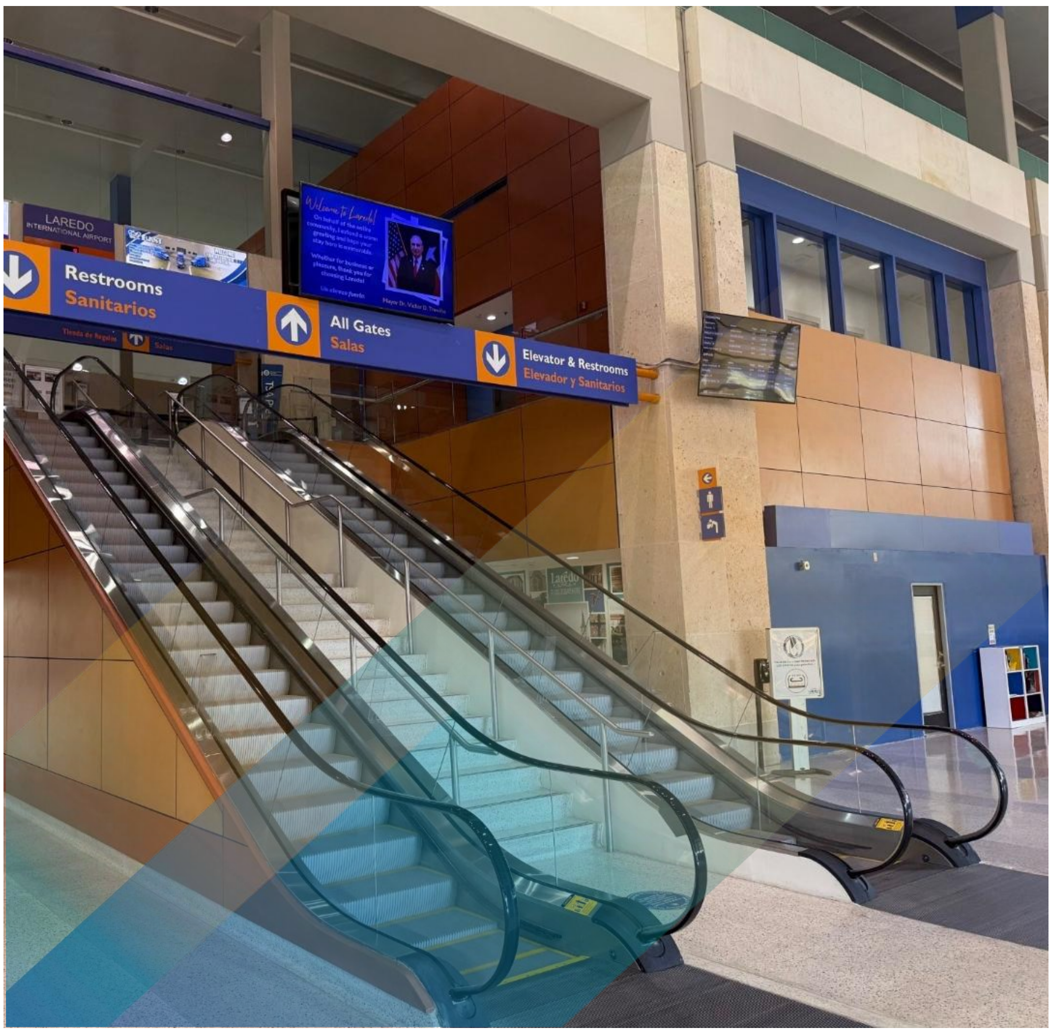
June 2026

Facility Requirements



Laredo International Airport
Facility Requirements

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Prepared by RS&H, Inc. at the
direction of Laredo International Airport

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3 Facility Requirements

3.1 Introduction

The goal of the Facility Requirement chapter is to determine what additional facilities or enhancements to existing infrastructure are needed based on the forecasted demand findings in **Chapter 2, Forecast of Aviation Activity**. The analysis defines the current and future needs and provides information as to why Laredo International Airport (also referred to as LRD or Airport in this report) needs to address them. The existing facilities will be evaluated to identify if there are deficiencies or constraints in the Airport's current capacity. This will ensure the Airport can avoid future capacity issues, align with the most up-to-date Federal Aviation Administration (FAA) regulations, and ensure LRD's strategic vision is fulfilled. The findings of this facility requirement analysis will serve as the basis for the next steps in alternative development.

This chapter addresses facility requirements that have been divided into the following functional areas of the Airport:

- Airfield Requirements
- Air Cargo Requirements
- Passenger Terminal Requirements
- Landside Requirements
- General Aviation Requirements
- Support Facility Requirements
- Utility Requirements

The critical aircraft for each runway was identified in Chapter 2, Forecast of Aviation Activity and is summarized in **Table 3-1**. These aircraft characteristics will be used to analyze runway and taxiway geometric and separation standards of the existing airfield at LRD.

Table 3-1:LRD Critical Aircraft by Runway

	Representative Aircraft	AAC	ADG	TDG
Runway 18R-36L and 18L-36R				
Existing Critical Aircraft	MD-83 / A-300-600	D	IV	5
Future Critical Aircraft	MD-83 / A-300-600	D	IV	5
Runway 14-32				
Existing Critical Aircraft	Beech 200 Super King	B	II	2A
Future Critical Aircraft	Beech 200 Super King	B	II	2A

Source: RS&H Analysis, 2025.
Abbreviations:

AAC = Aircraft Approach Category
ADG = Airplane Design Group
TDG = Taxiway Design Group

For the purposes of the analysis in the remainder of this report, references to specific years will be minimized and instead Planning Activity Levels (PALs) will be emphasized. The purpose of the PALs is to guide Airport staff and officials in determining when airport facilities need expansion or upgrades according to activity levels instead of calendar or fiscal years. By referencing decisions to activity levels and not specific dates, airport operators can better anticipate development needs.

PAL 1 (estimated to occur in 2029) is associated with the short-term planning horizon, PAL 2 (estimated to occur in 2034) is associated with the mid-term planning horizon, and PAL 3 (estimated to occur in 2044) is associated with the long-term planning horizon. **Table 3-2** summarizes the forecast demand by PAL for enplaned passengers, aircraft operations, and based aircraft.

Table 3-2:
LRD Forecast Summary

		Milestones		
	2024 Base Year	2029 PAL 1	2034 PAL 2	2044 PAL 3
Total Enplanements	**165,676**	**205,585**	**230,263**	**279,620**
Operations				
Passenger	5,636	8,400	9,400	11,500
Cargo	12,626	14,200	15,900	19,400
General Aviation	17,058	18,900	20,900	25,500
Air Taxi	1,094	1,300	1,400	1,800
Military	5,590	5,600	5,600	5,600
Total Operations	**42,004**	**48,400**	**53,200**	**63,800**
Based Aircraft				
Single-Engine	18	18	18	18
Multi-Engine	7	7	7	7
Turbojet	15	17	17	17
Helicopter	15	17	17	17
Ultralight / VTOL	10	12	12	12
Total Based Aircraft	**65**	**71**	**71**	**71**

Source: RS&H Analysis, 2025, FAA Terminal Area Forecast (TAF)

3.2 Airfield Requirements

This section outlines the airfield facility needs for LRD over the next 20 years. These requirements have been developed in accordance with current FAA Advisory Circulars and other regulations to ensure compliance and effectively meet future capacity, forecast demand requirements, and airfield safety standards.

3.2.1 Airfield Capacity

Airfield capacity (also referred to as throughput capacity) calculations are essential for designing and evaluating the needs for existing and future airport development and improvement projects. Airfield capacity refers to the maximum number of aircraft operations that can be accommodated at an airport within one hour. To determine LRD's airfield capacity and predict associated delays at a planning level, the FAA's Advisory Circular (AC) 150/5060-5, *Airport Capacity and Delay*, provides the standard methodology.

The aircraft mix is the relative percentage of flight operations by classes of aircraft based on the level of wake turbulence they develop, and is represented by the Mix Index (MI). The MI is computed using the formula MI = (%C+3*%D), where %c and %D are the percentages of aircraft classes C and D, respectively, expected at the airport during the year the capacity is being computed for. **Table 3-3** shows the classification criteria used to determine what class aircraft belong to.

Table 3-3:
Mix Index Classification

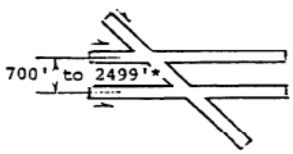
Aircraft Class	Max Cert. Takeoff Weight (lbs)	# of Engines	Wake Turbulence Classification
A	<12,500	Single	Small
B	<12,500	Multi	Small
C	12,500 – 300,000	Multi	Large
D	>300,000	Multi	Heavy

Source: FAA AC 150/5060-5

The Mix Index was determined to be at 78.7 for all PALs within the planning period. The Mix Index is then used to calculate the Annual Service Volume (ASV) for LRD.

The ASV is defined as a reasonable estimate of an airport's annual capacity which accounts for differences in runway use, meteorological conditions and more as found in AC 150/5060-5. **Table 3-4** illustrates the resulting ASV based on the Mix Index at LRD.

Table 3-4:
Capacity and ASV for Long Range Planning

Runway Configuration	Mix Index %(C+3D)	Hourly Capacity Ops/Hr		ASV Ops/Yr
		VFR	IFR	
	0-20	197	59	355,000
	21-50	145	57	275,000
	51-80	**121**	**56**	**260,000**
	81-120	105	59	285,000
	121-180	94	60	340,000

Chapter 2,Figure No. 10

Table 3-5 presents a comparison between forecasted aircraft operations and the estimated ASV ratio for the existing airfield.

Table 3-5:
Comparison of Forecast Operations and ASV

	Base Year	PAL 1	PAL 2	PAL 3
Forecast Operations	42,014	48,400	53,200	63,800
ASV	260,000	260,000	260,000	260,000
ASV Ratio	**16%**	**19%**	**20%**	**25%**

Source: RS&H Analysis, 2025

The ASV for the current runway configuration is estimated at 260,000 operations. Per FAA Order 5090.5 *Formulation of the National Plan of Integrated Airport Systems (NPIAS) and Airports Capital Improvement Plan (ACIP)*, planning for a new or extended runway to increase hourly capacity should begin when activity reaches 60 percent of the ASV, with development warranted at 80 percent of ASV. At the projected activity levels, no airfield capacity enhancements are anticipated to be needed during the planning period.

3.2.2 Runway Requirements

Runway requirements address the geometric ability of LRD's runways to meet FAA design standards based on the FAA-approved critical aircraft (see Chapter 2 Section 2.1). Elements examined in this section include geometric and separation standards, runway protection zones, length, orientation, designation, and pavement strength.

3.2.5.1 Runway Orientation and Wind Analysis

FAA AC 150/5300-13B *Airport Design, Change 1* states that an airport's primary runway should be orientated in the directions of the prevailing winds and recommends that an airport's runway system provide a minimum of 95 percent wind coverage. The following runway wind coverage analysis considers ten years of meteorological data (2015 through 2024) from the National Climatic Data Center for wind speed and direction in All Weather, Visual Flight Rules(VFR), and Instrument Flight Rules (IFR) conditions.

Table 3-6 summarizes the wind coverage for each runway direction and the overall runway system by showing the percentages of time when crosswind components fall below an acceptable velocity over a ten-year period. This analysis demonstrates that the combined runway system at the Airport exceeds the FAA's minimum 95 percent wind coverage threshold across all analyzed weather conditions and crosswind component levels. It is important for the Airport to have sufficient wind coverage meaning all three runways are required to maintain capacity.

Table 3-6:
LRD Wind Data

All Weather Wind Data				
Runway	Crosswind Component			
	10.5 Knots	13 Knots	16 Knots	20 Knots
18R-36L & 18L-36R	86.94%	94.11%	98.52%	99.80%
14-32	95.75%	97.93%	99.93%	99.86%
Combined	97.74%	99.21%	99.83%	99.97%

IFR Wind Data				
Runway	Crosswind Component			
	10.5 Knots	13 Knots	16 Knots	20 Knots
18R-36L & 18L-36R	95.73%	98.16%	99.34%	99.76%
14-32	94.82%	97.29%	99.19%	99.70%
Combined	98.29%	99.32%	99.78%	99.90%

Runway	VFR Wind Data			
	Crosswind Component			
	10.5 Knots	13 Knots	16 Knots	20 Knots
18R-36L & 18L-36R	85.95%	93.66%	98.43%	99.81%
14-32	95.84%	97.99%	99.46%	99.88%
Combined	97.67%	99.20%	99.84%	99.98%

Source: NOAA Integrated Surface Database (ISD)
Note: Data Range: 2015 – 2024

3.2.5.2 Runway Designation

Every runway has two associated directional headings: a true heading and a magnetic heading[1]. Runway designations are provided on each runway to provide visual reference to pilots of the orientation according to the magnetic bearing of a runway which changes over time and therefore runway redesignations must occasionally be updated. It is industry standard that a runway designation be considered when the runway magnetic heading shifts more than 5 degrees from the runway marking designation. The rate of magnetic variance at LRD is 4° 4' E ± 0° 20' as of April 2025. The current rate of change is 0° 5' W degrees per year[2]. As shown in **Table 3-7**, the current designations for all runways at LRD are not forecasted to require revisions during the planning period.

Table 3-7:
Existing and Future Runway Designation

Runway End	Base Year (2025)			
	True Bearing	Magnetic Bearing	Runway Heading	Runway Designation
18R	177° 0′ 32.00″	181° 4′ 32.12″	181°	18R
36L	357° 0′ 32.00″	001° 4′ 32.12″	001°	36L
18L	176° 59′ 58″	181° 3′ 58.1″	181°	18L
36R	356° 59′ 58″	001° 3′ 58.1″	001°	36R
14	141° 44′ 47″	145° 48′ 47.09″	146°	14
32	321° 44′ 47″	325° 48′ 47.09″	326°	32

[1] A true heading is the direction toward which a runway is physically oriented. This will not change unless the runway is realigned. A magnetic heading is the runway's true heading corrected for magnetic declination (the angle between magnetic north and true north).
[2] NOAA National Centers for Environmental Information. *Magnetic Declination Calculator.* https://www.ngdc.noaa.gov/geomag/calculators/magcalc.shtml

Runway End	Future (2044)			
	True Bearing	Magnetic Bearing	Runway Heading	Runway Designation
18R	177° 0′ 32.00″	179° 24′ 32.12″	179°	18R
36L	357° 0′ 32.00″	359° 24′ 32.12″	359°	36L
18L	176° 59′ 58″	179° 23′ 58.1″	179°	18L
36R	356° 59′ 58″	359° 23′ 58.1″	359°	36R
14	141° 44′ 47″	144° 8′ 47.09″	144°	14
32	321° 44′ 47″	324° 8′ 47.09″	324°	32

Source: RS&H Analysis, 2025

3.2.5.3 Runway Geometric and Separation Standards

The geometric and separation standards for a runway are determined by the Runway Design Code (RDC). The RDC is a three-component code that incorporates the Aircraft Approach Category (AAC), Airplane Design Group (ADG), and Runway Visual Range (RVR) expressed as a runway's lowest published visibility minimums. The RDC is shown as AAC-ADG-RVR, where the AAC and ADG are shown for the runway's critical aircraft (shown in **Table 3-1**), and the RVR indicates the minimum visibility required for approaches. The RDC serves as a reference for the relevant criteria outlined in AC 150/5300-13B that must be considered when assessing compliance with current runway design standards.

The following analysis identifies standard and non-standard conditions related to each of the runways at LRD (see **Table 3-8, Table 3-9**, and **Table 3-10**). The tables illustrate whether the runway fulfills the requirement or not by marking components with a red X for non-compliant or a green check mark if it meets the requirement.

Table 3-8:
Runway 18R-36L Design Standards

	Runway 18R (D-IV-2400)			Runway 36L (D-IV-4000)		
	Standard (ft)	Actual (ft)	Adequate (✓) or Deficient (X)	Standard (ft)	Actual (ft)	Adequate (✓) or Deficient (X)
Runway Design						
Runway Width	150	150	✓	150	150	✓
Shoulder Width	25	None	X	25	None	X
Blast Pad						
Width	200	200	✓	200	150	X
Length	200	200	✓	200	120	X
Runway Protection						
Runway Safety Area (RSA)						
Length Beyond Departure End	1,000	1,000	✓	1,000	517 [1]	✓
Length Prior to Threshold	600	600	✓	600	600	✓
Width	500	500	✓	500	500	✓
Runway Object Free Area (ROFA)						
Length Beyond Runway End	1,000	1,000	✓	1,000	517	X
Length Prior to Threshold	600	600	✓	600	600	✓
Width	800	800	✓	800	800	✓
Runway Obstacle Free Zone (ROFZ)						
Length Beyond Runway End	200	200	✓	200	200	✓
Width	400	400	✓	400	400	✓
Runway Precision Obstacle Free Zone (POFZ)						
Length	200	200	✓	None	None	✓
Width	800	800	✓	None	None	✓
Runway Separation						
Runway Centerline to:						
Parallel Runway Centerline	700 [2]	1,000	✓	700 [2]	1,000	✓
Holding Position	255 [3]	249	X	255 [3]	249	X
Parallel Taxiway Centerline	400	500	✓	400	500	✓
Aircraft Parking Area	400	≥1,100	✓	400	≥1,100	✓

[1] Non-standard length beyond runway end mitigated by EMAS
[2] For simultaneous independent landings and takeoffs using VFR
[3] Per AC 150/5300-13B, Increase distance by 1' for every 100' above sea level
Source: AC 150/5300-13B, RS&H Analysis, 2025

Table 3-9:
Runway 18L-36R Design Standards

	Runway 18L (D-IV-4000)			Runway 36R (D-IV-VIS)		
	Standard (ft)	Actual (ft)	Adequate (✓) or Deficient (X)	Standard (ft)	Actual (ft)	Adequate (✓) or Deficient (X)
Runway Design						
Runway Width	150	150	✓	150	150	✓
Shoulder Width	25	None	X	25	None	X
Blast Pad						
Width	200	150	X	200	None	X
Length	200	150	X	200	None	X
Runway Protection						
Runway Safety Area (RSA)						
Length Beyond Departure End	1,000	1,000	✓	1,000	1,000	✓
Length Prior to Threshold	600	600	✓	600	600	✓
Width	500	500	✓	500	500	✓
Runway Object Free Area (ROFA)						
Length Beyond Runway End	1,000	1,000	✓	1,000	1,000	✓
Length Prior to Threshold	600	600	✓	600	600	✓
Width	800	800	✓	800	800	✓
Runway Obstacle Free Zone (ROFZ)						
Length Beyond Runway End	200	200	✓	200	200	✓
Width	400	400	✓	400	400	✓
Runway Precision Obstacle Free Zone (POFZ)						
Length	None	None	✓	None	None	✓
Width	None	None	✓	None	None	✓
Runway Separation						
Runway Centerline to:						
Parallel Runway Centerline	700 [1]	1,000	✓	700 [1]	1,000	✓
Holding Position	255[2]	248	X	255[2]	254	X
Parallel Taxiway Centerline	400	400	✓	400	400	✓
Aircraft Parking Area	400	≥1,000	✓	400	≥1,000	✓

[1] For simultaneous independent landings and takeoffs using VFR
[2] Per AC 150/5300-13B, Increase distance by 1' for every 100' above sea level
Source: AC 150/5300-13B, RS&H Analysis. 2025

Table 3-10:
Runway14-32 Design Standards

	Runway 14 (B-II-4000)			Runway 32 (B-II-4000)		
	Standard (ft)	Actual (ft)	Adequate (✓) or Deficient (X)	Standard (ft)	Actual (ft)	Adequate (✓) or Deficient (X)
Runway Design						
Runway Width	75	150	✓	75	150	✓
Shoulder Width[1]	10	None	✓	10	None	X
Blast Pad						
Width	95	None	X	95	None	X
Length	150	None	X	150	None	X
Runway Protection						
Runway Safety Area (RSA)						
Length Beyond Departure End	300	300	✓	300	300	✓
Length Prior to Threshold	300	300	✓	300	300	✓
Width	150	150	✓	150	150	✓
Runway Object Free Area (ROFA)						
Length Beyond Runway End	300	300	✓	300	300	✓
Length Prior to Threshold	300	300	✓	300	300	✓
Width	500	500	✓	500	500	✓
Runway Obstacle Free Zone (ROFZ)						
Length Beyond Runway End	200	200	✓	200	200	✓
Width	400	400	✓	400	400	✓
Runway Precision Obstacle Free Zone (POFZ)						
Length	None	None	✓	None	None	✓
Width	None	None	✓	None	None	✓
Runway Separation						
Runway Centerline to:						
Parallel Runway Centerline	700	None	✓	700	None	✓
Holding Position	200	301	✓	200	250	✓
Parallel Taxiway Centerline	240	None	✓	240	None	✓
Aircraft Parking Area	250	≥1,100	✓	250	≥1,100	✓

[1] Taxiway shoulder are not required for ADG II runways; they are only a recommendation.
Source: AC 150/5300-13B, RS&H Analysis. 2025

The identified deficiencies in the current runway design standards at LRD, as shown in **Table 3-8**, **Table 3-9**, and **Table 3-10,** are primarily related to runway shoulders, runway blast pads, and runway hold position markings. The following sections provide a more detailed description of these specific deficiencies. Additionally, a potential improvement to protect the Runway 18L-36R ROFA is outlined to enhance safe aircraft operations.

3.2.2.3.1 Shoulder Width

The runway edges at LRD do not have shoulders. Runways shoulders are an important airfield feature providing resistance to jet blast erosion. Based on the critical aircraft for Runway 18R-36L and Runway 18L-36R (RDC D-IV), AC 150/5300-13B would recommend 25-foot-wide paved shoulders. It is also recommended to add 10-foot-wide paved shoulders for runway 14-32 based on the critical aircraft.

3.2.2.3.2 Blast Pad

Blast pads provide resistance to jet blast erosion beyond runway ends. Currently, the blast pad at Runway 36L is 50 feet too narrow and 80 feet too short. It is recommended that this blast pad be expanded to meet the standard dimensions of 200 feet by 200 feet. Similarly, the blast pad at Runway 18L is 50 feet too narrow and 50 feet too short and should also be brought up to the standard 200 feet by 200 feet. Runway 36R does not have a blast pad in place; it is recommended that LRD plan for the construction of blast pads at each runway end in accordance with FAA standards.

Runway 14-32 currently lacks blast pads on both ends. To meet runway design standards, blast pads measuring 95 feet in width and 150 feet in length should be constructed at each end. Paved blast pads are recommended for all runway ends serving critical aircraft classified as ADG III. Therefore, it is not recommended that 14-32 would need to construct blast pads.

3.2.2.3.3 Runway Object Free Area

The existing Runway 18R ROFA overlays the 18R localizer and is penetrating by 518 feet off the south end of the runway. Mitigation for this penetration will be addressed in **Chapter 4, Identification and Evaluation of Alternatives.** There are no additional deficiencies regarding the ROFA for the remaining runways.

3.2.2.3.4 Holding Position

Based on the field elevation at LRD (508’ MSL), the required setback for holding position markings for Runways 18R-36L and 18L-36R is 255 feet. The existing markings fall slightly short of this standard, with most locations adjacent to the parallel runways positioned approximately five feet or more below the required setback. Future changes to the taxiway system should account for the shift needed to meet the minimum.

3.2.5.4 Runway Length and EMAS Analysis

Runway length is determined by the greater requirement of the takeoff or landing performance characteristics of the existing and future critical aircraft. AC 150/5000-17, *Critical Aircraft and Regular Use Determination*, provides guidance on determinations for critical aircraft for runway length can use aircraft or grouping of aircraft with the longest runway length requirement.

In the case of LRD**, Table 3-11** depicts the most demanding cargo, passenger, and general aviation aircraft based on the Traffic Flow Management System Counts (TFMSC) data. Each aircraft's associated characteristics, total CY 2024 operations, and forecasted operations during the planning period are incorporated into the table.

Table 3-11:
LRD Runway Length Fleet Mix

ICAO Code	Aircraft Name	MTOW (lbs)	AAC-ADG	2024 Ops	PAL 1	PAL 2	PAL 3
Cargo Service Aircraft							
A306	Airbus A300 F4-600[1]	375,887	C-IV	936	1049	1175	1475
B722	Boeing 727-200	209,500	C-III	290	325	364	457
B733	Boeing 737-300	139,500	C-III	473	530	594	745
B734`	Boeing 737-400	150,000	C-III	854	957	1072	1346
B738	Boeing 737-800	179,800	D-III	150	168	188	236
B752	Boeing 757-200	255,500	C-IV	584	654	733	920
B763	Boeing 767-300	412,000	C-IV	206	231	259	325
DC91	Boeing (Douglas) DC-9-10	90,700	C-III	236	264	296	372
DC93	Boeing (Douglas) DC-9-31A	108,000	C-III	406	455	510	640
MD83	Boeing (Douglas) MD-83[1]	160,000	D-III	2,151	2410	2700	3390
Passenger Service Aircraft							
CRJ7	Canadair CRJ-700	75,000	C-II	259	266	274	289
E175	Embraer E-175[2]	85,517	C-III	2,158	2478	2844	3749
E145	Embraer E-145	48,502	C-III	2,449	2812	3228	4255
General Aviation Aircraft							
BE20	Beechcraft King Air 200[3]	12,500	B-II	518	575	638	785

1. Runway 18R-36L and Runway 18L-36R composite critical aircraft combined this aircraft's characteristics.
2. Representative aircraft for passenger service.
3. Runway 14-32 critical aircraft.

Source: TFMSC, FAA Aircraft Characteristics Database, RS&H Analysis 2025

It is important to note the history of deficiencies, current condition, and discussions of the Engineered Materials Arresting Systems (EMAS) and its consequent impact of the required runway length during the planning period.

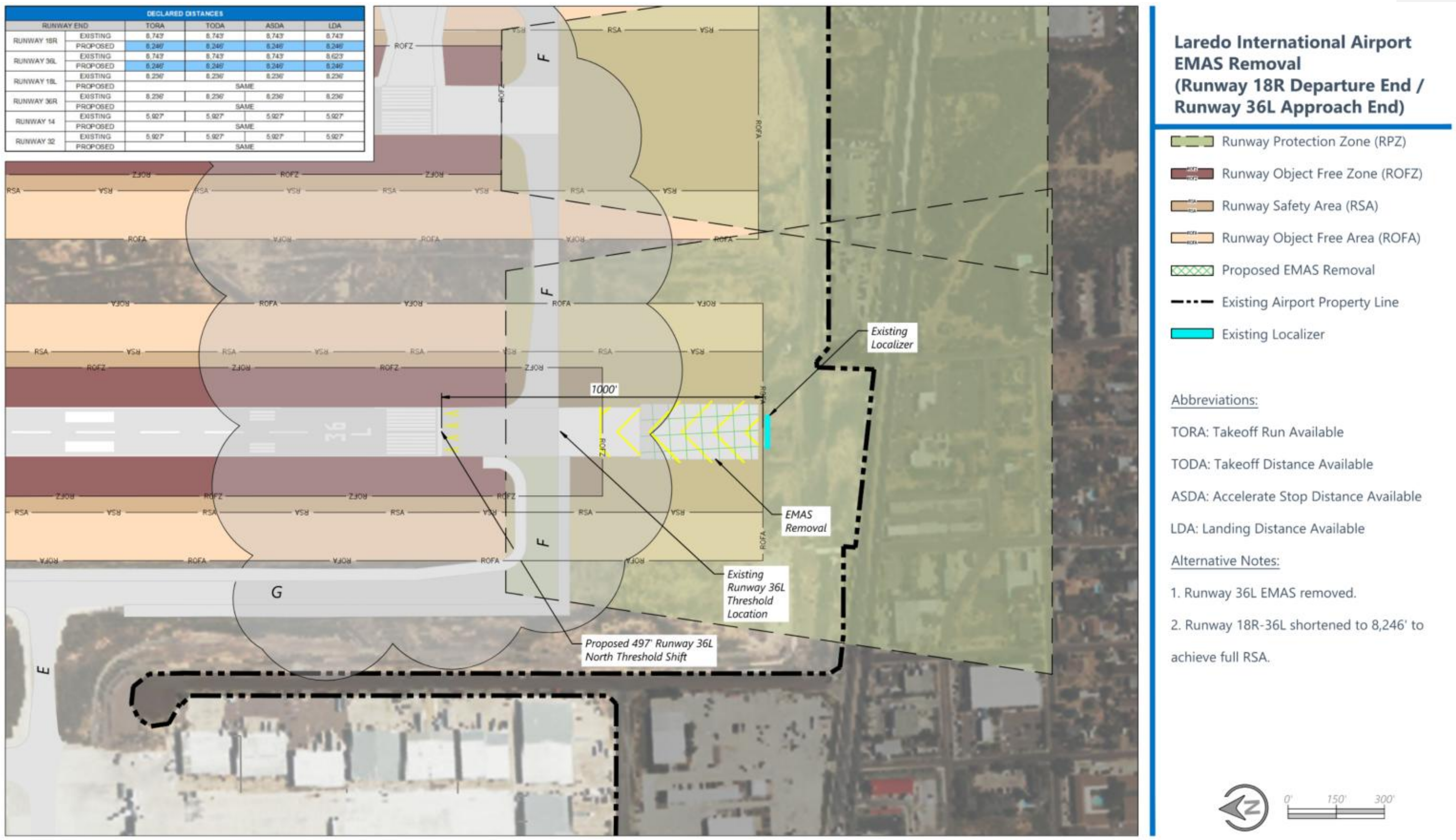
In 2006, the Airport elected to install an EMAS on the Runway 36L end due to the presence of the Runway 18R localizer within the standard runway safety area footprint of Runway 18R-36L.

Per the latest Runway Safe: EMAS Field Strength Test Report, the 19-year-old EMAS is in very poor condition and some areas are in a state of non-repair.[3] The Airport was set to undertake a capital improvement project to repair the outdated EMAS; however, subsequent to the FAA's annual Part 139 certification inspection of LRD, the FAA stated its intention not to fund a repair or replacement for the EMAS. The FAA has requested that the Airport remove the EMAS.

RSA standards cannot be modified or waived without the presence of EMAS. If the EMAS is removed the longest available runway will be 8,246 feet, as depicted in **Figure 3-1**, thus incurring additional payload penalties. A payload penalty refers to the reduction in takeoff weight by removing passengers, baggage, and/or cargo to ensure safe takeoff performance.

[3] Runway Safe, Field Strength Test Report, 2024

Figure 3-1:
Runway 18R-36L EMAS Removal



DECLARED DISTANCES					
RUNWAY END		TORA	TODA	ASDA	LDA
RUNWAY 18R	EXISTING	8,743'	8,743'	8,743'	8,743'
	PROPOSED	8,246'	8,246'	8,246'	8,246'
RUNWAY 36L	EXISTING	8,743'	8,743'	8,743'	8,623'
	PROPOSED	8,246'	8,246'	8,246'	8,246'
RUNWAY 18L	EXISTING	8,236'	8,236'	8,236'	8,236'
	PROPOSED	SAME			
RUNWAY 36R	EXISTING	8,236'	8,236'	8,236'	8,236'
	PROPOSED	SAME			
RUNWAY 14	EXISTING	5,927'	5,927'	5,927'	5,927'
	PROPOSED	SAME			
RUNWAY 32	EXISTING	5,927'	5,927'	5,927'	5,927'
	PROPOSED	SAME			

Source: RS&H Analysis, 2025

Two guidance documents are available with methodology for determining an airport's recommended runway lengths:

Guidance A: **FAA Recommended Runway Length**: General runway length guidance based on FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design,* performance graphs for composite aircraft groups, as adjusted for LRD mean maximum temperature (102°F) field elevation (508 feet above mean sea level), difference in runway centerline elevations (25 ft for Runway 18L-36R).

Guidance B: **Current and Forecast Critical Aircraft Planning Manuals**: Determines runway length for specific aircraft models and engines based on data from the aircraft manufacturer, as adjusted for LRD to the extent possible based on aircraft operating (payload) weights, flight range, non-standard temperatures, and field elevation.

Commercial service airports are associated with scheduled passenger service and cargo service resulting in larger aircraft dictating the longest runway length at an airport. For this reason, a formal runway length analysis was not performed for smaller general aviation aircraft.

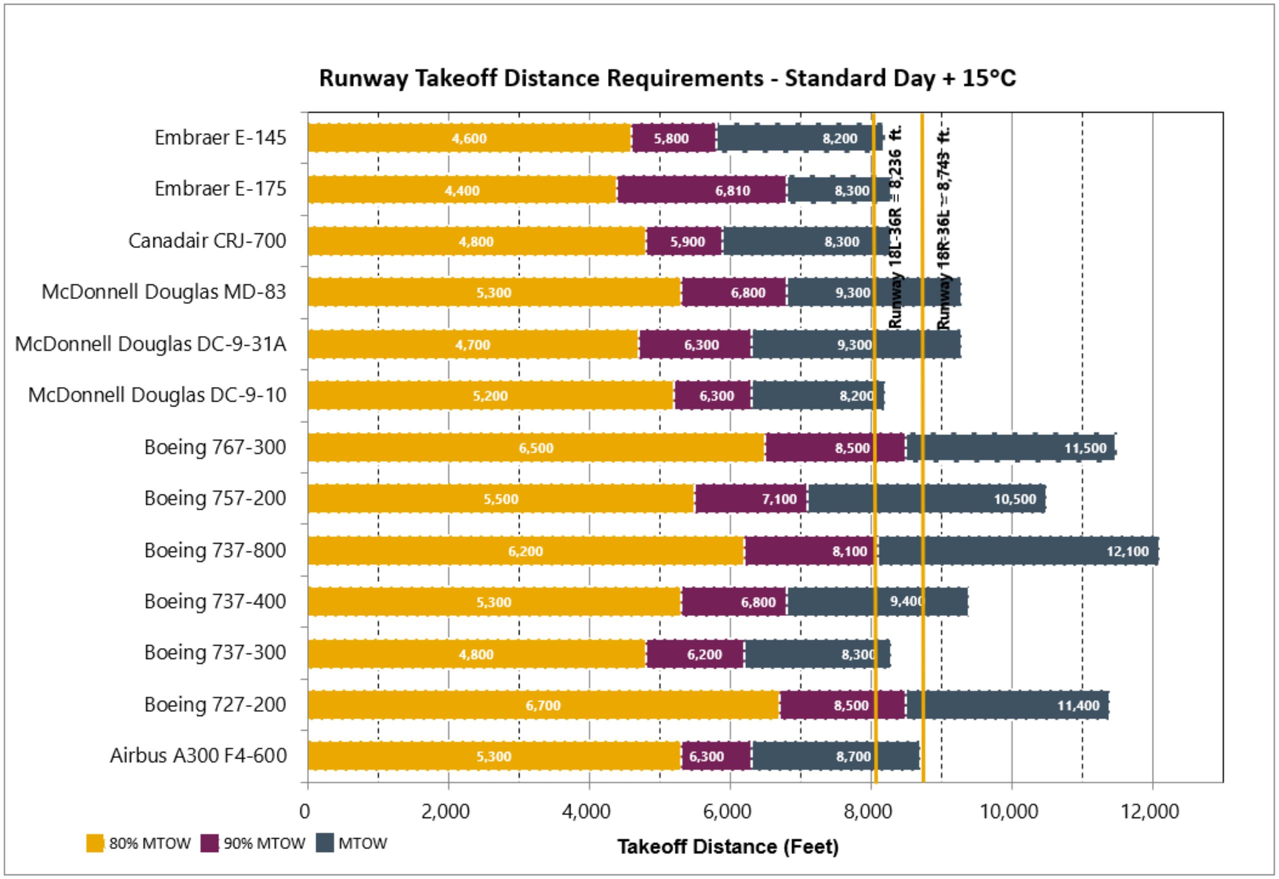
The analysis found that seven of the thirteen aircraft evaluated can depart from LRD without payload restrictions during hot weather conditions, which are common in South Texas. Significant payload penalties are operational limitations that can lead to flight delays, reduced revenue opportunities for air carriers, and, in severe cases, the loss of commercial service. The next step in the takeoff length analysis was to determine if the required takeoff length for the most demanding aircraft given their achievable takeoff weight from LRD to the farthest markets being served, **Table 3-12**. The achievable Takeoff Weight (TOW) used in this analysis was based on the aircraft's manufacturer-provided basic operating weight, along with estimated weights for passengers, crew, baggage, and fuel. Fuel loads were estimated using flight distance, standard reserve requirements, alternate airport distances, and engine performance characteristics to determine the corresponding runway length requirement. **Figure 3-2** reflects the results of the runway length analysis.

Table 3-12:
Most Demanding Aircraft Destination Markets

Aircraft	Destination	Associated Airport (Code)	Stage Length (nm)
Airbus A300 F4-600	Memphis, Tennessee	Memphis International Airport (MEM)	762
Boeing 727-200	Pontiac, Michigan	Oakland County International Airport (PTK)	1,378
Boeing 737-400	Detroit, Michigan	Willow Run Airport (YIP)	1,353
Boeing 757-200	Cleveland, Ohio	Cleveland Hopkins International Airport (CLE)	1,382
Boeing 767-300	Fort Worth, Texas	Fort Worth Alliance Airport (AFW)	430
McDonnell Douglas DC-9-31A	Toledo, Ohio	Eugene F Kranz Toledo Express Airport (TOL)	1,323
McDonnell Douglas MD-83	Niagara Falls, New York	Niagara Falls International Airport (IAG)	1,571

Source: RS&H Analysis, 2025, Diio Mi, LRD Airport Records

Figure 3-2:
Takeoff Distance Requirements



Source: RS&H Analysis, 2025, Airplane Characteristics for Airport Planning (Various), Airbus, Boeing, Bombardier, Embraer

To continue serving existing markets with the current fleet mix, the Airport must maintain a minimum runway length of 8,743-feet following the removal of the EMAS. As future markets are considered and travel distances increase, it will be necessary to increase the length of one or more of the runways to assure maximum efficiency and utilization of the Airport's runway system. If cargo operations continue to grow as forecasted, a 9,400-foot runway is required which would result in a 1,164-ft extension to Runway 18L-36R or a 1,154-ft extension to Runway 18R-36L post-EMAS removal. A runway length of 9,400 feet will adequately accommodate majority of future operations, even during hot weather conditions. An evaluation of runway extension options for Runway 18L-36R and Runway 18R-36L will be conducted to identify the most feasible alternative.

3.2.5.5 Runway Protection Zones

Defined in AC 150/5300-13B, Runway Protection Zones (RPZs) were established by the FAA to protect people and property on the ground in the instance of an aircraft runway overrun or undershoot during landing or takeoff. This designated area is intended to enhance aviation safety by preventing the intrusion of objects and obstacles that could pose risks to aircraft operations near the end of the runway. The RPZ has a trapezoidal shape and is made up of two components: the approach RPZ, which extends 200 feet from the runway threshold, and the departure RPZ, which extends 200 feet from the runway end. As a result, both RPZs typically start at the same point unless the threshold of the runway is displaced.

The FAA recommends that airport owners' control and keep RPZs clear of all obstructions. Acquiring the appropriate property interests, such as fee title or easements, offers a substantial level of control. Airport-compatible zoning/land use regulations also provide a level of control for restricting any future incompatible development, but ownership of the land is the best means of preventing incompatible development. When full ownership, easements, or complete obstruction clearing is not feasible, airport owners are advised to actively promote plans, regulations, and policies that support maintaining an RPZ clear of any facilities that support incompatible activities.

FAA AC 150/5190-4B, *Airport Land Use Compatibility Planning*, describes FAA guidance regarding identification of incompatible land uses within the RPZ and expectations for airport sponsors to resolve any issues. The FAA expects airport sponsors to seek all possible opportunities to eliminate, reduce, or mitigate existing incompatible land uses through an evaluation process. Although the AC does not explicitly indicate what is considered compatible, FAA identifies the following land uses that require no further evaluation:

- **Farming** that meets airport design clearance standards and guidance as outlines in AC 150/5200-33, *Hazardous Wildlife Attractants on or near Airports*.

- **Irrigation channels** meeting the standards of AC 150/5200-33 and FAA/United States Department of Agriculture manual, *Wildlife Hazard Management at Airports*.
- **Airport service roads** if they are not public roads and are directly controlled by the airport operator.
- **Underground facilities** meet other design criteria, such as RSA standards, as applicable.
- **NAVAIDs and aviation facilities** such as equipment for airport facilities considered fixed-by-function regarding the RPZ.
- **Above-ground fuel tanks** associated with back-up generators for unstaffed navigational aids.

Table 3-13 summarizes the existing RPZ dimensions for each runway end. The following figures; **Figure 3-3** through **Figure 3-8** illustrate the existing approach and departure RPZs for each runway end and any off-airport property that underlays each RPZ. (as applicable).

Table 3-13:
Existing RPZ Dimensions

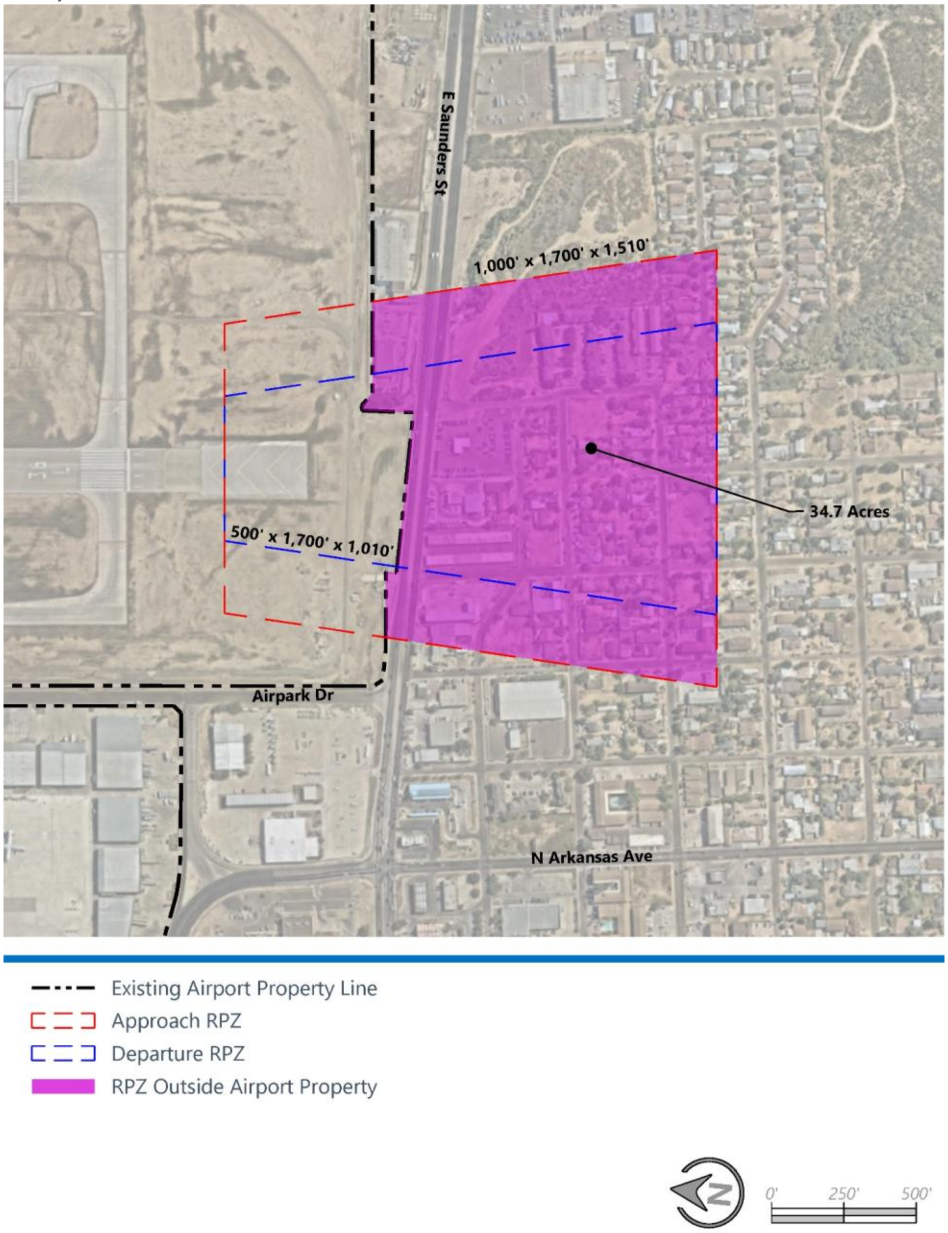
	Runway					
	18R	**36L**	**18L**	**36R**	**14**	**32**
AAC-ADG	D-IV	D-IV	D-IV	D-IV	B-II	B-II
Visibility Minimums	1/2 SM	3/4 SM	3/4 SM	VIS	3/4 SM	3/4 SM
Approach RPZ						
Standard Length	2,500	1,700	1,700	1,700	1,700	1,700
Standard Inner Width	1,000	1,000	1,000	500	1,000	1,000
Standard Outer Width	1,750	1,510	1,510	1,010	1,510	1,510
Airport Controls Entire RPZ	X	X	✓	X	✓	X
Departure RPZ						
Standard Length	1,700	1,700	1,700	1,700	1,000	1,000
Standard Inner Width	500	500	500	500	500	500
Standard Outer Width	1,010	1,010	1,010	1,010	700	700
Airport Controls Entire RPZ	X	X	✓	X	✓	X

Source: RS&H Analysis, 2025
Note: SM = statute mile

Figure 3-3
Runway 18R RPZ

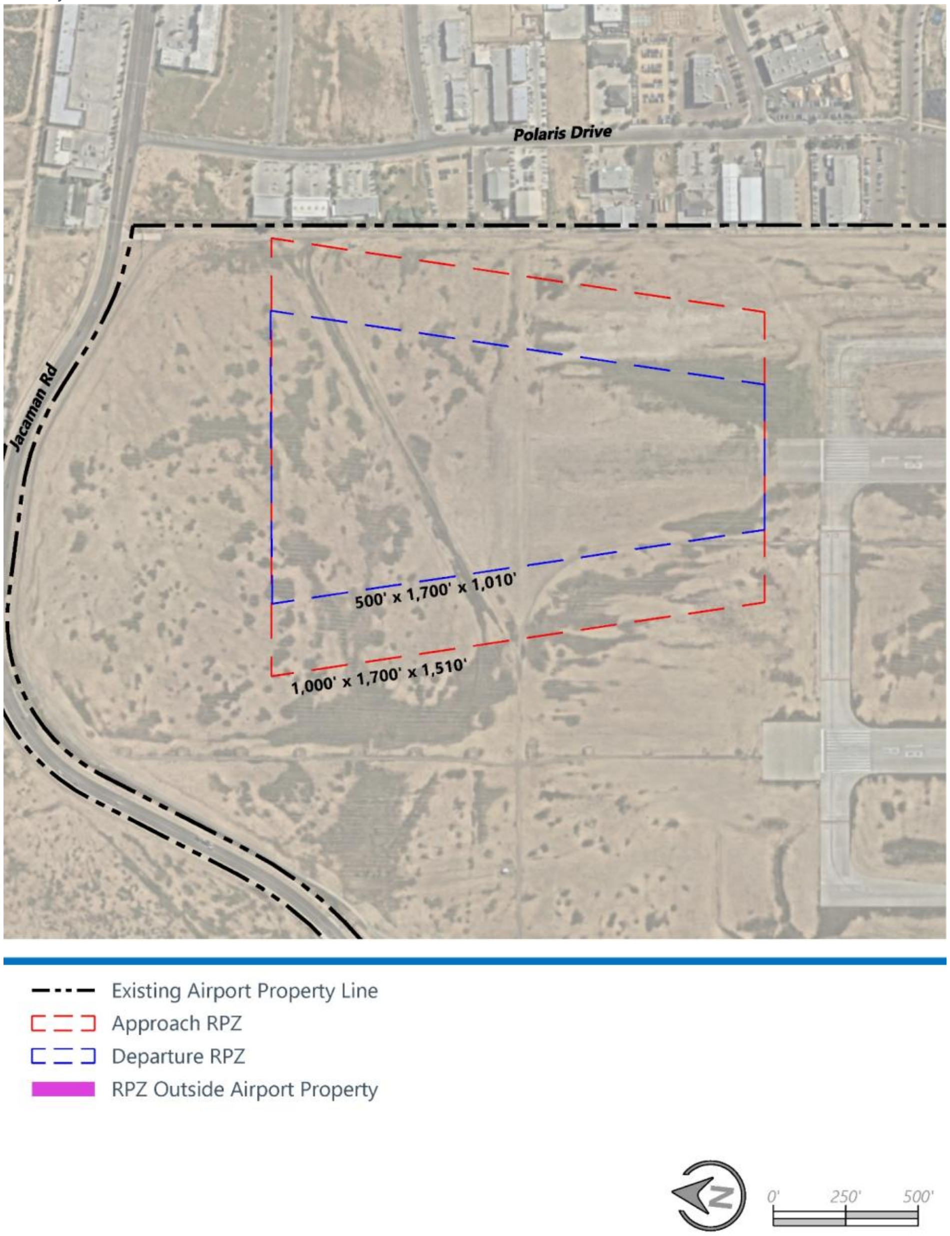
Source: RS&H Analysis, 2025

Figure 3-4
Runway 36L RPZ



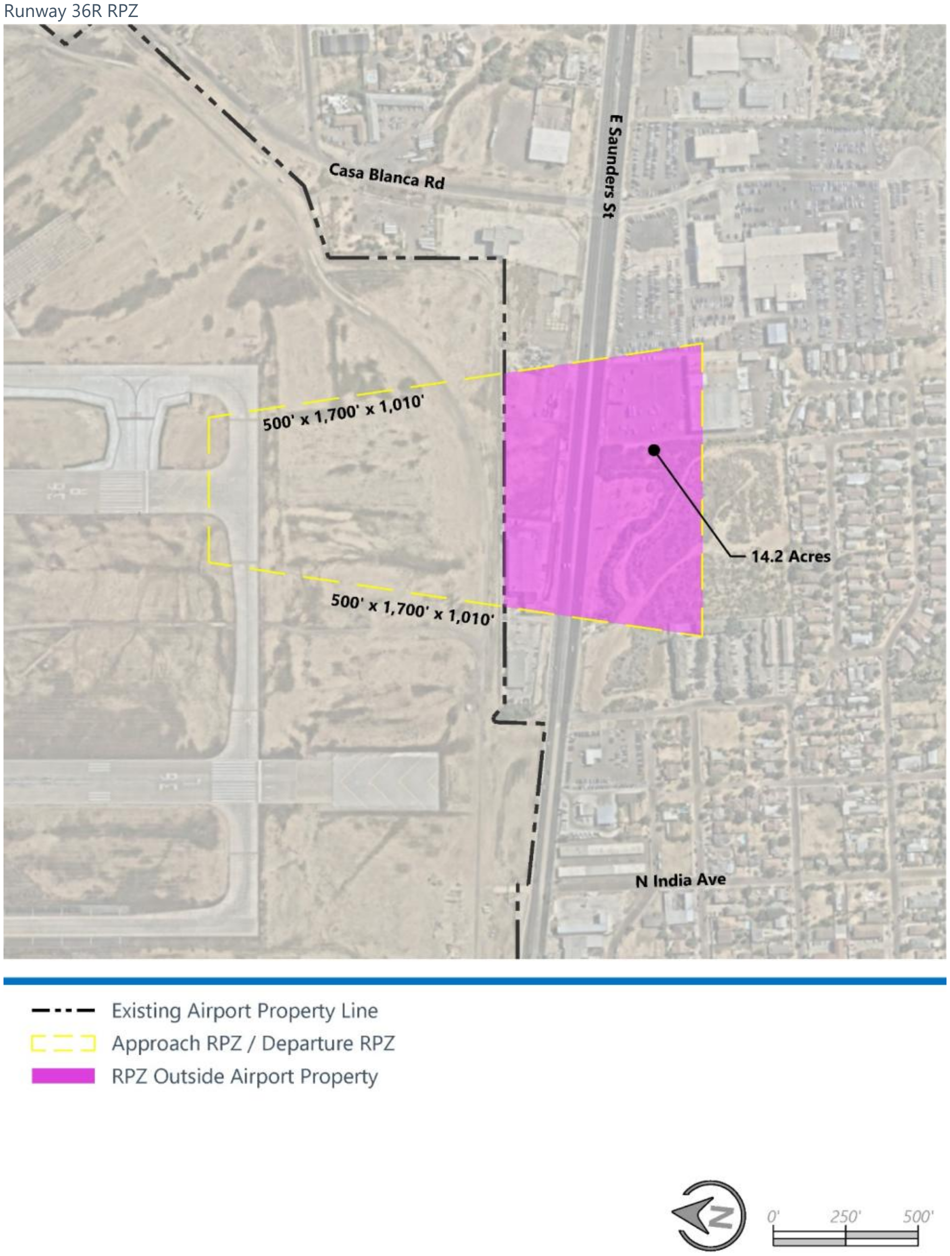
Source: RS&H Analysis, 2025

Figure 3-5
Runway 18L RPZ



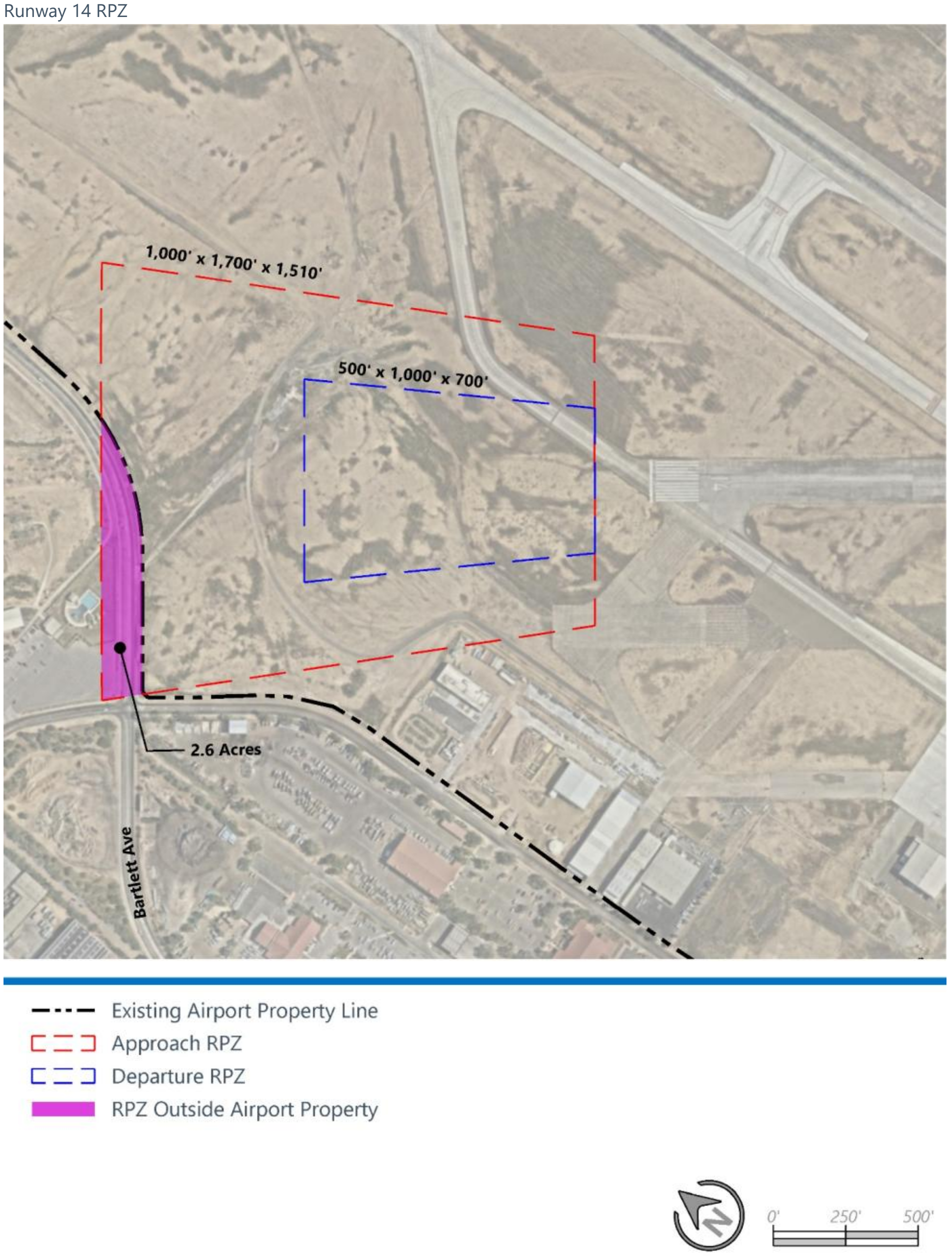
Source: RS&H Analysis, 2025

Figure 3-6
Runway 36R RPZ



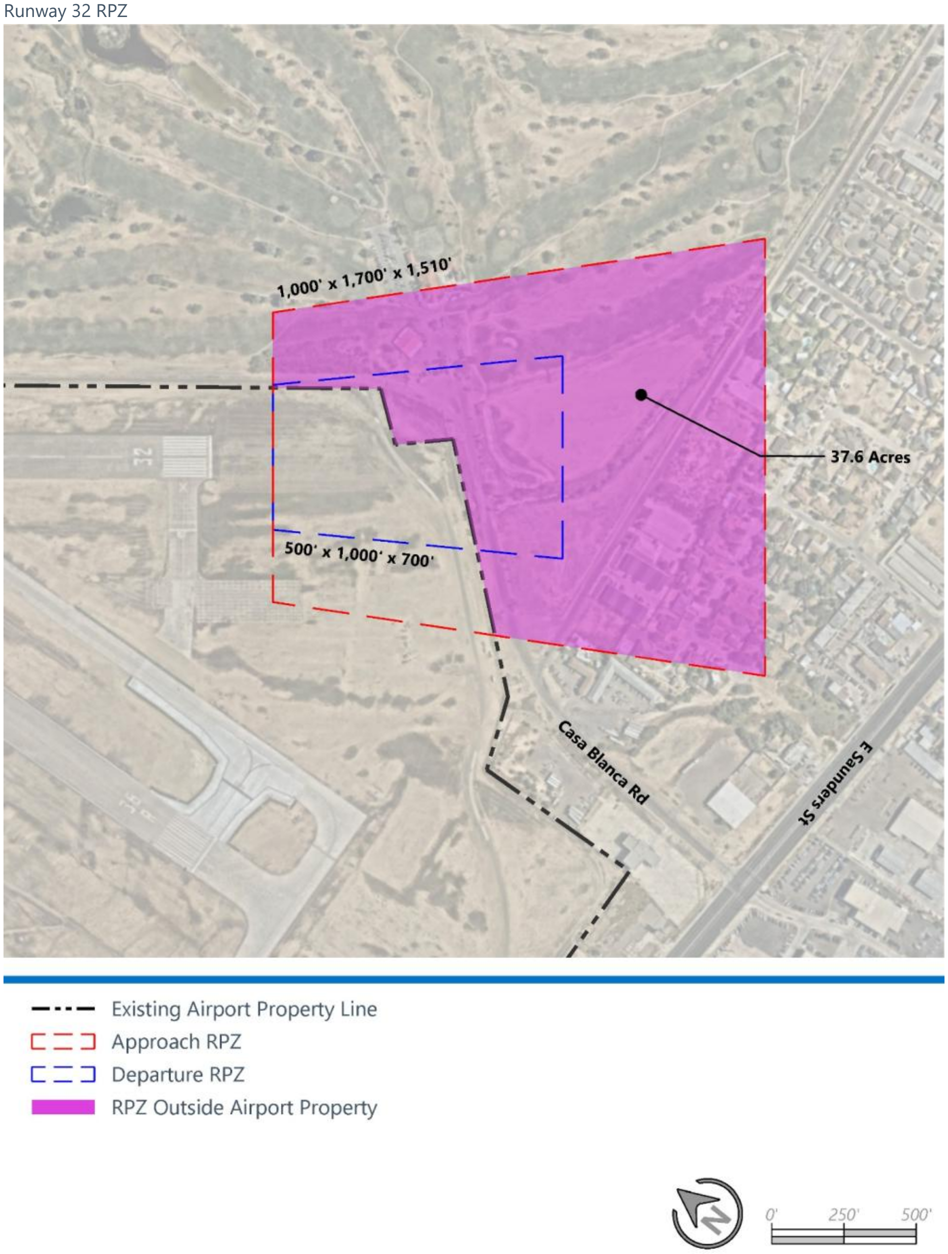
Source: RS&H Analysis, 2025

Figure 3-7
Runway 14 RPZ



Source: RS&H Analysis, 2025

Figure 3-8
Runway 32 RPZ



Source: RS&H Analysis, 2025

Based on the evaluation of LRD RPZs, the following deficiencies were identified:

Runway 18R
- Jacaman Road passes through both the approach and departure RPZ.
- The approach and departure RPZs extend off airport property, covering a total of 2.7 acres.

Runway 36L
- E Saunders Street as well as other residential streets pass through both the approach and departure RPZs.
- The approach and departure RPZs extend off airport property, covering a total of 34.7 acres.

Runway 18L
- No deficiencies were identified.

Runway 36R
- E Saunders Street passes through both the approach and departure RPZ.
- The approach and departure RPZs extend off airport property, covering a total of 14.2 acres.

Runway 14
- Bartlett Avenue passes through the approach RPZ.
- The approach RPZ extends off airport property, covering a total of 2.6 acres.

Runway 32
- Casa Blanca Road passes through both the approach and departure RPZ.
- The approach and departure RPZs extend off airport property, covering a total of 37.6 acres.

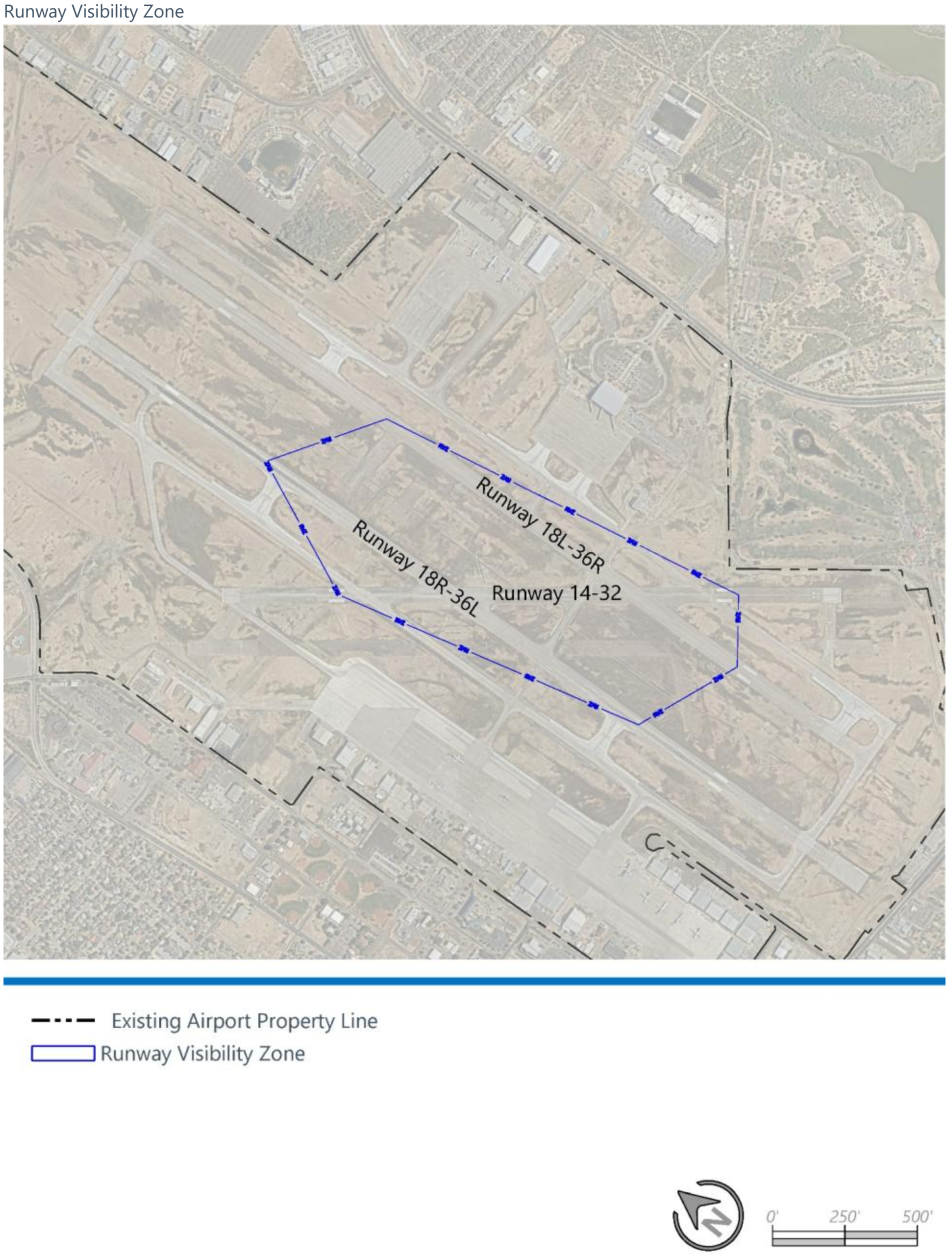
Chapter 4, Identification and Evaluation of Alternatives will evaluate and describe options to mitigate risk associated with the deficiencies in RPZ protection at the airport.

3.2.5.6 Runway Visibility Zone

The Runway Visibility Zone, which applies to airfields with intersecting runways, is formed by imaginary lines connecting two physically intersecting runways' line of sight (LOS) points.[4] It helps prevent potential hazards and/or collisions by enhancing situational awareness for pilots and ground operation vehicles. Structures as well as aircraft that are parked in these areas can create a potential LOS conflict. The RVZ is depicted in **Figure 3-9** and is sufficient for the planning period, so there will be no further analysis.

[4] AC 150/5300-13B Section 3.8.2

Figure 3-9
Runway Visibility Zone

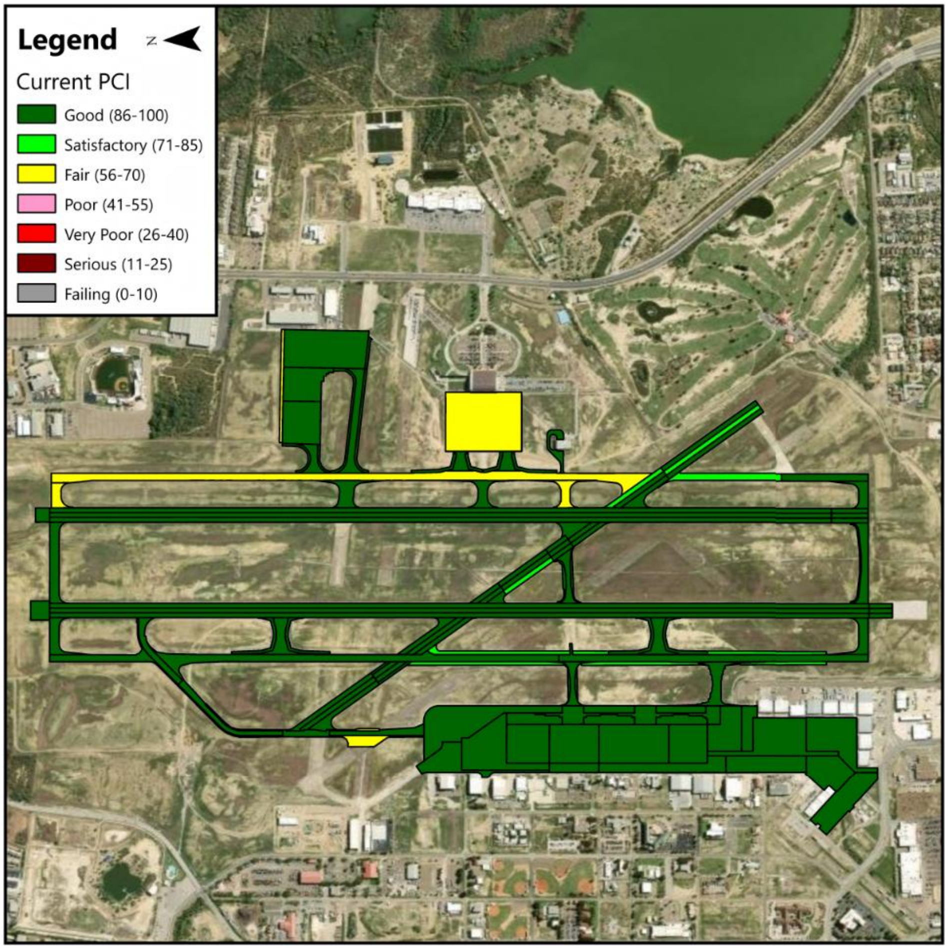


Source: RS&H Analysis, 2025

3.2.5.7 Pavement Condition

RS&H conducted pavement inspections in 2025 using the Pavement Condition Index (PCI) method as specified in ASTM D5340, 2020 and FAA AC 150/5380-7B. The PCI is a numerical rating scale from 0 to 100 that provides a measure of the pavement's functional surface condition. The rating reflects the overall condition of the pavement based on type, quantity, and severity of distress. **Figure 3-10** illustrates the existing pavement conditions.

Figure 3-10:
Airfield Pavement PCI by Section



Source: RS&H Analysis, 2025

The majority of inspected pavement areas were found to be in good or satisfactory condition, requiring only preventive maintenance measures. A portion of Taxiway A, Taxiway D, and Taxiway J as well as the Commercial Service Apron were found to be in fair condition. The predominant distress types observed included joint seal deterioration and joint spalling. For each area, PCI values were calculated at the sample unit level and subsequently averaged by section.

3.2.3 Taxiway Requirements

Taxiways and taxilanes play a crucial role in safe and efficient airfield circulation for airplanes and vehicles. They must be capable of supporting the size and weight of the design aircraft, be designed to avoid or minimize pilot/controller confusion and be able to maintain consistent traffic flow.

To ensure this, existing and future conditions are analyzed against guidance found in FAA AC 150-5300-13B, which provides airport design standards, recommended practices, and design considerations specifically for taxiways and taxilanes. The design standards vary for taxiways based upon the critical aircraft in use as well as separation requirements. To increase safety, the taxiways will also be evaluated in accordance with the FAA's Runway Incursion Mitigation Program (RIM) and will consider any possible areas of concern on the airfield.

At a minimum, the taxiways should:

- Provide efficient and safe circulation of aircraft.
- Have the necessary pavement strength for current and future aircraft types.
- Meet FAA design criteria for geometry, separation distances, and location.

3.2.5.1 Taxiway Geometric and Separation Standards

The geometric and separation standards for taxiways are determined by the ADG and Taxiway Design Group (TDG) of the critical aircraft using the taxiway. The taxiways serving the two parallel runways are evaluated against ADG IV and TDG 5 standards. Taxiways serving primarily Runway 14-32 are evaluated against ADG II and TDG 2A standards.

Table 3-14 summarizes the results of the taxiway system requirements by marking components with a red X for non-compliant or a green check mark if it meets the requirement.

Table 3-14
Taxiway Requirement

	Taxiway Safety Area (TSA)	Taxiway Object Free Area (TOFA)	Taxiway Centerline to Fixed or Movable Object	Taxiway Centerline to Parallel Taxiway Centerline	Taxiway Wingtip Clearance	Taxiway Width	Taxiway Edge Safety Margin (TESM)	Taxiway Shoulder Width
Runway 18R-36L			**ADG IV (E/F)**				**TDG 5 (E/F)**	
Requirement	**171'**	**243'**	**121.5'**	**207'**	**36'**	**75'**	**14'**	**30'**
Taxiway A (Cargo/GA Ramp)	✓	✓	✓	✓	✓	✓	✓	X
Taxiway B	✓	✓	✓	✓	✓	✓	✓	X
Taxiway D (West of Taxiway G)	✓	✓	✓	✓	✓	X	X	X
Taxiway D (East of 36L)	✓	✓	✓	✓	✓	✓	✓	X
Taxiway E	✓	✓	✓	✓	✓	✓	✓	X
Taxiway F	✓	✓	✓	✓	✓	✓	✓	X
Taxiway G (South of 14/32)	✓	✓	✓	✓	✓	✓	✓	✓[1]
Taxiway G (North of 14/32)	✓	✓	✓	✓	✓	✓	✓	X
Taxiway G1	✓	✓	✓	✓	✓	✓	✓	✓
Taxiway G2	✓	✓	✓	✓	✓	✓	✓	✓
Taxiway L	✓	✓	✓	✓	✓	✓	✓	X
Runway 18L-36R			**ADG IV (E/F)**				**TDG 5 (E/F)**	
Requirement	**171'**	**243'**	**121.5'**	**207'**	**36'**	**75'**	**14'**	**30'**
Taxiway C	✓	✓	✓	✓	✓	✓	✓	X
Taxiway D (East of 36R)	✓	✓	✓	✓	✓	✓	✓	X
Taxiway J	✓	✓	✓	✓	✓	✓	✓	X
Taxiway J1	✓	✓	✓	✓	✓	✓	✓	✓
Taxiway J2	✓	✓	✓	✓	✓	✓	✓	✓
Taxiway H	✓	✓	✓	✓	✓	✓	✓	X
Taxiway H1	✓	✓	✓	✓	✓	✓	✓	✓
Taxiway H2	✓	✓	✓	✓	✓	✓	✓	✓
Taxiway K	✓	✓	✓	✓	✓	✓	✓	X
Runway 14-32			**ADG II (E/F)**				**TDG 2A (E/F)**	
Requirement	**79'**	**124'**	**62'**	**94.5'**	**22.5**	**35'**	**7.5'**	**15'**
Taxiway A (North of Cargo/GA Ramp)	✓	✓	✓	✓	✓	✓	✓	✓

[1]Shoulder ends 440' from the south end of Taxiway G
Source: AC 150/5300-13B; RS&H Analysis, 2025
Note: E = Existing; F = Future

As indicated in **Table 3-14**, the taxiways generally accommodate required minimum width and clearances based on their respective critical aircraft. Apart from Taxiway D (west of Taxiway G), all taxiways meet applicable design and safety standards for existing and future conditions, aside from the minimum shoulder width requirement. Taxiway D features a width less than 75 feet; however, it primarily serves the general aviation apron, which supports aircraft smaller than TDG 5.

Additionally, Taxiway markings must also meet FAA design standards. Based on the evaluation of Taxiway markings, it is recommended that Taxiway L centerline on the east side of Runway 18L marking be realigned to coincide with the Taxiway L centerline extending west of Runway 18L to west of Runway 18R. An additional 20 feet of pavement will need to be added to the north end of Taxiway L to meet the required taxiway design standards.

3.2.5.2 Runway Incursion Mitigation (RIM) and Hot Spots

In 2015, the FAA initiated the Runway Incursion Mitigation (RIM) program to proactively improve runway safety by identifying specific airfield locations with elevated risks of runway incursions. Locations were identified based on national runway incursion data, focusing on intersections where three or more incursions occurred within a year or where more than ten incursions were recorded during the evaluation period. These locations were compiled into the FAA's RIM Inventory List. As of the most recent update, released September 12,2025, LRD does not have any locations listed in the RIM Inventory.

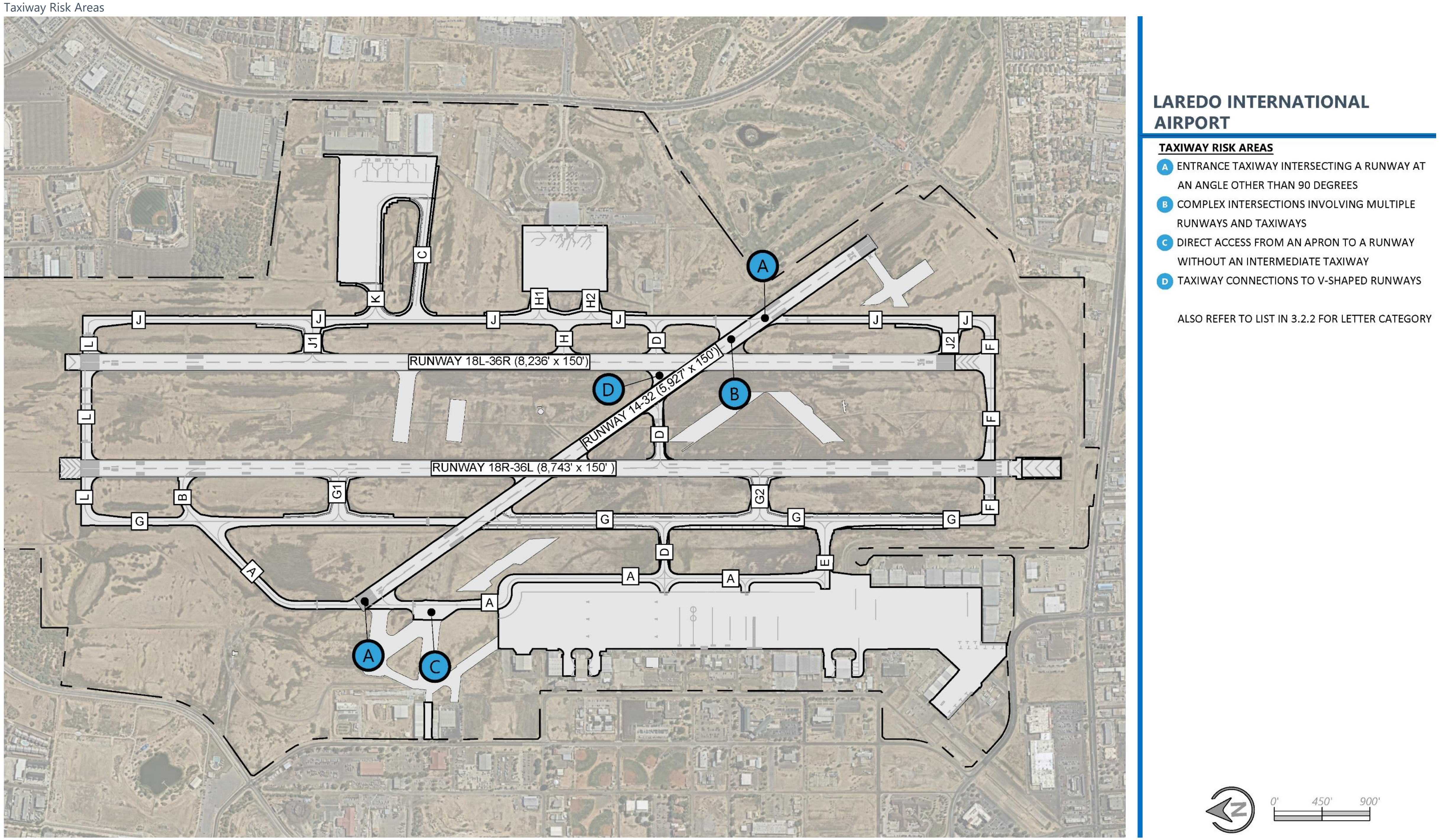
Separately, the FAA also identifies "hot spots" on airfields to alert pilots and ground personnel to areas where there is a heightened potential for confusion or runway incursions. While RIM locations are selected based on specific national thresholds, hot spots are identified through local stakeholder feedback and operational experience. LRD currently does not have any designated hot spots at the airport but does have taxiways that fall under RIM categories.

According to FAA AC 150/5300-13B, Appendix J.5 (Taxiway Geometries with Elevated Risk to Safety), the following taxiway and pavement configurations are associated with increased risk of runway incursions and wrong surface events currently at LRD:

- **(A)** Entrance taxiway intersecting a runway at an angle other than 90 degrees
- **(B)** Complex intersections involving multiple runways and taxiways
- **(C)** Direct access from an apron to a runway without an intermediate taxiway
- **(D)** Taxiway connections to V-shaped runways

Figure 3-11 illustrates the location of the Taxiway Risk Areas on the airfield based on the categories described above.

Figure 3-11
Taxiway Risk Areas



Source: RS&H Analysis, 2025

3.2.4 Navigational Aids and Lighting Requirements

At LRD, there are multiple types of navigational aids (NAVAIDS) and lighting systems to help pilots, air traffic/ground controllers, and ground personnel see and navigate the airfield and surrounding airspace both effectively and safely. The requirement is dictated upon the critical aircraft's design groups and the types of approach at each runway ends. The current NAVAIDS and lighting requirements are sufficient.

3.2.5.1 Visual and Electronic Aids

The visual and electronic aids at LRD are crucial to safe and effective airport operations. They equip the pilots and controllers with the tools they need to properly perform take-offs and approach/landings regardless of weather or time of day. Some aids are runway specific such as an approach lighting system whereas others serve the entire airfield. The visual and electronic aids at LRD are sufficient to meet airport needs as noted in **Table 3-15**.

Although there are not any regulatory deficiencies at the Airport, it is recommended to change the VASI lighting system at Runway 14-32 to a simpler and more modern PAPI system to help aid pilots with familiarity and easier to understand landing slope indications. The PAPI system is also generally easier to maintain throughout the lifespan as it is a single unit in one location.

3.2.5.2 Meteorological Aids

LRD currently provides meteorological data with its own Automatic Weather Observing System (AWOS) and through visual indicators such as the segmented circle. The ATIS system provides pilots and controllers with field and local weather conditions roughly every hour, which includes a phonetic alphabet identifier as a way to confirm they have the current information. In addition, the segmented circle provides a physical way to identify the wind direction in reference to runway headings and the traffic pattern. These meteorological aids are adequate for both existing and future operations at the Airport.

Table 3-15:
NAVAIDs and Electronic Aids

NAVAID	Runway 18R-36L	Adequate (✓) or Deficient (X)	Runway 18L-36R	Adequate (✓) or Deficient (X)	Runway 14-32	Adequate (✓) or Deficient (X)
Visual Aids						
Approach Lighting	MALSR[1]	✓	NO	✓	NO	✓
Lighting System	HIRL[2]	✓	HIRL[2]	✓	MIRL[3]	✓
Runway Markings	Precision	✓	Non-Precision	✓	Non-Precision	✓
Runway Wind Cone	YES	✓	YES	✓	YES	✓
Runway Centerline Lighting	NO	✓	NO	✓	NO	✓
Runway Touchdown Zone Lighting	NO	✓	NO	✓	NO	✓
Visual Slope Indicator	PAPI[4] (P4L)	✓	PAPI[4] (P4L)	✓	VASI[5] (V4L)	✓[6]
Rotating Beacon	YES[7]	✓	YES[7]	✓	YES[7]	✓
Segmented Circle	YES[7]	✓	YES[7]	✓	YES[7]	✓
Electronic Aids						
ILS	YES	✓	NO	✓	NO	✓
Localizer	YES[8]	✓	NO	✓	NO	✓
Glideslope	YES	✓	NO	✓	NO	✓
DME	YES	✓	NO	✓	NO	✓
RNAV (RNP or GPS)	YES	✓	YES	✓	YES	✓
VOR	NO	✓	NO	✓	YES	✓

[1] Medium Intensity Approach Lighting System, [2] High Intensity Runway Lights, [3] Medium Intensity Runway Lights, [4] Precision Approach Path Indicators, [5] Visual Approach Slope Indicator, [6] Runway should upgrade to PAPIs,
[7] Not specific to any runway end, [8] Back course localizer for Runway 36L
Source: RS&H Analysis, 2025

3.3 Air Cargo Requirements

Air cargo operations have long played a vital role in LRD's overall flight activity profile, supported by a diverse mix of domestic and international carriers and a robust inventory of dedicated cargo facilities and parking apron areas. To evaluate the adequacy of existing infrastructure and plan for future demand, a comprehensive assessment was conducted using forecast data, facility inventories, operator interviews, and industry planning benchmarks. This analysis incorporates validated cargo tonnage and landed weight metrics from CY2024, alongside facility utilization ratios and apron capacity modeling, to establish baseline requirements and guide long-term cargo facility development. The following section outlines LRD's current cargo capacity and presents projected facility needs based on forecasted growth and operational trends.

Along with a review of previous cargo studies and interviews with cargo operators, an assessment of the adequacy of existing cargo facilities was conducted using information obtained from **Chapter 2, Forecast of Aviation Activity** and **Chapter 1, Inventory of Existing Conditions.** Additionally, planning factors for estimating future cargo area requirements were developed. **Table 3-16** presents the baseline scenario of the LRD forecast for air cargo operations throughout the planning period. This forecast will serve as the foundation for determining cargo facility requirements.

Table 3-16:
Air Cargo Operations Forecast

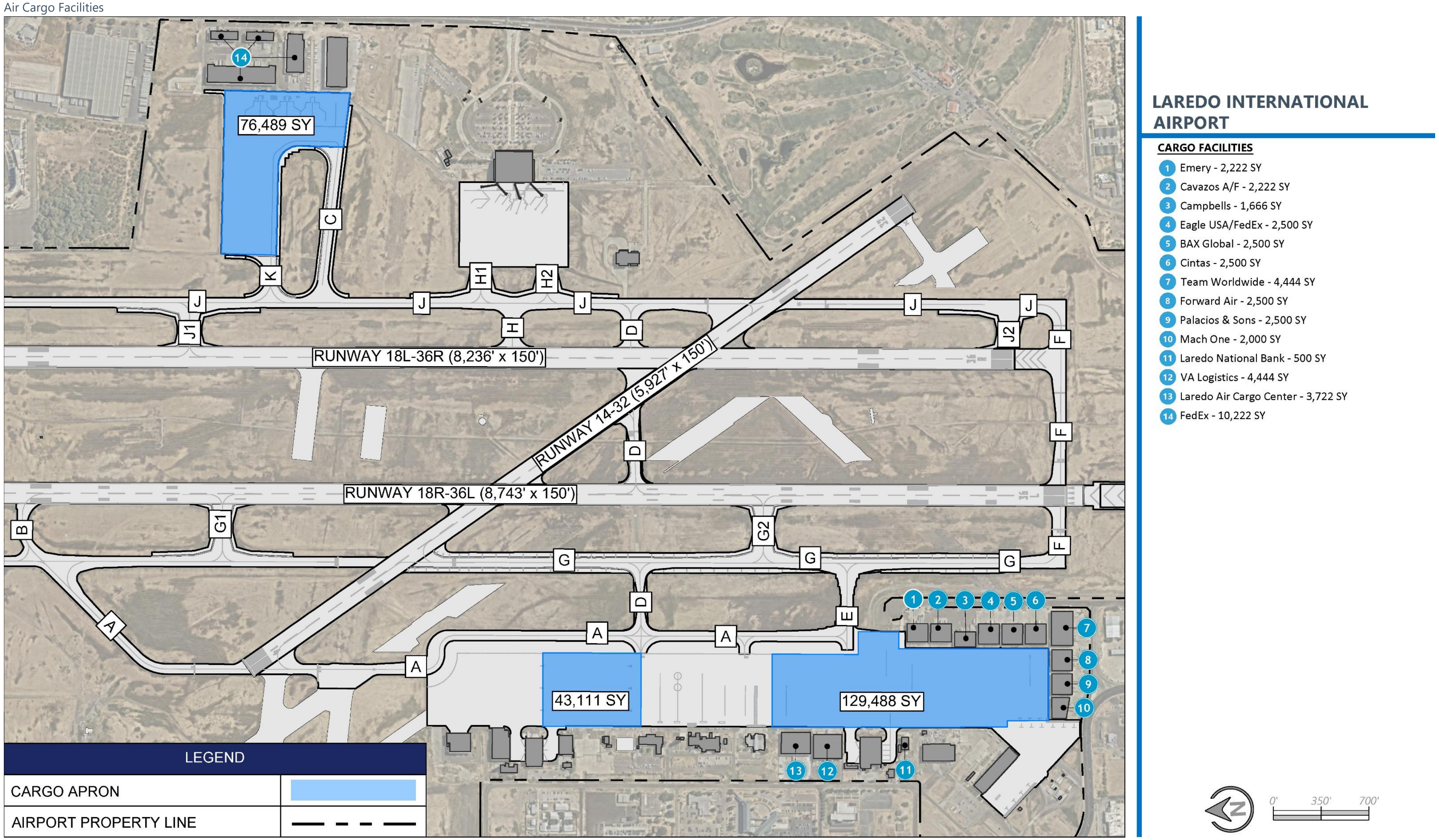
	Base Year (2024)	Planning Activity Level		
		PAL 1	PAL 2	PAL 3
Air Cargo Operations	12,626	14,200	15,900	19,400
Compound Annual Growth Rate	-	2.4%	2.3%	2.0%
Landed Weight (in 000s of lbs.)	634,978	712,100	798,700	973,600
Compound Annual Growth Rate	-	2.3%	2.2%	2.0%

Source: US DOT; Airport Records, RS&H Analysis, 2025

3.3.1 Air Cargo Facilities

LRD's cargo operations have been a crucial role in the Airport's history as mentioned in **Chapter 1, Inventory of Existing Conditions.** Most cargo operations at LRD are concentrated on the west side of the airfield. This area supports the processing and movement of cargo for Aeronaves T.S.M., USA Jet, UPS, and various other cargo operators. Approximately 303,500 square feet of cargo warehouse and office space on the west side of the airfield support both inbound and outbound freight handling activities. On the east side of the airfield, FedEx conducts operations from dedicated facilities encompassing 92,000 square feet of warehouse and office space. Combined, these cargo facilities account for approximately 395,500 square feet of operational space dedicated to air cargo processing. Existing cargo facilities are depicted in **Figure 3-12**.

Figure 3-12
Air Cargo Facilities



Source: RS&H Analysis, 2025

Total cargo tonnage data was obtained from cargo carriers operating at the Airport to assess cargo facility demand over the planning period. Twenty of the 26 cargo carriers that operated in CY24 provided total cargo tonnage for the facility requirements analysis. These 20 cargo carriers accounted for 90 percent of total cargo operations and 91 percent of total landed weight in CY24. It is important to note total “landed weight” refers to the weight of aircraft transporting freight and mail in intrastate, interstate, and foreign air transportation; this metric includes both the aircraft weight and the payload weight. Landed weight differs from cargo volume as “cargo volume” refers to the weight (tons or pounds) of freight and mail arriving and departing from air cargo facilities on Airport. Total cargo tonnage for CY24 from responsive cargo carriers amounted to 85,589,280 pounds (44,800 tons). Although this does not represent the Airport’s full cargo volume, the validated carrier-provided data will be incorporated into the facility requirements analysis.

According to ACRP Report 143, *Guidebook for Air Cargo Facility Planning and Development*, the “area per annual ton ratio” is a key industry metric used to assess the efficiency and adequacy of air cargo facilities. This metric derived from average building throughput rates observed in various airport master plans, typically falls within a range of 1.0 to 2.5 square feet of building space per annual ton of cargo. A ratio near the lower end of the range (e.g., 1.0 square foot per annual ton) is indicative of high facility utilization and may suggest the need for near-term expansion to accommodate continued growth. Conversely, a higher ratio (e.g., 2.5 square feet per annual ton) implies that tenants may have surplus capacity within their current facilities.[5] It is important to note that these benchmarks are generalized and reflect a wide range of operator types, including passenger airline belly freight handlers, all-cargo carriers, integrated express operators, and third-party logistics providers. As such, application of the area per annual ton metric should consider the unique operational characteristics, tenant mix, and cargo handling requirements specific to the airport under evaluation. Given the growth in cargo operations over the past 20 years and considering that existing cargo facilities have generally been adequate in meeting demand, a planning ratio of 1.5 square feet per annual ton was assumed to estimate future cargo facility requirements over the planning period. This planning ratio also aligns with the cargo building utilization rate assumed in the 2015 Modernization Plan Update.

Based on the obtained data, the cargo requirements analysis (shown in **Table 3-17**) revealed that the cargo warehouse and office space at LRD is sufficient for the facility planning benchmarks established in the Master Plan.

[5] National Academies of Sciences, Engineering, and Medicine. 2015. Guidebook for Air Cargo Facility Planning and Development. Washington, DC: The National Academies Press. https://doi.org/10.17226/21906.

Table 3-17:
Air Cargo Facility Requirements

	Baseline (2024)	Planning Activity Level		
		PAL 1	PAL 2	PAL 3
Annual Cargo Volume (tons)	44,800	50,200	56,300	68,700
Landside				
Warehouse/Office Space Demand (sq ft)	67,200	75,300	84,500	103,100
Warehouse/Office Space (sq ft)	395,500	395,500	395,500	395,500
Warehouse/Office Space **Surplus / (Deficit)** (sq ft)	**328,300**	**320,200**	**311,000**	**292,400**

Notes: (1) sf = square feet. (2) Annual cargo volume is assumed to grow at the same compound annual growth rate as forecasted cargo operations. (3) Warehouse/Office Space Demand (sq ft) based on the following assumptions – 1.5 sq ft per annual ton, rounded to the nearest 100 square feet.
Source: Airport Records, RS&H Analysis. 2025

3.3.2 Air Cargo Apron

The cargo apron serves as an interface for aircraft and support crews to enplane, deplane, and transfer cargo, service, and park aircraft, and conduct aircraft turn operations. The facility requirements for the apron are highly dependent on the size of aircraft projected to use the ramp, as well as the operational requirements of the users of the ramp. For this analysis, the cargo apron facility requirements were based on the maximum number of cargo aircraft that are forecast to be on the ground during a peak period, often defined as 60 minutes, on the average day of the peak month (PMAD). A peak period is defined with the intention of striking a balance between providing capacity at an acceptable service level for most of the time without incurring the cost of building for the single busiest time of the year.

The existing number of parking positions and available apron area were used as the baseline, with future requirements projected based on the forecast growth in cargo aircraft operations. Since the last Master Plan in 2015, LRD successfully completed a major expansion of the Cargo-GA Apron which added approximately 16,111 square yards of paved cargo apron. As reflected in **Table 3-18**, LRD has approximately 249,100 square yards of apron space. To determine air cargo apron facility requirements the peak hour demand on the PMAD of operations was assessed. LRD's Vector software was analyzed and revealed December was the peak month of operations with 4,525 aircraft operations. A factor of 30% was applied to reflect forecasted ratio of cargo operations to total operations, resulting in 1,358 cargo operations during the peak month and an average of 45 cargo operations per day during the peak month. The PMAD peak hour was analyzed to determine the amount of space needed for cargo aircraft parking and circulation during the planning period. The peak hour of activity was found to be between 3:00 PM CT and 4:00 PM CT resulting in a baseline peak hour demand of 21 cargo aircraft.

Parking position dimensions were established based on three representative aircraft types: the A300-600 (ADG IV), Boeing 737-300 (ADG III), and Saab 340 (Turboprop). These aircraft reflect the range of cargo operations at the Airport and are assumed to remain representative of the cargo fleet mix throughout the planning period.

Apron space requirements were derived from ACRP Report 143, which provides total space requirements per aircraft type based on wingspan and overall length. Requirements include buffer space to maintain separation between aircraft, buildings, and service lanes. Circulation space was also incorporated to account for aircraft taxiing to and from cargo facilities, movement past parked aircraft outside the object free area, and clearways in front of hangars.

Total apron space requirements, including circulation, are as follows:

- Airbus 300-600 (ADG IV): 10,400 square yards
- Boeing 737-300 (ADG III): 5,300 square yards
- Saab 340 (ADG I/II): 3,700 square yards

A 10% factor was applied to the total cargo apron space requirement to account for ground support equipment (GSE) storage and circulation. **Table 3-18** presents the cargo apron area facility requirements for aircraft parking and circulation throughout the planning period.

Table 3-18:
Cargo Apron Area Requirements

	Existing Capacity	Baseline	PAL 1	PAL 2	PAL 3
Cargo Aircraft Peak Period		**21**	**24**	**26**	**33**
Turboprop (ADG I/II)		7	8	9	11
ADG III		10	11	12	16
ADG IV		4	5	5	6
Turboprop (ADG I/II) Apron Space Req. (SY)		25,900	29,600	33,300	40,700
ADG III Apron Space Req. (SY)		53,000	58,300	63,600	84,800
ADG IV Apron Space Req. (SY)		41,600	52,000	52,000	62,400
Subtotal (SY)		120,500	139,900	148,900	187,900
GSE Apron Requirement (SY)		12,100	14,000	14,900	18,800
Total Apron Area Required (SY)	**249,100**	**132,600**	**153,900**	**163,800**	**206,700**
Total Apron Area Surplus/(Deficit)		**116,500**	**95,200**	**85,300**	**42,400**

Source: RS&H Analysis, 2025

According to the findings presented in **Table 3-18**, the current cargo apron area meets the requirements for the planning period.

3.4 Passenger Terminal Facility Requirements

This section covers the requirements for the Passenger Terminal based on findings from the forecast, the current inventory, as well as surveys conducted with current tenants.

Terminal issues that have been identified prior to the development of the Airport Master Plan have been items that are known to show constraints at the Airport. Therefore, LRD has since adopted a Terminal Improvement Program which is currently underway. As discussed in **Chapter 1, Inventory of Existing Conditions**, the Terminal Improvement Program (TIP) includes many of the issues to be addressed such as:

- Outdated MEP systems
- Outdated PA system
- Aging restroom facilities in poor condition

- Passenger boarding bridges, escalators, elevator surpassing useful life
- Inefficient baggage handling system
- No restrooms for grounds crew or TSA
- No queue space creating hazardous situation at top of escalator (many incidents of injury documented)
- SSCP not TSA compliant and extremely undersized
- Terminal roof exceeding useful life

The Terminal Improvement Program is currently in the process of updating or has completed the update of the issues noted above. The updates of the new terminal program will include the following features:

- New and updated restroom facilities
- New baggage system and airline offices
- Expanded TSA compliant security screening checkpoint with expanded queue
- Automated secure exit corridor
- New escalators
- Upgraded elevator
- New passenger boarding bridges
- Facility generator
- MEP upgrades
- LED lighting throughout
- Public address system upgrades
- Family Restroom, Quiet Room, Nursing Room, Service animal relief area
- Baggage & wheelchair storage
- Additional airside concessions
- Landside concession improvements
- New roof

Due to the Terminal Improvement Program making updates concurrently as the Master Plan analysis, these elements will be incorporated into the design assessment as existing conditions and shown as such in terminal alternatives later in the Master Plan.

3.4.1 Design Passenger Activity Levels

Determining peak hour passenger demand is used to compare terminal facility capacity with current and future demand. This method is done by establishing peak-hour, 30-, and 20-minute enplanement, deplanement, and combined passenger values for all Planning Activity Level (PAL)'s. This is determined by taking a current peak-day flight schedule and applying forecasting methodology discussed in the Forecasting chapter to create realistic future flight schedules for the airport. These peak values, combined with annual enplanement figures, help identify terminal facility requirements needed to provide an ideal level of service for passengers. Three passenger enplanement scenarios were developed from Baseline 2024 values: PAL 1, PAL 2, and PAL 3.

Table 3-19 introduces these scenarios with a breakdown of fleet mix, seats per aircraft type, and peak-hour passenger enplaning and deplaning levels.

Table 3-19:
Design Activity Level

Scenario	Aircraft Type	Passenger Seats	Peak Enplaning Passengers	Peak Deplaning Passengers (Domestic)	Peak Deplaning Passengers (International)
Baseline (2024)	Airbus A319	156	107	176	0
	Embraer 170	65			
	Embraer 145	50			
PAL 1	Airbus A319	156	97	171	7
	Embraer 170	65			
	Cessna Grand Caravan EX	9			
PAL 2	Boeing B737-8 Max	190	114	175	7
	Embraer 170	65			
	Mitsubishi CRJ-700	65			
	Cessna Grand Caravan EX	9			
PAL 3	Boeing B737-8 Max	190	119	227	11
	Embraer 170	65			
	Mitsubishi CRJ-500	50			
	Cessna 408 SkyCourier	14			

Source: RS&H Analysis, 2025

3.4.2 Terminal Area Programming Summary

The terminal building requirements are estimated based on airport terminal planning best practices and recommended methodologies used within the industry. Two reputable industry resources, the International Air Transportation Association (IATA) and the Airport Cooperative Research Program (ACRP), have developed rating systems that discuss recommended practices for determining the level of service (LOS) for passenger terminals. These practices and methodologies used in this evaluation can be found within the following resources:

- Airport Passenger Terminal Planning and Design – Airport Cooperative Research Program Report 25, 2010, Volumes 1 and 2
- IATA Airport Development Reference Manual, 11th Edition, 2023
- Airport Curbside and Terminal Area Roadway Operations – Airport Cooperative Research Program Report 266, 2024

The passenger terminal requirements were determined based on the design hour activity identified in each planning activity level in **Table 3-19** combined with planning parameters to meet a desired LOS. LOS is a benchmark that determines the overall performance of an airport based on passenger comfort, level of delay, and passenger flows. PAL 3 was used to determine the size and area volumes for the passenger terminal that would be sufficient for future airline operations. The terminal sizing is based on standards required to provide an optimum level of service to passengers.

Table 3-20 Outlines the terminal size requirements based on the post renovation of the TIP for each planning activity level broken out by space. Descriptions of each terminal space is defined below. This table also assesses area surplus & deficiencies of the existing terminal through passenger activity levels (PAL) 1-3 to inform how the terminal will operate in the future if existing facility remains unchanged through 2044.

Airline Space: The area used for ticketing/check-in, active and queuing spaces, and airline ticketing offices, baggage storage & airline storage.

Airport Space: The terminal areas used by the airport administration for offices, storage, and operations functions.

Baggage Service: The areas of the terminal used for baggage handling (inbound and outbound), baggage sorting facilities, baggage screening, tug on/off loading, retrieval, and baggage claim.

Building Systems: The areas that are reserved for mechanical, electrical, telecom, and other services that provide the utilities to keep the terminal operational.

Concessions: The areas of the terminal that are leasable to third-party vendors, including food, beverage, retail, and banks/(ATMs).
U.S. Customs and Border Protection (CBP): The areas of the terminal operated by the CBP, including primary inspection space, secondary inspection space, offices, and item search rooms.
Ground Transportation: The areas that are used for car rental, taxi, bus, and ride-sharing counter space, queuing, and offices.
Holdrooms/Gates: The areas of the terminal where passengers wait to board an aircraft, including airline podiums, boarding queues, and other amenities.
Public Space: The area mainly used by the public for circulation and associated functions, including waiting areas for passenger meeting/greeting.
Transportation Security Administration (TSA): The areas of the terminal operated by the TSA, including the Security Screening Checkpoint (SSCP), offices, and screening rooms.
Restrooms: The areas of the terminal with space providing toilets and lavatories for passengers.

Based on the existing terminal areas following TIP implementation, LRD is projected to experience terminal area deficiencies beginning in PAL 1 (2029). These initial shortfalls are anticipated in Airport Space, CBP, and Ground Transportation facilities.

By PAL 2 (2034), these deficiencies are expected to worsen, with Concessions areas also falling below projected demand requirements.

At PAL 3 (2044), the previously identified deficiencies continue to increase in magnitude. In addition, new deficiencies are projected to emerge in Airport Space, Baggage Service, and Restroom facilities by 2044, further highlighting the need for terminal alternatives and enhancements to accommodate future growth.

Table 3-20:
Terminal Building Requirements

Terminal Components	Existing Post TIP (sf)	Forecast				Surplus / (Deficiency) Based on Existing			
		Baseline (2024) (sf)	PAL 1 (sf)	PAL 2 (sf)	PAL 3 (sf)	Base 2024 (sf)	PAL 1 Concept 2029 (sf)	PAL 2 Concept 2034 (sf)	PAL 3 Concept 2044 (sf)
Airline Space	5,862	6,147	4,500	5,300	6,200	1,647	1,362	562	**-338**
Airport Space	9,606	10,488	11,000	11,000	11,000	**-512**	**-1,394**	**-1,394**	**-1,394**
Baggage Service	11,276	11,646	10,500	11,000	12,000	1,146	776	276	**-724**
Building Systems	12,840	12,771	2,500	2,600	2,800	10,211	10,340	10,240	10,040
Concessions	3,182	2,833	3,100	3,500	4,200	**-267**	82	**-318**	**-1,018**
Customs and Border Protection (CBP)	10,685	10,685	14,500	14,500	14,500	**-3,815**	**-3,815**	**-3,815**	**-3,815**
Ground Transportation	1,317	1,317	1,900	2,100	2,600	**-583**	**-583**	**-783**	**-1,283**
Holdrooms/Gates	10,117	10,117	6,600	6,600	6,600	3,517	3,517	3,517	3,517
Public Space	20,653	20,113	8,500	8,900	9,700	11,613	12,153	11,753	10,953
Restrooms	3,313	3,264	3,100	3,300	3,600	164	213	13	**-287**
Transportation Security Administration (TSA)	3,849	3,319	3,000	3,000	3,000	319	849	849	849
Total	**92,700**	**92,700**	**69,700**	**71,300**	**76,200**	**23,440**	**23,500**	**20,900**	**16,500**

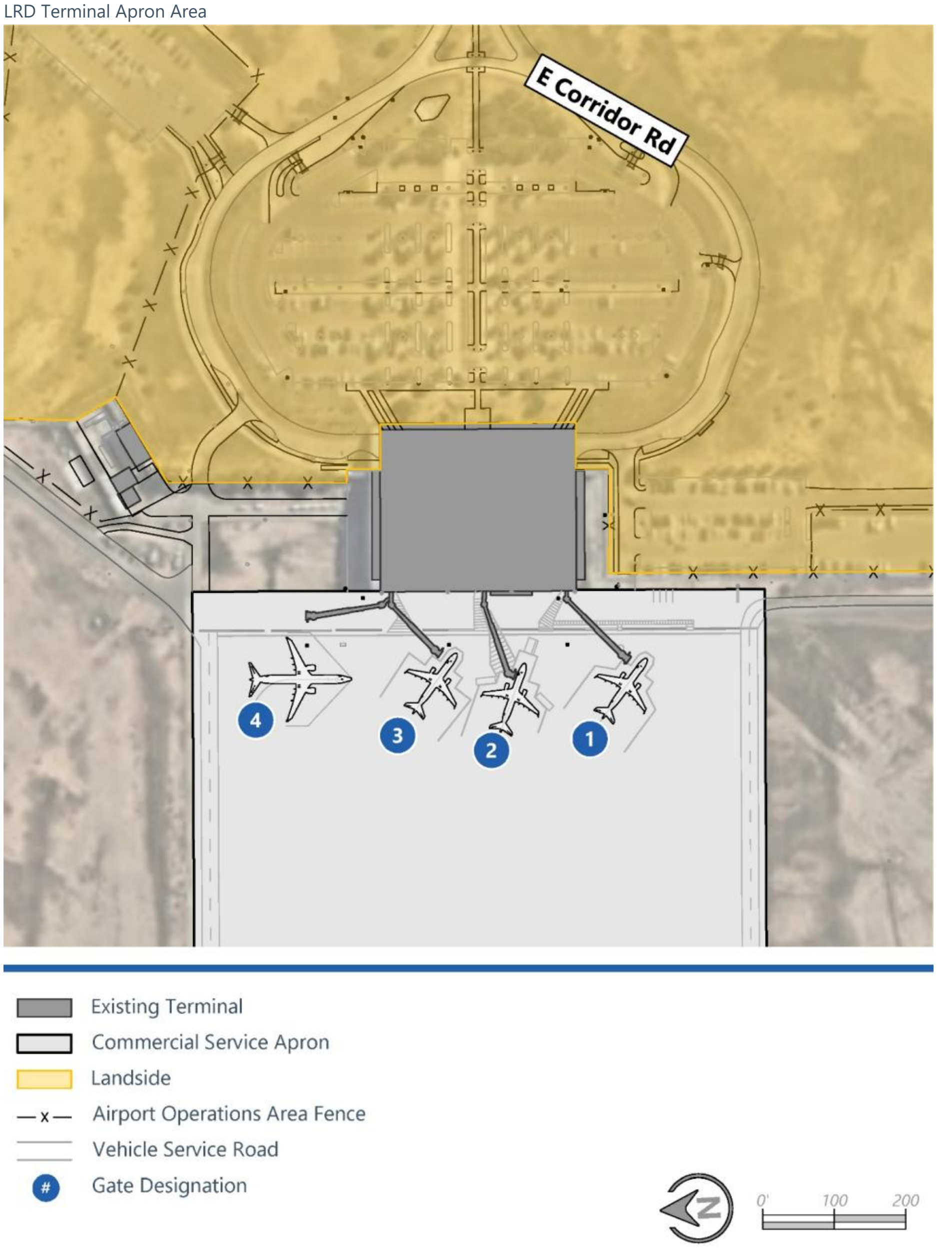
Source: RS&H Analysis, 2026

Commented [AA1]: Needs updating

3.4.3 Airside Components - Terminal Apron and Aircraft Gates

Currently, LRD has a total of four (4) aircraft gates with one accommodating up to an ADG III aircraft, shown in **Figure 3-13.** Analysis of the Design Day Flight Schedule (DDFS) was used to determine the maximum number of commercial service aircraft using the apron at any given point in time. The existing DDFS shows a total of two aircraft on the ground during the Baseline (2024) scenario, increasing to four aircraft during PAL 1 and PAL 2. The PAL 3 schedule showed demand for five aircraft on the ground occurring overnight. PAL 3 introduces the need for five (5) apron parking positions with at least one suitable for an ADG-III Boeing 737-8 MAX. It is recommended the Airport look into the addition of a remain overnight (RON) parking position allowing the Airport to accommodate these aircraft. Additionally, surveys were conducted with the existing airlines to identify issues that cannot be found through analyzing demand. This survey concluded that passenger boarding bridges (PBB) and the lack of pushback options limited their operations. Specifically, Allegiant Airlines does not have an aircraft tug, so the gate they use, Gate 4, has to accommodate their Power-Out operations when departing the gate. The issue of outdated PBBs was addressed during the Terminal Improvement Program. Moreover, a need was identified for reconfiguration and upsizing of the gates to accommodate potential aircraft demand. This need will be further studied in **Chapter 4, Identification and Evaluation of Alternatives.**

Figure 3-13
LRD Terminal Apron Area



Source: RS&H Analysis, 2025

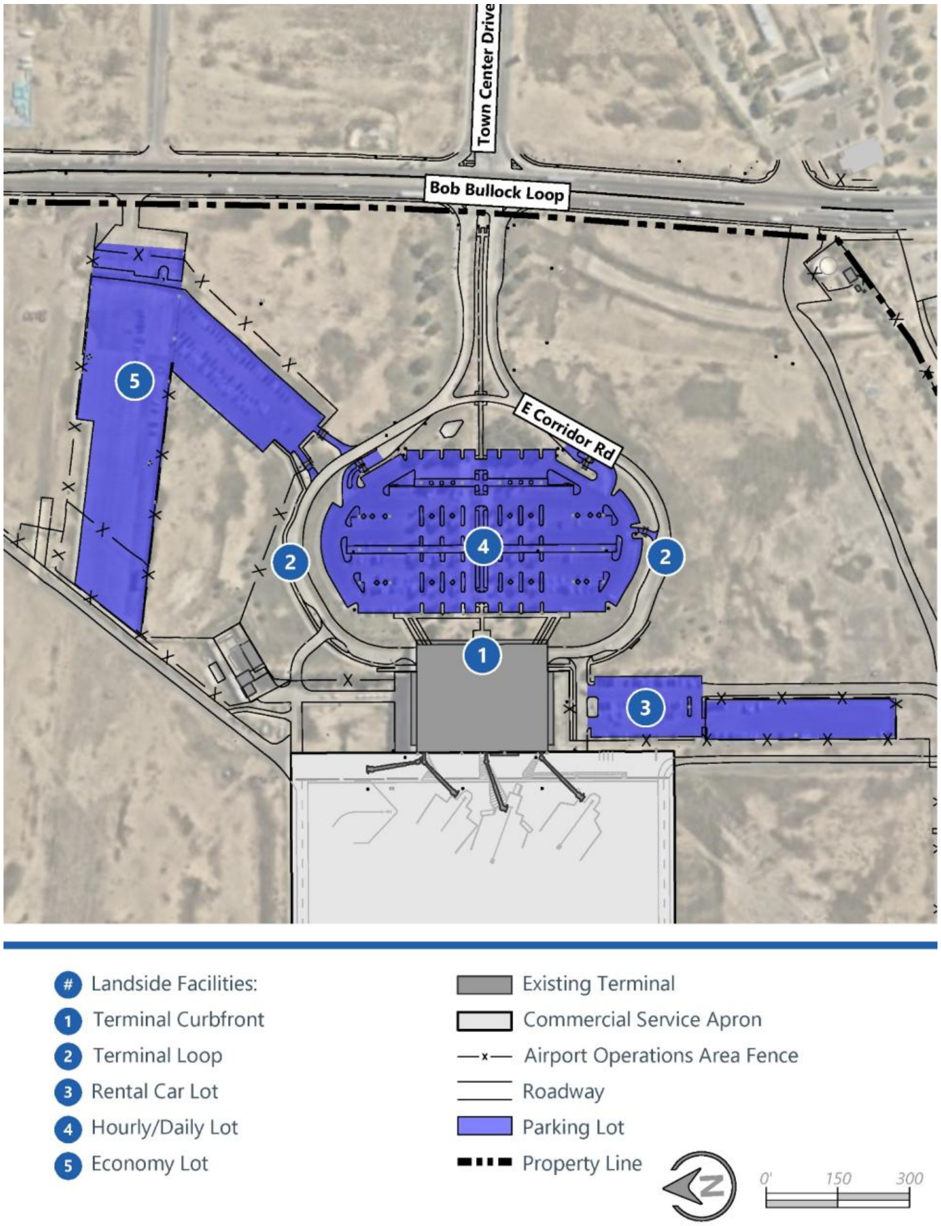
3.5 Landside Components

As described in **Chapter 1, Inventory of Existing Conditions,** the Airport is accessible by a single road that connects all the landside facilities. This allows for easy wayfinding and travel in and out of the Airport. This section covers the analysis done on existing landside facilities and if they can meet future planning requirements.

3.5.1 On-Airport Circulation

The airport access roadway, East Corridor Road, provides access to the passenger terminal, public and employee parking, and rental car facilities from Bob Bullock Loop. Currently, the roadway provides a minimum of two through lanes throughout its entire length. This road provides access to all three surface lots, allows for easy return to the terminal, and some spaces to pull off to wait for passenger arrivals. Along the terminal frontage, the curbfront area consists of three lanes, leaving two for loading/unloading and one for through traffic. This loop provides convenient access for travelers; however, it has been noted that some passengers are parking in the rental car lot and along the curbside for extended periods of time. This has been analyzed and could be improved through wayfinding signage along the circle. Currently, there are no capacity concerns that would be needed to improve on-airport circulation at this time. Error! Reference source not found. shows an aerial view of the landside facilities for LRD.

Figure 3-14
LRD Landside Facilities



Source: RS&H Analysis, 2025

3.5.2 Terminal Curbfront

The terminal curbfront provides passenger drop-off and pick-up locations in front of the passenger terminal for private and commercial vehicles. Curbfront requirements were calculated using the methodology provided by ACRP 266, *Airport Curbside and Terminal Area Roadway Operations: New Analysis and Strategies,* Second Edition, 2024.

Based on passenger data from the airport, it is estimated that approximately 58 percent of airport users access the curb by vehicle modes such as private vehicles, shuttles, public transportation, etc., while approximately 42 percent use the rental car return lot or the public parking lots. Given that there is 270 feet of existing curb with allowable double parking, the available curb length would increase to 540 feet of existing curb. Shown in **Table 3-21**, the existing curb is projected to be adequate to accommodate anticipated demand throughout the planning period.

Table 3-21:
Terminal Curb Requirements

Terminal Curb	Existing Conditions	Baseline 2025	PAL 1 2029	PAL 2 2034	PAL 3 2044
Total Curb Length Requirement (ft)	540	280	280	280	305
Surplus / (Deficit) (ft)	-	260	260	260	235

Source: RS&H Analysis, 2025

3.5.3 Vehicle Parking

LRD offers two public parking options, an Economy Lot and a Daily/Hourly Lot. The Airport also has a Rental Car Lot for its rental car tenants. Approximately 42 percent of airport users access these parking lots daily. The evaluation of parking at the Airport concentrated on two areas: passenger parking and rental car parking, both of which are located on airport property. Other parking facilities such as cargo tenants, Fixed-Base Operator (FBO), and other aeronautical/non-aeronautical tenants were not evaluated as their needs are guided by each tenant separately.

3.5.5.1 Passenger Parking

Data for passenger parking lots was obtained from the Airport's third-party contractor, TIBA Parking Systems. Data was given in daily occupancy reports for both lots, therefore passenger parking requirements were evaluated as a combined parking study. Since there is no employee parking lot, employees are guided to park in either passenger parking lot. Assuming one third of the employees are on site at any one time, this evaluation assumes as the Airport grows the employees will grow at the same rate as demand. Since employee parking is free, daily revenue reports were not considered in this evaluation. The Airport has a total of 896 parking spaces, which is sufficient for their existing demand. As shown in **Table 3-22,** the analysis determined no anticipated deficit in parking spaces through PAL 3.

Table 3-22:
Passenger Parking Requirements

Passenger Parking Facility	Existing Conditions	Baseline 2025	PAL 1 2029	PAL 2 2034	PAL 3 2044
Passenger Parking Capacity (spaces)	896	349	452	505	614
Passenger Parking Surplus / (Deficit)	-	547	444	391	282

Source: RS&H Analysis, 2025

3.5.5.2 Car Rental Parking

LRD rental car companies lease out a singular parking lot with an unassigned parking lot for vehicle storage attached. The ready-return area has a total of 104 spaces while the storage lot has an extra 88 vehicle spaces. Each company has their own Quick Turnaround (QTA) facility located off site. This analysis included surveys from current companies who are leasing space to determine the need as well as passenger demand. Tenant surveys have discovered that the rental car companies are near capacity for their ready-return spots. There have also been concerns about long turnaround times as there is no QTA facility on site. **Table 3-23** provides the rental car ready/return parking space requirements for the planning period**.** Assuming the existing 88 extra storage spaces can be converted to ready/return parking, the existing rental car lot is adequate until the end of PAL 3. Landside alternatives should anticipate providing additional expansion capability of the ready/return lot, and the potential provision of a QTA facility and overflow parking storage for the rental car companies in the vicinity of the rental car lot. It should be noted that PAL 2 Terminal Alternate includes a 60' addition to the South of the existing terminal. This will likely impact rental car parking. Minor roadway/sidewalk modifications may need to be addressed to maintain proper vehicular access and pedestrian circulation. If car rental parking spaces are removed to accommodate the southern addition, they should be replaced to maintain parking surplus seen below.

Table 3-23:
Rental Car Parking Requirements

Rental Car Parking Facility	Existing Conditions	Baseline 2025	PAL 1 2029	PAL 2 2034	PAL 3 2044
Rental Car Parking (Spaces)	192	118	146	163	198
Rental Car Parking Surplus / (Deficit)	-	74	46	29	-6

Source: RS&H Analysis, 2025

3.5.5.3 Electric Vehicle Charging Stations

Currently, the Airport does not have any dedicated electric vehicle (EV) charging station. According to the Airport Cooperative Research Program, Synthesis 64, *Electric Vehicle Charging Stations at Airport Parking Facilities* (2014), the demand depends on geographical region; however, changes in the industry are leaning towards more EV dedicated parking spaces. Current rental car tenants do not store EVs on property. It is recommended that the Airport develop a plan to include the addition of EVs dedicated charging spaces as the trend continues to grow. As the Airport will not need an increase in parking capacity through the planning period, converting a few existing parking spaces with EV charging stations could encourage the use of EVs while supporting the Airport's sustainability goals.

3.6 General Aviation

General aviation includes all aviation activity outside of those air carriers that operate under Part 121, Part 129, Part 135, or Part 291 of Chapter 14 of the Code of Federal Regulations. General aviation facility requirements include aircraft storage areas (tie-downs and hangars), apron space, building support space for operations and maintenance, fueling, and ground support equipment storage areas. General aviation facility requirements include the based and transient general aviation aircraft operating at LRD.

General aviation facilities at LRD are primarily located on the west side of the airfield, commonly referred to as the Cargo-General Aviation Apron. The Airport's general aviation facilities include two FBOs, maintenance repair overhaul shops, air taxi, and medevac providers. The general aviation facilities at the Airport are depicted in **Figure 3-15**. General aviation facility requirements were determined for based aircraft parking and hangar storage areas.

Figure 3-15
LRD General Aviation Facilities

Source: RS&H Analysis, 2025

3.6.1 Based Aircraft Parking and Storage

Aircraft parking and storage demand is driven by many varied factors, making it crucial to understand and evaluate the associated variables such as type and number of hangars available, weather conditions, and use-case for the parking areas. Future growth predictions in **Chapter 2, Forecast of Aviation Activity**, allow us to see the increase in parking demand by based aircraft type. **Table 3-2** illustrates the growth of based aircraft by type. Based aircraft count is expected to remain at 71 aircraft during the planning period.

To understand the based aircraft requirements, the following will define general terms to help with understanding the different hangar and parking options.

- Tie-downs: located in the open on an apron, tie-down spots allow small GA aircraft to park in a more affordable manner, however they are open to the elements. A tie-down spot is generally an area set aside for parking small aircraft and using ropes from anchor spots to secure the aircraft.

- T-hangars: smaller hangers with alternating parking directions to maximize use of space. Primarily single-engine and small multi-engine aircraft are stored in this type of hangar.

- Conventional (Box) hangars: larger, rectangular hangers with the ability to house more than one small aircraft or a singular large aircraft such as a business jet or multi-engine. Its size can range from 5,000 to 30,000 square feet. Due to the larger nature of aircraft stored in these hangars, additional space and safety buffers are needed for safe movement outside of the hangar itself.

LRD does not have any T-hangars and does not intend to plan for them in future development; therefore, T-hangar demand was not included in the analysis. All hangars on-airport fall between 5,000 to 30,000 square feet; therefore, the based aircraft parking and storage analysis will consider tie-down and conventional (box) hangar demand only.

3.6.5.1 Tie-Downs

The Airport currently has 20 tie-down positions available today for single and multi-engine aircraft. From field observations and discussions with tenants it was determined 70% of single-engine piston based aircraft (13 aircraft), 40% of multi-engine piston based aircraft (3), and 20% of jet based aircraft (3) are stored on a tie-down. A total of 19 based aircraft were factored into this analysis and resulted in the existing tie-downs being found to be sufficient for future needs. **Table 3-24** summarizes the facility requirement analysis for tie-downs for each of the planning activity levels.

Table 3-24:
Based Aircraft Tie-Down Requirements

	Existing Capacity	Baseline (2024)	Planning Activity Level		
			PAL 1	PAL 2	PAL 3
Tie-Downs (Units)	20	20	20	20	20
Tie-Down Demand (Units)		19	19	19	19
Tie-Down Surplus / (Deficit)		**1**	**1**	**1**	**1**

Source: Airport records, RS&H Analysis, 2025

3.6.5.2 Based Aircraft Hangar Storage

A greater proportion of based aircraft demand hangar space for long-term storage than tie-down storage. Hangar areas include aircraft storage, aircraft maintenance equipment storage, and general storage. In determining based aircraft hangar storage requirements, it was assumed 30% of single-engine piston based aircraft (5 aircraft), 60% of multi-engine based aircraft (4), 80% of jet based aircraft (14 aircraft), all helicopters, and all ultralight/VTOL aircraft will be stored in a hangar during the planning period.

Planning factors for the aircraft parking in hangar areas are as follows:

- Single-engine piston 2,900 SF
- Multi-Engine (Piston and Turbine) 3,200 SF
- Jet 3,900 SF
- Helicopter 2,250 SF
- Ultralight/VTOL 2,250 SF

The space planning factors are based on representative aircraft operating at LRD. The forecasted number of based aircraft is multiplied by the corresponding planning factor to determine the hangar storage space requirements.

Support space needed for based aircraft was estimated from the proportion of hangar space dedicated to aircraft storage and support space. A planning factor of 25% of the total hangar space was used to determine support space requirements while the remaining 75% was allocated for aircraft parking requirements. The existing hangar storage at LRD is indicated in **Table 3-25**.

Table 3-25:
Based Aircraft Hangars

TENANT(S)	SIZE (SF)
Barker FBO	36,316
Lone Star Aviation	5,888
Laredo National Bank	33,199
USBP	20,000
Signature FBO	23,418
IBOC	20,000
Airevac	26,000
Jett Racing	30,000
Jett Racing	19,200
Total	**214,021**

Source: RS&H Analysis, 2025

The analysis, as shown in **Table 3-26**, indicates the current aircraft storage hangar area is sufficient for the planning period demand.

Table 3-26:
Based Aircraft Hangar Storage Requirements

	Existing	Baseline	PAL 1	PAL 2	PAL 3
Aircraft Hangar Area (sf)	160,500	138,200	147,200	147,200	147,200
Support Space Area (sf)	53,500	34,550	36,800	36,800	36,800
Total Aircraft Hangar Area Required (sf)	214,100	172,750	184,000	184,000	184,000
Total Aircraft Hangar Area Surplus/(Deficit)		**29,800**	**30,000**	**30,000**	**30,000**

Source: Airport records, RS&H Analysis, 2025

3.6.2 Transient Aircraft Parking Apron

Transient apron requirements were calculated by applying a utilization rate to the forecasted number of operations. The utilization rate is estimated based on the total existing apron area compared to the Base PAL average day peak month operations, previously identified as December 2024 with 10 percent of operations of the year. The total existing apron space for all general aviation facilities is 77,000 square yards as depicted in Error! Reference source not found. For transient aircraft, consideration must be made for the aircraft parking area and circulation areas. Based on the current level of operations during the average day of the peak month, the current utilization rate is calculated per aircraft type. The current utilization rate was applied to the forecasted average day peak month general aviation aircraft operations to determine the total based and transient

apron requirements for the PALs. From review of historical operations an assumption of 50 percent of itinerant operations would be on the ground during the peak period of the average day of the month (PMAD). The peak period of transient operations resulted in 30 aircraft in PAL 1,
33 aircraft in PAL 2, and 41 aircraft in PAL 3.

The transient fleet mix was determined based on Vector and FAA OPSNET data from the past year. Transient aircraft type breakdown for LRD is as follows:

- Single Engine – 25 percent
- Multi Engine (Piston and Turbine) – 25 percent
- Jet – 48 percent
- Helicopters – 2 percent

The analysis for transient apron requirements is summarized in **Table 3-27** indicates GA apron space is sufficient and is expected to meet the demand over the planning period.

Table 3-27
Based Aircraft Hangar Storage Requirements

	Required Space Per Aircraft	Existing Space	Base Year	PAL 1	PAL 2	PAL 3
Transient Aircraft						
Single Engine			7	7	8	10
Multi Engine			7	8	9	11
Jet Aircraft			12	14	15	19
Helicopter			1	1	1	1
Peak Period Aircraft			**27**	**30**	**33**	**41**
Single Engine Parking	324		2,300	2,300	2,600	3,200
Multi Engine Parking	360		2,500	2,900	3,200	4,000
Jet Aircraft Parking	430		5,200	6,000	6,500	8,200
Helicopter Parking	300		300	300	300	300
Parking Area Required (SY)			10,300	11,500	12,600	15,700
Circulation Area Required (SY)			4,100	4,600	5,000	6,300
Total Apron Area Required (SY)		77,000	14,400	16,100	17,600	22,000
Total Apron Area Surplus/(Deficit)			**62,600**	**60,900**	**59,400**	**55,000**

Source: Airport records, RS&H Analysis, 2025
Note: A circulation area factor of 40 percent was assumed for this analysis.

Existing GA tenants were also interviewed to gain insight into what the airport could improve for their apron. The main concerns included maintaining the GA apron pavement as well as considering the addition of a Taxilane connecting to Taxiway E to standardize the flow of traffic. This will be analyzed in **Chapter 4, Identification and Evaluation of Alternatives**.

3.7 Support Facilities Requirements

Support facilities at an airport encompass a broad set of functions that exist to ensure the airport can fulfill its primary role and mission in a safe and operationally efficient manner. The following sections detail the requirements and specifications for various support facilities.

3.7.1 Air Traffic Control Tower (ATCT)

The ATCT is located on the west side of the Airport along Maher Road reaching a height of 95 feet above ground level (AGL). This location strategically allows for required visibility for the controllers. ATCT controllers were interviewed and stated that the current ATCT has unrestricted sight to critical areas of the airfield and is assumed to be adequate through the planning period.

3.7.2 Aircraft Fuel Storage

The Airport contains several fuel storage facilities. At the Northeast Fuel Farm, there is one above-ground tank with a 12,000-gallon capacity designated for Jet-A fuel. The Southwest Fuel Farm includes a combination of above ground and underground tanks. Aero Center operates three above-ground tanks with capacities of 20,000 gallons each for Jet-A, two additional tanks with 15,000-gallon capacities each for Jet-A, and one 10,000-gallon tank for Avgas. AltAir Aviation operates two above-ground tanks with 15,000-gallon capacities for Jet-A fuel. Barker Ground Services, Inc., manages one 12,000-gallon above-ground tank for Jet-A fuel and another 12,000-gallon tank for Avgas. Sanchez Oil and Gas operates one underground tank with a 10,000-gallon capacity for Jet-A fuel. An analysis on future aircraft fuel storage was not evaluated as fuel operators did not provide sufficient information on usage. Therefore, aircraft fuel storage will not be further analyzed unless requested by the Airport.

3.7.3 Airport Maintenance Facilities

LRD's maintenance building occupies 7,500 square feet on the northwest corner of the General/Cargo apron at the Hillside Road and Maher Avenue intersection. The maintenance building stores groundskeeping equipment, airfield maintenance vehicles, and fuel tanks for refueling the on-site airport vehicles and machinery. Airport maintenance facilities were found to be sufficient by interviewing airport personnel.

3.7.4 Aircraft Rescue and Firefighting

The Aircraft Rescue and Firefighting (ARFF) Division consists of nine (9) personnel: three (3) Captains, three (3) Drivers, three (3) Firefighters, and one (1) Training Coordinator. Per 14 CFR Part 139.315 *Aircraft Rescue and Firefighting: Index Determination*, LRD is classified as an Index B Airport. Index B applies to airports with 5 or more average daily air carrier operations from aircraft at least 90 feet but less than 126 feet in length. The Airport currently has two (2) trucks with water capacity of 3,000 gallons each. The ARFF station is located on the east side of the airfield, south of the passenger terminal apron allowing for quick airfield access via Taxiway J. The ARFF station's current equipment and airfield access is sufficient for the planning period.

3.7.5 Advanced Air Mobility (AAM) and Urban Air Mobility

Although LRD does not currently have a formal plan for Advanced Air Mobility (AAM) or Urban Air Mobility (UAM), airport leadership has expressed an openness to exploring future opportunities. As the industry evolves, LRD is interested in staying informed and considering how the airport may support technologies such as electric vertical takeoff and landing (eVTOL) aircraft and other advanced aerial systems.

At the state level, the Texas Department of Transportation (TxDOT) is taking proactive steps to prepare for AAM integration. Through the 2024 Advanced Air Mobility Advisory Committee Final Report[6], TxDOT outlines a framework to support statewide readiness, which includes encouraging early-stage planning, identifying potential vertiport locations, and coordinating with regional partners. The report also emphasizes the importance of public engagement and data-driven decision-making to support safe and effective AAM deployment.

While detailed AAM planning is outside the current scope of this document, continued awareness of TxDOT and FAA initiatives, such as the FAA's Innovate28 Implementation Plan, will help ensure LRD is well-positioned to accommodate this emerging mode of transportation as interest and feasibility grow.

3.7.5.1 FAA Guidance

Updated in December 2024, the FAA released Engineering Brief 105A, *Vertiport Design*, which provides guidance on planning for vertiports for eVTOL aircraft. As eVTOL technology forms the backbone of UAM and AAM initiatives, this brief is an early

[6] https://www.txdot.gov/content/dam/docs/aviation/aama/aam-committee-final-report-2024.pdf

framework for developing infrastructure that could enable the growth of these air transportation systems. The brief emphasizes that, due to insufficient validated performance data for eVTOL aircraft at the time of publication, the FAA is adopting a "prescriptive and conservative approach" in its recommendations regarding vertiport design and pad location.

Table 3-28, adapted from Engineering Brief 105A, outlines the specifications for the reference aircraft used to determine eVOTL pad space requirements for the purposes of this Master Plan.

Table 3-28:
eVTOL Design Characteristics

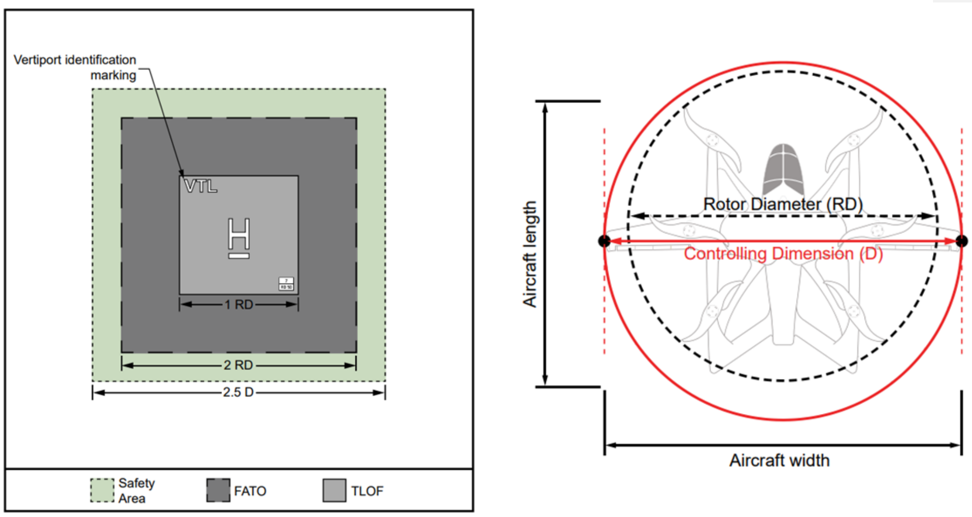
Design Characteristics	Criteria
Propulsion	Electric battery driven, Utilizing distributed electric propulsion
Propulsive Units	2 or more
Battery Systems	2 or more
Maximum Takeoff Weight	12,500 lbs. or less
Aircraft Length	50 feet or less
Aircraft Width	50 feet or less

Source: Engineering Brief 105A, FAA, 2024

The controlling dimensions of eVTOL aircraft are defined as the length and width, specifically the diameter of the smallest circle that can enclose the aircraft's projection on a horizontal plane during takeoff or landing, with rotors or propellers in motion if applicable. The design and geometry of a vertiport are based on the Touchdown and Liftoff (TLOF)[7] area, Final Approach and Takeoff (FATO)[8] area, and Safety Area (SA).[9] **Figure 3-18** illustrates these controlling dimensions and the spatial relationships between TLOF, FATO, and Safety Area.

[7] Touchdown and Liftoff (TLOF) = A load bearing, generally paved area centered in the FATO, on which the aircraft performs a touchdown or liftoff.
[8] Final Approach and Takeoff (FATO) area = A load-bearing area over which the aircraft completes the final phase of the approach, to a hover or a landing, and from which the aircraft initiates takeoff.
[9] Safety Area = A defined area surrounding the FATO intended to reduce the risk of damage to aircraft accidentally diverging from the FATO.

Figure 3-16:
Controlling Dimensions for Planning



Note: "D" is equal to the diameter of the smallest circle enclosing the VTOL aircraft projection on a horizontal plane, while the aircraft is in the takeoff or landing configuration, with rotors/propellers turning, if applicable.
Source: Adapted by RS&H from Engineering Brief 105A

Engineering Brief 105A also includes guidance on the recommended separation distances between vertiports and runways. For VFR operations, the brief outlines the minimum recommended distance between a vertiport's FATO center and the runway centerline to ensure safe operations. However, the document does not provide specific recommendations for IFR operations. **Table 3-29** shows these VFR separation distances for planning purposes.

Table 3-29:
eVTOL VFR Operations

Airplane Size	Distance from Vertiport FATO Center to Runway Centerline
Small Airplane (12,500 lbs or less)	300 feet
Large Airplane (12,500-300,000 lbs)	500 feet
Heavy Airplane (Over 300,000 lbs)	700 feet

Source: Engineering Brief 105A, FAA, 2024

Although the future of AAM development at LRD is uncertain, it is recommended that LRD start planning for AAM infrastructure, including space for future vertiport facilities and necessary utility infrastructure to support battery charging and computer peripherals. Based on current AAM aircraft designs and space requirements, a typical vertiport is expected to need around 20,000 square feet. AAM infrastructure and possible locations will be evaluated further in **Chapter 4.**

3.8 Utility Capacity and Requirements

The following sections will discuss the demand of utilities over the planning period.

3.8.1 Water and Sanitary Sewer

The Airport currently sources its raw water from the Rio Grande River which is then processed at two water treatment facilities. The Jefferson Water Treatment Plant can provide 65 million gallons per day (MGD) and the EL Pico Water Treatment Plant can accommodate 20 MGD for a combined capacity of 85 MGD.

LRD's sewer system is interlinked within the city of Laredo's wastewater infrastructure. The city's sewer system spans over 520 miles. Both water and the sewer system were evaluated as sufficient for the planning period.

3.8.2 Natural Gas

The Airport uses Laredo's City Public Service (CPS) for its additional energy needs. CPS has expended its facilities to increase availability and reliability of natural gas to the Airport and other customers. This helps avoid low quantity during peak times. During the course of this study there will not be an appreciable increase in gas demand leading to no further evaluation.

3.8.3 Electric Power

LRD currently receives its electrical power from the city's power distribution lines provided by the Texas Utility Company (TXU). The addition of electric aircraft at the airfield or an increase in the need for vehicle charging stations will necessitate an increase in electric load. However, the demand for eVTOLs and EVs has not been defined, so no specific estimate of electrical demand can be presented currently.

3.8.4 Telephone/Communications

The airport uses a range of communication technologies for it to ensure safe operations and provide access to customers and tenants. LRD uses radio frequencies for air traffic control to pilot communication along with weather reports. Phone and internet providers allow the Airport to stay connected and give the public the ability to access the internet as well. The Airport's communications infrastructure is sufficient for the planning period.

3.9 Facility Requirements Summary

The Facility Requirements analysis identifies areas at the airport that need to be addressed based on the forecasted demand, the critical aircraft, and other triggering events. The following chapter, **Chapter 4, Alternatives Evaluation** will develop options to address the areas identified in this chapter. **Table 3-30** provides a summary of the requirements and recommendations determined in this study for LRD.

Table 3-30:
Facility Requirements Summary

Element	Description of Need and/or Recommendation
Airfield	
Runways	
Geometric and Separation Standards	
Shoulder Width	Construct standard-width shoulder along the entire length of each runway
Blast Pad	Expand paved blast pads for 18R-36L and install paved blast pads for 14-32 and 18L-36R
Runway Object Free Area (ROFA)	Consider relocating vehicle service road or removing it from being situated in the ROFA south of Runway 18L-36R
Runway Protection Zones (RPZs)	Several incompatible land uses found under RPZs, it is recommended that LRD controls lands under RPZ
Taxiways	
Geometric and Separation Standards	Install standard shoulder width along the entirety of each taxiway on each side
Non-standard Conditions and Hot Spots	Five non-standard conditions were identified and should be investigated for modification in the long-term airfield planning period
Centerline Realignment	Taxiway L centerline marking east of Runway 18L will need to be realigned to coincide with Taxiway L west of Runway 18L through Runway 18R. Additional Taxiway pavement will be required.
Navigational Aids and Lighting	
Visual and Electronic Aids	Recommend changing Runway 14-32 VASI lighting system to the modern PAPI system
Air Cargo	
Air Cargo Facilities	Considering the growth and significance of cargo operations, airport land existing near current cargo aprons should be preserved for the future demand for apron area
Landside	
Passenger Terminal and Apron	Analysis shows the need for future space for baggage services, concessions, CBP, ground transportation, restrooms, airlines spaces, building systems, and gates. Consider reallocating surplus terminal area and expanding the terminal with additions, as well as reconfiguring the gate apron area to accommodate larger aircraft. Addition of 1 PBB is recommended by PAL 3. PBBs are at their useful life, and it is recommended they be replaced with PBBs that can accommodate an ADG 3 Aircraft. Remain overnight (RON) parking spaces should also be considered, allowing the Airport to accommodate these aircraft.
On-Airport Circulation	Consider investing in more way-finding signage for the airport loop
Rental Car Parking	Consider a QTA facility or an expansion of current ready/return spaces. Deficient by 6 spaces in PAL 3
General Aviation	
Based Aircraft Parking and Storage	Based Aircraft Parking and Storage is sufficient for the planning period
Transient Aircraft Parking Apron	Transient Aircraft Parking is sufficient for the planning period

Element	Description of Need and/or Recommendation
Support Facilities	
Air Traffic Control Tower (ATCT)	The ATCT is in fair condition and is sufficient for the planning period
Aircraft Fuel Storage	Aircraft fuel storage has not been evaluated due to insufficient data received
Airport Maintenance Facilities	Airport maintenance facilities have been identified as sufficient for the planning period
Aircraft Rescue and Firefighting (ARFF)	ARFF facilities have been identified as sufficient for the planning period
Advanced Air Mobility (AAM) and Urban Air Mobility (UAM)	Evaluate possible locations for AAM and UAM infrastructure for eVTOL readiness
Utilities	Addition of eVTOLs and EVs might cause an increase of demand for electricity

Source: RS&H Analysis, 2025