108,000	2,952,600	77,700	77,700
14	Relocate Western Portion of Service Road	1,261,000	1,197,950	31,525	31,525
15	Construct Parallel Runway with Parallel Taxiway and Connecting Taxiways	25,600,000	24,320,000	640,000	640,000
16	Install REILs Each End of Parallel Runway	465,000	441,750	11,625	11,625
17	Install PAPIs Each End of Parallel Runway	408,000	387,600	10,200	10,200
SUBTOTAL LONG TERM PLANNING HORIZON (11-20 YEARS)		$ 133,713,000	$ 127,027,350	$ 3,342,825	$ 3,342,825

REIL - Runway End Identifier Lights
PAPI - Precision Approach Path Indicator

the south general aviation apron to the south and west is planned to accommodate additional aircraft storage and movement needs. The construction of the south air cargo area is programmed, as well as the expansion of the passenger terminal area, to meet projected long term passenger enplanement needs. The construction of the parallel runway including land acquisition is also included in this planning horizon. Provisions for long term pavement maintenance/rehabilitation are also included in this planning horizon. This could include pavement overlays, reconstruction, or maintenance projects such as slurry seals.

The total investment for the long term capital needs program is approximately $133.7 million. Of this total, $127.0 million is eligible for FAA grant funding and approximately $3.3 million is eligible for state funding. The remaining $3.3 million would be the responsibility of the MCAA.

TOTAL DEVELOPMENT PROGRAM SUMMARY

Exhibit 5J summarizes the total development program over the long term planning horizon for Laughlin/Bullhead International Airport. The total investment for the capital needs program is approximately $286.8 million. Of this total, $272.5 million is eligible for FAA grant funding and approximately $7.1 million is eligible for state funding. The remaining $7.1 million would be the responsibility of the MCAA. **Exhibit 5K** presents development staging over the three planning horizons.

CAPITAL IMPROVEMENT FUNDING SOURCES

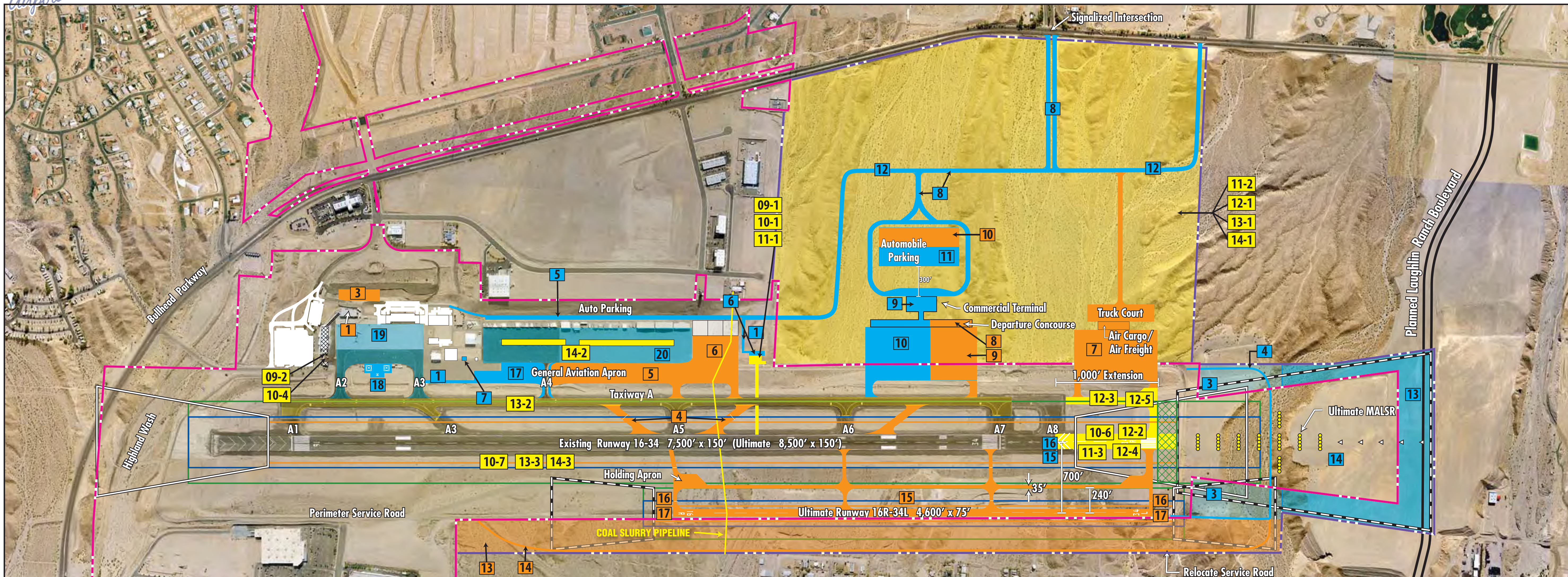
Financing capital improvements at the airport will not rely solely on the financial resources of the airport. Capital improvement funding is available through various grant-in-aid programs on both the state and federal levels. The following discussion outlines key sources of funding potentially available for capital improvements at Laughlin/Bullhead International Airport.

FEDERAL GRANTS

Through federal legislation over the years, various grant-in-aid programs have been established to develop and maintain a system of public airports across the United States. The purpose of this system and its federally based funding is to maintain national defense and to promote interstate commerce. The most recent legislation affecting federal funding was enacted in late 2003 and was titled, *Century of Aviation Re-authorization Act*, or Vision 100. The four-year bill covered FAA fiscal years 2004, 2005, 2006, and 2007. Vision 100 expired at the end of fiscal year 2007. In December 2007, AIP was included in the omnibus appropriation act and authorized $3.5 billion in 2008 for airport improvements. However, full authorization was never granted. A series of continuing resolutions were passed in order to carry the program through September 2008, the end of the federal fiscal year. The FAA *Extension Act of 2008, Part II* authorizes the Airport Improvement Program (AIP) through March 31, 2009; however, the Continuing Resolution provides funds only through March 6, 2009. It directs the FAA to calculate the AIP formulas as though the

Exhibit 5J
TOTAL DEVELOPMENT PROGRAM SUMMARY

	TOTAL COST	FEDERALLY ELIGIBLE	STATE ELIGIBLE	LOCAL SHARE
Short Term Planning Horizon (First Five Years)	$ 41,024,368	$ 38,973,150	$ 1,025,609,	$ 1,025,609
Intermediate Term Planning Horizon (6-10 years)	$ 112,130,000	$ 106,523,500	$ 2,803,250	$ 2,803,250
Long Term Planning Horizon (11-20 years)	$ 133,713,000	$ 127,027,350	$ 3,342,825	$ 3,342,825
Total All Development	$ 286,867,368	$ 272,524,000	$ 7,171,684	$ 7,171,684



SHORT TERM

2009
- 09-1 ARFF Building - Phase I (Design Only)
- 09-2 Terminal Bag Claim Area Enclosure (Design Only)

2010
- 10-1 ARFF Building - Phase II (Site Prep/Drainage/Infrastructure/Generator)
- 10-2 Acquire ARFF Vehicle (Not Pictured)
- 10-3 Acquire High-Speed Sweeper (Not Pictured)
- 10-4 Terminal Bag Claim Enclosure
- 10-5 Environmental Assessment (Not Pictured)
- 10-6 Extend Runway 16-34 (Design Only)
- 10-7 Airport Drainage/Safety Area Improvements

2011
- 11-1 ARFF Building - Phase II (Construct Building)
- 11-2 Acquire ASLD Land - Phase I (75 acres)
- 11-3 Extend Runway 16-34 (Site Preparation)

2012
- 12-1 Acquire ASLD Land - Phase II (75 acres)
- 12-2 Extend Runway 16-34 (1,000'x150')
- 12-3 Extend Taxiway A (1,000'x75')
- 12-4 Install Medium Intensity Runway Lighting (MIRL)
- 12-5 Install Medium Intensity Taxiway Lighting (MITL)

2013
- 13-1 Acquire ASLD Land - Phase III (75 acres)
- 13-2 Pavement Rehabilitation - Taxiway A
- 13-3 RSA Erosion Protection/Drainage

2014
- 14-1 Acquire ASLD Land - Phase IV (75 acres)
- 14-2 Construct T-Hangar Infrastructure
- 14-3 RSA Erosion Protection/Drainage

KEY
- **ARFF** - Airport Rescue and Firefighting
- **ASLD** - Arizona State Land Department
- **RSA** - Runway Safety Area
- **EA** - Environmental Assessment
- **RPZ** - Runway Protection Zone
- **ATCT** - Airport Traffic control Tower
- **MALSR** - Medium Intensity Approach Lighting System with Runway Alignment Indicators

INTERMEDIATE TERM

1 New Electric Vault, Extend Airfield Lighting Controls to ATCT
2 Environmental Assessment for Projects in the Intermediate Term (Not Pictured)
3 Land Acquisition to Relocate Service Road (1 acre)
4 Service Road Relocation
5 Construct Segregated Access for General Aviation and 175 Parking Spaces
6 Construct Segregated Access to ARFF Building
7 Construct Aircraft Wash Rack
8 Construct Access Roadway to South Terminal/Extend Utilities
9 Construct South Terminal - Phase I
10 Construct South Terminal Apron - Phase I
11 Construct South Terminal Automobile Parking - Phase I
12 Construct South Terminal Roadway/Extend Utilities
13 RPZ Land Acquisition (50 acres)
14 Install MALSR Runway 34
15 Install Instrument Landing System (ILS) Runway 34
16 Install High Intensity Runway Lighting (HIRL) on Runway 16-34
17 Expand General Aviation Apron West - Phase I
18 Construct Helipad and Hardstands
19 Existing Terminal Apron Pavement Maintenance/Rehabilitation
20 Existing GA Apron Pavement Maintenance/Rehabilitation

LONG TERM

1 Convert Existing Departure Facility to General Aviation Terminal
2 EA for Exit Taxiway, Apron Expansion, Air Cargo Development, Terminal Expansion (Not Pictured)
3 Construct General Aviation Automobile Parking at Converted Terminal
4 Construct Exit Taxiways
5 Expand General Aviation Apron West - Phase II
6 Expand General Aviation Apron South
7 Construct Air Cargo Building, Access, Parking, and Apron
8 Construct South Terminal - Phase II
8 Construct South Terminal Apron - Phase II
10 Construct South Terminal Automobile Parking - Phase II
11 Pavement Maintenance/Rehabilitation (Not Pictured)
12 EA for Parallel Runway (Not Pictured)
13 Land Acquisition for Parallel Runway (56 acres)
14 Relocate Western Portion of Service Road
15 Construct Parallel Runway with Parallel Taxiway and Connecting Taxiways
16 Install REILs Each End of Parallel Runway
17 Install PAPIs Each End of Parallel Runway

NORTH

0 1000 2000
SCALE IN FEET

Date of Photo: February 2008

Exhibit 5K
DEVELOPMENT STAGING

AIP level is $3.9 billion for the full fiscal year. Further action by the United States Congress will be necessary to provide funding for the full FY 2009. As of December 2008, a new multi-year AIP authorization and authority bill had not been passed.

The source for airport improvement funds from the federal government is the Aviation Trust Fund. The Aviation Trust Fund was established in 1970 to provide funding for aviation capital investment programs (aviation development, facilities and equipment, and research and development). The Aviation Trust Fund also finances the operation of the FAA. It is funded by user fees, including taxes on airline tickets, aviation fuel, and various aircraft parts. Under the AIP program, examples of eligible development projects include the airfield, public aprons, and access roads.

Entitlement Funds

AIP provides funding for eligible projects at airports through an entitlement program. Primary commercial service airports receive a guaranteed minimum of federal assistance each year, based on their enplaned passenger levels and Congressional appropriation levels. A primary airport is defined as any commercial service airport enplaning at least 10,000 passengers annually. AIR 21, and now Vision 100, adjusted allocation formulas to increase entitlements over previous levels and to establish special set-asides for noise programs, general aviation airports, non-primary airports, and other special programs.

Under the entitlement formula, airports enplaning 10,000 or more passengers annually will receive the higher of $1.0 million or an amount based upon the entitlement formula. The entitlement formula is based upon $15.60 per enplaned passenger for the first 50,000 enplanements, and $10.40 per enplanement for the next 50,000 boardings. The next 400,000 enplanements provide $5.20 each, and an airport receives $1.30 for the next 500,000 boardings. For each annual enplanement above one million, the airport will receive $1.00. A primary airport will receive the minimum entitlement level until annual boardings exceed 71,154.

Another entitlement program available to airports is associated with air cargo operations. Airports that have over 100 million pounds of landed weight by all-cargo carriers receive a cargo entitlement. The national cargo entitlement fund is established at three percent of the annual AIP appropriation. The airport cargo entitlement is based upon the airport's percentage of total landed weight at all eligible airports. Laughlin/Bullhead International Airport does not have, nor is it expected to have, sufficient air cargo activities to qualify for cargo entitlements.

Discretionary Funds

In a number of cases, airports face major projects that will require funds in excess of the airport's annual entitlements. Thus, additional funds from discretionary apportionments under AIP become desirable. The primary feature about discretionary funds is that they are distributed on a priority basis. These priorities are established by the FAA, utilizing a priority code system. Under this system, projects are ranked by their purpose. Projects ensuring airport safety and security are ranked as the most important priorities, followed by maintaining current infrastructure development, mitigating noise and other environmental impacts, meeting standards, and increasing system capacity.

Whereas entitlement monies are guaranteed on an annual basis, discretionary funds are not assured. If the combination of entitlement and discretionary funding does not provide enough capital for planned development, projects would either be delayed or require funding from the airport's revenues or other authorized sources.

It is important to note that competition for discretionary funding is not limited to airports in the State of Arizona or those within the FAA Western-Pacific Region. The funds are distributed to all airports in the country and, as such, are more difficult to obtain.

High priority projects will often fare favorably, while lower priority projects many times may not receive discretionary grants.

Passenger Facility Charges

The *Aviation Safety and Capacity Expansion Act of 1990* contained a provision for airports to levy passenger facility charges (PFCs) for the purposes of enhancing airport safety, capacity, security, or to reduce noise or enhance competition.

14 CFR Part 158 of May 29, 1991, establishes the regulations that must be followed by airports choosing to levy PFCs. Passenger facility charges may be imposed by public agencies controlling a commercial service airport with at least 2,500 annual passengers with scheduled service. Authorized agencies were allowed to impose a charge of $1.00, $2.00, or $3.00 per enplaned passenger. Legislation (AIR-21) passed in 2000 allowed the cap to increase to $4.50, which remains the current cap level under Vision 100. It should be noted that Congress has worked in the past to produce a new FAA spending Bill which could increase PFC levels up to $7 per enplanement. At the end of the 110th Congress, the Bill had stalled; however, a new Bill and potentially higher PFC level could be enacted by the 111th Congress in 2009.

Prior approval is required from the Department of Transportation (DOT) before an airport is allowed to levy a PFC. The DOT must find that the projected revenues are needed for specific, approved projects. Any AIP-eligible project, whether development or planning related, is eligible for PFC funding. Gates and related areas for the movement of passengers and baggage are eligible, as are on-airport ground access projects. Any project approved must preserve or enhance safety, security, or capacity; reduce/ mitigate noise impacts; or enhance competition among carriers.

PFCs may be used only on approved projects. However, PFCs can be utilized to fund 100 percent of a project. They may also be used as matching funds for AIP grants or to augment AIP-funded projects. PFCs can be used for debt service and financing costs of bonds for eligible airport development. These funds may also be commingled with general revenue for bond debt service. Before submitting a PFC application, the airport must give notice and an opportunity for consultation with airlines operating at the airport.

PFCs are to be treated similar to other airport improvement grants, rather than as airport revenues, and are administered by the FAA. Airlines retain up to 11 cents per passenger for collecting PFCs. It should also be noted that only revenue passengers pay PFCs. Non-revenue passengers, such as those using frequent flier rewards or airline personnel, are counted as enplanements but do not generate PFCs.

A $2.00 PFC is currently imposed at Laughlin/Bullhead International Airport. This PFC is currently in effect from May 1, 2008 through July 1, 2012.

Projected Entitlements and PFCs

Table 5D estimates the potential total entitlements for each planning horizon based upon the current entitlement formula. This assumes that the short term horizon activity level of 145,000 enplanements would be attained in five years. Similarly, the intermediate horizon would be reached in another five years, and the long term, ten years after that. A slower rate of growth would not result in fewer entitlement funds, unless enplanements fall below 10,000. PFC funds were projected based at the maximum rate of $4.50 per enplanement for the intermediate and long term periods. The current PFC of $2.00 was assumed through the short term planning period.. Obviously, this could increase if the new FAA funding legislation increases PFC collection rates. A faster rate of growth would produce

TABLE 5D
Projected Entitlements and PFCs for Each Planning Horizon

Planning Period	Passenger Enplanements	Total Potential AIP Entitlements During Planning Horizon	Total Potential PFCs During Planning Horizon	Total PFCs & Entitlements
Short Term (5 years)	145,000	$7,345,200	$1,252,200	$8,597,400
Intermediate (5 years)	200,000	$8,528,000	$3,907,100	$12,435,100
Long Term (10 years)	375,000	$23,205,000	$13,005,400	$36,210,400

a higher level of entitlement funding and PFCs, but may also require an acceleration of projects.

Based on **Table 5D**, the airport could expect to generate $8.5 million in entitlement and PFC funds to offset the costs of projects listed in the short term program. The total short term program costs are estimated at approximately $41 million. As a result, the airport will need to attract discretionary or other state and local funds to fully implement the projects programmed for the short term. Similarly, the projects proposed for the intermediate and long term exceed the entitlement and PFC funds which can be potentially generated by the entitlement and PFC programs. As such, the airport will need to attract discretionary grants or other local or state funds to fully implement the program.

FAA Facilities and Equipment (F&E) Program

The Air Traffic Organization (ATO) of the FAA administers the Facilities and Equipment (F&E) Program. This program provides funding for the installation and maintenance of various navigational aids and equipment of the national airspace system. Under the F&E program, funding is provided for FAA airport traffic control towers (ATCTs), en route navigational aids, on-airport navigational aids, and approach lighting systems. Projects which could be funded through F&E include: installing a MALSR on Runway 34 and the PAPIs and REILs on the future parallel runway.

STATE FUNDING PROGRAM

In support of the state airport system, the State of Arizona also participates in airport improvement projects. The source for state airport improvement funds is the Arizona Aviation Fund. Taxes levied by the state on aviation fuel, flight property, aircraft registration tax, and registration fees (as well as interest on these funds) are deposited in the Arizona Aviation Fund. The Transportation Board establishes the policies for distribution of these state funds.

Under the State of Arizona grant program, an airport can receive funding for one-half (currently 2.5 percent) of the local share of projects receiving federal AIP funding. The state also provides 90 percent funding for projects which are typically not eligible for federal AIP funding or have not received federal funding.

State Airport Loan Program

The Arizona Department of Transportation-Aeronautics Division's (ADOT) Airport Loan Program was established to enhance the utilization of state funds and provide a flexible funding mechanism to assist airports in funding improvement projects. Eligible projects include runway, taxiway, and apron improvements; land acquisition, planning studies, and the preparation of plans and specifications for airport construction projects; as well as revenue-generating improvements such as hangars and fuel storage facilities. Projects which are not currently eligible for the State Airport Loan Program are considered if the project would enhance the airport's ability to be financially self-sufficient.

Pavement Maintenance Program

The airport system in Arizona is a multi-million dollar investment of public and private funds that must be protected and preserved. State aviation fund dollars are limited and the State Transportation Board recognizes the need to protect and extend to the maximum amount the useful life of the airport system's pavement. This program, Arizona Pavement Preservation Program (APPP), is established to assist in the preservation of the Arizona airport system infrastructure.

Public Law 103-305 requires that airports requesting Federal AIP funding for pavement rehabilitation or reconstruction have an effective pavement maintenance management system. To this end, ADOT-Aeronautics has completed and is maintaining an Airport Pavement Management System (APMS) which, coupled with monthly pavement evaluations by the airport sponsors, fulfills this requirement.

The Arizona Airport Pavement Management System uses the Army Corps of Engineers' "Micropaver" program as a basis for generating a Five-Year Airport Pavement Preservation Program (APPP). The APMS consists of visual inspections of all airport pavements. Evaluations are made of the types and severities observed and entered into a computer program database. Pavement Condition Index (PCI) values are determined through the visual assessment of pavement condition in accordance with the most recent FAA Advisory Circular 150/5380-6, and range from 0 (failed) to 100 (excellent). Every three years, a complete database update with new visual observations is conducted. Individual airport reports from the update are shared with all participating system airports. The Aeronautics Division ensures that the APMS database is kept current, in compliance with FAA requirements.

Every year, the Aeronautics Division, utilizing the APMS, will identify airport pavement maintenance projects eligible for funding for the upcoming five years. These projects will appear in the State's Five-Year Airport Development Program. Once a project has been identified and approved for funding by the State Transportation Board, the airport sponsor may elect to accept a state grant for the project and not participate in the Airport Pavement Preservation Program (APPP), or the airport sponsor may sign an Inter-Government Agreement (IGA) with the Aeronautics Division to participate in the APPP.

LOCAL FUNDING

The balance of project costs, after consideration has been given to grants, must be funded through local resources. There are several alternatives for local financing options for future development at the airport, including airport revenues, direct funding from the MCAA, loans, bonding, and leasehold financing. These strategies could be used to fund the local matching share or complete the project if grant funding cannot be arranged.

Local funding options may also include the solicitation of private developers to construct and manage hangar facilities. The airport has, in the past, supported private development of hangars. Private hangar development should only be allowed within the definition of the airport master plan and within the rules and regulations of the airport in order to maintain an efficient airport facility layout.

SUMMARY

The best means to begin implementation of the recommendations in this master plan is to first recognize that planning is a continuous process that does not end with completion and approval of this document. Rather, the ability to continuously monitor the existing and forecast status of airport activity must be provided and maintained. The issues upon which this master plan is based will remain valid for a number of years. The primary goal is for the airport to best serve the air transportation needs of the region, while continuing to be economically self-sufficient.

The actual need for facilities is most appropriately established by airport activity levels rather than a specified date. For example, projections have been made as to when additional hangars may be needed at the airport. In reality, however, the timeframe in which the development is needed may be substantially different. Actual demand may be slower to develop than expected. On the other hand, high levels of demand may establish the need to accelerate development. Although every effort has been made in this master planning process to conservatively estimate when facility development may be needed, aviation demand will dictate when facility improvements need to be delayed or accelerated.

The real value of a usable master plan is in keeping the issues and objectives in the minds of the managers, decision-makers, and the community, so that they are better able to recognize change and its effects. In addition to adjustments in aviation demand, decisions made as to when to undertake the improvements recommended in this master plan will impact the period that the plan remains valid. The format used in this plan is intended to reduce the need for formal and costly updates by simply adjusting the timing. Updating can be done by the manager, thereby improving the plan's effectiveness.

Appendix A: Glossary of Terms

LAUGHLIN BULLHEAD INTERNATIONAL Airport

Glossary of Terms

ABOVE GROUND LEVEL: The elevation of a point or surface above the ground.

ACCELERATE-STOP DISTANCE AVAILABLE (ASDA): See declared distances.

ADVISORY CIRCULAR: External publications issued by the FAA consisting of non-regulatory material providing for the recommendations relative to a policy, guidance and information relative to a specific aviation subject.

AIR CARRIER: An operator which: (1) performs at least five round trips per week between two or more points and publishes flight schedules which specify the times, days of the week, and places between which such flights are performed; or (2) transports mail by air pursuant to a current contract with the U.S. Postal Service. Certified in accordance with Federal Aviation Regulation (FAR) Parts 121 and 127.

AIRCRAFT: A transportation vehicle that is used or intended for use for flight.

AIRCRAFT APPROACH CATEGORY: An alphabetic classification of aircraft based upon 1.3 times the stall speed in a landing configuration at their maximum certified landing weight.

AIRCRAFT OPERATION: The landing, takeoff, or touch-and-go procedure by an aircraft on a runway at an airport.

AIRCRAFT OPERATIONS AREA: A restricted and secure area on the airport property designed to protect all aspects related to aircraft operations.

AIRCRAFT OWNERS AND PILOTS ASSOCIATION: A private organization serving the interests and needs of general aviation pilots and aircraft owners.

AIRCRAFT APPROACH CATEGORY: A grouping of aircraft based on 1.3 times the stall speed in their landing configuration at their maximum certificated landing weight. The categories 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.

AIRCRAFT RESCUE AND FIRE FIGHTING: A facility located at an airport that provides emergency vehicles, extinguishing agents, and personnel responsible for minimizing the impacts of an aircraft accident or incident.

AIRFIELD: The portion of an airport which contains the facilities necessary for the operation of aircraft.

AIRLINE HUB: An airport at which an airline concentrates a significant portion of its activity and which often has a significant amount of connecting traffic.

AIRPLANE DESIGN GROUP (ADG): A grouping of aircraft based upon wingspan. The groups are as follows:

- *Group I:* Up to but not including 49 feet.
- *Group II:* 49 feet up to but not including 79 feet.
- *Group III:* 79 feet up to but not including 118 feet.
- *Group IV:* 118 feet up to but not including 171 feet.
- *Group V:* 171 feet up to but not including 214 feet.
- *Group VI:* 214 feet or greater.

AIRPORT AUTHORITY: A quasi-governmental public organization responsible for setting the policies governing the management and operation of an airport or system of airports under its jurisdiction.

AIRPORT BEACON: A navigational aid located at an airport which displays a rotating light beam to identify whether an airport is lighted.

AIRPORT CAPITAL IMPROVEMENT PLAN: The planning program used by the Federal Aviation Administration to identify, prioritize, and distribute funds for airport development and the needs of the National Airspace System to meet specified national goals and objectives.

AIRPORT ELEVATION: The highest point on the runway system at an airport expressed in feet above mean sea level (MSL).

AIRPORT LAYOUT DRAWING (ALD): The drawing of the airport showing the layout of existing and proposed airport facilities.

AIRPORT MASTER PLAN: The planner's concept of the long-term development of an airport.

AIRPORT MOVEMENT AREA SAFETY SYSTEM: A system that provides automated alerts and warnings of potential runway incursions or other hazardous aircraft movement events.

AIRPORT OBSTRUCTION CHART: A scaled drawing depicting the Federal Aviation Regulation (FAR) Part 77 surfaces, a representation of objects that penetrate these surfaces, runway, taxiway, and ramp areas, navigational aids, buildings, roads and other detail in the vicinity of an an airport.

AIRPORT REFERENCE CODE (ARC): A coding system used to relate airport design criteria to the operational (Aircraft Approach Category) to the physical characteristics (Airplane Design Group) of the airplanes intended to operate at the airport.

AIRPORT REFERENCE POINT (ARP): The latitude and longitude of the approximate center of the airport.

AIRPORT SPONSOR: The entity that is legally responsible for the management and operation of an airport, including the fulfillment of the requirements of laws and regulations related thereto.

AIRPORT SURFACE DETECTION EQUIPMENT: A radar system that provides air traffic controllers with a visual representation of the movement of aircraft and other vehicles on the ground on the airfield at an airport.

AIRPORT SURVEILLANCE RADAR: The primary radar located at an airport or in an air traffic control terminal area that receives a signal at an antenna and transmits the signal to air traffic control display equipment defining the location of aircraft in the air. The signal provides only the azimuth and range of aircraft from the location of the antenna.

AIRPORT TRAFFIC CONTROL TOWER (ATCT): A central operations facility in the terminal air traffic control system, consisting of a tower, including an associated instrument flight rule (IFR) room if radar equipped, using air/ground communications and/or radar, visual signaling and other devices to provide safe and expeditious movement of terminal air traffic.

AIR ROUTE TRAFFIC CONTROL CENTER: A facility which provides enroute air traffic control service to aircraft operating on an IFR flight plan within controlled airspace over a large, multi-state region.

AIRSIDE: The portion of an airport that contains the facilities necessary for the operation of aircraft.

AIRSPACE: The volume of space above the surface of the ground that is provided for the operation of aircraft.

AIR TAXI: An air carrier certificated in accordance with FAR Part 121 and FAR Part 135 and authorized to provide, on demand, public transportation of persons and property by aircraft. Generally operates small aircraft "for hire" for specific trips.

AIR TRAFFIC CONTROL: A service operated by an appropriate organization for the purpose of providing for the safe, orderly, and expeditious flow of air traffic.

AIR ROUTE TRAFFIC CONTROL CENTER (ARTCC): A facility established to provide air traffic control service to aircraft operating on an IFR flight plan within controlled airspace and principally during the enroute phase of flight.

AIR TRAFFIC HUB: A categorization of commercial service airports or group of commercial service airports in a metropolitan or urban area based upon the proportion of annual national enplanements existing at the airport or airports. The categories are large hub, medium hub, small hub, or non-hub. It forms the basis for the apportionment of entitlement funds.

AIR TRANSPORT ASSOCIATION OF AMERICA: An organization consisting of the principal U.S. airlines that represents the interests of the airline industry on major aviation issues before federal, state, and local government bodies. It promotes air transportation safety by coordinating industry and governmental safety programs and it serves as a focal point for industry efforts to standardize practices and enhance the efficiency of the air transportation system.

ALERT AREA: See special-use airspace.

ALTITUDE: The vertical distance measured in feet above mean sea level.

ANNUAL INSTRUMENT APPROACH (AIA): An approach to an airport with the intent to land by an aircraft in accordance with an IFR flight plan when visibility is less than three miles and/or when the ceiling is at or below the minimum initial approach altitude.

APPROACH LIGHTING SYSTEM (ALS): An airport lighting facility which provides visual guidance to landing aircraft by radiating light beams by which the pilot aligns the aircraft with the extended centerline of the runway on his final approach and landing.

APPROACH MINIMUMS: The altitude below which an aircraft may not descend while on an IFR approach unless the pilot has the runway in sight.

APPROACH SURFACE: An imaginary obstruction limiting surface defined in FAR Part 77 which is longitudinally centered on an extended runway centerline and extends outward and upward from the primary surface at each end of a runway at a designated slope and distance based upon the type of available or planned approach by aircraft to a runway.

APRON: A specified portion of the airfield used for passenger, cargo or freight loading and unloading, aircraft parking, and the refueling, maintenance and servicing of aircraft.

AREA NAVIGATION: The air navigation procedure that provides the capability to establish and maintain a flight path on an arbitrary course that remains within the coverage area of navigational sources being used.

AUTOMATED TERMINAL INFORMATION SERVICE (ATIS): The continuous broadcast of recorded non-control information at towered airports. Information typically includes wind speed, direction, and runway in use.

AUTOMATED SURFACE OBSERVATION SYSTEM (ASOS): A reporting system that provides frequent airport ground surface weather observation data through digitized voice broadcasts and printed reports.

AUTOMATED WEATHER OBSERVATION STATION (AWOS): Equipment used to automatically record weather conditions (i.e. cloud height, visibility, wind speed and direction, temperature, dewpoint, etc.)

AUTOMATIC DIRECTION FINDER (ADF): An aircraft radio navigation system which senses and indicates the direction to a non-directional radio beacon (NDB) ground transmitter.

AVIGATION EASEMENT: A contractual right or a property interest in land over which a right of unobstructed flight in the airspace is established.

AZIMUTH: Horizontal direction expressed as the angular distance between true north and the direction of a fixed point (as the observer's heading).

BASE LEG: A flight path at right angles to the landing runway off its approach end. The base leg normally extends from the downwind leg to the intersection of the extended runway centerline. See "traffic pattern."

BASED AIRCRAFT: The general aviation aircraft that use a specific airport as a home base.

BEARING: The horizontal direction to or from any point, usually measured clockwise from true north or magnetic north.

BLAST FENCE: A barrier used to divert or dissipate jet blast or propeller wash.

BLAST PAD: A prepared surface adjacent to the end of a runway for the purpose of eliminating the erosion of the ground surface by the wind forces produced by airplanes at the initiation of takeoff operations.

BUILDING RESTRICTION LINE (BRL): A line which identifies suitable building area locations on the airport.

CAPITAL IMPROVEMENT PLAN: The planning program used by the Federal Aviation Administration to identify, prioritize, and distribute Airport Improvement Program funds for airport development and the needs of the National Airspace System to meet specified national goals and objectives.

CARGO SERVICE AIRPORT: An airport served by aircraft providing air transportation of property only, including mail, with an annual aggregate landed weight of at least 100,000,000 pounds.

CATEGORY I: An Instrument Landing System (ILS) that provides acceptable guidance information to an aircraft from the coverage limits of the ILS to the point at which the localizer course line intersects the glide path at a decision height of 100 feet above the horizontal plane containing the runway threshold.

CATEGORY II: An ILS that provides acceptable guidance information to an aircraft from the coverage limits of the ILS to the point at which the localizer course line intersects the glide path at a decision height of 50 feet above the horizontal plane containing the runway threshold.

CATEGORY III: An ILS that provides acceptable guidance information to a pilot from the coverage limits of the ILS with no decision height specified above the horizontal plane containing the runway threshold.

CEILING: The height above the ground surface to the location of the lowest layer of clouds which is reported as either broken or overcast.

CIRCLING APPROACH: A maneuver initiated by the pilot to align the aircraft with the runway for landing when flying a predetermined circling instrument approach under IFR.

CLASS A AIRSPACE: See Controlled Airspace.

CLASS B AIRSPACE: See Controlled Airspace.

CLASS C AIRSPACE: See Controlled Airspace.

CLASS D AIRSPACE: See Controlled Airspace.

CLASS E AIRSPACE: See Controlled Airspace.

CLASS G AIRSPACE: See Controlled Airspace.

CLEAR ZONE: See Runway Protection Zone.

COMMERCIAL SERVICE AIRPORT: A public airport providing scheduled passenger service that enplanes at least 2,500 annual passengers.

COMMON TRAFFIC ADVISORY FREQUENCY: A radio frequency identified in the appropriate aeronautical chart which is designated for the purpose of transmitting airport advisory information and procedures while operating to or from an uncontrolled airport.

COMPASS LOCATOR (LOM): A low power, low/medium frequency radio-beacon installed in conjunction with the instrument landing system at one or two of the marker sites.

CONICAL SURFACE: An imaginary obstruction-limiting surface defined in FAR Part 77 that extends from the edge of the horizontal surface outward and upward at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

CONTROLLED AIRPORT: An airport that has an operating airport traffic control tower.

CONTROLLED AIRSPACE: Airspace of defined dimensions within which air traffic control services are provided to instrument flight rules (IFR) and visual flight rules (VFR) flights in accordance with the airspace classification. Controlled airspace in the United States is designated as follows:

- *CLASS A:* Generally, the airspace from 18,000 feet mean sea level (MSL) up to but not including flight level FL600. All persons must operate their aircraft under IFR.

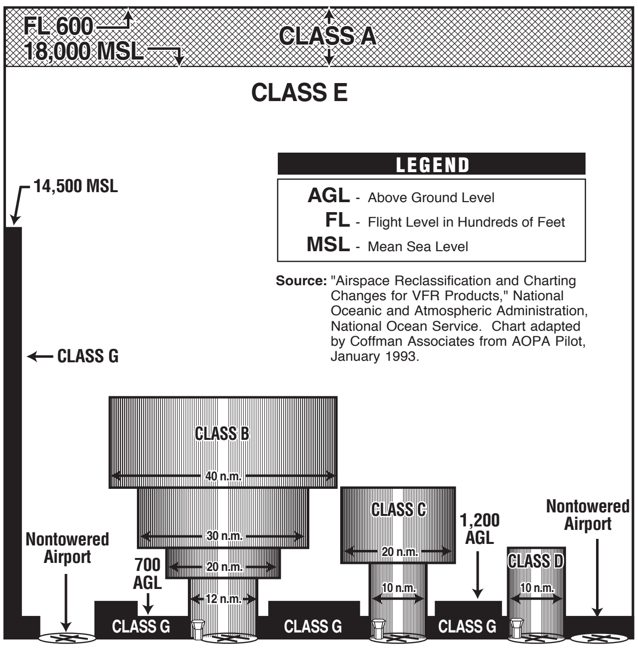
- *CLASS B:* Generally, the airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports. The configuration of Class B airspace is unique to each airport, but typically consists of two or more layers of air space and is designed to contain all published instrument approach procedures to the airport. An air traffic control clearance is required for all aircraft to operate in the area.

- *CLASS C:* Generally, the airspace from the surface to 4,000 feet above the airport elevation (charted as MSL) surrounding those airports that have an operational control tower and radar approach control and are served by a qualifying number of IFR operations or passenger enplanements. Although individually tailored for each airport, Class C airspace typically consists of a surface area with a five nautical mile (nm) radius and an outer area with a 10 nautical mile radius that extends from 1,200 feet to 4,000 feet above the airport elevation. Two-way radio communication is required for all aircraft.

- *CLASS D:* Generally, that airspace from the surface to 2,500 feet above the air port elevation (charted as MSL) surrounding those airports that have an operational control tower. Class D airspace is individually tailored and configured to encompass published instrument approach proce dures. Unless otherwise authorized, all persons must establish two-way radio communication.

- *CLASS E:* Generally, controlled airspace that is not classified as Class A, B, C, or D. Class E airspace extends upward from either the surface or a designated altitude to the overlying or adjacent controlled airspace. When designated as a surface area, the airspace will be configured to contain all instrument procedures. Class E airspace encompasses all Victor Airways. Only aircraft following instrument flight rules are required to establish two-way radio communication with air traffic control.

- *CLASS G:* Generally, that airspace not classified as Class A, B, C, D, or E. Class G airspace is uncontrolled for all aircraft. Class G airspace extends from the surface to the overlying Class E airspace.



CONTROLLED FIRING AREA: See special-use airspace.

CROSSWIND: A wind that is not parallel to a runway centerline or to the intended flight path of an aircraft.

CROSSWIND COMPONENT: The component of wind that is at a right angle to the runway centerline or the intended flight path of an aircraft.

CROSSWIND LEG: A flight path at right angles to the landing runway off its upwind end. See "traffic pattern."

DECIBEL: A unit of noise representing a level relative to a reference of a sound pressure 20 micro newtons per square meter.

DECISION HEIGHT: The height above the end of the runway surface at which a decision must be made by a pilot during the ILS or Precision Approach Radar approach to either continue the approach or to execute a missed approach.

DECLARED DISTANCES: The distances declared available for the airplane's takeoff runway, takeoff distance, accelerate-stop distance, and landing distance requirements. The distances are:

- *TAKEOFF RUNWAY AVAILABLE (TORA):* The runway length declared available and suitable for the ground run of an airplane taking off;

- *TAKEOFF DISTANCE AVAILABLE (TODA):* The TORA plus the length of any remaining runway and/or clear way beyond the far end of the TORA;

- *ACCELERATE-STOP DISTANCE AVAILABLE (ASDA):* The runway plus stopway length declared available for the acceleration and deceleration of an aircraft aborting a takeoff; and

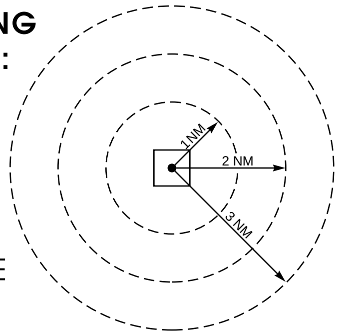
- *LANDING DISTANCE AVAILABLE (LDA):* The runway length declared available and suitable for landing.

DEPARTMENT OF TRANSPORTATION: The cabinet level federal government organization consisting of modal operating agencies, such as the Federal Aviation Administration, which was established to promote the coordination of federal transportation programs and to act as a focal point for research and development efforts in transportation.

DISCRETIONARY FUNDS: Federal grant funds that may be appropriated to an airport based upon designation by the Secretary of Transportation or Congress to meet a specified national priority such as enhancing capacity, safety, and security, or mitigating noise.

DISPLACED THRESHOLD: A threshold that is located at a point on the runway other than the designated beginning of the runway.

DISTANCE MEASURING EQUIPMENT (DME): Equipment (airborne and ground) used to measure, in nautical miles, the slant range distance of an aircraft from the DME navigational aid.



DNL: The 24-hour average sound level, in A-weighted decibels, obtained after the addition of ten decibels to sound levels for the periods between 10 p.m. and 7 a.m. as averaged over a span of one year. It is the FAA standard metric for determining the cumulative exposure of individuals to noise.

DOWNWIND LEG: A flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extends between the crosswind leg and the base leg. Also see "traffic pattern."

EASEMENT: The legal right of one party to use a portion of the total rights in real estate owned by another party. This may include the right of passage over, on, or below the property; certain air rights above the property, including view rights; and the rights to any specified form of development or activity, as well as any other legal rights in the property that may be specified in the easement document.

ELEVATION: The vertical distance measured in feet above mean sea level.

ENPLANED PASSENGERS: The total number of revenue passengers boarding aircraft, including originating, stop-over, and transfer passengers, in scheduled and non-scheduled services.

ENPLANEMENT: The boarding of a passenger, cargo, freight, or mail on an aircraft at an airport.

ENTITLEMENT: Federal funds for which a commercial service airport may be eligible based upon its annual passenger enplanements.

ENVIRONMENTAL ASSESSMENT (EA): An environmental analysis performed pursuant to the National Environmental Policy Act to determine whether an action would significantly affect the environment and thus require a more detailed environmental impact statement.

ENVIRONMENTAL AUDIT: An assessment of the current status of a party's compliance with applicable environmental requirements of a party's environmental compliance policies, practices, and controls.

ENVIRONMENTAL IMPACT STATEMENT (EIS): A document required of federal agencies by the National Environmental Policy Act for major projects ar legislative proposals affecting the environment. It is a tool for decision-making describing the positive and negative effects of a proposed action and citing alternative actions.

ESSENTIAL AIR SERVICE: A federal program which guarantees air carrier service to selected small cities by providing subsidies as needed to prevent these cities from such service.

FEDERAL AVIATION REGULATIONS: The general and permanent rules established by the executive departments and agencies of the Federal Government for aviation, which are published in the Federal Register. These are the aviation subset of the Code of Federal Regulations.

FINAL APPROACH: A flight path in the direction of landing along the extended runway centerline. The final approach normally extends from the base leg to the runway. See "traffic pattern."

FINDING OF NO SIGNIFICANT IMPACT (FONSI): A public document prepared by a Federal agency that presents the rationale why a proposed action will not have a significant effect on the environment and for which an environmental impact statement will not be prepared.

FIXED BASE OPERATOR (FBO): A provider of services to users of an airport. Such services include, but are not limited to, hangaring, fueling, flight training, repair, and maintenance.

FLIGHT LEVEL: A designation for altitude within controlled airspace.

FLIGHT SERVICE STATION: An operations facility in the national flight advisory system which utilizes data interchange facilities for the collection and dissemination of Notices to Airmen, weather, and administrative data and which provides pre-flight and in-flight advisory services to pilots through air and ground based communication facilities.

FRANGIBLE NAVAID: A navigational aid which retains its structural integrity and stiffness up to a designated maximum load, but on impact from a greater load, breaks, distorts, or yields in such a manner as to present the minimum hazard to aircraft.

GENERAL AVIATION: That portion of civil aviation which encompasses all facets of aviation except air carriers holding a certificate of convenience and necessity, and large aircraft commercial operators.

GLIDESLOPE (GS): Provides vertical guidance for aircraft during approach and landing. The glideslope consists of the following:

1. Electronic components emitting signals which provide vertical guidance by reference to airborne instruments during instrument approaches such as ILS; or

2. Visual ground aids, such as VASI, which provide vertical guidance for VFR approach or for the visual portion of an instrument approach and landing.

GLOBAL POSITIONING SYSTEM (GPS): A system of 24 satellites used as reference points to enable navigators equipped with GPS receivers to determine their latitude, longitude, and altitude.

GROUND ACCESS: The transportation system on and around the airport that provides access to and from the airport by ground transportation vehicles for passengers, employees, cargo, freight, and airport services.

HELIPAD: A designated area for the takeoff, landing, and parking of helicopters.

HIGH INTENSITY RUNWAY LIGHTS: The highest classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

HIGH-SPEED EXIT TAXIWAY: A long radius taxiway designed to expedite aircraft turning off the runway after landing (at speeds to 60 knots), thus reducing runway occupancy time.

HORIZONTAL SURFACE: An imaginary obstruction-limiting surface defined in FAR Part 77 that is specified as a portion of a horizontal plane surrounding a runway located 150 feet above the established airport elevation. The specific horizontal dimensions of this surface are a function of the types of approaches existing or planned for the runway.

INSTRUMENT APPROACH PROCEDURE: A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing, or to a point from which a landing may be made visually.

INSTRUMENT FLIGHT RULES (IFR): Procedures for the conduct of flight in weather conditions below Visual Flight Rules weather minimums. The term IFR is often also used to define weather conditions and the type of flight plan under which an aircraft is operating.

INSTRUMENT LANDING SYSTEM (ILS): A precision instrument approach system which normally consists of the following electronic components and visual aids:

1. Localizer.
2. Glide Slope.
3. Outer Marker.
4. Middle Marker.
5. Approach Lights.

INSTRUMENT METEOROLOGICAL CONDITIONS: Meteorological conditions expressed in terms of specific visibility and ceiling conditions that are less than the minimums specified for visual meteorological conditions.

ITINERANT OPERATIONS: Operations by aircraft that are not based at a specified airport.

KNOTS: A unit of speed length used in navigation that is equivalent to the number of nautical miles traveled in one hour.

LANDSIDE: The portion of an airport that provides the facilities necessary for the processing of passengers, cargo, freight, and ground transportation vehicles.

LANDING DISTANCE AVAILABLE (LDA): See declared distances.

LARGE AIRPLANE: An airplane that has a maximum certified takeoff weight in excess of 12,500 pounds.

LOCAL AREA AUGMENTATION SYSTEM: A differential GPS system that provides localized measurement correction signals to the basic GPS signals to improve navigational accuracy, integrity, continuity, and availability.

LOCAL OPERATIONS: Aircraft operations performed by aircraft that are based at the airport and that operate in the local traffic pattern or within sight of the airport, that are known to be departing for or arriving from flights in local practice areas within a prescribed distance from the airport, or that execute simulated instrument approaches at the airport.

LOCAL TRAFFIC: Aircraft operating in the traffic pattern or within sight of the tower, or aircraft known to be departing or arriving from the local practice areas, or aircraft executing practice instrument approach procedures. Typically, this includes touch-and-go training operations.

LOCALIZER: The component of an ILS which provides course guidance to the runway.

LOCALIZER TYPE DIRECTIONAL AID (LDA): A facility of comparable utility and accuracy to a localizer, but is not part of a complete ILS and is not aligned with the runway.

LONG RANGE NAVIGATION SYSTEM (LORAN): Long range navigation is an electronic navigational aid which determines aircraft position and speed by measuring the difference in the time of reception of synchronized pulse signals from two fixed transmitters. Loran is used for enroute navigation.

LOW INTENSITY RUNWAY LIGHTS: The lowest classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

MEDIUM INTENSITY RUNWAY LIGHTS: The middle classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

MICROWAVE LANDING SYSTEM (MLS): An instrument approach and landing system that provides precision guidance in azimuth, elevation, and distance measurement.

MILITARY OPERATIONS: Aircraft operations that are performed in military aircraft.

MILITARY OPERATIONS AREA (MOA): See special-use airspace.

MILITARY TRAINING ROUTE: An air route depicted on aeronautical charts for the conduct of military flight training at speeds above 250 knots.

MISSED APPROACH COURSE (MAC): The flight route to be followed if, after an instrument approach, a landing is not affected, and occurring normally:

1. When the aircraft has descended to the decision height and has not established visual contact; or

2. When directed by air traffic control to pull up or to go around again.

MOVEMENT AREA: The runways, taxiways, and other areas of an airport which are utilized for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports with a tower, air traffic control clearance is required for entry onto the movement area.

NATIONAL AIRSPACE SYSTEM: The network of air traffic control facilities, air traffic control areas, and navigational facilities through the U.S.

NATIONAL PLAN OF INTEGRATED AIRPORT SYSTEMS: The national airport system plan developed by the Secretary of Transportation on a biannual basis for the development of public use airports to meet national air transportation needs.

NATIONAL TRANSPORTATION SAFETY BOARD: A federal government organization established to investigate and determine the probable cause of transportation accidents, to recommend equipment and procedures to enhance transportation safety, and to review on appeal the suspension or revocation of any certificates or licenses issued by the Secretary of Transportation.

NAUTICAL MILE: A unit of length used in navigation which is equivalent to the distance spanned by one minute of arc in latitude, that is, 1,852 meters or 6,076 feet. It is equivalent to approximately 1.15 statute mile.

NAVAID: A term used to describe any electrical or visual air navigational aids, lights, signs, and associated supporting equipment (i.e. PAPI, VASI, ILS, etc.)

NOISE CONTOUR: A continuous line on a map of the airport vicinity connecting all points of the same noise exposure level.

NON-DIRECTIONAL BEACON (NDB): A beacon transmitting nondirectional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine his or her bearing to and from the radio beacon and home on, or track to, the station. When the radio beacon is installed in conjunction with the Instrument Landing System marker, it is normally called a Compass Locator.

NON-PRECISION APPROACH PROCEDURE: A standard instrument approach procedure in which no electronic glide slope is provided, such as VOR, TACAN, NDB, or LOC.

NOTICE TO AIRMEN: A notice containing information concerning the establishment, condition, or change in any component of or hazard in the National Airspace System, the timely knowledge of which is considered essential to personnel concerned with flight operations.

OBJECT FREE AREA (OFA): An area on the ground centered on a runway, taxiway, or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

OBSTACLE FREE ZONE (OFZ): The airspace below 150 feet above the established airport elevation and along the runway and extended runway centerline that is required to be kept clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function,
in order to provide clearance for aircraft landing or taking off from the runway, and for missed approaches.

OPERATION: A take-off or a landing.

OUTER MARKER (OM): An ILS navigation facility in the terminal area navigation system located four to seven miles from the runway edge on the extended centerline, indicating to the pilot that he/she is passing over the facility and can begin final approach.

PILOT CONTROLLED LIGHTING: Runway lighting systems at an airport that are controlled by activating the microphone of a pilot on a specified radio frequency.

PRECISION APPROACH: A standard instrument approach procedure which provides runway alignment and glide slope (descent) information. It is categorized as follows:

- *CATEGORY I (CAT I):* A precision approach which provides for approaches with a decision height of not less than 200 feet and visibility not less than 1/2 mile or Runway Visual Range (RVR) 2400 (RVR 1800) with operative touchdown zone and runway centerline lights.

- *CATEGORY II (CAT II):* A precision approach which provides for approaches with a decision height of not less than 100 feet and visibility not less than 1200 feet RVR.

- *CATEGORY III (CAT III):* A precision approach which provides for approaches with minima less than Category II.

PRECISION APPROACH PATH INDICATOR (PAPI): A lighting system providing visual approach slope guidance to aircraft during a landing approach. It is similar to a VASI but provides a sharper transition between the colored indicator lights.

PRECISION APPROACH RADAR: A radar facility in the terminal air traffic control system used to detect and display with a high degree of accuracy the direction, range, and elevation of an aircraft on the final approach to a runway.

PRECISION OBJECT FREE AREA (POFA): An area centered on the extended runway centerline, beginning at the runway threshold and extending behind the runway threshold that is 200 feet long by 800 feet wide. The POFA is a clearing standard which requires the POFA to be kept clear of above ground objects protruding above the runway safety area edge elevation (except for frangible NAVAIDS). The POFA applies to all new authorized instrument approach procedures with less than 3/4 mile visibility.

PRIMARY AIRPORT: A commercial service airport that enplanes at least 10,000 annual passengers.

PRIMARY SURFACE: An imaginary obstruction limiting surface defined in FAR Part 77 that is specified as a rectangular surface longitudinally centered about a runway. The specific dimensions of this surface are a function of the types of approaches existing or planned for the runway.

PROHIBITED AREA: See special-use airspace.

PVC: Poor visibility and ceiling. Used in determining Annual Sevice Volume. PVC conditions exist when the cloud ceiling is less than 500 feet and visibility is less than one mile.

RADIAL: A navigational signal generated by a Very High Frequency Omni-directional Range or VORTAC station that is measured as an azimuth from the station.

REGRESSION ANALYSIS: A statistical technique that seeks to identify and quantify the relationships between factors associated with a forecast.

REMOTE COMMUNICATIONS OUTLET (RCO): An unstaffed transmitter receiver/facility remotely controlled by air traffic personnel. RCOs serve flight service stations (FSSs). RCOs were established to provide ground-to-ground communications between air traffic control specialists and pilots at satellite airports for delivering enroute clearances, issuing departure authorizations, and acknowledging instrument flight rules cancellations or departure/landing times.

REMOTE TRANSMITTER/RECEIVER (RTR): See remote communications outlet. RTRs serve ARTCCs.

RELIEVER AIRPORT: An airport to serve general aviation aircraft which might otherwise use a congested air-carrier served airport.

RESTRICTED AREA: See special-use airspace.

RNAV: Area navigation - airborne equipment which permits flights over determined tracks within prescribed accuracy tolerances without the need to overfly ground-based navigation facilities. Used enroute and for approaches to an airport.

RUNWAY: A defined rectangular area on an airport prepared for aircraft landing and takeoff. Runways are normally numbered in relation to their magnetic direction, rounded off to the nearest 10 degrees. For example, a runway with a magnetic heading of 180 would be designated Runway 18. The runway heading on the opposite end of the runway is 180 degrees from that runway end. For example, the opposite runway heading for Runway 18 would be Runway 36 (magnetic heading of 360). Aircraft can takeoff or land from either end of a runway, depending upon wind direction.

RUNWAY ALIGNMENT INDICATOR LIGHT: A series of high intensity sequentially flashing lights installed on the extended centerline of the runway usually in conjunction with an approach lighting system.

RUNWAY END IDENTIFIER LIGHTS (REIL): Two synchronized flashing lights, one on each side of the runway threshold, which provide rapid and positive identification of the approach end of a particular runway.

RUNWAY GRADIENT: The average slope, measured in percent, between the two ends of a runway.

RUNWAY PROTECTION ZONE (RPZ): An area off the runway end to enhance the protection of people and property on the ground. The RPZ is trapezoidal in shape. Its dimensions are determined by the aircraft approach speed and runway approach type and minima.

RUNWAY SAFETY AREA (RSA): A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.

RUNWAY VISIBILITY ZONE (RVZ): An area on the airport to be kept clear of permanent objects so that there is an unobstructed line-of-site from any point five feet above the runway centerline to any point five feet above an intersecting runway centerline.

RUNWAY VISUAL RANGE (RVR): An instrumentally derived value, in feet, representing the horizontal distance a pilot can see down the runway from the runway end.

SCOPE: The document that identifies and defines the tasks, emphasis, and level of effort associated with a project or study.

SEGMENTED CIRCLE: A system of visual indicators designed to provide traffic pattern information at airports without operating control towers.

SHOULDER: An area adjacent to the edge of paved runways, taxiways, or aprons providing a transition between the pavement and the adjacent surface; support for aircraft running off the pavement; enhanced drainage; and blast protection. The shoulder does not necessarily need to be paved.

SLANT-RANGE DISTANCE: The straight line distance between an aircraft and a point on the ground.

SMALL AIRPLANE: An airplane that has a maximum certified takeoff weight of up to 12,500 pounds.

SPECIAL-USE AIRSPACE: Airspace of defined dimensions identified by a surface area wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. Special-use airspace classifications include:

- *ALERT AREA:* Airspace which may contain a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft.

- *CONTROLLED FIRING AREA:* Airspace wherein activities are conducted under conditions so controlled as to eliminate hazards to nonparticipating aircraft and to ensure the safety of persons or property on the ground.

- *MILITARY OPERATIONS AREA (MOA):* Designated airspace with defined vertical and lateral dimensions established outside Class A airspace to separate/segregate certain military activities from instrument flight rule (IFR) traffic and to identify for visual flight rule (VFR) traffic where these activities are conducted.

- *PROHIBITED AREA:* Designated airspace within which the flight of aircraft is prohibited.

- *RESTRICTED AREA:* Airspace designated under Federal Aviation Regulation (FAR) 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Most restricted areas are designated joint use. When not in use by the using agency, IFR/VFR operations can be authorized by the controlling air traffic control facility.

- *WARNING AREA:* Airspace which may contain hazards to nonparticipating aircraft.

STANDARD INSTRUMENT DEPARTURE (SID): A preplanned coded air traffic control IFR departure routing, preprinted for pilot use in graphic and textual form only.

STANDARD TERMINAL ARRIVAL (STAR): A preplanned coded air traffic control IFR arrival routing, preprinted for pilot use in graphic and textual or textual form only.

STOP-AND-GO: A procedure wherein an aircraft will land, make a complete stop on the runway, and then commence a takeoff from that point. A stop-and-go is recorded as two operations: one operation for the landing and one operation for the takeoff.

STOPWAY: An area beyond the end of a takeoff runway that is designed to support an aircraft during an aborted takeoff without causing structural damage to the aircraft. It is not to be used for takeoff, landing, or taxiing by aircraft.

STRAIGHT-IN LANDING/APPROACH: A landing made on a runway aligned within 30 degrees of the final approach course following completion of an instrument approach.

TACTICAL AIR NAVIGATION (TACAN): An ultra-high frequency electronic air navigation system which provides suitably-equipped aircraft a continuous indication of bearing and distance to the TACAN station.

TAKEOFF RUNWAY AVAILABLE (TORA): See declared distances.

TAKEOFF DISTANCE AVAILABLE (TODA): See declared distances.

TAXILANE: The portion of the aircraft parking area used for access between taxiways and aircraft parking positions.

TAXIWAY: A defined path established for the taxiing of aircraft from one part of an airport to another.

TAXIWAY SAFETY AREA (TSA): A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway.

TERMINAL INSTRUMENT PROCEDURES: Published flight procedures for conducting instrument approaches to runways under instrument meteorological conditions.

TERMINAL RADAR APPROACH CONTROL: An element of the air traffic control system responsible for monitoring the en-route and terminal segment of air traffic in the airspace surrounding airports with moderate to high-levels of air traffic.

TETRAHEDRON: A device used as a landing direction indicator. The small end of the tetrahedron points in the direction of landing.

THRESHOLD: The beginning of that portion of the runway available for landing. In some instances the landing threshold may be displaced.

TOUCH-AND-GO: An operation by an aircraft that lands and departs on a runway without stopping or exiting the runway. A touch-and-go is recorded as two operations: one operation for the landing and one operation for the takeoff.

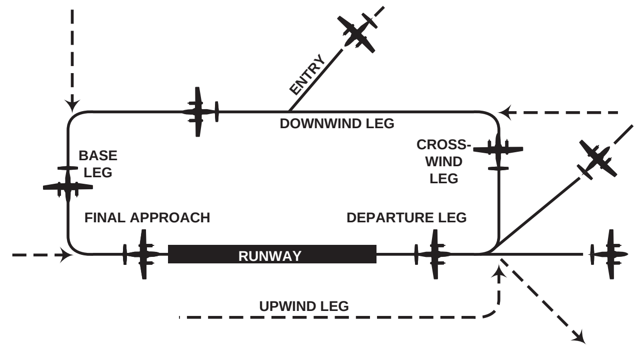
TOUCHDOWN: The point at which a landing aircraft makes contact with the runway surface.

TOUCHDOWN ZONE (TDZ): The first 3,000 feet of the runway beginning at the threshold.

TOUCHDOWN ZONE ELEVATION (TDZE): The highest elevation in the touchdown zone.

TOUCHDOWN ZONE (TDZ) LIGHTING: Two rows of transverse light bars located symmetrically about the runway centerline normally at 100-foot intervals. The basic system extends 3,000 feet along the runway.

TRAFFIC PATTERN: The traffic flow that is prescribed for aircraft landing at or taking off from an airport. The components of a typical traffic pattern are the upwind leg, crosswind leg, downwind leg, base leg, and final approach.

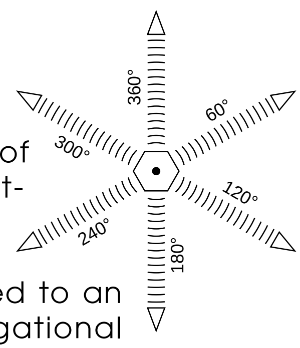


UNCONTROLLED AIRPORT: An airport without an air traffic control tower at which the control of Visual Flight Rules traffic is not exercised.

UNCONTROLLED AIRSPACE: Airspace within which aircraft are not subject to air traffic control.

UNIVERSAL COMMUNICATION (UNICOM): A nongovernment communication facility which may provide airport information at certain airports. Locations and frequencies of UNICOM's are shown on aeronautical charts and publications.

UPWIND LEG: A flight path parallel to the landing runway in the direction of landing. See "traffic pattern."



VECTOR: A heading issued to an aircraft to provide navigational guidance by radar.

VERY HIGH FREQUENCY/ OMNIDIRECTIONAL RANGE STATION (VOR): A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, oriented from magnetic north. Used as the basis for navigation in the national airspace system. The VOR periodically identifies itself by Morse Code and may have an additional voice identification feature.

VERY HIGH FREQUENCY OMNI-DIRECTIONAL RANGE STATION/ TACTICAL AIR NAVIGATION (VORTAC): A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance-measuring equipment (DME) at one site.

VICTOR AIRWAY: A control area or portion thereof established in the form of a corridor, the centerline of which is defined by radio navigational aids.

VISUAL APPROACH: An approach wherein an aircraft on an IFR flight plan,
operating in VFR conditions under the control of an air traffic control facility and having an air traffic control authorization, may proceed to the airport of destination in VFR conditions.

VISUAL APPROACH SLOPE INDICATOR (VASI): An airport lighting facility providing vertical visual approach slope guidance to aircraft during approach to landing by radiating a directional pattern of high intensity red and white focused light beams which indicate to the pilot that he is on path if he sees red/white, above path if white/white, and below path if red/red. Some airports serving large aircraft have three-bar VASI's which provide two visual guide paths to the same runway.

VISUAL FLIGHT RULES (VFR): Rules that govern the procedures for conducting flight under visual conditions. The term VFR is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.

VISUAL METEOROLOGICAL CONDITIONS: Meteorological conditions expressed in terms of specific visibility and ceiling conditions which are equal to or greater than the threshold values for instrument meteorological conditions.

VOR: See "Very High Frequency Omnidirectional Range Station."

VORTAC: See "Very High Frequency Omnidirectional Range Station/Tactical Air Navigation."

WARNING AREA: See special-use airspace.

WIDE AREA AUGMENTATION SYSTEM: An enhancement of the Global Positioning System that includes integrity broadcasts, differential corrections, and additional ranging signals for the purpose of providing the accuracy, integrity, availability, and continuity required to support all phases of flight.

Abbreviations

AC: advisory circular

ADF: automatic direction finder

ADG: airplane design group

AFSS: automated flight service station

AGL: above ground level

AIA: annual instrument approach

AIP: Airport Improvement Program

AIR-21: Wendell H. Ford Aviation Investment and Reform Act for the 21st Century

ALS: approach lighting system

ALSF-1: standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT I configuration)

ALSF-2: standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT II configuration)

APV: instrument approach procedure with vertical guidance

ARC: airport reference code

ARFF: aircraft rescue and firefighting

ARP: airport reference point

ARTCC: air route traffic control center

ASDA: accelerate-stop distance available

ASR: airport surveillance radar

ASOS: automated surface observation station

ATCT: airport traffic control tower

ATIS: automated terminal information service

AVGAS: aviation gasoline - typically 100 low lead (100LL)

AWOS: automated weather observation station

BRL: building restriction line

CFR: Code of Federal Regulations

CIP: capital improvement program

DME: distance measuring equipment

DNL: day-night noise level

DWL: runway weight bearing capacity for aircraft with dual-wheel type landing gear

DTWL: runway weight bearing capacity fo aircraft with dual-tandem type landing gear

FAA: Federal Aviation Administration

FAR: Federal Aviation Regulation

FBO: fixed base operator
FY: fiscal year

GPS: global positioning system

GS: glide slope

HIRL: high intensity runway edge lighting

IFR: instrument flight rules (FAR Part 91)

ILS: instrument landing system

IM: inner marker

LDA: localizer type directional aid

LDA: landing distance available

LIRL: low intensity runway edge lighting

LMM: compass locator at middle marker

LOC: ILS localizer

LOM: compass locator at ILS outer marker

LORAN: long range navigation

MALS: medium intensity approach lighting system

MALSR: medium intensity approach lighting system with runway alignment indicator lights

MIRL: medium intensity runway edge lighting

MITL: medium intensity taxiway edge lighting

MLS: microwave landing system

MM: middle marker

MOA: military operations area

MSL: mean sea level

NAVAID: navigational aid

NDB: nondirectional radio beacon

NM: nautical mile (6,076 .1 feet)

NPES: National Pollutant Discharge Elimination System

NPIAS: National Plan of Integrated Airport Systems

NPRM: notice of proposed rulemaking

ODALS: omnidirectional approach lighting system

OFA: object free area

OFZ: obstacle free zone

OM: outer marker

PAC: planning advisory committee

PAPI: precision approach path indicator

PFC: porous friction course

PFC: passenger facility charge

PCL: pilot-controlled lighting

PIW: public information workshop

PLASI: pulsating visual approach slope indicator

POFA: precision object free area

PVASI: pulsating/steady visual approach slope indicator

PVC: Poor visibility and ceiling.

RCO: remote communications outlet

REIL: runway end identifier lighting

RNAV: area navigation

RPZ: runway protection zone

RSA: Runway Safety Area

RTR: remote transmitter/receiver

RVR: runway visibility range

RVZ: runway visibility zone

SALS: short approach lighting system

SASP: state aviation system plan

SEL: sound exposure level
SID: standard instrument departure

SM: statute mile (5,280 feet)

SRE: snow removal equipment

SSALF: simplified short approach lighting system with sequenced flashers

SSALR: simplified short approach lighting system with runway alignment indicator lights

STAR: standard terminal arrival route

SWL: runway weight bearing capacity for aircraft with single-wheel type landing gear

STWL: runway weight bearing capacity for aircraft with single-wheel tandem type landing gear

TACAN: tactical air navigational aid

TDZ: touchdown zone

TDZE: touchdown zone elevation

TAF: Federal Aviation Administration (FAA) Terminal Area Forecast

TODA: takeoff distance available

TORA: takeoff runway available

TRACON: terminal radar approach control

VASI: visual approach slope indicator

VFR: visual flight rules (FAR Part 91)

VHF: very high frequency

VOR: very high frequency omni-directional range

VORTAC: VOR and TACAN collocated

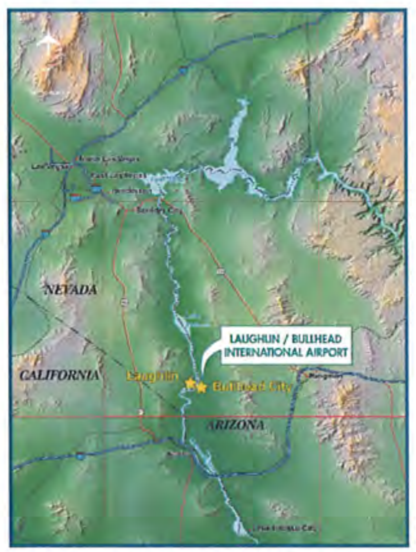
Appendix B: Airport Layout Drawings

LAUGHLIN BULLHEAD INTERNATIONAL Airport

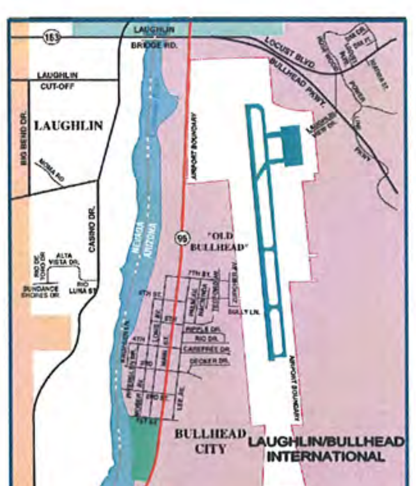
LAUGHLIN/BULLHEAD INTERNATIONAL AIRPORT

AIRPORT LAYOUT PLANS

PREPARED FOR THE
MOHAVE COUNTY AIRPORT AUTHORITY



LOCATION MAP



VICINITY MAP

DRAWING INDEX

1. AIRPORT LAYOUT DRAWING
2. TERMINAL AREA DRAWING
3. AIRPORT AIRSPACE DRAWING I
4. AIRPORT AIRSPACE DRAWING II
5. AIRPORT AIRSPACE APPROACH PROFILE RUNWAY 16L-34R
6. AIRPORT AIRSPACE APPROACH PROFILE RUNWAY 34R
7. AIRPORT AIRSPACE APPROACH PROFILE RUNWAY 16R-34L
8. INNER PORTION OF THE APPROACH SURFACE DRAWING RUNWAY 16L
9. INNER PORTION OF THE APPROACH SURFACE DRAWING RUNWAY 34R
10. INNER PORTION OF THE APPROACH SURFACE DRAWING RUNWAY 16R
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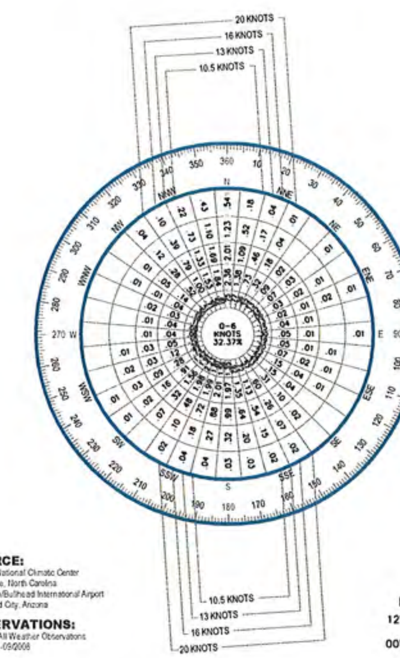
14. ON-AIRPORT LAND USE DRAWING
15. AIRPORT PROPERTY MAP
16. INNER APPROACH OFZ DRAWING

ALL WEATHER WIND COVERAGE

Runway	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 16-34	95.04%	97.87%	99.19%	99.71%



SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Laughlin/Bullhead International Airport
Bullhead City, Arizona

OBSERVATIONS:
42,061 All Weather Observations
11/1998-09/2008

Magnetic Declination
12° 13' East (February 2009)
Annual Rate of Change
00° 06' West (February 2009)

February 27, 2009

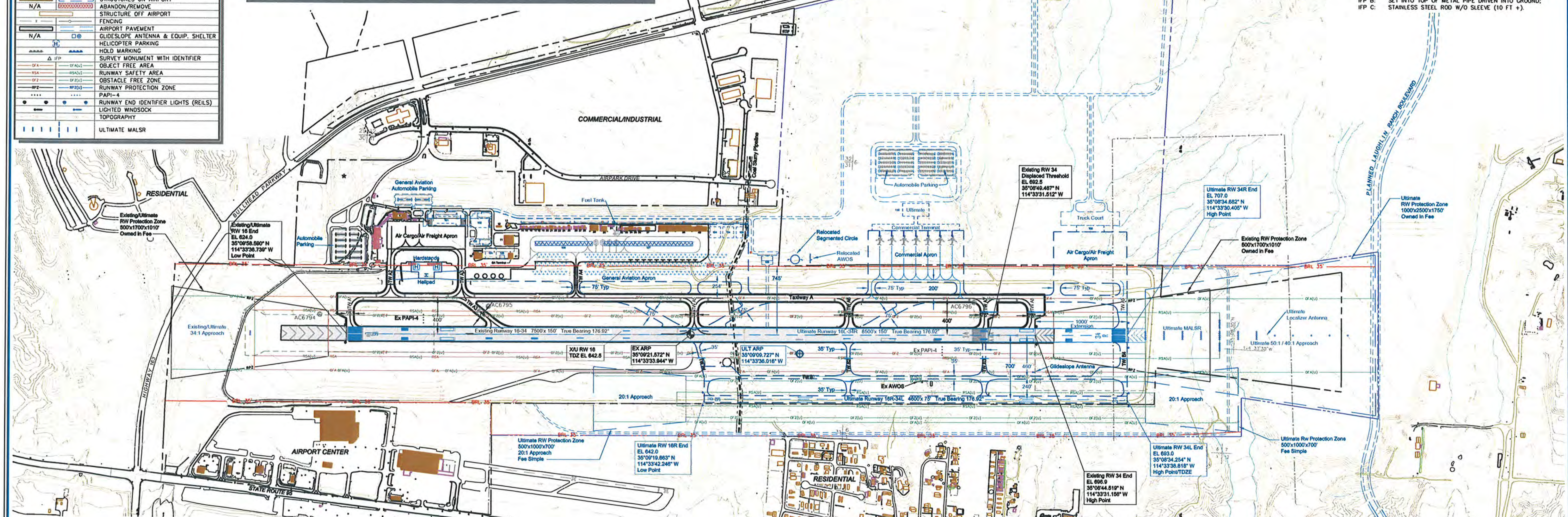
Coffman Associates
Airport Consultants
www.coffmanassociates.com

LEGEND		
EXISTING	ULTIMATE	DESCRIPTION
		AIRPORT PROPERTY LINE
		SECTION CORNERS
		AIRPORT REFERENCE POINT (ARP)
		AIRPORT ROTATING BEACON
		AVIGATION EASEMENT
	BRL 35'	BUILDING RESTRICTION LINE
		STRUCTURES ON AIRPORT
N/A		ABANDON/REMOVE
		STRUCTURE OFF AIRPORT
		FENCING
		AIRPORT PAVEMENT
N/A		GLIDESLOPE ANTENNA & EQUIP. SHELTER
		HELICOPTER PARKING
		HOLD MARKING
IFP		SURVEY MONUMENT WITH IDENTIFIER
OFA	OFA(U)	OBJECT FREE AREA
RSA	RSA(U)	RUNWAY SAFETY AREA
OFZ	OFZ(U)	OBSTACLE FREE ZONE
RPZ	RPZ(U)	RUNWAY PROTECTION ZONE
		PAPI-4
		RUNWAY END IDENTIFIER LIGHTS (REILS)
		LIGHTED WINDSOCK
		TOPOGRAPHY
		ULTIMATE MALSR

DEVIATIONS TO DESIGN STANDARD TABLE		
STANDARD	DESCRIPTION OF MODIFICATION	ACTION
OFA CLEAR OF ABOVE GROUND OBJECTS PROTRUDING ABOVE THE RUNWAY SAFETY AREA EDGE ELEVATION	SERVICE ACCESS ROAD AND FENCE PENETRATE OBJECT FREE AREA AT RUNWAY 16 END	TO REMAIN

SURVEY CONTROL STATIONS			
ID	PERMANENT IDENTIFIER	LATITUDE	LONGITUDE
IFP A	AC6796	35° 08' 51.2456" N	114° 33' 28.0413" W
IFP B	AC6795	35° 09' 43.4799" N	114° 33' 32.0758" W
IFP C	AC6794	35° 10' 01.6050" N	114° 33' 34.4039" W

IFP A: SET INTO TOP OF METAL PIPE DRIVEN INTO GROUND;
IFP B: SET INTO TOP OF METAL PIPE DRIVEN INTO GROUND;
IFP C: STAINLESS STEEL ROD W/O SLEEVE (10 FT +).



RUNWAY DATA	RUNWAY 16-34 EXISTING 16	RUNWAY 16-34 EXISTING 34	RUNWAY 16-34 ULTIMATE 16L	RUNWAY 16-34 ULTIMATE 34R	RUNWAY 16R-34L ULTIMATE 16R	RUNWAY 16R-34L ULTIMATE 34L
AIRCRAFT APPROACH CATEGORY-DESIGN GROUP	C-III		D-IV		B-II	
14 CFR PART 77 CATEGORY	Nonprecision	Nonprecision	Nonprecision	Precision	Visual	Visual
APPROACH VISIBILITY MINIMUMS	1 Mile	1 Mile	1 Mile	1/2 Mile	Visual	Visual
DESIGN CRITICAL AIRCRAFT	Boeing 737		Boeing 757/G 450		Cessna Citation III	
WINGSPAN OF DESIGN AIRCRAFT	112.58'		124.83'/77.83'		53.5'	
UNDERCARRIAGE WIDTH OF DESIGN AIRCRAFT	18.75'		24'		9.04'	
APPROACH SPEED (KNOTS) OF DESIGN AIRCRAFT	141		143		114	
MAXIMUM CERTIFIED TAKEOFF WEIGHT (LBS) OF DESIGN AIRCRAFT	174,200		272,000		22,000	
RUNWAY EFFECTIVE GRADIENT	1.0%		1.0%		1.1%	
RUNWAY MAXIMUM GRADIENT	1.0%		1.0%		1.1%	
PAVEMENT DESIGN STRENGTH (in thousand lbs.)[1]	75(S), 200(D), 400(DTW)		75(S), 200(D), 400(DTW)		12.5(S)	
APPROACH SLOPE	34:1	34:1	34:1	50:1/40:1	20:1	20:1
RUNWAY END ELEVATION (MSL)	624.0'	696.9'	624.0'	707.0'	642.0'	693.0'
RUNWAY TOUCHDOWN ZONE ELEVATION (MSL)	644.5'	696.9'	644.5'	707.0'	677.8'	693.0'
RUNWAY HIGH POINT ELEVATION (MSL)	696.9'		707.0'		6930'	
RUNWAY LOW POINT ELEVATION (MSL)	616.0'		616.0'		642.0'	
LINE OF SIGHT REQUIREMENT MET	YES		YES		YES	
RUNWAY LENGTH	7500'		8500'		4600'	
RUNWAY WIDTH	150'		150'		75'	
RUNWAY BEARING (TRUE)	176.92°	356.92°	176.92°	356.92°	176.92°	356.92°
RUNWAY SAFETY AREA LENGTH BEYOND STOP END OF RUNWAY	1000'	1000'	1000'	1000'	300'	300'
RUNWAY SAFETY AREA WIDTH	500'		500'		150'	
RUNWAY OBJECT FREE AREA LENGTH BEYOND STOP END OF RUNWAY	878'	1000'	878'	1000'	300'	300'
RUNWAY OBJECT FREE AREA WIDTH	800'		800'		500'	
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND RUNWAY END	200'	200'	200'	200'	200'	200'
RUNWAY OBSTACLE FREE ZONE WIDTH	400'		400'		250'	
DISTANCE FROM RUNWAY CENTERLINE TO HOLD BARS AND SIGNS	250'		256.9'		125'	
RUNWAY MARKING	NP	P	NP	P	V	V
STANDARD SEPARATION - RUNWAY CL TO PARALLEL TAXIWAY CL	400'		400'		240'	
STANDARD SEPARATION - TAXIWAY CL TO FIXED OR MOVABLE OBJECT	93'		129.5'		65.5'	
RUNWAY THRESHOLD DISPLACEMENT	0'	500'	0'	0'	0'	0'
RUNWAY SURFACE/PAVEMENT MATERIAL	Asphalt		Asphalt		Asphalt	
RUNWAY PAVEMENT SURFACE TREATMENT	None		None		None	
RUNWAY LIGHTING	MIRL		HIRL		MIRL	
TAKE-OFF RUN AVAILABLE	7,500'	7,500'	8,500'	8,500'	4,600'	4,600'
TAKE-OFF DISTANCE AVAILABLE	7,500'	7,500'	8,500'	8,500'	4,600'	4,600'
LANDING DISTANCE AVAILABLE	7,500'	7,000'	8,500'	8,500'	4,600'	4,600'
ACCELERATE STOP DISTANCE AVAILABLE	7,500'	7,500'	8,500'	8,500'	4,600'	4,600'
TAXIWAY WIDTH	75' (50' Standard)		75' (50' Standard)		35'	
TAXIWAY SURFACE MATERIAL	Asphalt		Asphalt		Asphalt	
TAXIWAY OBJECT FREE AREA WIDTH	186'		259'		131'	
TAXIWAY SAFETY AREA WIDTH	118'		171'		79'	
TAXIWAY WINGTIP CLEARANCE	34'		44'		26'	
TAXIWAY MARKING	Enhanced		Enhanced		Enhanced	
TAXIWAY LIGHTING	MITL		MITL		MITL	
RUNWAY NAVIGATION AIDS	RNAV GPS (34) VOR (34)		LPV GPS (34R) ILS (34R)		None	
RUNWAY VISUAL AIDS	Rotating Beacon PAPI-4 (16,34) REIL (16,34)		Rotating Beacon MALSR (34R) PAPI-4 (16L,34R) REIL (16L,34R)		Rotating Beacon PAPI-2 (16R,34L) Lighted Wind Indicator REILS	

EXISTING BUILDING TABLE		
EXIST	DESCRIPTION	TOP ELEV
1	ARFF/AIRPORT MAINTENANCE	654.5
2	TICKETING/SECURE SCREENING/RENTAL CARS/AIRPORT ADMINISTRATION	655.3
3	RENTAL CAR MAINTENANCE	670.5
4	DEPARTURE HOLDROOM/ LONGTERM GENERAL AVIATION TERMINAL	655.0
5	CHARTER BUS LOADING	648.4
6	OFFICE BUILDING	647.0
7	OFFICE BUILDING	655.0
8	FEDEX	648.0
9	AIR TRAFFIC CONTROL TOWER	793.8
10	CONVENTIONAL HANGAR	663.5
11	CONVENTIONAL HANGAR	665.8
12	FBO	658.0
13	FUEL FARM	680.0
14	T-HANGAR	643.5
15	T-HANGAR	644.7
16	T-HANGAR	644.3
17	T-HANGAR	643.5
18	T-HANGAR	644.3
19	T-HANGAR	645.8
20	T-HANGAR	647.4
21	T-HANGAR	646.7
22	T-HANGAR	645.8
23	T-HANGAR	646.6
24	T-HANGAR	646.5
25	T-HANGAR	649.4
26	T-HANGAR	647.3
27	T-HANGAR	647.8
28	T-HANGAR	649.6
29	CONVENTIONAL HANGAR	674.8
30	CONVENTIONAL HANGAR	671.9
31	OFFICE BUILDING	662.4
32	T-HANGAR	650.7
33	CONVENTIONAL HANGAR	666.6
34	CONVENTIONAL HANGAR	652.5
35	T-HANGAR	653.1
36	CONVENTIONAL HANGAR	667.4
37	CONVENTIONAL HANGAR	672.6
38	CONVENTIONAL HANGAR	681.7
39	CONVENTIONAL HANGAR	683.3
40	CONVENTIONAL HANGAR	679.8
41	GENERAL AVIATION TERMINAL	679.8

GENERAL NOTES:

1. HORIZONTAL DATUM: NORTH AMERICAN DATUM 1983 - NAD83; VERTICAL DATUM: NORTH AMERICAN DATUM 1988 - NAVD88. DERIVED FROM SURVEY PERFORMED BY KENNEY AERIAL MAPPING, INC., PHOENIX, ARIZONA; PROVIDED BY STANTEC CONSULTING, INC., PHOENIX, ARIZONA
2. NO OFZ PENETRATIONS
3. SEE SHEETS 8 THROUGH 11 FOR THRESHOLD SITING SURFACE OBJECT PENETRATION DETAILS.
4. THE PROPOSED SITE FOR THE FUTURE AIRCRAFT RESCUE FIRE FIGHTING (ARFF) STATION WILL MEET THE REQUIRED EMERGENCY RESPONSE TIME FOR CERTIFICATED FEDERAL AVIATION REGULATION PART 139 COMMERCIAL SERVICE OPERATIONS.
5. ALL ELEVATIONS IN NAVD 88.

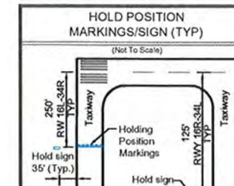
FOR APPROVAL BY Mohave County Airport Authority

David C. Gideon, Chief Operating Officer — DATE:

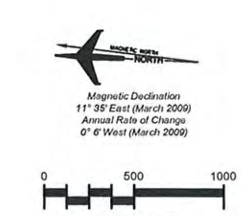
AIRPORT DATA			
OWNER: Mohave County Airport Authority		AIRPORT NPIAS CODE: P	
CITY: Bullhead City, Arizona		COUNTY: Mohave, Arizona	
RANGE: R 21 W		TOWNSHIP: T 32 S	
LAUGHLIN/BULLHEAD INTERNATIONAL (KIFP)		EXISTING	ULTIMATE
AIRPORT SERVICE LEVEL		Commercial (P)	Commercial (P)
AIRPORT REFERENCE CODE		C-III	D-IV
AIRPORT ELEVATION		696.9' MSL	707.0' MSL
MEAN MAXIMUM TEMPERATURE OF HOTTEST MONTH		108.2° July	108.2° July
AIRPORT REFERENCE POINT (NAD 83)	Latitude	35° 09' 21.572" N	35° 09' 09.727" N
	Longitude	114° 33' 33.944" W	114° 33' 36.016" W
AIRPORT INSTRUMENT APPROACH		GPS, VOR	GPS, ILS, VOR
NAVAIDS		Airport Beacon PAPI-4 (16,34) REIL (16, 34)	Airport Beacon GPS (16L, 34R) ILS (34R) MALSR (34R) PAPI-4 (16L, 34R) PAPI-2 (16R, 34L) REIL (ALL RW ENDS)
GPS AT AIRPORT		Yes	Yes

HOLD POSITION MARKINGS/SIGN (TYP)

(Not To Scale)



FAA APPROVAL STAMP



PROPOSED BUILDING TABLE	
ULT	DESCRIPTION
101	AIR CARGO/AIR FREIGHT BUILDING
102	CONVENTIONAL HANGAR
103	CONVENTIONAL HANGAR
104	CONVENTIONAL HANGAR
105	AIRCRAFT WASH RACK
106	T-HANGARS
107	T-HANGARS
108	ARFF
109	AIR CARGO/AIR FREIGHT
110	COMMERCIAL TERMINAL

RUNWAY END COORDINATES (NAD 83)		
RUNWAY	LATITUDE	LONGITUDE
EXISTING RUNWAY 16	35° 09' 58.590" N	114° 33' 36.739" W
EXISTING RUNWAY 34	35° 08' 44.519" N	114° 33' 31.153" W
EXISTING RUNWAY 34 DISPLACED THRESHOLD	35° 08' 49.490" N	114° 33' 31.512" W
ULTIMATE RUNWAY 34R	35° 08' 34.682" N	114° 33' 30.405" W
ULTIMATE RUNWAY 16R	35° 09' 19.663" N	114° 33' 42.246" W
ULTIMATE RUNWAY 34L	35° 08' 34.254" N	114° 33' 38.818" W

No.	REVISIONS	DATE	BY	APP'D.
3	UPDATED AIRPORT MASTER PLAN	04/28/00	MR	SGB
2	ADDED INTERIM WEST APRON	05/02/93	JMH	DT
1	ADDED PARALLEL TAXIWAY	09/15/88	JMH	DT

"THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS."

LAUGHLIN/BULLHEAD INTERNATIONAL AIRPORT

AIRPORT LAYOUT DRAWING

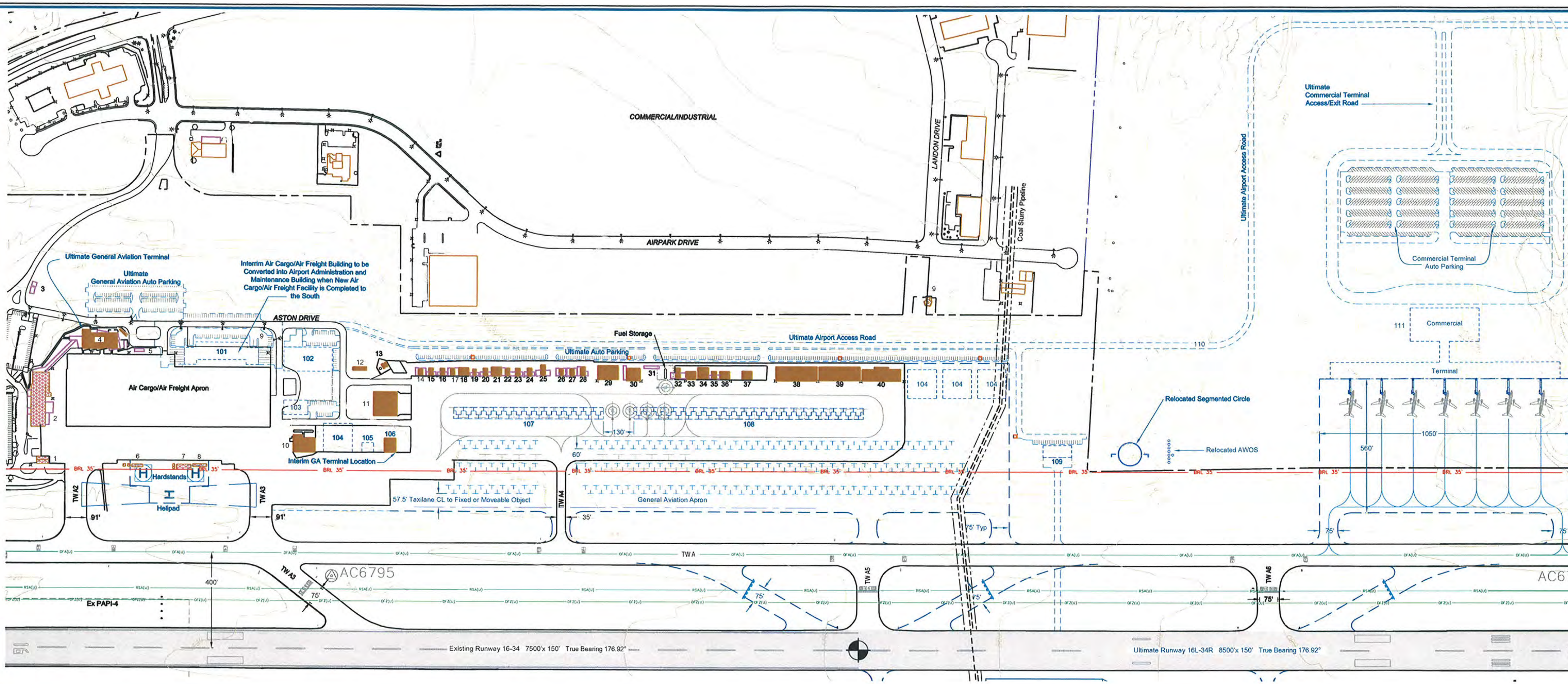
DRAFT

BULLHEAD CITY, ARIZONA

PLANNED BY: Chris M. Hugunin
DETAILED BY: Diana L. Hopkins
APPROVED BY: James M. Harris

Coffman Associates Airport Consultants www.coffmanassociates.com

FEBRUARY 27, 2009 — SHEET 1 OF 16



LEGEND

EXISTING	ULTIMATE	DESCRIPTION
		AIRPORT PROPERTY LINE
		SECTION CORNERS
		AIRPORT REFERENCE POINT (ARP)
		AIRPORT ROTATING BEACON
		AVIGATION EASEMENT
BRL 35'		BUILDING RESTRICTION LINE
		STRUCTURES ON AIRPORT
N/A		ABANDON/REMOVE
		STRUCTURE OFF AIRPORT
		FENCING
		AIRPORT PAVEMENT
N/A		GLIDESLOPE ANTENNA & EQUIP. SHELTER
		HELICOPTER PARKING
		HOLD MARKING
IFP		SURVEY MONUMENT WITH IDENTIFIER
OFA	OFA(U)	OBJECT FREE AREA
RSA	RSA(U)	RUNWAY SAFETY AREA
OFZ	OFZ(U)	OBSTACLE FREE ZONE
RPZ		RUNWAY PROTECTION ZONE
		PAPI-4
		RUNWAY END IDENTIFIER LIGHTS (REILS)
		LIGHTED WINDSOCK
		TOPOGRAPHY
		ULTIMATE MALSR

EXISTING BUILDING TABLE

EXIST	DESCRIPTION	TOP ELEV
1	ARFF/AIRPORT MAINTENANCE	654.5
2	TICKETING/SECURE SCREENING/RENTAL CARS/AIRPORT ADMINISTRATION	655.3
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5	CHARTER BUS LOADING	648.4
6	OFFICE BUILDING	647.0
7	OFFICE BUILDING	655.0
8	FEDEX	648.0
9	AIR TRAFFIC CONTROL TOWER	793.8
10	CONVENTIONAL HANGAR	663.5
11	CONVENTIONAL HANGAR	665.8
12	FBO	658.0
13	FUEL FARM	680.0
14	T-HANGAR	643.5
15	T-HANGAR	644.7
16	T-HANGAR	644.3
17	T-HANGAR	643.5
18	T-HANGAR	644.3
19	T-HANGAR	645.8
20	T-HANGAR	647.4

EXISTING BUILDING TABLE

EXIST	DESCRIPTION	TOP ELEV
21	T-HANGAR	646.7
22	T-HANGAR	645.8
23	T-HANGAR	646.6
24	T-HANGAR	646.5
25	T-HANGAR	649.4
26	T-HANGAR	647.3
27	T-HANGAR	647.8
28	T-HANGAR	649.6
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41	GENERAL AVIATION TERMINAL	679.8

HOLD POSITION MARKINGS/SIGN (TYP)

PROPOSED BUILDING TABLE

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102	CONVENTIONAL HANGAR
103	CONVENTIONAL HANGAR
104	CONVENTIONAL HANGAR
105	AIRCRAFT WASH RACK
106	T-HANGARS
107	T-HANGARS
108	ARFF
109	AIR CARGO/AIR FREIGHT
110	COMMERCIAL TERMINAL

GENERAL NOTES:

1. HORIZONTAL DATUM: NORTH AMERICAN DATUM 1983 – NAD83; VERTICAL DATUM: NORTH AMERICAN DATUM 1988 – NAVD88. DERIVED FROM SURVEY PERFORMED BY KENNEY AERIAL MAPPING, INC., PHOENIX, ARIZONA; PROVIDED BY STANTEC CONSULTING, INC., PHOENIX, ARIZONA
2. EXISTNG BUILDING ELEVATIONS FROM STANTEC CONSULTING, INC., PHOENIX, ARIZONA.
3. THE PROPOSED SITE FOR THE FUTURE AIRCRAFT RESCUE FIRE FIGHTING (ARFF) STATION WILL MEET THE REQUIRED EMERGENCY RESPONSE TIME FOR CERTIFICATED FEDERAL AVIATION REGULATION PART 139 COMMERCIAL SERVICE OPERATIONS.
4. THE BRL BOUNDARY LOCATION OCCURS COINCIDENT WITH THE ULTIMATE OBJECT FREE AREA (OFA) ALONG WEST SIDE OF PLANNED RUNWAY 16R-34L.
5. ALL ELEVATIONS IN NAVD 88.

Magnetic Declination
11° 35' East (March 2009)
Annual Rate of Change
0° 6' West (March 2009)

0 200 400
SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.

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LAUGHLIN/BULLHEAD INTERNATIONAL AIRPORT

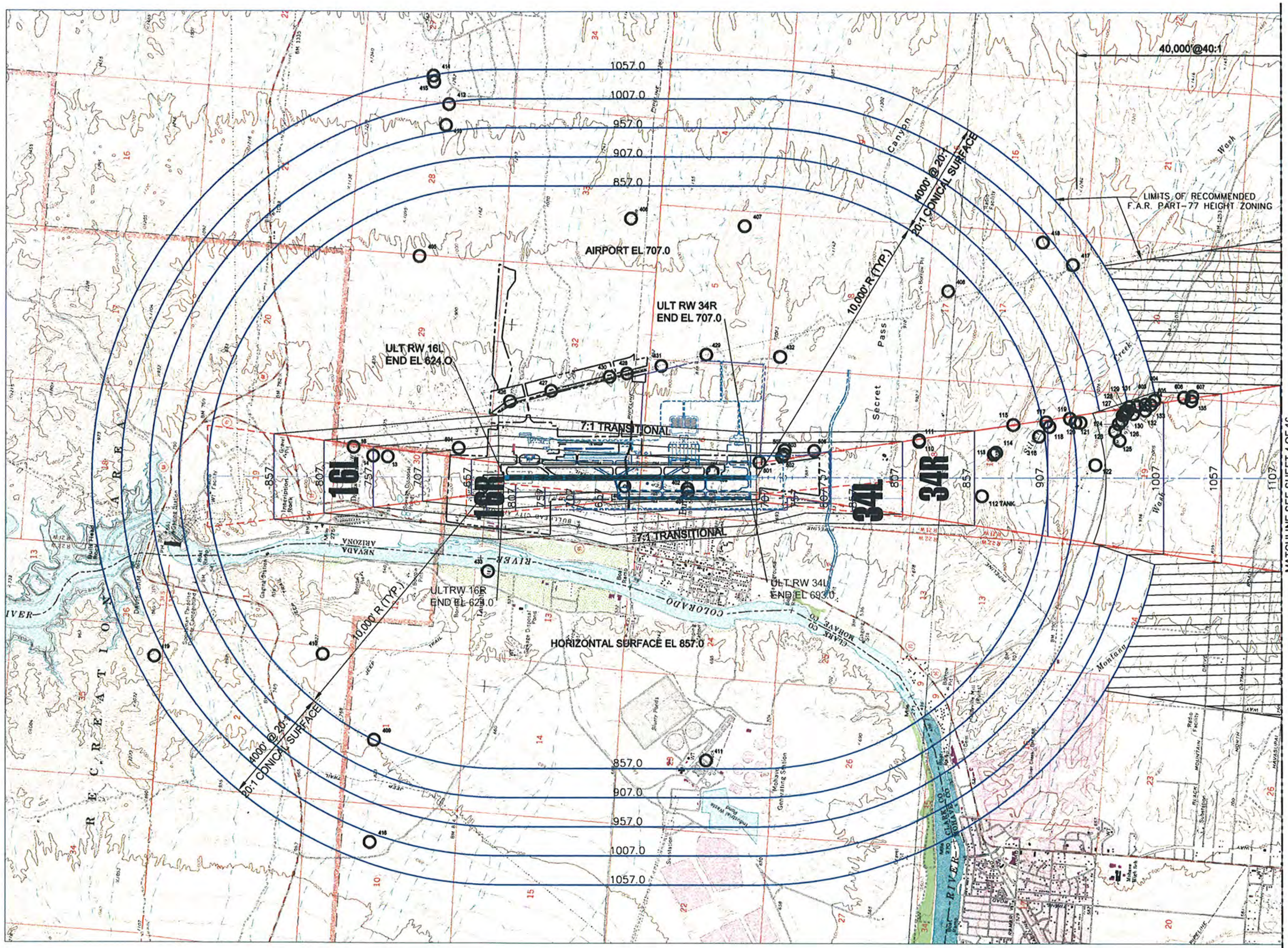
TERMINAL AREA DRAWING

DRAFT

BULLHEAD CITY, ARIZONA

PLANNED BY: Chris M. Hugnin
DETAILED BY: Diana L. Hopkins
APPROVED BY: James M. Harris

FEBRUARY 27, 2009



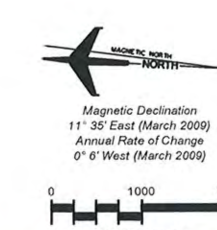
AIRSPACE PLAN

OBSTRUCTION TABLE							
Item #	Description	Top Elevation	Distance from RW End	Offset from Centerline	Part 77 Surface Penetrated	Penetration	Remediation
401	WIND SOCK	666.7	4350	300	PRIMARY	4.7	TO REMAIN
402	TERRAIN	693.7	2174	367	PRIMARY	6.7	TO BE REMOVED
403	BUSH	697.3	1311	189	PRIMARY	3.3	TO BE REMOVED
404	TERRAIN	691.8	2157	507	PRIMARY	4.8	TO BE REMOVED
405	TANK	1012.2	-11438	7591	HORIZONTAL	155	REQUEST AERONAUTICAL STUDY
406	TERRAIN	1184.0	-4137	8883	HORIZONTAL	327	REQUEST AERONAUTICAL STUDY
407	TERRAIN	1135.3	-207	8626	HORIZONTAL	278	REQUEST AERONAUTICAL STUDY
408	TOWER	1190.1	-6791	6410	HORIZONTAL	333	REQUEST AERONAUTICAL STUDY
409	TOWER	878.6	-12996	9027	HORIZONTAL	22	REQUEST AERONAUTICAL STUDY
410	TOWER	928.6	-14769	6088	HORIZONTAL	72	REQUEST AERONAUTICAL STUDY
411	SMOKE STACK	1222.5	-1538	9714	HORIZONTAL	366	REQUEST AERONAUTICAL STUDY
428	UTILITY POLE	931.7	-4277	3565	HORIZONTAL	75	REQUEST AERONAUTICAL STUDY
429	UTILITY POLE	940.8	-1566	4206	HORIZONTAL	84	REQUEST AERONAUTICAL STUDY
430	UTILITY POLE	911.4	-4877	3452	HORIZONTAL	54	REQUEST AERONAUTICAL STUDY
431	UTILITY POLE	926.2	-3083	3825	HORIZONTAL	69	REQUEST AERONAUTICAL STUDY
432	UTILITY POLE	913.8	-983	4143	HORIZONTAL	57	REQUEST AERONAUTICAL STUDY
433	BUILDING	877.0	-9054	3221	HORIZONTAL	20	REQUEST AERONAUTICAL STUDY
412	TERRAIN	1297.2	-10414	12810	CONICAL	294	REQUEST AERONAUTICAL STUDY
413	TANK	1219.0	-10519	12089	CONICAL	299	REQUEST AERONAUTICAL STUDY
414	BUILDING	1320.5	-10952	13784	CONICAL	265	REQUEST AERONAUTICAL STUDY
415	BUILDING	1314.4	-10926	13581	CONICAL	269	REQUEST AERONAUTICAL STUDY
416	TOWER	1025.1	-13140	12539	CONICAL	3.0	REQUEST AERONAUTICAL STUDY
417	POWER POLE	1201.1	11067	7313	CONICAL	189	REQUEST AERONAUTICAL STUDY
418	TERRAIN	1192.2	10038	8090	CONICAL	229	REQUEST AERONAUTICAL STUDY
419	TERRAIN	1035.9	-20542	6170	CONICAL	11	REQUEST AERONAUTICAL STUDY
426	TOWER	878.0	-8303	2612	CONICAL	21	REQUEST AERONAUTICAL STUDY
427	POLE	884.0	-6890	2970	CONICAL	27	REQUEST AERONAUTICAL STUDY
501	FENCE	722.0	297	527 R	INNER TRANSITIONAL	11	TO BE REMOVED
502	VEGETATION	759.1	1054	720 R	INNER TRANSITIONAL	22	TO BE REMOVED
503	TERRAIN	774.6	1121	795 R	INNER TRANSITIONAL	27	REQUEST AERONAUTICAL STUDY
504	POWER POLE	727.1	1569	1000 L	INNER TRANSITIONAL	16	REQUEST AERONAUTICAL STUDY
506	VEGETATION	733.7	2153	917 R	INNER TRANSITIONAL	3	REQUEST AERONAUTICAL STUDY
507	VEGETATION	791.8	1142	938 R	INNER TRANSITIONAL	24	REQUEST AERONAUTICAL STUDY
602	TREE	1025.3	13006	2443 R	TRANSITIONAL	45	REQUEST AERONAUTICAL STUDY
603	TREE	1034.4	13287	2480 R	TRANSITIONAL	49	REQUEST AERONAUTICAL STUDY
604	BUILDING	1031.6	13563	2533 R	TRANSITIONAL	37	REQUEST AERONAUTICAL STUDY
605	BUILDING	1038.1	13882	2668 R	TRANSITIONAL	23	REQUEST AERONAUTICAL STUDY
606	TERRAIN	1054.4	14905	2770 R	TRANSITIONAL	21	REQUEST AERONAUTICAL STUDY
607	BUILDING	1076.7	15193	2804 R	TRANSITIONAL	37	REQUEST AERONAUTICAL STUDY
13	POWER POLE	789.2	4026	708 L	APPROACH 16L	53	REQUEST AERONAUTICAL STUDY
14	POWER POLE	762.0	4526	691 L	APPROACH 16L	11	REQUEST AERONAUTICAL STUDY
16	TOWER	808.9	5208	1035 L	APPROACH 16L	38	REQUEST AERONAUTICAL STUDY
110	VEGETATION	886.9	5774	1242 R	APPROACH 34R	68	REQUEST AERONAUTICAL STUDY
111	TERRAIN	889.9	5774	1290 R	APPROACH 34R	71	REQUEST AERONAUTICAL STUDY
112	TANK	926.6	7952	620 L	APPROACH 34R	65	REQUEST AERONAUTICAL STUDY
113	VEGETATION	980.4	8361	810 R	APPROACH 34R	110	REQUEST AERONAUTICAL STUDY
114	TERRAIN	980.6	8435	874 R	APPROACH 34R	109	REQUEST AERONAUTICAL STUDY
115	TERRAIN	979.0	9025	1826 R	APPROACH 34R	96	REQUEST AERONAUTICAL STUDY
116	UTILITY POLE	916.0	9905	1433 R	APPROACH 34R	16	REQUEST AERONAUTICAL STUDY
117	BUILDING	960.6	10150	1918 R	APPROACH 34R	55	REQUEST AERONAUTICAL STUDY
118	VEGETATION	938.5	10260	1759 R	APPROACH 34R	30	REQUEST AERONAUTICAL STUDY
119	TERRAIN	961.7	10966	2043 R	APPROACH 34R	36	REQUEST AERONAUTICAL STUDY
120	VEGETATION	959.6	11154	1914 R	APPROACH 34R	29	TSS CLEAR; NAR
121	VEGETATION	963.0	11328	1900 R	APPROACH 34R	28	TSS CLEAR; NAR
122	BUILDING	979.7	11837	446 R	APPROACH 34R	32	TSS CLEAR; NAR
123	POWER POLE	1001.2	12511	1605 R	APPROACH 34R	36	TSS CLEAR; NAR
124	SIGN	995.5	12640	1856 R	APPROACH 34R	27	TSS CLEAR; NAR
125	TREE	1004.8	12674	1288 R	APPROACH 34R	36	TSS CLEAR; NAR
126	BUILDING	997.7	12747	1970 R	APPROACH 34R	27	REQUEST AERONAUTICAL STUDY
127	POWER POLE	1029.1	12777	2159 R	APPROACH 34R	58	REQUEST AERONAUTICAL STUDY
128	TREE	1006.3	12848	2176 R	APPROACH 34R	33	REQUEST AERONAUTICAL STUDY
129	TREE	1010.4	12874	2306 R	APPROACH 34R	37	REQUEST AERONAUTICAL STUDY
130	TREE	1029.9	12894	2214 R	APPROACH 34R	56	REQUEST AERONAUTICAL STUDY
131	BUILDING	1013.5	12962	2311 R	APPROACH 34R	37	REQUEST AERONAUTICAL STUDY
132	TREE	1024.4	13142	2199 R	APPROACH 34R	44	REQUEST AERONAUTICAL STUDY
133	TREE	1023.0	13562	2319 R	APPROACH 34R	32	REQUEST AERONAUTICAL STUDY
134	BUILDING	1031.8	13755	2516 R	APPROACH 34R	36	REQUEST AERONAUTICAL STUDY
135	BUILDING	1076.6	15158	2648 R	APPROACH 34R	46	REQUEST AERONAUTICAL STUDY

ALL ELEVATIONS AND DISTANCE MEASUREMENTS IN FEET

ALL APPROACH SURFACE OFFSETS DESCRIBED AS RIGHT (R) OR LEFT (L) OF THE EXTENDED RUNWAY CENTERLINE AS SEEN FROM APPROACHING AIRCRAFT

ALL PRIMARY, HORIZONTAL, AND CONICAL SURFACE OFFSETS MEASURED FROM THE END OF RUNWAY 34R.



GENERAL NOTES:

1. HORIZONTAL DATUM: NORTH AMERICAN DATUM 1983 - NAD 83; VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM - NAVD88. FROM STANTEC, PHOENIX, ARIZONA.
2. THE FOLLOWING USGS QUAD MAPS APPLY AS BACKGROUND: DAVIS, DAVIS DAM SE, AND OATMAN.
4. SEE THE INNER PORTION OF THE APPROACH SURFACE DRAWINGS FOR CLOSE-IN OBSTRUCTIONS.

No.	REVISIONS	DATE	BY	APP'D.

"THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS."

LAUGHLIN/BULLHEAD INTERNATIONAL AIRPORT

AIRPORT AIRSPACE DRAWING I

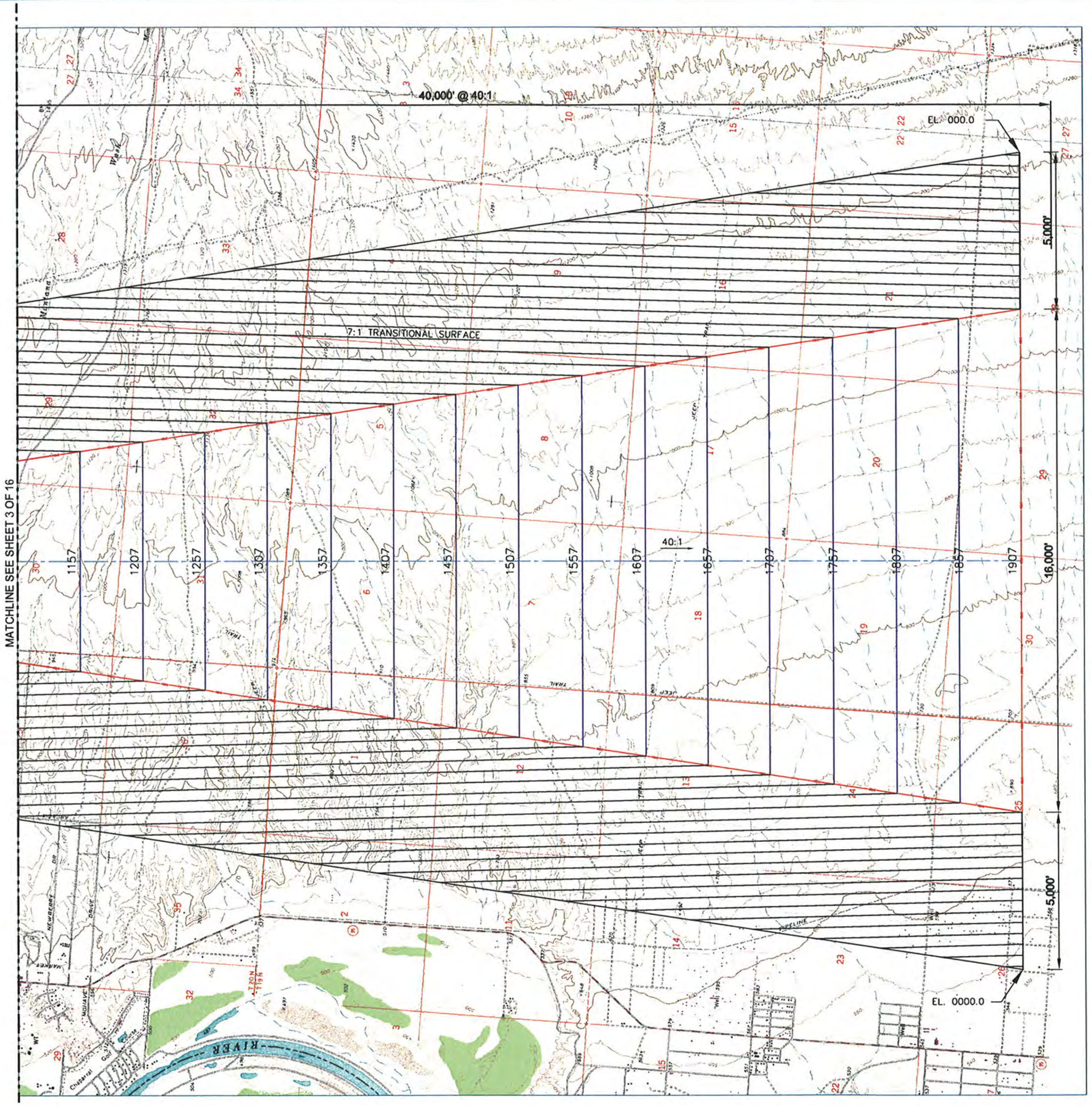
DRAFT

BULLHEAD CITY, ARIZONA

PLANNED BY: Chris M. Hugunin
DETAILED BY: Diana L. Hopkins
APPROVED BY: James M. Harris

FEBRUARY 27, 2009 — SHEET 3 OF 16

Coffman Associates
Airport Consultants
www.coffmanassociates.com



AIRSPACE PLAN

Magnetic Declination
11° 35' East (March 2009)
Annual Rate of Change
0° 6' West (March 2009)

0 1000 2000
SCALE IN FEET

OBSTRUCTION TABLE							
Item	Object Description	Distance From RW End	Offset From RW Centerline	Top Elevation	Surface Penetrated	Penetration	Remediation
	NONE FOUND						

NAR – NO ACTION REQUIRED

ALL OFFSETS DESCRIBED AS RIGHT (R) OR LEFT (L) OF THE EXTENDED RUNWAY CENTERLINE AS SEEN FROM APPROACHING AIRCRAFT

GENERAL NOTES:

1. HORIZONTAL DATUM: NORTH AMERICAN DATUM 1983 – NAD 83; VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM – NAVD88. FROM STANTEC, PHOENIX, ARIZONA.
2. THE FOLLOWING USGS QUAD MAPS APPLY AS BACKGROUND: DAVIS, DAVIS DAM SE, AND OATMAN.
4. SEE THE INNER PORTION OF THE APPROACH SURFACE DRAWINGS FOR CLOSE-IN OBSTRUCTIONS.

No.	REVISIONS	DATE	BY	APP'D.

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LAUGHLIN/BULLHEAD INTERNATIONAL AIRPORT

AIRPORT AIRSPACE DRAWING II

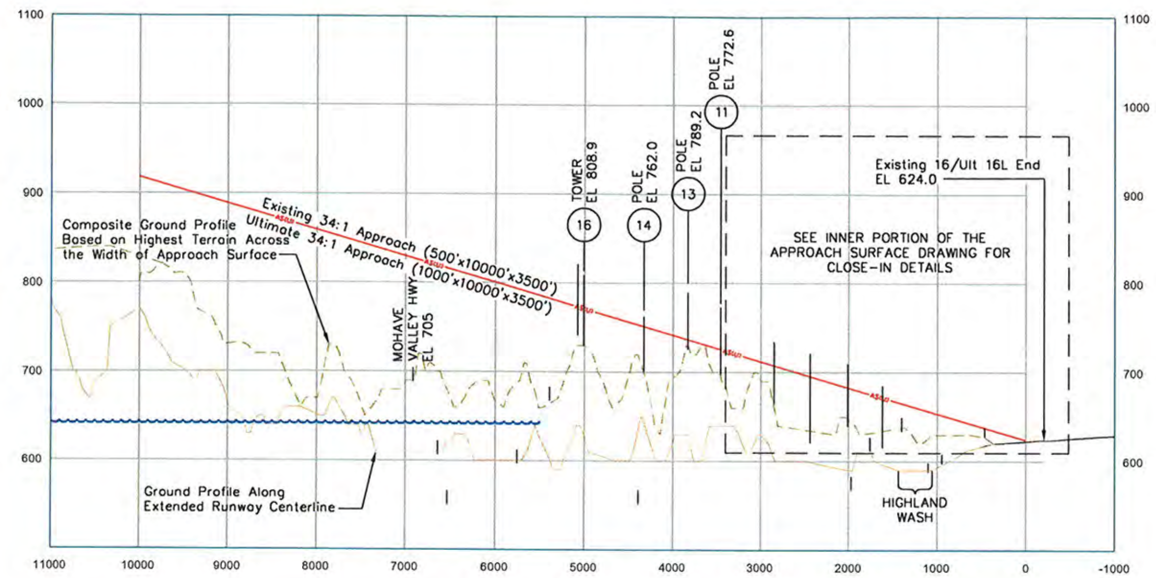
DRAFT

BULLHEAD CITY, ARIZONA

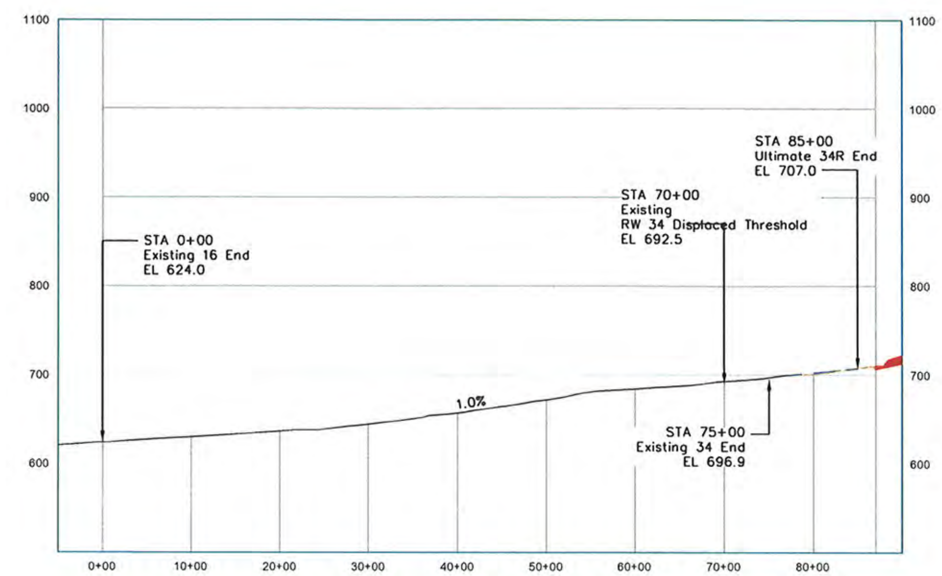
PLANNED BY: Chris M. Hugunin
DETAILED BY: Diana L. Hopkins
APPROVED BY: James M. Harris

FEBRUARY 27, 2009 | SHEET 4 OF 16

Coffman Associates
Airport Consultants
www.coffmanassociates.com



RUNWAY 16L APPROACH PROFILE



RUNWAY 16L-34R CENTERLINE PROFILE

EXISTING RW 16/ULTIMATE RW 16L OBSTRUCTION TABLE						
Item	Description	Top Elevation	Distance from RW End	Offset from Centerline	Penetration	Remediation
11	POLE	772.6	3662	692 L	47	REQUEST AERONAUTICAL STUDY
13	POLE	789.2	4031	708 L	53	REQUEST AERONAUTICAL STUDY
14	POLE	762.0	4531	691 L	11	REQUEST AERONAUTICAL STUDY
16	TOWER	808.9	5208	1035 L	38	REQUEST AERONAUTICAL STUDY

EXISTING RW 34 OBSTRUCTION TABLE						
Item	Description	Top Elevation	Distance from RW End	Offset from Centerline	Penetration	Remediation
	TERRAIN	VARIES	SEE PROFILE	VARIES	VARIES	REQUEST AERONAUTICAL STUDY
113	VEGETATION	980.4	9361	810 R	49	REQUEST AERONAUTICAL STUDY
114	TERRAIN	980.6	9435	874 R	12	REQUEST AERONAUTICAL STUDY

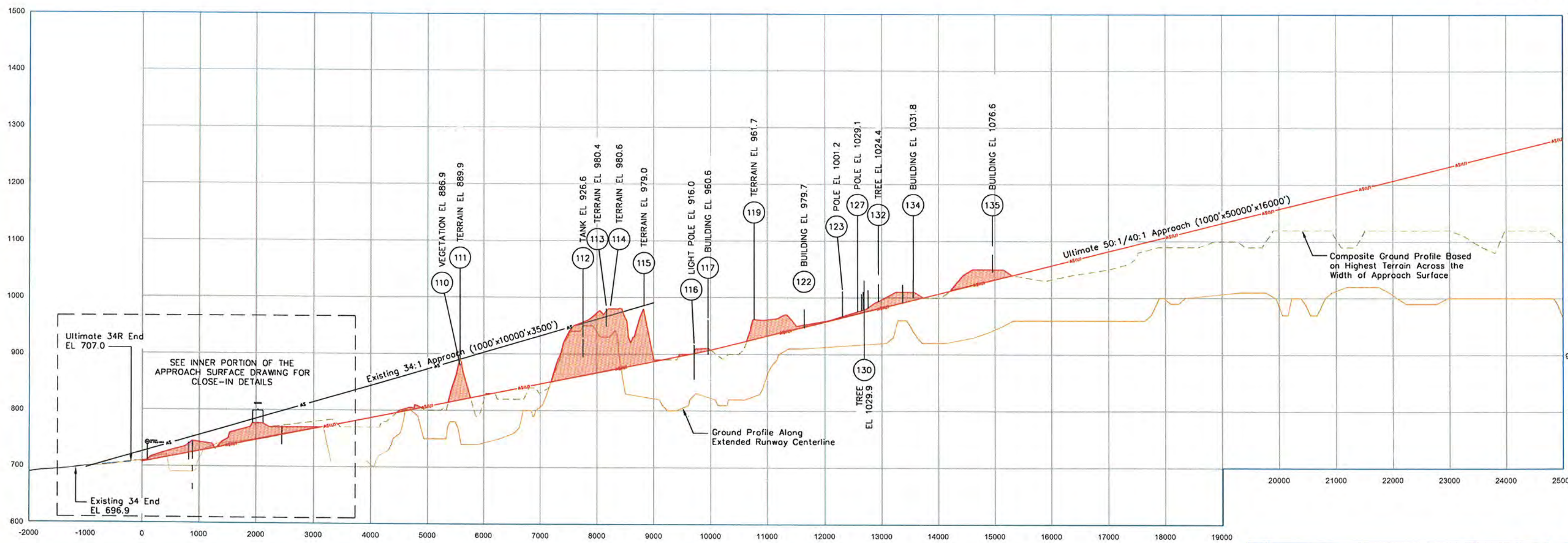
ULTIMATE RW 34R OBSTRUCTION TABLE						
Item	Description	Top Elevation	Distance from RW End	Offset from Centerline	Penetration	Remediation
	TERRAIN	VARIES	SEE PROFILE	VARIES	VARIES	REQUEST AERONAUTICAL STUDY
110	VEGETATION	886.9	5774	1242 R	68	REQUEST AERONAUTICAL STUDY
111	TERRAIN	889.9	5775	1290 R	71	REQUEST AERONAUTICAL STUDY
112	TANK	926.6	7952	620 L	65	REQUEST AERONAUTICAL STUDY
113	VEGETATION	980.4	8361	810 R	110	REQUEST AERONAUTICAL STUDY
114	TERRAIN	980.6	8435	874 R	109	REQUEST AERONAUTICAL STUDY
115	TERRAIN	979.0	9025	1826 R	96	REQUEST AERONAUTICAL STUDY
116	POLE	916.0	9905	1433 R	16	REQUEST AERONAUTICAL STUDY
117	BUILDING	960.6	10150	1918 R	55	REQUEST AERONAUTICAL STUDY
119	TERRAIN	961.7	10966	2043 R	36	REQUEST AERONAUTICAL STUDY
122	BUILDING	979.7	11837	446 R	32	REQUEST AERONAUTICAL STUDY
123	POLE	1001.2	12511	1605 R	36	REQUEST AERONAUTICAL STUDY
127	POLE	1029.1	12777	2159 R	58	REQUEST AERONAUTICAL STUDY
130	TREE	1029.9	12894	2214 R	56	REQUEST AERONAUTICAL STUDY
132	TREE	1024.4	13142	2199 R	44	REQUEST AERONAUTICAL STUDY
134	BUILDING	1031.8	13755	2516 R	36	REQUEST AERONAUTICAL STUDY
135	BUILDING	1076.6	15158	2648 R	46	REQUEST AERONAUTICAL STUDY

ALL ELEVATIONS AND DISTANCE MEASUREMENTS IN FEET

ALL APPROACH SURFACE OFFSETS DESCRIBED AS RIGHT (R) OR LEFT (L) OF THE EXTENDED RUNWAY CENTERLINE AS SEEN FROM APPROACHING AIRCRAFT

GENERAL NOTES:

1. HORIZONTAL DATUM: NORTH AMERICAN DATUM 1983 – NAD83; VERTICAL DATUM: NORTH AMERICAN DATUM 1988 – NAVD88; FROM STANTEC, PHOENIX, ARIZONA. FROM STANTEC, PHOENIX, ARIZONA.
2. ALL DISTANCE MEASUREMENTS IN FEET.
3. SEE THE INNER PORTION OF THE APPROACH SURFACE DRAWINGS FOR CLOSE-IN OBSTRUCTIONS.



RUNWAY 34R APPROACH PROFILE

0 1000 2000

HORIZONTAL SCALE IN FEET

0 100 200

VERTICAL SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.

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LAUGHLIN/BULLHEAD INTERNATIONAL AIRPORT

AIRPORT AIRSPACE PROFILES
RUNWAY 16L-34R

DRAFT

BULLHEAD CITY, ARIZONA

PLANNED BY: Chris M. Hugunin
DETAILED BY: Diana L. Hopkins
APPROVED BY: James M. Harris

FEBRUARY 27, 2009 SHEET 5 OF 16

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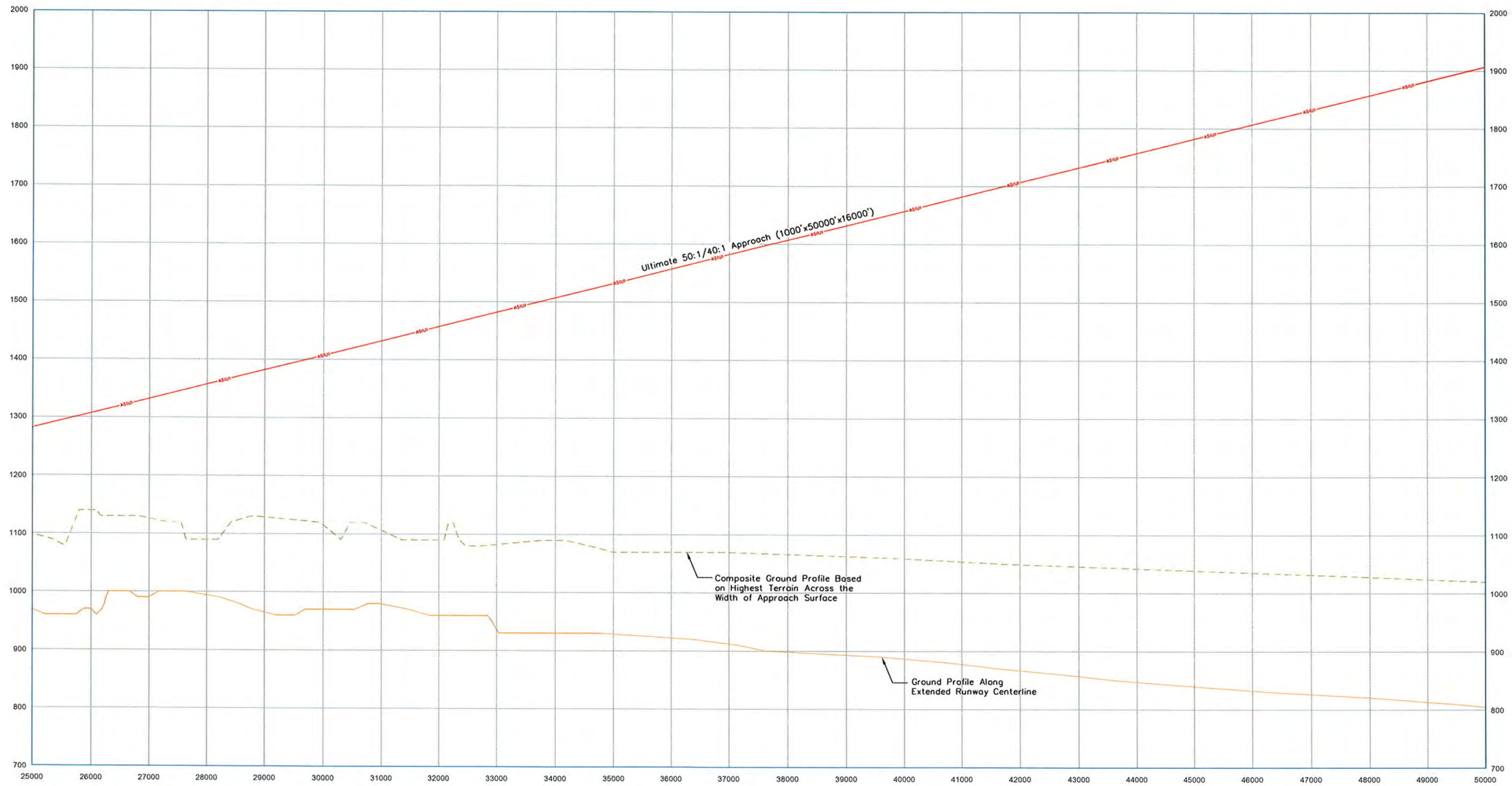

RUNWAY 34R APPROACH PROFILE

EXISTING RW 34 OBSTRUCTION TABLE

No.	Description	Top Elevation	Distance from RW End	Offset from Centerline	Penetration	Remediation
–	NONE FOUND	–	–	–	–	–

ULTIMATE RW 34R OBSTRUCTION TABLE

No.	Description	Top Elevation	Distance from RW End	Offset from Centerline	Penetration	Remediation
–	NONE FOUND	–	–	–	–	–

GENERAL NOTES:

1. HORIZONTAL DATUM: NORTH AMERICAN DATUM 1983 – NAD83; VERTICAL DATUM: NORTH AMERICAN DATUM 1988 – NAVD88; FROM STANTEC, PHOENIX, ARIZONA.

HORIZONTAL SCALE IN FEET (0, 1000, 2000)

VERTICAL SCALE IN FEET (0, 100, 200)

No.	REVISIONS	DATE	BY	APP'D.

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LAUGHLIN/BULLHEAD INTERNATIONAL AIRPORT

AIRPORT AIRSPACE PROFILE
RUNWAY 34R

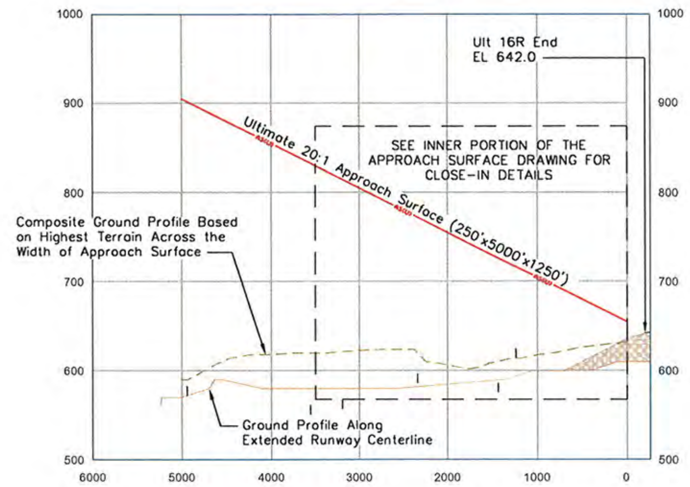
DRAFT

BULLHEAD CITY, ARIZONA

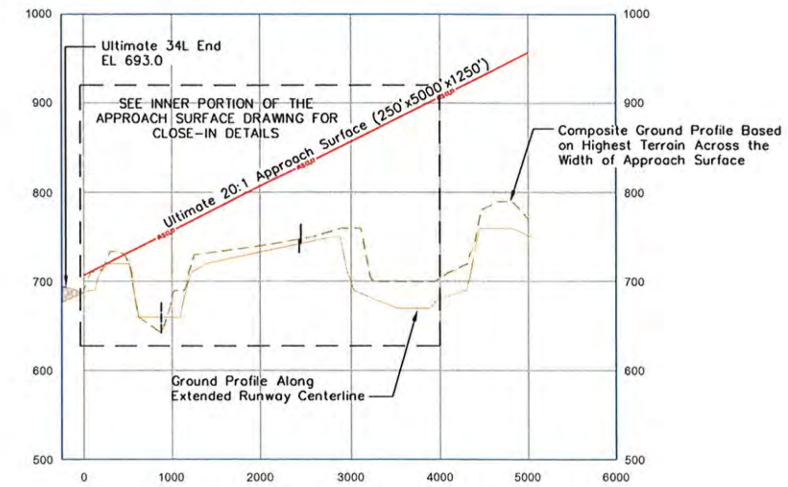
PLANNED BY: Chris M. Hugunin
DETAILED BY: Diana L. Hopkins
APPROVED BY: James M. Harris

FEBRUARY 27, 2009 SHEET 6 OF 16

Coffman Associates Airport Consultants www.coffmanassociates.com



RUNWAY 16R APPROACH PROFILE



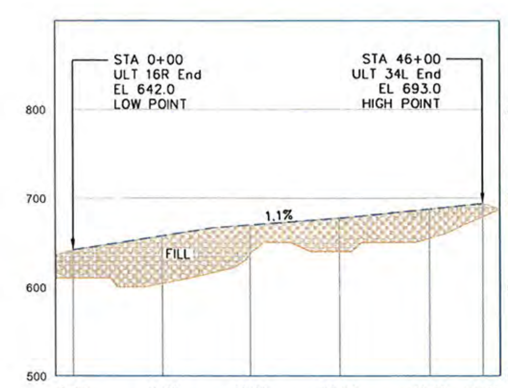
RUNWAY 34L APPROACH PROFILE

ULTIMATE RW 16R OBSTRUCTION TABLE						
Item	Description	Top Elevation	Distance from RW End	Offset from Centerline	Penetration	Remediation
	NONE FOUND					

ULTIMATE RW 34L OBSTRUCTION TABLE						
Item	Description	Top Elevation	Distance from RW End	Offset from Centerline	Penetration	Remediation
–	SEE SHEET 11 OF 15 FOR INNER PORTION OF THE APPROACH SURFACE OBSTRUCTIONS	–	–	–	–	–

GENERAL NOTES:

1. HORIZONTAL DATUM: NORTH AMERICAN DATUM 1983 – NAD83;
   VERTICAL DATUM: NORTH AMERICAN DATUM 1988 – NAVD88;
   FROM STANTEC, PHOENIX, ARIZONA.
2. SEE THE INNER PORTION OF THE APPROACH SURFACE DRAWINGS FOR CLOSE-IN OBSTRUCTIONS.



RUNWAY 16R-34L CENTERLINE PROFILE

Magnetic Declination
11° 35' East (March 2009)
Annual Rate of Change
0° 6' West (March 2009)

0 1000 2000
HORIZONTAL SCALE IN FEET

0 100 200
VERTICAL SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.

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LAUGHLIN/BULLHEAD INTERNATIONAL AIRPORT

AIRPORT AIRSPACE PROFILES
RUNWAY 16R-34L

DRAFT

BULLHEAD CITY, ARIZONA

PLANNED BY: Chris M. Huqunin
DETAILED BY: Diana L. Hopkins
APPROVED BY: James M. Harris

FEBRUARY 27, 2009 | SHEET 7 OF 16

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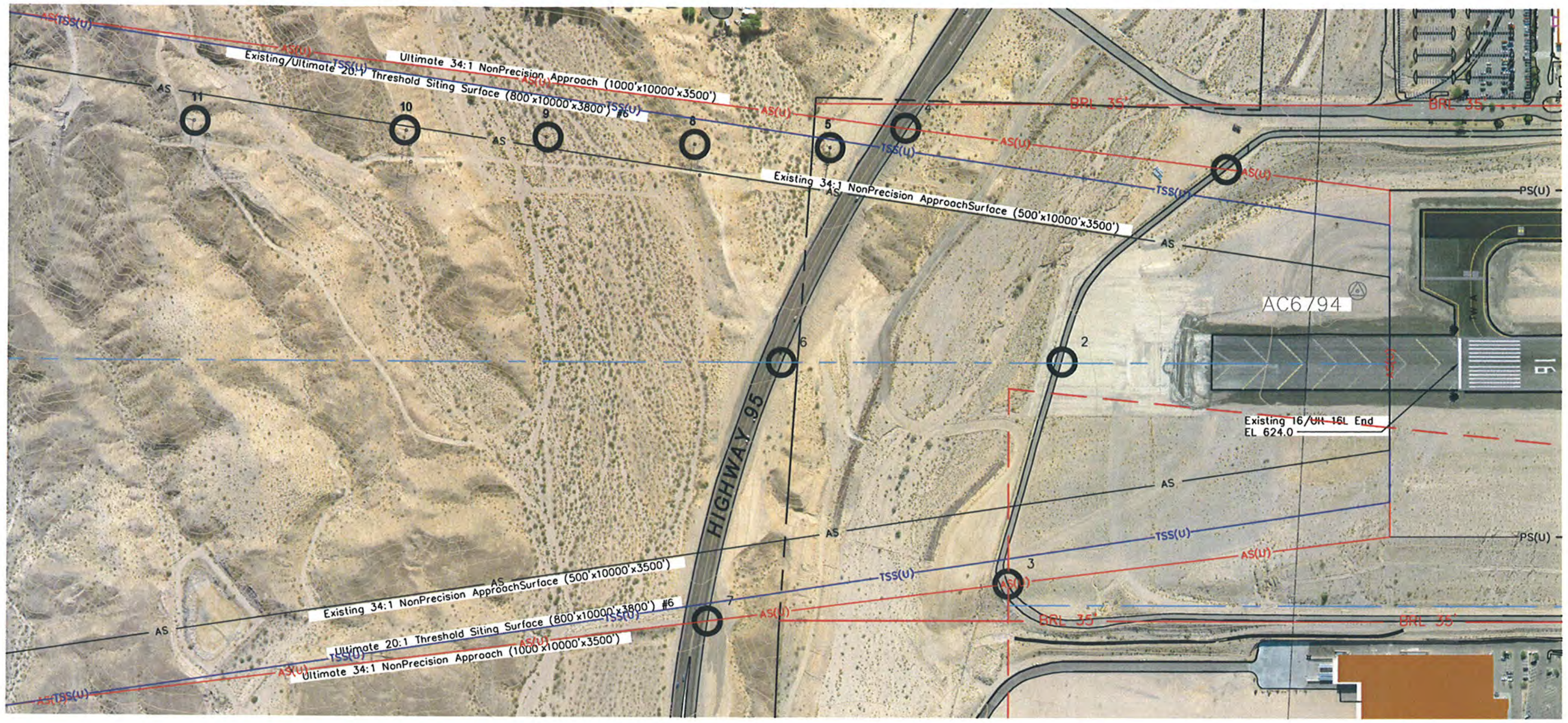


RUNWAY 16L PLAN

EXISTING RUNWAY 16 OBSTRUCTION TABLE							
Item	Description	Top Elevation	Distance from RW End	Offset from Centerline	Approach Penetration	TSS Penetration	Remediation
5	UTILITY POLE	684.9	1817	621 L	13	CLEAR	TSS CLEAR; NAR
8	UTILTIY POLE	708.8	2212	628 L	26	CLEAR	TSS CLEAR; NAR
9	UTILTIY POLE	725.3	2640	646 L	30	CLEAR	TSS CLEAR; NAR
10	UTILITY POLE	735.6	3046	666 L	28	CLEAR	TSS CLEAR; NAR
11	POWER POLE	772.6	3658	692 L	47	CLEAR	TSS CLEAR; NAR

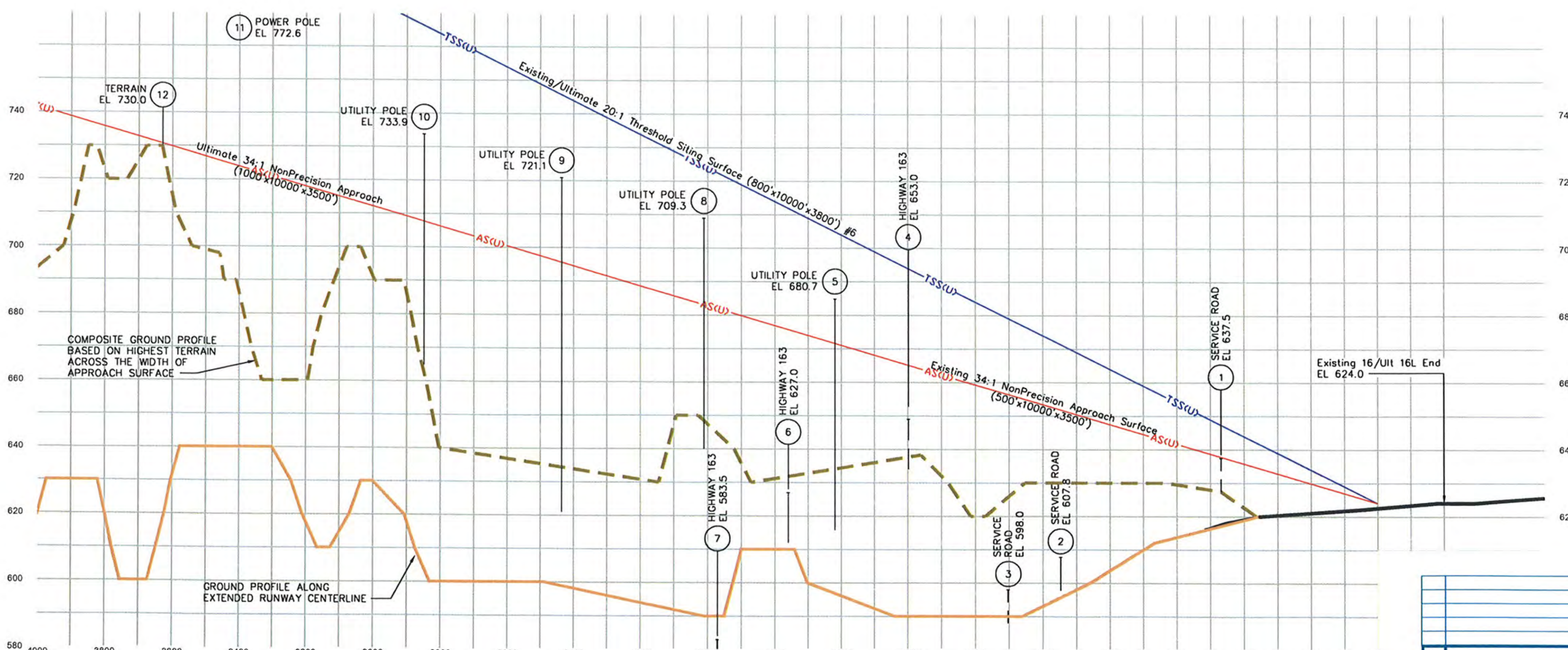
NAR – NO ACTION REQUIRED

ULTIMATE RUNWAY 16L OBSTRUCTION TABLE							
Item	Description	Top Elevation	Distance from RW End	Offset from Centerline	Approach Penetration	TSS Penetration	Remediation
5	UTILTIY POLE	684.9	1817	621 L	13	CLEAR	TSS CLEAR; NAR
8	UTILTIY POLE	708.8	2212	628 L	26	CLEAR	TSS CLEAR; NAR
9	UTILTIY POLE	725.3	2640	646 L	30	CLEAR	TSS CLEAR; NAR
10	UTILITY POLE	735.6	3046	666 L	28	CLEAR	TSS CLEAR; NAR
11	POWER POLE	772.6	3658	692 L	47	CLEAR	TSS CLEAR; NAR

NAR – NO ACTION REQUIRED

GENERAL NOTES:

1. HORIZONTAL DATUM: NORTH AMERICAN DATUM 1983 – NAD83; VERTICAL DATUM: NORTH AMERICAN DATUM 1988 – NAVD88; FROM STANTEC, PHOENIX, ARIZONA.



RUNWAY 16L PROFILE

0 200 400
HORIZONTAL SCALE IN FEET

0 20 40
VERTICAL SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.

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LAUGHLIN/BULLHEAD INTERNATIONAL AIRPORT

INNER PORTION OF THE APPROACH SURFACE DRAWING RUNWAY 16L

DRAFT

BULLHEAD CITY, ARIZONA

PLANNED BY: Chris M. Hugunin
DETAILED BY: Diana L. Hopkins
APPROVED BY: James M. Harris

FEBRUARY 27, 2009 SHEET 8 OF 16

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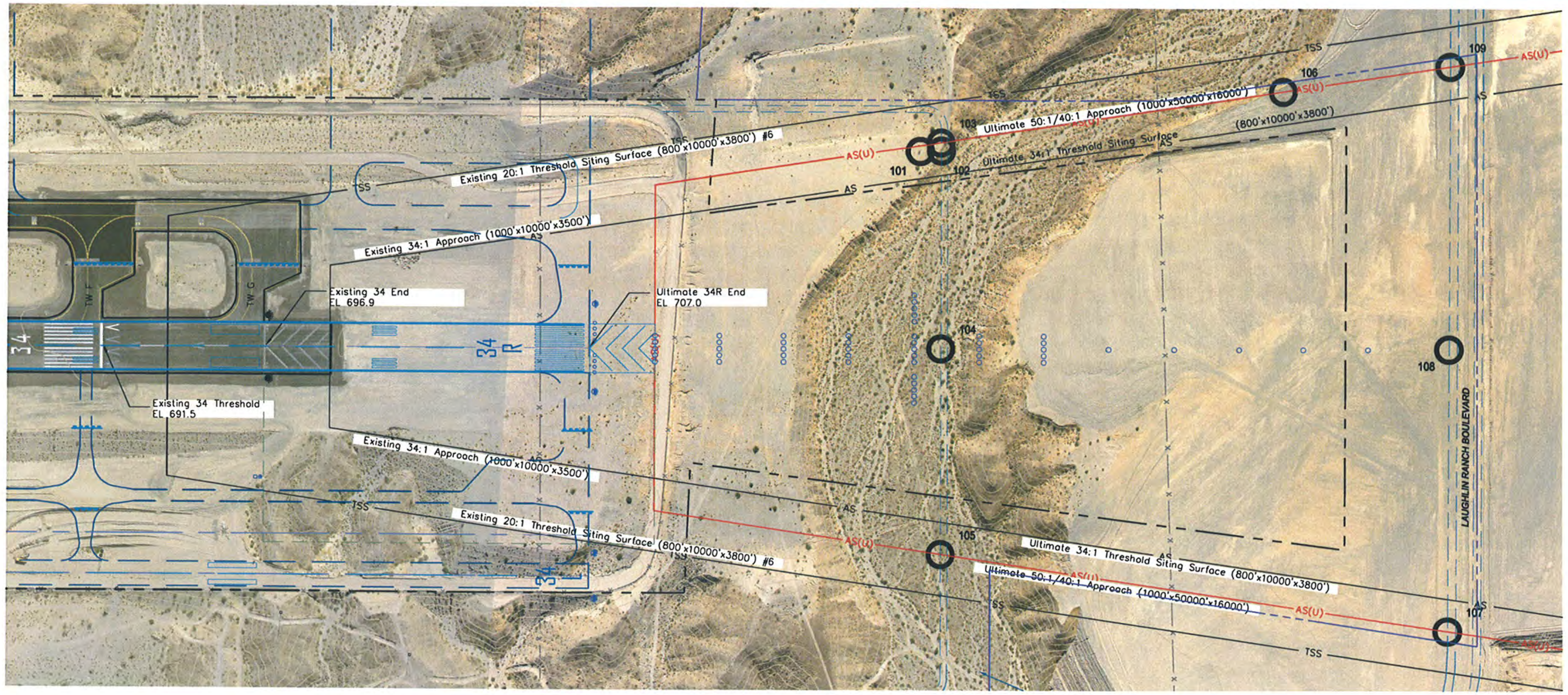


RUNWAY 34R PLAN

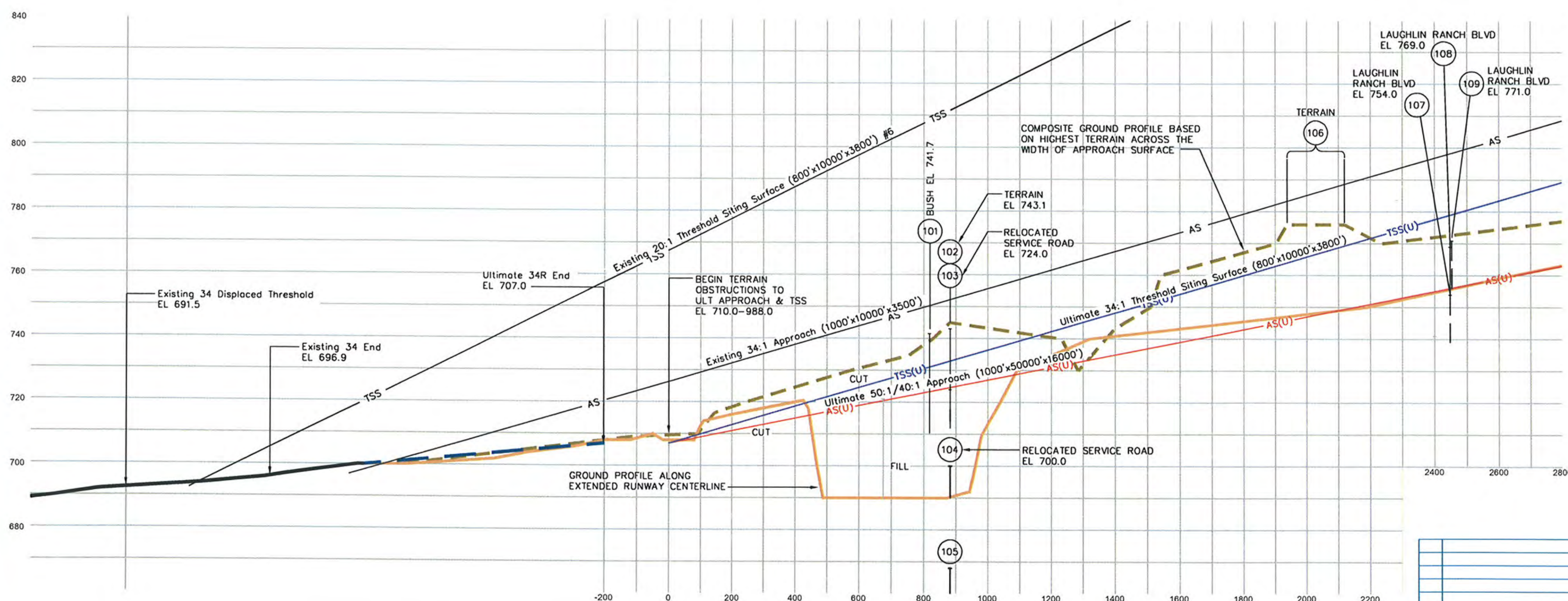
EXISTING RUNWAY 34 OBSTRUCTION TABLE							
Item	Description	Top Elevation	Distance from RW End	Offset from Centerline	Approach Penetration	TSS Penetration	Remediation
	NONE FOUND						

ULTIMATE RUNWAY 34R OBSTRUCTION TABLE							
Item	Description	Top Elevation	Distance from RW End	Offset from Centerline	Approach Penetration	TSS Penetration	Remediation
101	VEGETATION	741.7	1518	607 R	18	11	TO BE REMOVED DURING RW EXTENSION CONSTRUCTION
102	TERRAIN	743.1	1583	0	18	11	TERRAIN TO BE GRADED DURING RW EXTENSION CONSTRUCTION
106	TERRAIN	776.7	2138	792 R	31	13	REQUEST AERONAUTICAL STUDY
108	LAUGHLIN RANCH BLVD	769.0	3148	0	3	CLEAR	TSS CLEAR; NAR
109	LAUGHLIN RANCH BLVD	771.0	3153	869 R	5	CLEAR	TSS CLEAR; NAR
	TERRAIN	VARIES	SEE PROFILE VIEW	VARIES	VARIES	VARIES	REQUEST AERONAUTICAL STUDY
141	TERRAIN	718.3	582	319 L	4	<1	TERRAIN TO BE GRADED DURING RW EXTENSION CONSTRUCTION
142	TERRAIN	720.6	626	34 L	5	1	TERRAIN TO BE GRADED DURING RW EXTENSION CONSTRUCTION
143	TERRAIN	725.4	712	431 R	8	3	TERRAIN TO BE GRADED DURING RW EXTENSION CONSTRUCTION

NAR – NO ACTION REQUIRED

GENERAL NOTES:

1. HORIZONTAL DATUM: NORTH AMERICAN DATUM 1983 – NAD83; VERTICAL DATUM: NORTH AMERICAN DATUM 1988 – NAVD88; FROM STANTEC, PHOENIX, ARIZONA.
2. ALL DISTANCE MEASUREMENTS IN FEET.



RUNWAY 34R PROFILE

Magnetic Declination
11° 35' East (March 2009)
Annual Rate of Change
0° 6' West (March 2009)

0 200 400
HORIZONTAL SCALE IN FEET

0 20 40
VERTICAL SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.

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LAUGHLIN/BULLHEAD INTERNATIONAL AIRPORT

INNER PORTION OF THE APPROACH SURFACE DRAWING RUNWAY 34R

DRAFT

BULLHEAD CITY, ARIZONA

PLANNED BY: Chris M. Hugunin
DETAILED BY: Diana L. Hopkins
APPROVED BY: James M. Harris

FEBRUARY 27, 2009 — SHEET 9 OF 16

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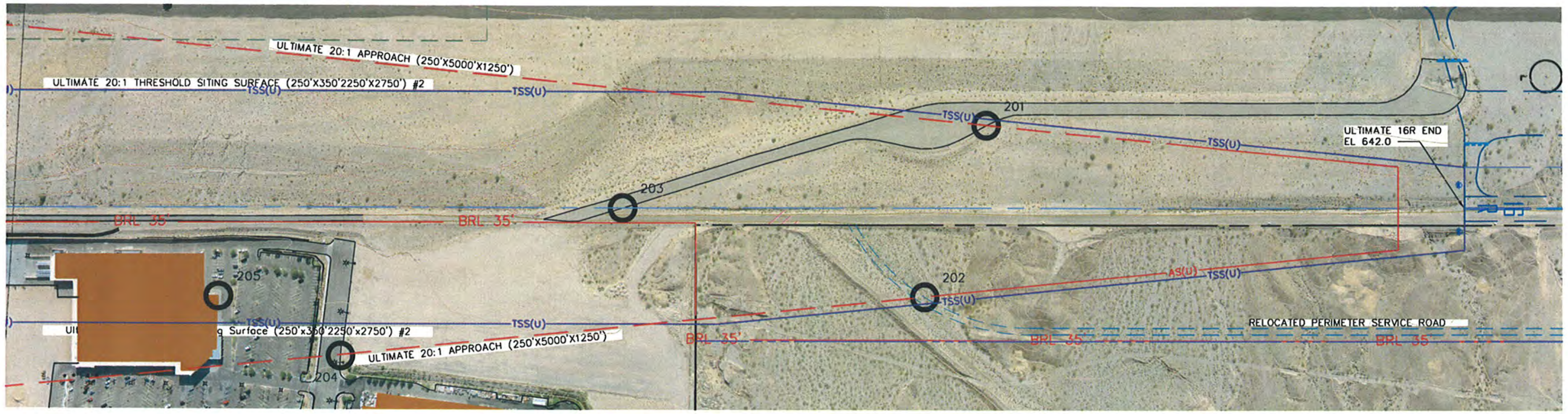


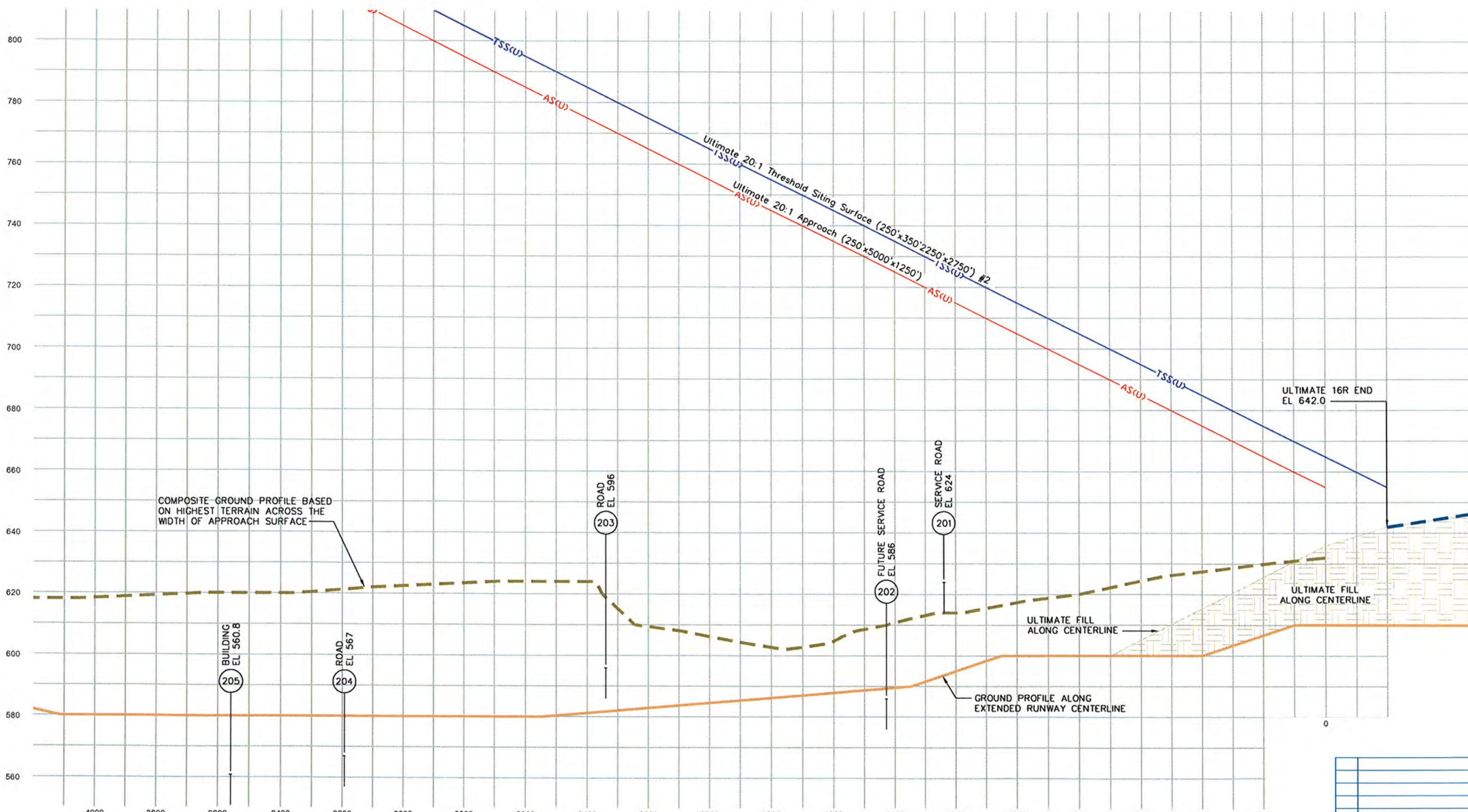
RUNWAY 16R PLAN

EXISTING RUNWAY 16R OBSTRUCTION TABLE						
Item	Description	Top Elevation	Distance from RW End	Offset from Centerline	Penetration	Remediation
	NONE FOUND					

ULTIMATE RUNWAY 16R OBSTRUCTION TABLE						
Item	Description	Top Elevation	Distance from RW End	Offset from Centerline	Penetration	Remediation
	NONE FOUND					

GENERAL NOTES:

1. HORIZONTAL DATUM: NORTH AMERICAN DATUM 1983 – NAD83; VERTICAL DATUM: NORTH AMERICAN DATUM 1988 – NAVD88; FROM STANTEC, PHOENIX, ARIZONA.
2. ALL DISTANCE MEASUREMENTS IN FEET.



RUNWAY 16R PROFILE

Magnetic Declination 11° 35' East (March 2009) Annual Rate of Change 0° 6' West (March 2009)

0 200 400
HORIZONTAL SCALE IN FEET

0 20 40
VERTICAL SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.

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LAUGHLIN/BULLHEAD INTERNATIONAL AIRPORT

INNER PORTION OF THE APPROACH SURFACE DRAWING RUNWAY 16R

DRAFT

BULLHEAD CITY, ARIZONA

PLANNED BY: Chris M. Hugunin
DETAILED BY: Diana L. Hopkins
APPROVED BY: James M. Harris

FEBRUARY 27, 2009 | SHEET 10 OF 16

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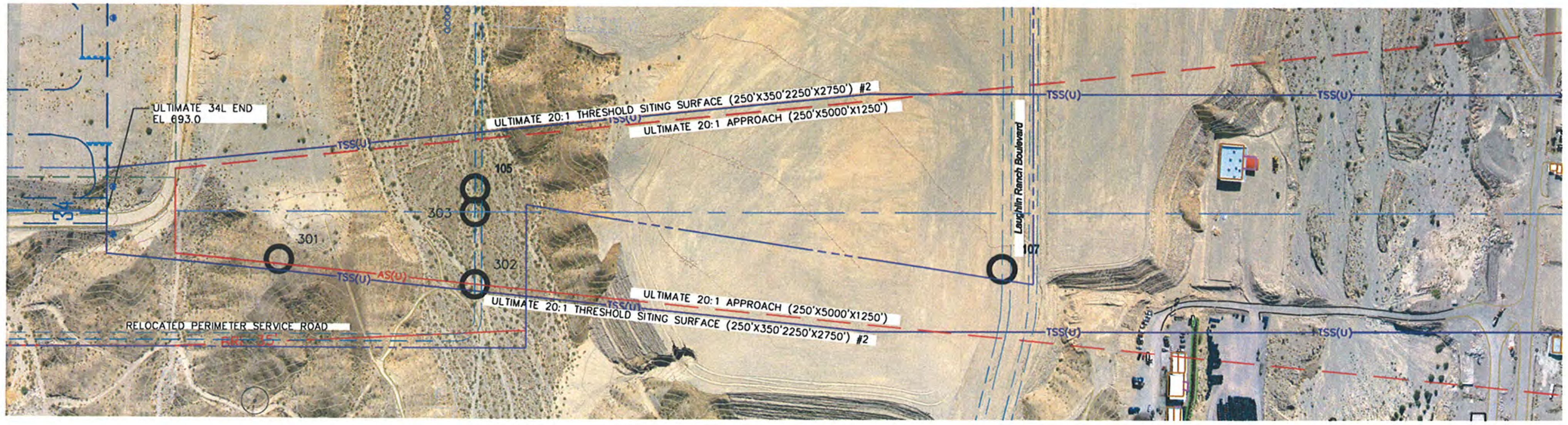


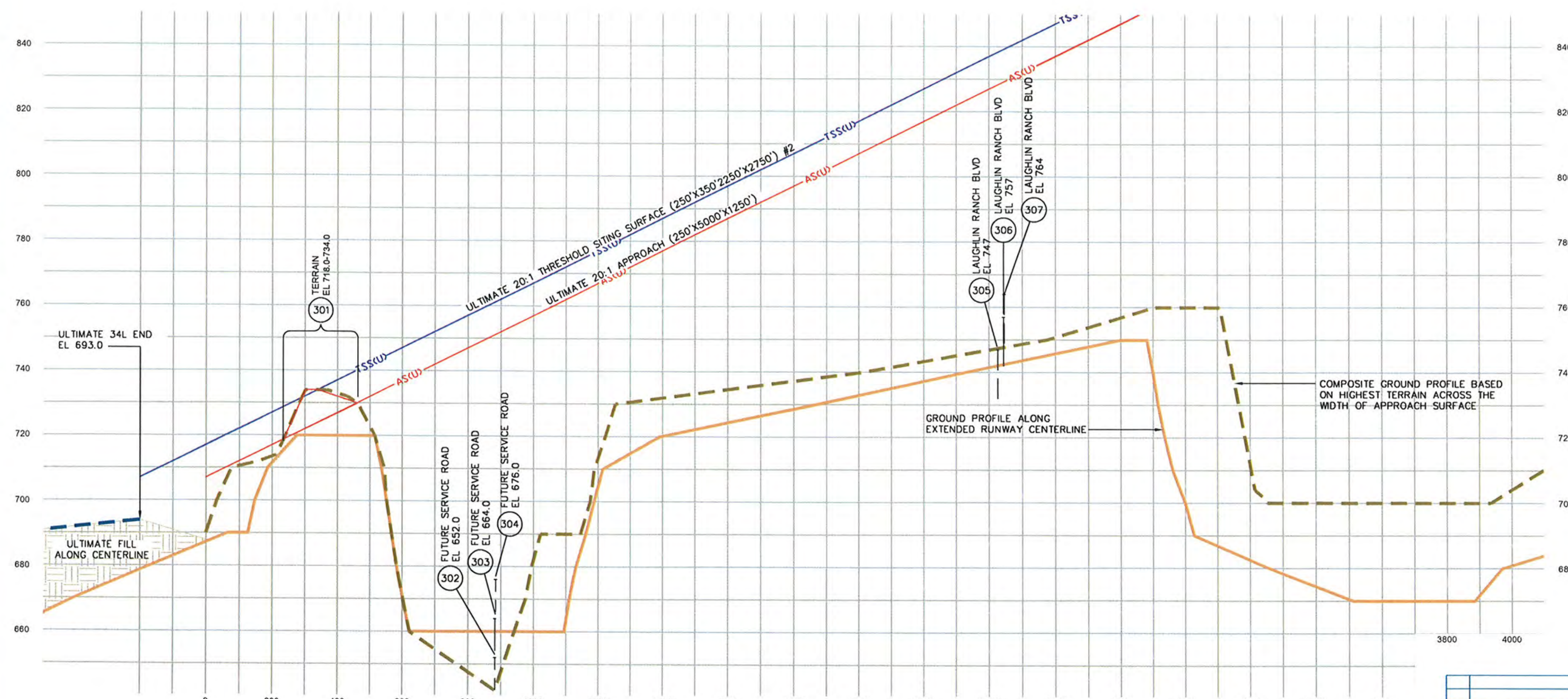
RUNWAY 34L PLAN

ULTIMATE RUNWAY 34L OBSTRUCTION TABLE							
Item	Description	Top Elevation	Distance from RW End	Offset from Centerline	20:1 Approach Penetration	20:1 TSS Penetration	Remediation
301	TERRAIN	734.0	503	145 L	26	16	REQUEST AERONAUTICAL STUDY
	TERRAIN	VARIES	VARIES	VARIES	VARIES	VARIES	REQUEST AERONAUTICAL STUDY

ALL DISTANCE MEASUREMENTS IN FEET

GENERAL NOTES:

1. HORIZONTAL DATUM: NORTH AMERICAN DATUM 1983 – NAD83; VERTICAL DATUM: NORTH AMERICAN DATUM 1988 – NAVD88; FROM STANTEC, PHOENIX, ARIZONA.
2. ALL DISTANCE MEASUREMENTS IN FEET.



RUNWAY 34L PROFILE

Magnetic Declination
11° 35' East (March 2009)
Annual Rate of Change
0° 6' West (March 2009)

0 200 400
HORIZONTAL SCALE IN FEET

0 20 40
VERTICAL SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.

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LAUGHLIN/BULLHEAD INTERNATIONAL AIRPORT

INNER PORTION OF THE APPROACH SURFACE DRAWING RUNWAY 34L

DRAFT

BULLHEAD CITY, ARIZONA

PLANNED BY: Chris M. Hugunin
DETAILED BY: Diana L. Hopkins
APPROVED BY: James M. Harris

FEBRUARY 27, 2009

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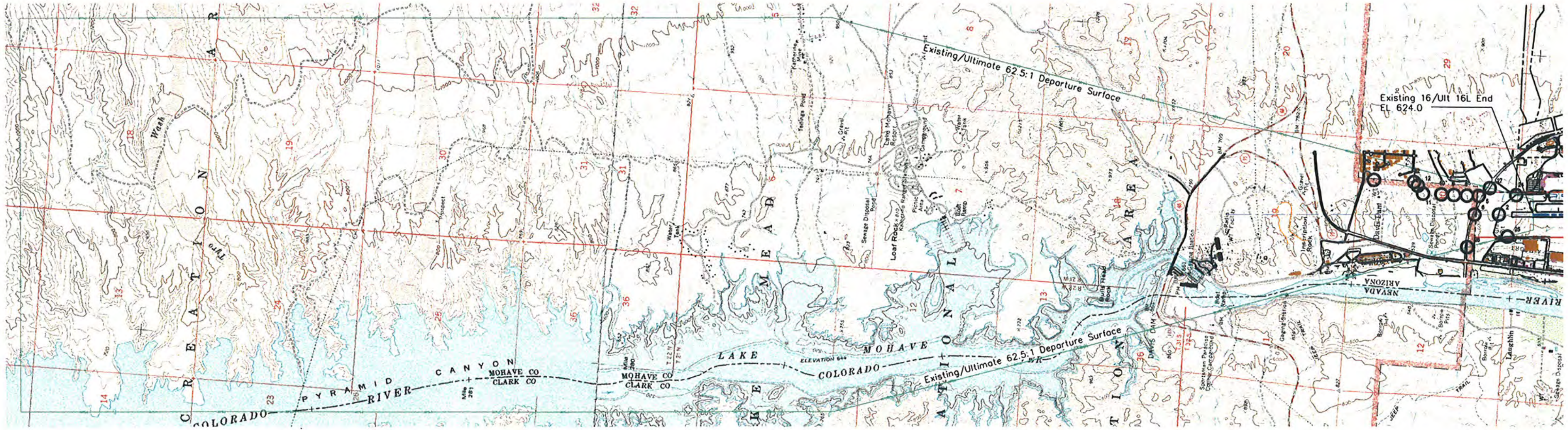
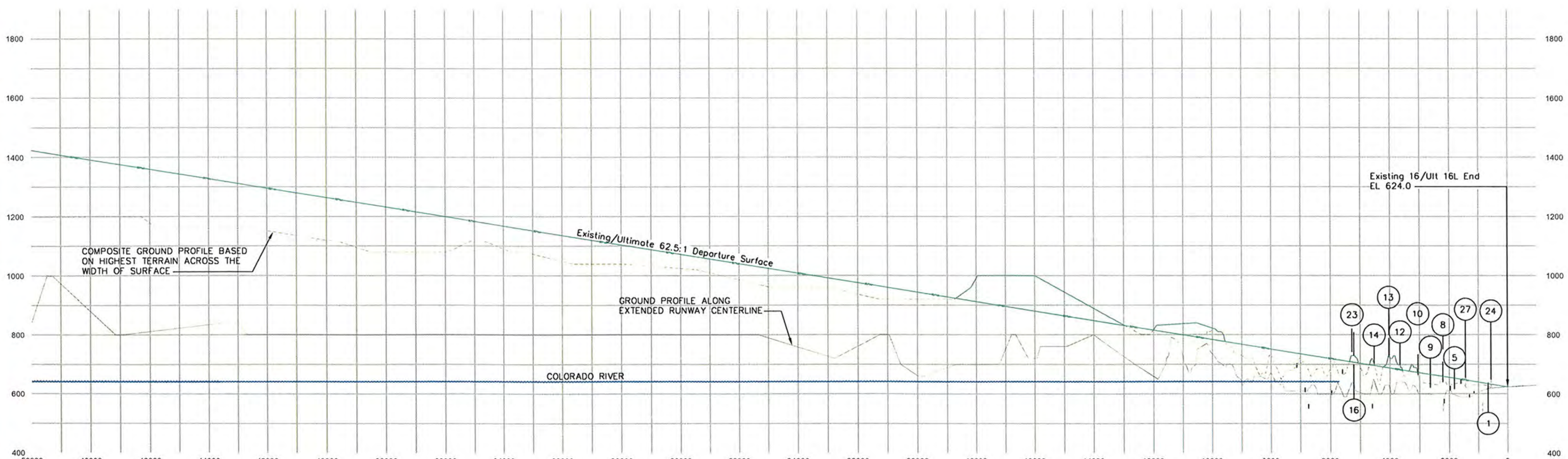


RUNWAY 16L PLAN

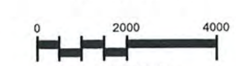
ULTIMATE RUNWAY 16L OBSTRUCTION TABLE			
Item	Description	Top Elevation	Penetration
1	TBD	637.5	3
5	POLE	684.9	32
8	POLE	708.8	49
9	POLE	725.3	59
10	POLE	735.6	63
11	POLE	772.6	90
12	TERRAIN	730.0	45
13	POLE	789.2	101
14	POLE	762.0	66
16	TOWER	808.9	102
22	TERRAIN	739.6	56
23	TOWER	820.7	116
24	SERVICE ROAD	648.0	15
27	HWY 163	7.0	7
	TERRAIN	VARIES	VARIES

GENERAL NOTES:

1. HORIZONTAL DATUM: NORTH AMERICAN DATUM 1983 – NAD83; VERTICAL DATUM: NORTH AMERICAN DATUM 1988 – NAVD88; PROVIDED BY STANTEC, PHOENIX, ARIZONA.



RUNWAY 16L PROFILE



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LAUGHLIN/BULLHEAD INTERNATIONAL AIRPORT

RUNWAY DEPARTURE SURFACE DRAWING
RUNWAY 16L

DRAFT

BULLHEAD CITY, ARIZONA

PLANNED BY: Chris M. Hugunin
DETAILED BY: Diana L. Hopkins
APPROVED BY: James M. Harris

FEBRUARY 27, 2009 | *SHEET* 12 *OF* 16

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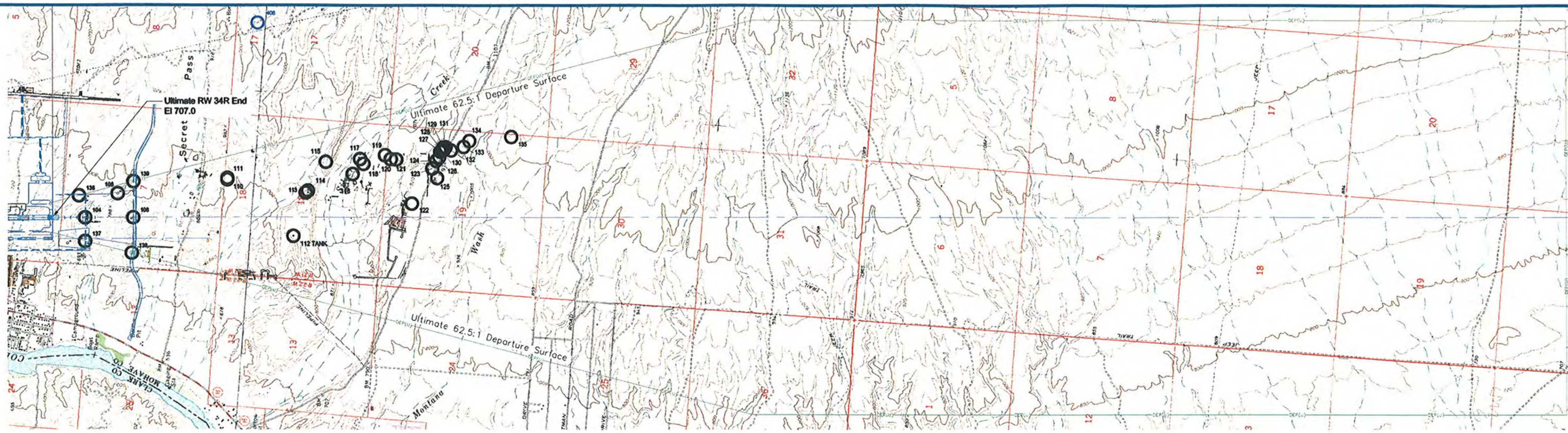
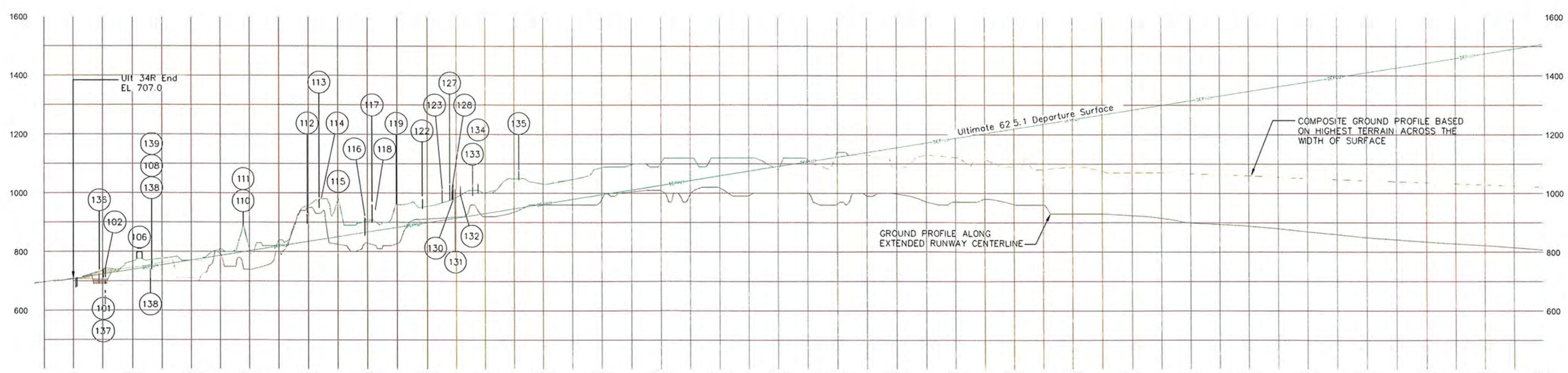


RUNWAY 34R PLAN

GENERAL NOTES:

1. HORIZONTAL DATUM: NORTH AMERICAN DATUM 1983 – NAD83; VERTICAL DATUM: NORTH AMERICAN DATUM 1988 – NAVD88; PROVIDED BY STANTEC, PHOENIX, ARIZONA.

ULTIMATE RUNWAY 34R OBSTRUCTION TABLE			
Item	Description	Top Elevation	Penetration
101	VEGETATION	741.7	18
102	TERRAIN	743.1	19
106	TERRAIN	776.7	35
107	LAUGHLIN RANCH BLVD	754.0	5
108	LAUGHLIN RANCH BLVD	769.0	20
109	LAUGHLING RANCH BLVD	771.0	22
110	VEGETATION	886.9	88
111	TERRAIN	889.9	91
112	TANK	926.6	92
113	VEGETATION	980.4	140
114	TERRAIN	980.6	139
115	TERRAIN	979.0	128
116	POLE	916.0	50
117	BUILDING	960.6	91
118	VEGETATION	938.5	67
119	TERRAIN	961.7	79
122	BUILDING	979 7	83
123	POLE	1001.2	94
127	POLE	1029.1	118
128	TREE	1006.3	94
130	TREE	1029.9	117
131	BUILDING	1013.5	99
132	TREE	1024.4	107
133	TREE	1023.0	99
134	BUILDING	1031.8	105
135	BUILDING	1076.6	127
	TERRAIN	VARIES	VARIES



RUNWAY 34R PROFILE

0 2000 4000
SCALE IN FEET

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LAUGHLIN/BULLHEAD INTERNATIONAL AIRPORT

RUNWAY DEPARTURE SURFACE DRAWING
RUNWAY 34R

DRAFT

BULLHEAD CITY, ARIZONA

PLANNED BY: Chris M. Hugunin
DETAILED BY: Diana L. Hopkins
APPROVED BY: James M. Harris

FEBRUARY 27, 2009 SHEET 13 OF 16

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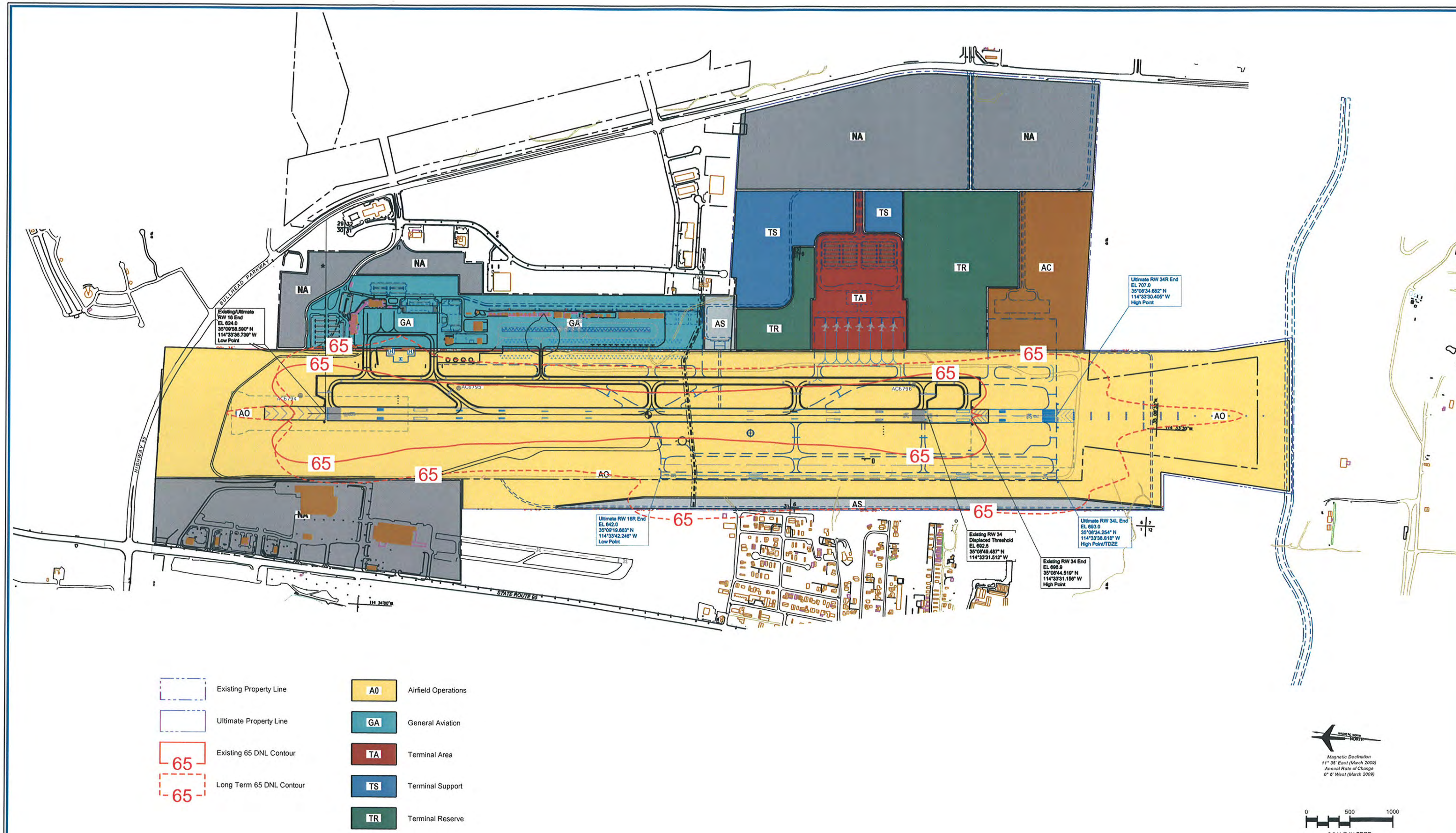

- Existing Property Line
- Ultimate Property Line
- 65 — Existing 65 DNL Contour
- 65 — Long Term 65 DNL Contour

AO	Airfield Operations
GA	General Aviation
TA	Terminal Area
TS	Terminal Support
TR	Terminal Reserve
AC	Air Cargo
AS	Airfield Support
NA	Non-Airfield Access Support

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LAUGHLIN/BULLHEAD INTERNATIONAL AIRPORT

AIRPORT LANDUSE DRAWING

DRAFT

BULLHEAD CITY, ARIZONA

PLANNED BY: Chris M. Huqunin
DETAILED BY: Diana L. Hopkins
APPROVED BY: James M. Harris

FEBRUARY 27, 2009 | SHEET 14 OF 16

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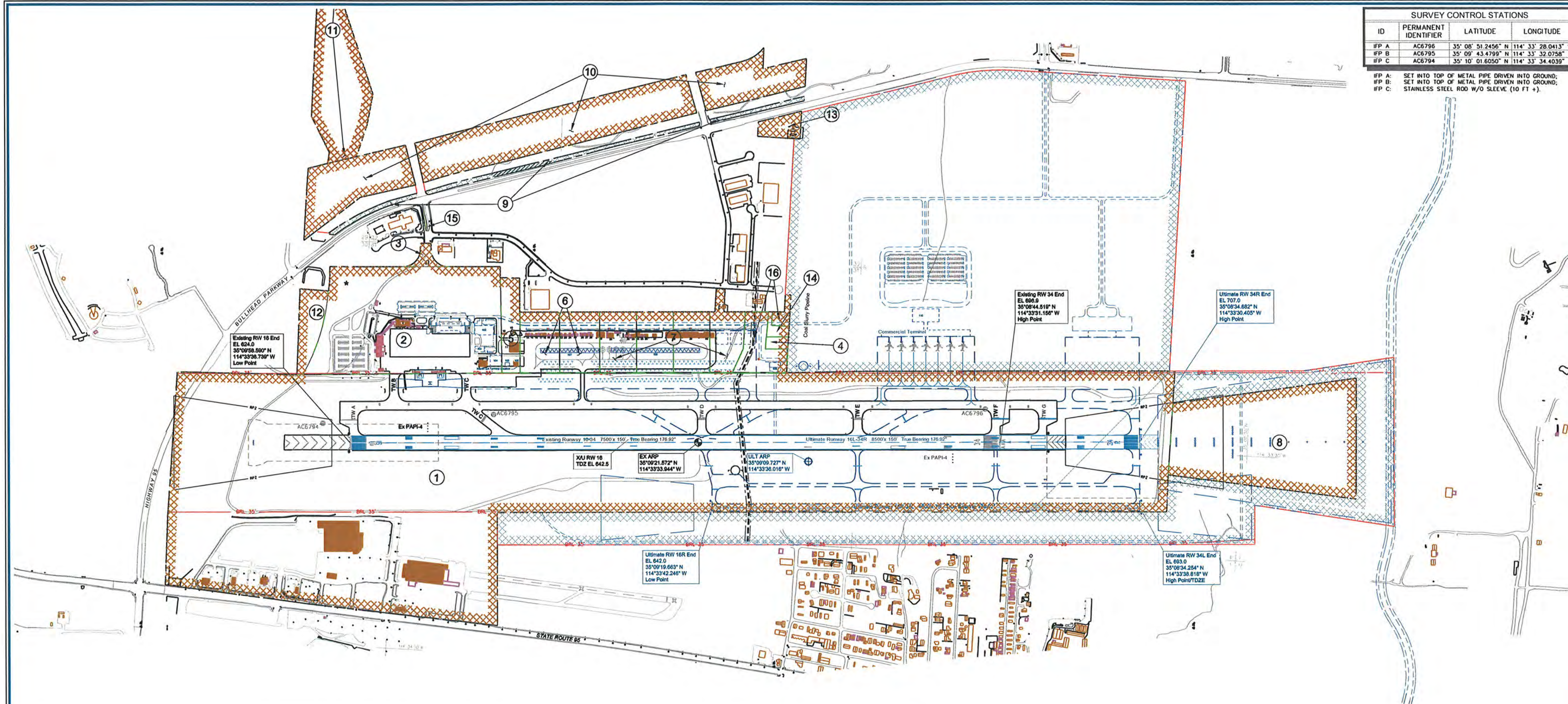

SURVEY CONTROL STATIONS

ID	PERMANENT IDENTIFIER	LATITUDE	LONGITUDE
IFP A	AC6796	35° 08' 51.2456" N	114° 33' 28.0413" W
IFP B	AC6795	35° 09' 43.4799" N	114° 33' 32.0758" W
IFP C	AC6794	35° 10' 01.6050" N	114° 33' 34.4039" W

IFP A: SET INTO TOP OF METAL PIPE DRIVEN INTO GROUND;
IFP B: SET INTO TOP OF METAL PIPE DRIVEN INTO GROUND;
IFP C: STAINLESS STEEL ROD W/O SLEEVE (10 FT +).

RECORDING INFORMATION (County Assessor - Mohave County, Arizona.)

PARCEL	OWNER: (SEE NOTE 1)	ACREAGE	DATE RECORDED	RECORDING INFORMATION	GRANTOR/METHOD	NOTES:	PARCEL	OWNER: (SEE NOTE 1)	ACREAGE	DATE RECORDED	RECORDING INFORMATION	GRANTOR/METHOD	NOTES:
1	County of Mohave, AZ	±433.30	02/18/1987	Mohave County Official Records Book: 1291 Page: 337-342	D. J Loughlin Donated	Land Patent from State of Arizona, paid for by D. J. Loughlin	9	County of Mohave, AZ	±4.79	12/18/1996	Mohave County Official Records Book: 2833 Page: 94	D. J. Loughlin Donated	N/A
2	County of Mohave, AZ	±51.05	07/23/1991	Mohave County Official Records Book: 1921 Page: 928	Condemned	Superior Court Case #30326	10	County of Mohave, AZ	±53.34	12/18/1996	Mohave County Official Records Book: 2833 Page: 97	D. J. Loughlin Donated	N/A
3	County of Mohave, AZ	±1.04	10/07/1991	Mohave County Official Records Book: Page:	D. J Loughlin Donated	--	11	County of Mohave, AZ	±41.55	08/11/2000	Mohave County Official Records Book: 3566 Page: 459	D. J. Loughlin Donated	N/A
4	County of Mohave, AZ	±0.72	05/15/1996	-- --	D. J Loughlin Donated	--	12	County of Mohave, AZ	±4.36	12/18/1996	Mohave County Official Records Book: 2833 Page: 93	D. J. Loughlin Donated	N/A
5	County of Mohave, AZ	±5.00	05/15/1996	-- --	D. J Loughlin Donated	--	13	County of Mohave, AZ	±2.40	07/23/1991	Mohave County Official Records Book: 1921 Page: 929	Condemned	--
6	County of Mohave, AZ	±13.00	02/23/1999	Mohave County Official Records Book: 1894 Page: 379	D. J. Loughlin Purchased	--	14	County of Mohave, AZ	±0.84	12/18/1996	Mohave County Official Records Book: 2833 Page: 100	D. J. Loughlin Donated	--
7	County of Mohave, AZ	±30.85	07/16/1999	Mohave County Official Records Book: 3341 Page: 915	D. J. Loughlin Purchased	--	15	County of Mohave, AZ	±0.08	12/18/1996	Mohave County Official Records Book: 2833 Page: 114	D. J. Loughlin Donated	--
8	County of Mohave, AZ	±47.73	10/23/2000	Mohave County Official Records Book: 3608 Page: 260	Condemned	--	16	County of Mohave, AZ	±6.35	02/14/2000	Mohave County Official Records Book: 3472 Page: 946	D. J. Loughlin Purchased	--
							Total Acreage		696.34				

Please note: The total acreage shown in this table is the cumulative sum of the above described parcels, whose individual acreages were obtained from legal description and other legal documents by Mohave County Arizona.

Note 1: The Mohave County Airport Authority operates the Loughlin/Bullhead International Airport under a "master lease" granted by the County of Mohave (original dated 11/4/1991; amended 2/18/1997) See Official Records of Mohave County Recorder: Book: 2002 Page; 66-89 Fee: #92-5295

LEGEND

Existing Airport Property

Property To Be Acquired

Parcel Boundary

Magnetic Declination 11° 35' East (March 2009) Annual Rate of Change 0° 6' West (March 2009)

0 500 1000 SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.

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LAUGHLIN/BULLHEAD INTERNATIONAL AIRPORT

EXHIBIT "A"
DRAFT
PROPERTY MAP

BULLHEAD CITY, ARIZONA

PLANNED BY: Chris M. Hugunin
DETAILED BY: Diana L. Hopkins
APPROVED BY: James M. Harris
FEBRUARY 27, 2009

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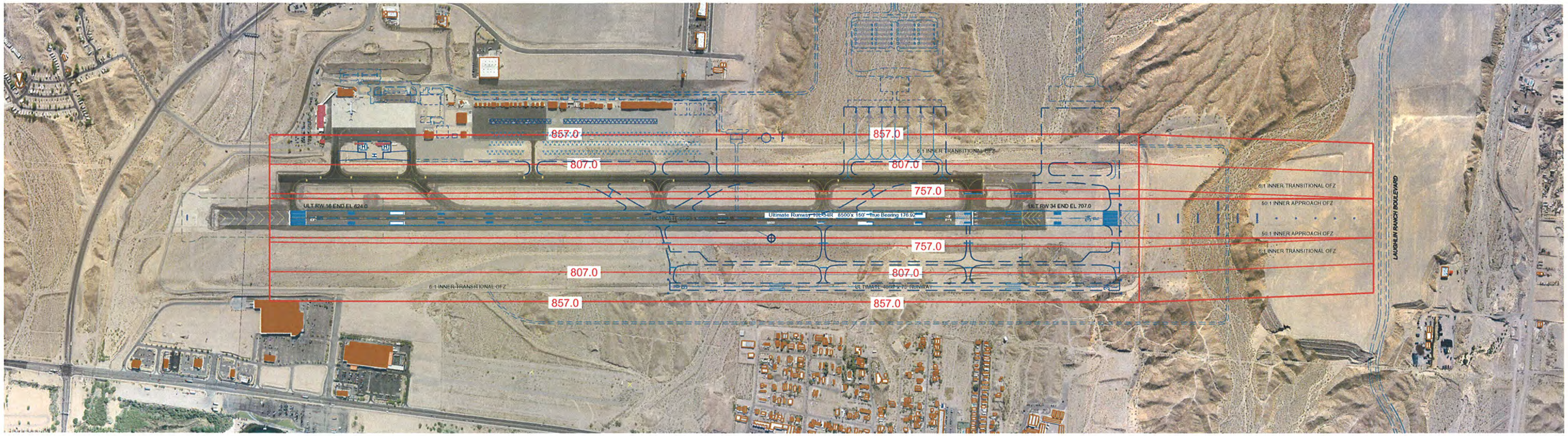
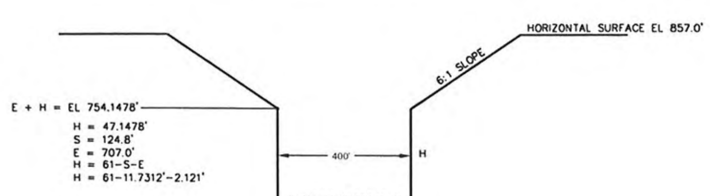


RUNWAY 34 END



N.T.S.

OBSTACLE FREE ZONE (OFZ) OBJECT PENETRATIONS		
Object	Penetration	Disposition
NONE FOUND		

0 500 1000
SCALE IN FEET

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LAUGHLIN/BULLHEAD INTERNATIONAL AIRPORT

INNER APPROACH & INNER TRANSITIONAL OFZ DRAWING

DRAFT

BULLHEAD CITY, ARIZONA

PLANNED BY: Chris M. Hugunin
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FEBRUARY 27, 2009

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